Die Spiele

Volume 2

The constructions

Olympic Village Architects: Heinle, Wischer and Associates, Stuttgart/Munich (Total Planning) Ludwig, Wiegand, Zuleger, Munich

(Men's Olympic Village) Eckert, and Wirsing, Munich (Women's Olympic Village) Heinle, Wischer and Associates

(Olympic Village Center, the School and the Childrens' Day Care) Christ and Karg, Munich (Church and Community Center) (Outdoor Facilities) Miller and Luz, Stuttgart



Layout diagram

Street level

- 1 Moosacher Strasse 2 Lerchenauer Strasse 3 Strassberger Strasse 4 Thouwi Weg 5 Nadi Strasse 6 Helene-Mayer-Ring 7 Connollystrasse 8 Subway and bus station
- P1 Open air parking lot P2 Roofed-over parking places







Munich used an important argument in its application for the 1972 Olympic Games, namely, the advantage of having the athletes' and assistants' quarters in direct proximity to the contest sites. The Olympic Village had to offer accommodations for 7,000 persons on eighty hectares of land. It was to include the facilities necessary for its temporary function and to be a residential area in a convenient location after the Games were over.

Although during the primary planning stages approximately 10,000 athletes (1,800 women and 8,200 men) were expected, it turned out that actually 12,000 athletes, trainers, and assistants stayed in the settlement near the Olympic Park.

In March, 1968, the Olympic Construction Company, following a decision of the supervisory board, awarded the contract for the entire Oberwiesenfeld to the winner of the third prize. The designing of a section of the Village was entrusted to Eckert and Wirsing. These architects had contracts to design student apartments at Oberwiesenfeld even before Munich applied for the Olympics. This section was the Women's Village during the Games.

The concept of architects Behnisch and Associates was the basis of the designs for the Olympic buildings at Oberwiesenfeld. The final area and building program envisioned 5,000 apartments to house 10,000 persons after the Olympics. This apartment building program was supplemented by infrastructure measures because of the wide differences in pre- and post-Olympic requirements. This demanded thorough consideration during the important design stage.





In order to carry out their urban planning and architectural concepts, the planners decided to apply the "process of optimation", a method frequently used in engineering to find the best possible solution of a given task. This was the first time for this procedure to be used in architecture in the contest of a project of such magnitude.

Sharing in this part of the work were Gordon Ludwig, Franz Raab, Gert Wiegand, and Wolf Zuleger of Munich as independent architects of equal rank and winners of one of the four fourth prizes in the

"Oberwiesenfeld Architectural Competition".

Either alone or in groups, 22 architects were competing in the first stages of the "optimation process". They designed fiftyseven architectural proposals in a scale of 1:500. By eliminating the less suitable designs in three successive steps the final design concept was developed with the cooperation of the participants and seventeen special advisors. The fifty-seven proposals were reduced to twenty, then to seven, and then to three well thought-out concepts which finally resulted in the solution. This final concept stood up to the criticism of the expert advisors in regard to living quality, room layout, daylight, hygiene, sound conditioning as well as in relation to sociological conditions, building codes, ecology, green zones, traffic patterns, urban planning and general considerations of landscaping.





A central area with highrises as tall as twenty stories is located on Lerchenauer Strasse, the eastern boundary of Oberwiesenfeld. Two lengthy buildings are placed parallel to each other on a northsouth axis, and are complemented by an administration building placed perpendicularly to this axis. Three tracts of terraced houses with seven to fourteen stories each extend out of this center on an east-west axis toward the south. In front of these there are terraced houses of three to five stories' height and in front of these there are semidetached houses of one to three stories. In

the south this village ends in rows of twostoried bungalows (ground floor with set-back upper level). Pedestrian and vehicular traffic are separated on two levels. The green zones stretch from Olympic Park through the free area between the three tracts all the way to the center. The three tracts with their terraced houses served as the Men's Olympic Village. The women athletes were housed in the terraced highrise to the south and in the bungalows. The northern highrise offered apartments, a hotel, a row of stores, and a medical center.

One of the difficulties in allocating the various apartments was the diversity in the size of the various competing teams. Since the apartments were conceived to be used after the Olympics, the athletes and their coaches had to be satisfactorily housed in apartments ranging from one to six rooms in size. Each apartment also has a balcony with flower boxes.

Indoor swimming-pools, some of them complemented by saunas on the upper story, are located in the middle of each tract.









A great variety of follow-up structures is necessary for such a city unit that includes 4,728 apartments for 12,000 sportsmen from 122 nations. It was only in this way that such a city of this size could be filled with life during the Olympic Games.

The administration building was located at the main entrance, in the immediate vicinity of the subway and bus stations. The mayor of the Village and his staff worked here during the Games. Immediately upon entering the very heart of the Village the buildings open out

heart of the Village the buildings open out onto a plaza.

While the cafeteria was located south of the plaza the row of stores started to the right of the foot of the extensive highrise. When the Village was occupied by athletes, it seemed like an oriental bazaar. If one could speak of any place of contact, it was here.

could speak of any place of contact, it was here. Roughly half-way down the shopping mall a covered walkway branches off, leading to the adjacent entertainment center. The versatility of this center becomes obvious from the following list: grouped around a wide hall for idling and walking were TV rooms, a reading room, a room for playing checkers and other games, a discotheque, the post office of the Olympic Village, a record bar, a sound tape studio for classic music, a billiard room, a ping-pong hall, a hall with coin-operated games, a theater seating 200 spectators. Some of these installations extend through two stories. The variety of available rooms was matched by a rich program which ran the whole gamut from music and theater performances of high artistic value to light entertainment. Films from twenty-four countries were shown in the Village movie theater.

The center was converted into an elementary school and a children's day care center after the Games. The auditorium of the theater hall, for example, now serves as a gymnastics hall and the stage area is used as a calisthenics hall.

At its end the shopping mall opens onto another plaza — the second place for meetings and communication. This is the location of the church center which unites the two big Christian denominations as well as — in adjoining worship halls — the Jewish and Islamic faiths under one roof. In the open area around the Village center the athletes were able to spend their leisure time in the yards of the future school where they could play ping-pong, minigolf, garden chess, the mill and checkers. The total installation was complemented by playgrounds, fashioned in accordance with modern design concepts, and by water pools, lawns and zones of rest. All of the facilities were supposed to promote human contact among all athletes according to the ideals of the founders of the Olympic Games. Those who experienced the Olympic Village during the Games will testify that the facilities built were in harmony with this ideal.



















The Olympic Village is advantageously situated in relation to Munich's streets and traffic patterns. At two places, individual traffic flows in and out of Lerchenauer Strasse at the same level. Visitors and residents reach the parking spaces nearest their apartments by this drive-in system. In addition, a three-story parking house has been erected east of the highrise tract of the Village center.

By stairs or elevators residents reach the traffic-free pedestrian level and the apartments situated on the upper stories of the terraced houses. A service drive and an emergency access are located at Moosacher Strasse. Within the Village, motor roads extend underneath the shopping mall and under each tract so that there are practically a connecting street parallel to Lerchenauer Strasse and three branch streets with U-turn loops at the western boundary of the Olympic Village. The same system is used one level higher in the pedestrian area. Sidewalks extend from the shopping mall between the terraced houses and the green area. The connection to the public paths in Olympic Park will be made over the Kusoczinskidamm which runs north and south. An inside passage, which is also usable as a street, extends from the Village through an underpass in the Kusoczinskidamm directly into the Central University Sports fields. During the Olympics this way was reserved for Village residents. The contest and training areas which were located outside of Oberwiesenfeld were served from an internal bus station which was temporarily situated at the main entrance. Public transportation, i.e. the bus and subway stations at Lerchenauer Strasse and the rapid transit system at the western outskirts of Olympic Park, can be reached conveniently on foot. For post-Olympic use, subway and buses are the most important means of public transportation.















The median guidelines created by Hans Hollein of Vienna improved orientation in the pedestrian zone. These guidelines consisted of lengths of tubing on supports, which branched out to the different living areas. An easily remembered color from the Olympic spectrum was chosen for each tract. Simultaneously, these tubes served as conduits for lighting and public address systems and were so set up that bulletin boards and display panels could be hung upon them wherever needed. Plazas and streets were named in memory of deceased Olympic champions. The same street names and color symbols were used also at the motor traffic level below the pedestrian zone.











Section/direct view

- Entrance, vestibule "Wet cell" Wash basin
- 3
- Toilet Shower

- Closet and book case Terrace, facade, sleeping and study area, upper level



Rooms in the Women's Village, Level Area Floor Plan/ View from Above

- Part of the living area on the ground floor
 Sleeping and study area on the upper level
 Free steps

- Entrance, vestibule
- 4 Entrance, vestibule5 Closet and book case



6 Prefab "wet cell" with wash basin, shower and

electric stove, refrigera-tor, sink and cabinet

toilet 7 Kitchenette with



The Women's Olympic Village to the south consists of a nineteen-story highrise with 800 apartments, a bungalow area with 800 more apartments, 118 apartments for mar-ried students and employees, and a student cafeteria. The apartments in the highrise had between nineteen and twenty-four square matters of living space the bunga square meters of living space, the bunga-low approximately twenty-four square meters on two floors. 1,800 women ath-letes lived here during the games.

A double row maisonette-apartment type was chosen for the bungalows. Each unit consists of a ground floor living area of approximately sixteen square meters, a gallery with a studio approximately five square meters, and a roof-terrace of approximately six square meters. In this way a building plan for students was developed in accord with their desire to live independently.

The addition of up to 800 units of this type resulted in structures with indepen-dent character, which were divided only by alleys, paths and plazas. The narrow alleys, the light-colored flat houses with their closed facades, and the high-lying balconies gave the impression of a Moorish settlement.

The highrise and the bungalows were built of prefabricated concrete components. Completely prefabricated bathrooms with shower, toilet and wash basin were set into each apartment. On the side of the acrylic glass segments facing the apartment, con-nections were available for a kitchenette with sink and refrigerator with sink and refrigerator.

Orientation within the Women's Olympic Village was facilitated for residents by designating the block alphabetically and by painting the doors in distinctive colors. The letters A and B were assigned to the highrise. The doors of the flat buildings bore the row and house number in addition to the block-color and letter (starting with C).

The Women's Olympic Village was not directly connected to the motor traffic system. The bus terminal for internal and outside traffic was in the immediate vicinity.



The students' cafeteria, located between the Men's and the Women's Villages, was enlarged with the help of a steel pipe frame construction in such a way that at dinner time 12,000 meals could be served within two hours.

The large number of meals which had to be served in a short time demanded a kitchen and distribution operation planned to the very last detail. A self-service system on all three floors was seen to be the most promising solution.

There were three large kitchens with five food distribution counters and three dining rooms.





Cafeteria Cross Section

Ventilation center (this part of the building was removed after the Olympics.)
 Dining hall
 Kitchen and food distribution
 Business area
 Special restaurant
 Elevator
 Technical area

Visitors' Conveniences, Restaurants, Beer Gardens and Kiosks in Olympic Park Architects: Behnisch and Associates, Munich/ Stuttgart with Domenig and Huth, Graz (Dining Center North)

Leyck and Hugle, Munich (Beer Garden on the Lake) Ray Lardschneider, Munich (Kiosk Stands) 3h design-hübner and huster, Stuttgart z (room-cells)

Peter Lanz, Munich (Restaurant South)



It was necessary at times to reckon with gatherings of far more than 100,000 people simultaneously because so many different facilities for competitive sports were concentrated in the Olympic Park. This was quite a constrast to sports centers elsewhere which usually had only one sports event at any one time. On the one hand visitors came as spectators for events in the stadium, in the gymnasium, in the halls for swimming, boxing and volleyball, at the bicycle stadium and at the hockey field. On the other hand, many people who were interested in the happenings at the Games but could get no tickets, wanted to participate in this big celebration at least by a stroll through the Olympic Park.

At the Regatta course at Oberschleissheim, at the riding arena at Riem or in the basketball gymnasium, the spectators could be easily supplied with food and drink at kiosks or in beer tents, as well as on the fair grounds where all the necessary facilities are continually maintained in their original use. The problem of determining the extent of the facilities needed to provide for the visitors to the Olympic Park itself had to be faced by the Organizing Committee from the earliest planning stages.

The size of the permanent restaurants in the sports facilities could only be determined by taking into consideration their general usage after the Olympics. During the Olympic Games, their capacity was adequate for VIPs, journalists and functionaries only. The only restaurant in the area of the Olympic Park that could be used to serve visitors was the atrium restaurant at the foot of the television tower.

Therefore, the huge restaurants and beer gardens and the multitude of kiosks, whose large capacity was needed solely during the Games, could be provided only on a temporary basis. The planners of the Olympic Park wanted these structures to indicate their temporary character, and to be a kind of sheltered landscape area with a maximum combination of "outside" and "inside"—they were not intended to be formal competitors to the tent roof. The type of protection against sun and rain which was chosen combined a roof of thin sheeting with transparent sheets on the facades capable of being opened to a height of three meters from the ground. This material was secured to the steel girders of the facade or supported on a light supporting structure-galvanized steel supports, lattice plinths, and crossed tubing arranged in arches.

Within the structures the intersecting and overlapping parapet and floor levels, the asbestos cement walls of the kitchen area, and the distinct groups of different colored chairs divided the space into various areas for eating and drinking. This gave the structures their lively appearance. Additional plants, smaller walls, bridges, overpasses, plateaus in harmonious forms, and broadly arching stairs—all these elements helped these "flying structures"1 fit into the landscape of Olympic Park. The large restaurants were erected at prominent points on the entry and exit paths for the visitors. They were separated from the major sports facilities in order to avoid aggravating the congestion in the area around these installations.

They were divided into two areas: simple country eating establishments with a rustic menu and restaurants with higher standards and a richer menu selection.

The "Beer Garden on the Lake" was built on a northerly oriented spit of land on the eastern shore of the lake. It was subdivided into two areas with 950 and 700 seats. It was conveniently located in relation to the swimming hall, the boxing gymnasium and the pedestrian zone on the eastern shore of the lake.





Ground floor plan to the restaurant on the lake

Delivery area
 Kitchen and administrative area
 Food serving area
 Dining area
 Toilets
 Entrance and Exit





Ground floor plan of the South Restaurant

 Hestaurant

 1
 Delivery area

 2
 Pantry and food preparation

 3
 Personnel area

 4
 Main kitchen

 5
 Serving area/self-service

 6
 Serving area for drinks

 7
 Dining area/Restau-rant

 8
 Dining area/Restau-rant

 9
 Toilets

 10
 Transformer room

 11
 Entrance and Exit

 12
 Dining area under the trial roof for the large plexiglas tent roof

The southern restaurant, located south of the stadium and of the lake, had 3,000 places. It provided primarily for the visitors coming from the parking area for buses and from the streetcar loop on Ackermann-strasse. Finally, at the streetcar station there was a tent restaurant that could serve 1,000 guests simultaneously.









Within the individual establishments there was a difference in the design of the areas "restaurant" and "rural eating establishment". In the "restaurant", a dynamic design was the dominant theme with dining areas on various levels, lively room dividers and railings, and interesting stairways. The walls and ventilation ducts were painted in pop-art style. The lights were concentrated into a kind of "area of light" and suspended in the supporting structure of the restaurant. At night, they transformed the ceilings into broad zones of illumination.







The situation of the "rural eating establish-ments" was different. Here one found the type of beer garden native to Bavaria, originally an outdoor locale with tables under broad shade trees. In the Olympic Park these restaurants were decorated with colorful pennants and festive garlands.

The northern restaurant had 1,000 places. It was planned primarily to serve the visitors from the northern part of the park (volleyball hall and hockey field) as well as the spectators going back and forth be-tween the facilities in the southern part of the center (stadium, gymnasium, swim-ming hall) and the subway station.





Ground floor plan of the Northern Restaurant

- Delivery area
 Pantry and food preparation
 Personnel area
 Main kitchen
 Serving area for food and drinks
 Dining area/Self-service
 Dining area/Country Inn
 Toilets
 Entrance and Exit







The kiosks, too, were temporary auxiliary facilities. While the restaurants only had to take care of the physical needs of the visitors, the kiosks had to serve other needs too. Besides snacks, drinks, ice cream, other dairy products, pastries, fruit and candy, they also sold various drug store items, cameras, optical equipment, com-memorative medals, tobacco, newspapers, books and souvenirs books and souvenirs.

A principal consideration in choosing the locations for the kiosks in the park as in the decision on the sites for the restaurants was the desire not to add to the congestion in the area around the sports facilities. A further consideration was the wish to concentrate the kiosks in larger groups.

Within the gates of the sports facilities themselves the refreshment stands sold only snacks and cold drinks. The kiosk clusters with a greater selection were on the main access paths on the dams and em-bankments within the Olympic Park, on the footpaths to and from the public transpor-tation and close to the parking lots. Serving as space-dividing elements for the kiosk clusters were folding walls in the Olympic colors: yellow, green, and blue – each color appearing in one light and one dark shade. The groups of stands were roofed with translucent sheeting which was supported by light galvanized steel structures independent of the walls of the kiosks themselves. kiosksthemselves.

To provide restrooms for the visitors and toilet and lounge facilities for the personnel, as well as first aid stations, booths were erected in close proximity to the kiosk clusters, but not under the same roof. For the booths, simple corrugated cardboard was glued to a self-supporting threedimensional stressed skin construction. These booths were protected from the effects of the weather by an outer skin of polyester resin strengthened by spun glass.

On the embankments within the Olympic Park, the kiosks were combined with in-dividual trees or groups of trees so as to fit harmoniously into the overall conception of a "verdant Olympics".

Footnote ¹ "Fliegende Bauten" — a technical term of the German building commission that happens to be especially appropriate in this case.



Ground floor plan of a kiosk cluster

Sales area Storage room Rubbish room 23 Technical equipment Broom closet 6 Toilets





- training) 5 Hall 18 (judo,
- 5 Hall to Uudo, training)
 6 Partial area of Hall 16 (special post office,
- security guards) 7 Hall 14 (wrestling and 7 Hall 14 (wrestling and judo, competitions; central sports direction)
 8 Hall 12 (fencing, competitions)
 9 Hall 11 (fencing, dressing rooms)
 10 Hall 9 (weightlifting, training)
 11 Hall 7 (weightlifting, competitions)
 12 Hall 5 (press, technical services, doping control)

- control)
- control) 13 Restaurant 14 Assembly building 15 Post office 16 Meeting building 17 Streetcar stop

The fairground halls were included in the program presented by Munich in Rome for the contest and training sites to be used during the Olympic Games. The accommo-dation of every Olympic discipline at what was formerly called "Oberwiesenfeld" already was considered impossible at the first considerations regarding the program. During the preliminary and early planing stages, however, it was believed that the basketball and volleyball games could be held in the exhibition halls. When both international sports federations had stated international sports federations had stated their prerequisites for the contest sites, the exhibition halls proved to be unsuitable for these sports. Neither hall could accommodate courts with sufficient safety zones (volleyball requires a 12.5 m. high ceiling) and room for 4,000 to 5,000 spectators.

Thus the Organizing Committee decided to equip the grounds of the "Munich Fair Company" as the center for heavy athletics, wrestling, judo, weight lifting and fencing. A contest site and training hall were remodelled for each of these disciplines.

The fencers did not only train in the three-storied hall 20, they also held the preliminary and part of the intermediary bouts there. The rest of the intermediary and final bouts took place in hall 12.

The planning situation for the facilities which the weight lifters needed was ideal. The neighboring hall 7 (for contests) and hall 9 (for training) were remodelled without serious difficulties.

The hall which was initially foreseen for wrestling was rejected when it was learned that at least 5,000 spectator seats were required for this sport. Thus a new hall had to be built. For economy reasons a corresponding decision was not difficult for the people responsible in the Organizing Committee and the Olympic Construction Company since the exhibition areas in the halls belonging to the Munich Fair Company had to be enlarged anyway. Considering deadlines, a further difficulty had to be overcome due to the short planning and building period. The approval of the building project followed relatively late.

The hall in which some of the judo contests took place—the rest were in the basketball hall and the boxing hall — was converted into a two-storied exhibition hall by the construction of an intermediary floor after the Games. The judo enthusiasts trained in hall 18, the wrestlers in hall 19.

Subcenters for radio, television and the press completed the program of the second Olympic center at the exhibition grounds. The fairgrounds had another advantage as opposed to completely new facilities in that consequential installations such as the post office, restaurant, organization and meeting rooms, toilets etc. were alreadyavailable.

The traffic access system, which had been tested by numerous events, functioned smoothly. Individual transportation was made practically unnecessary by a well organized shuttling service with internal or public means of transportation between Olympic Park and the fairgrounds.

The main entrance was located on Heimeran Strasse during the Olympic Games. The contest and training halls which were arranged around a park-like green area could be easily reached from a large plaza.

An essential task remained after the solution of every structural and organizational problem; namely, to convert temporarily an incongruous building complex construc-ted during different eras into a sports center. The somewhat depressing utilitarian architecture of the majority of the existing exhibition buildings had to be brought near to the theme of the "cheerful Games" by minimal, but effective means. Here the planners used the Olympic colors vellow planners used the Olympic colors yellow, green and blue in both light and dark shades which had been determined by the "Visual Formation" Commission of the OC. These colors and the signs carrying information concerning sports and other installations became the main elements for shaping the impressions made by the fairgrounds.























According to the rules at international competitions and at Olympic Games, weight lifting events must take place on one meter high, 12 m. x 12 m. platforms. The weight lifter faces the audience during the contest. Thus it is possible to arrange the audience's seating arrangement only on three sides of the stage. The competition area resembles an ancient theater in this form.

The remodelled hall 7 offered an advantage with its total length of 106 m. in that it was large enough to contain the athletes' readying room and the ancillary rooms for the organization and the contest jury in addition to the spectators' facilities. On account of the height of the platform it was possible to reduce the angle of incline of the spectators' stands from that which would have been necessary if the action had taken place at ground level, which would have required a construction with a steeper line of vision. Nevertheless, the height of the existing hall limited the number of seats to 3,300.

A sound absorbing wall at the rear side of the weight lifting stage separated the contest area from the readying area. The electronic scoreboard, which displayed the names, nationalities, the weights lifted in the various disciplines and the total weight, was mounted on this partition.

The hall was illuminated exclusively by artificial light. The weight lifters' platform stood in a bright light as opposed to the darker spectator area in which the partitions, draperies and barriers were dominated by the color yellow.

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Cross section of the grandstand

Basement, storerooms
 Ground floor with temporary installations
 Contest platform

temporary additions Contest platform Temporary additions to grandstand 5 Entrance level 6 Lighting bridge 7 Machinery room

Wrestling and Judo Hall Ground floor plan

- 1 Stairwell and elevator shaft Participants' entrance
- a respectators' entrance)
 Press entrance
 Entrance for organizers and VIPs
 Athletes' dressing rooms
- 6 Athletes' showers and
- Warm-up area Athletes' lounge DOZ subcenter Medical rooms
- 7
- 10
- Spectators' stands
 Places for the press and commentators
 Participants' stands
- Competition area VIP Stands 15
- 16 Working rooms for FILA
- FILA
 17 Storage rooms
 18 Working rooms for the judo association
 19 Working rooms for the OC
 20 Referees' coat room
 21 Director of competi-tions
- Director of competi-tions
 Dressing rooms and lounge for referees

The new wrestling and judo hall connects the semicircle of exhibition halls to Gang-hofer Strasse and Heimeran Platz in the northwest.

northwest. This 17 m. high steel frame building is a cube with an almost square base measuring 72 m. x 78 m. whose walls are finished with cement facing panels. The hall is covered by a supporting struc-ture constructed of prefabricated steel pipe building elements and has no interior columns. This roof is set on the framework of the building in a way that results in a band of windows around the hall which admit natural light. Characteristic of the building are the outer stairway doors for access to the upper level which were completed only in the grandstand area during the Olympic Games. (The inter-mediary floor which divides the entire hall horizontally and is necessary for the use of the building as an exhibition hall was installed afterwards).

The majority spectators were accommo-dated on the two-storied stands at the eastern and western sides of the hall. Another stand which ascended from the hall level was located on the southern side. In relation to the contest platform on a northsouth axis, the impression was given of a symetrical hall area which offered 5,000 spectator seats in addition to 700 seats for guests of honor, participants, press, radio and television personnel. The area under the ground floor stands was divided into work and waiting rooms for athletes, organizers, communications personnel and honored guests.

The wrestling mats were laid on a contest area 90 cm. higher than the floor of the hall. This 15 m. x 55 m. platform took up almost all of the inner area of the hall. It was sloped at the sides for the safety of the competitors. Only a narrow lane around the platform remained free for the contest jury. According to need as many as four yellow octagonal mats could be laid on the platform relieved with blue. Three-sided miniature scoreboards which displayed the contest time and number of points were suspended over each mat.

Fencing Hall 1 (Fairgrounds) (Hall 11 and Hall 12) Architect: Peter Lanz, Munich



- Competition area
 Participants' stands
 Access to upper floor
 Access to stands
 ViP area
 Ground floor stands
 (temporary)
 Places for commentators
 Upper floor stands





Hall 12, also known as the Bavaria Hall, was used for shows and sport events even before the Olympic Games. Hardly any remodelling was necessary in this 3,000-seat hall for the intermediate and final rounds in the fencing events.

rounds in the rencing events. The grandstands on the lower level as-cended up to a point under the galleries extending around the four sides of the upper level. The planners' main attention was directed to the extensive technical fencing equipment and the artistic arran-gement of details. Cloth dyed in the Olym-pic colors was usually used to divide areas and to mark spectator limits as in the other halls. The contest area held two parallel, but not completely abreast fencing strips only at the semifinals. The inner area of the hall which was only illuminated by artificial light had a lighting intensity of 1,500 lux and provided a strong contrast to the spectator area on the galleries. The colors contributed less than the lighting effects to the creation of an exciting tournament area in this hall.







Fencers were able to train on forty strips on the lower and upper levels of hall 20. The preliminary and intermediary rounds and the sword fighting event of the modern pentathlon took place on the ground floor. Fourteen strips were available here. While the over-all lighting on this floor was set at 600 lux, the two centrally located strips were accentuated with a stronger illumination of 1,500 lux. It was only in this area that temporary bleachers were set up as spectator stands with a total of 1,000 seats. Otherwise spectators were able to wander from strip to strip and watch the bouts at close quarters. The only thing remarkable about this otherwise dreary hall was the colorful decoration. Yellow cloth was hung from the ceiling in parallel irregular lines. The judges' table was covered with a light blue cloth, the stands were covered with yellow material, and the platform areas remained black. The stands were equipped with yellow seats.



Longitudinal section

- Warm-up hall
 Entrance hall
 Auxiliary room
 Passageway for street shoes
 Locker section
 Passageway for gym shoes 1 2 3 4
- 5 6
- Passageway for gym shoes
 T elescoping stands
 Central radio and television installation (DOZ)
 Restaurant
 Foyer
 Hat and coat check
 Scoreboard
 Central ventilation installation
 Direction

Diagram of grandstand level

- Roof lookout in entrance hall
 Scoreboard
 Permanent stands
 Direction booth
 Camera stand
 Press seats (on telescoping stands)
 Telescoping stands
 Temporary collapsible stands
 Special floor preparation for the basketball court

- Information Interview room Cafeteria 21 22 23 24

- 36









3 Doctor's office
4 Air-space warm-up hall
5 Massage parlor
6 Auxiliary room
7 Passageway for street shoes
8 Toilets
9 Passageway for gym shoes
10 Locker room
11 Showers and washroom
12 Referees' room
13 Shower room and toilet unit
14 Jury
15 Mimeographing room
16 German Basketball Federation (DBB)
17 Organizing Committee (OC)
18 International Amateur BasketballFederation (FIBA)
19 Conference room
20 Entrace for the press andorganizers

Diagram of ground floor

Technical apparatus
 Doping control
 Doctor's office
 Air-space warm-up



The hall forms part of a municipal sports ground situated in a green belt which extends as far as the center of Munich. Nearby are the exhibition grounds, the second focal point of the Olympic Games, where the fencing, judo, wrestling and weightlifting events were held.

Along with the Olympic sports hall, the basketball hall forms the second stadium that is permanently reserved for Munich sporting events. During the Olympic Games it had capacity for 6.356 spectators. The decision on the site and space utilization program for this building was made comparatively late. In the autumn of 1969 the Olympic Construction Company invited two firms of contractors to submit tenders. The contract was awarded in February, 1970 and stipulated completion by March 15, 1972. The short time available for building necessitated the employment of a simple principle of construction and the use of prefabricated components. The foundations and the whole ground floor were constructed by conventional methods using reinforced concrete cast on site. After only six months the prefabricated concrete elements for the external supports of the grandstands and the circular beam for the roof could be erected and the roof placed in position.

The construction is based on the principle that steel can take extremely high tensional stresses and concrete can stand extremely high pressures. Thus a suspended conical steel roof, made up of sheets 4 to 6 mm. in thickness, transfers the whole weight of the roof (i.e. its own weight including insulation, snow) to a circular reinforced concrete pressure ring which, in its turn, transfers the static forces vertically to the walls. The steel roof is braced against wind suction by a weight suspended from its centre, which also serves as the base for the structure containing the ventilation and air-conditioning units. This load results in the formation of a conical shell. The steel sheeting for the roof was cut to shape in the factory and delivered in large segments which were welded together on site. The underside of the roof was covered with a layer of dark blue acicular asbestos as a fire safety measure and for acoustical reasons. The stadium is illuminated solely by artificial light. The outer walls are constructed of hollow, aerated sections with heat insulation. Asbestos cement sheets were used for the exterior facade.

From the very beginning this circular hall was designed as a multi-purpose sports arena. Its diameter is 100 m. at the foundation level and 72 m. at the roof. The area available for sport measures 40 m. x 40 m. the clearance is 12.50 m. In order to provide this 1,600-square meter playing field (with a further 400 sq. m. in the warm-up hall on the ground-floor), a total usable area, including hallways of 12,200 sq.m. and an enclosed space of 104,500 cub. m. was required.

The permanent grandstands on the upper floor were supplemented during the Olympic Games by telescopic and transportable stands that could quickly be assembled. The circular upper gallery for spectators has 4,500 plastic seats with backs; a further 1,400 spectators, together with 200 athletes, 36 radio and television commentators, 220 guests of honor and 300 journalists were accommodated on the. mobile grandstands.

Spectators enter the stadium through an entrance hall in the south-west that is joined on each side with a circular corridor which gives access to the grandstands at the mezzanine level through doors at a number of points along its circumference. All facilities for spectators such as checkrooms, toilets, kiosks and a post office are situated below the grandstands at the entrance level. In the north-east section, opposite the entrance hall, there is a restaurant which can be entered by the public and staff without passing through the stadium. The rooms for athletes, journalists, organizers, equipment and technical services are located on a floor below the spectators' circular gallery. The warm-up hall, 24 m. x 17 m. in area and 7 m. high, is below the spectators' entrance hall. It is reached by a ramp from inside the stadium.

The 90-ton base-plate under the roof carries a structure which houses the airconditioning equipment for filtering, warming, humidifying and cooling the air in the stadium. Below it hangs a grid-type ceiling composed of laminated wooden beams. High-pressure mercury vapor lamps are installed at regular intervals in the openings of this grid. They provide a dazzlefree illumination with a vertical power of 1.500 lux.





Floors, surfaced with polyvinyl chloride sheets, were laid on all areas used for sport, including the warm-up hall. At the request of the International Basketball Federation (FIBA), a maple floor was also laid over the playing field area. The heating installation, the caretaker's apartment, changing-rooms, and the club rooms of the municipal sports ground are situated in an adjacent building.



Shooting Range Hochbrück

Architects: Wolfgang Kleibömer, Hamburg/Munich Michael Eberl, Munich Erich Stein, Munich



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Scoring in the competition area itself was carried out manually in the case of skeet and trap shooting. In the halls for rifle, pistol and moving target shooting it was performed partly electronically and partly by telewriter. The final results were posted by hand on large scoreboards on the back wall of the grandstand and on the walls of the shooting ranges which faced the square where the awards ceremonies took place. All Olympic shooting events were attended by large numbers of spectators. As was to be expected, most of these visitors were attracted by the skeet and trap contests. Provision had been made for them in a covered grandstand with 2,000 seats, including 600 seats for guests of honor, journalists and commentators. A certain number of seats were also provided behind the shooters in the covered ranges. Usually they were overfilled, so that many spectators had to stand crowded against the rear wall of the range. Nevertheless, they showed great discipline and maintained absolute silence in order not to disturb the shooter concentrating on his target. Communication by signals functioned very smoothly. It was only occasionally interrupted by a short dialogue between the referee and a shooter.









Particular attention was devoted to safety and sound proofing. German building codes require that shooting ranges must be constructed in a way which prevents unskilfully fired bullets from leaving the range. For this reason, the lawn bearing ground layer was sieved prior to sowing the grass in order to eliminate any hidden stones which might divert bullets in uncontrollable directions. Staggered protection screens were mounted above the shooting ranges.

To minimize noise, the rifle halls were fitted with sound absorbing walls. In the pistol halls additional double dividing walls of sound absorbing material were installed after every second stand.



In order to meet the requirements of the International Sport Federations for Rowing and Canoeing in respect to water and wind conditions, the Olympic Construction Company first investigated the Upper Bavarian lakes as to their suitability for the Olympic rowing and canoeing events. They proved to be unsuitable because of the prevailing wind conditions and variations in the depth of the water. It was therefore necessary to construct an artificial course. On account of the size of such a course, a location had to be found which fulfilled the following requirements: short distance from the Olympic Village at Oberwiesenfeld, good transportation facilities, level ground without steep gradients, a high level of subsoil water, and a reasonable price for the land. These requirements were met by the locations Königsdorf in the south and Zenger Moos, Eching and Feldmoching/ Oberschleissheim north of Munich, and most suitably by the latter.

The architects who won the first prize in a limited architectural competition, succeeded in designing buildings which harmonize with the extensive landscape of the Dachau Moor. The typical hedges and rows of bushes and the stream which flows into the Schleissheim Schloss canal have provided the motif as in the neighboring Schleissheim Schloss Park, and have been utilized as elements for proportioning and delimiting the area concerned. The three large groups of buildings at the finish of the course bring the long stretch of water to an end and, with their roofs sloping down towards the water, make a fitting termination to the course. The building materials of steel, concrete and laminated wooden beams are largely hidden by roofs of grey-green wood.

The feature of the regatta installation that makes the strongest mark on the landscape is the artificial watercourse, which runs from south-west to north-east. It is 2,230 m. long and 140 m. wide; its depth is 3.50 m. throughout for all tracks. In order to minimize wash, the banks on each side slope away from the water with an even gradient of 1:6.

Reasons connected with sport did not permit any curves or sharp bends to be made in the course, either before or after the start to finish stretch. The excavated material was used for the embankments for the grandstands, a highway under construction in the vicinity, and for a panorama hill 1 km. away. The channel is filled with ground water, which is not far below the surface. Its level drops by about 5 m. from the start to the finish of the course, so that the channel had to be dug correspondingly deeper at the starting end. The start area is a basin formed by the two lateral banks and the terminal bank of the channel. At the end of the basin is the starting tower. This tower, the aligning house at the starting line, and the starting towers for canoes at 1,000 m. and 500 m. are the only buildings on the long course before the finishing area is reached.









As the rowers leave the enclosing banks of the starting basin, the landscape flattens out more and more while the course continues. Nothing may be planted in a zone 65 m. wide on each side of the course, in order to ensure uniform wind conditions for all six rowing lanes. Behind these zones, at varying distances from the course, typical trees and shrubs grow singly or in groups or rows, the birches standing out particularly in contrast to the blue surface of the water.

In the direction of the finish, the land is completely flat and only raised above the level of water in the channel by the difference in height between its surface and the level of the ground water. The area around the finish is a large open space enclosed by the grandstands on the eastern bank, the boathouses at the head of the channel and the buildings for competitors situated at an angle on the western bank. The higher level of this area is further accentuated by the sharply indented roofs.





Located only 7.5 km. from Oberwiesenfeld, the site presented no traffic problems after improvements had been made at the feeder roads. A further advantage is the proximity of the suburban railway station of Ober-schleissheim. The parking places are en-closed by hedges and separated from the actual regatta grounds by a stream which has been diverted. From this parking area, visitors arrive at the rear of the main grand-stand. stand.





The steel beams of the framework of the grandstand are enclosed in wood and form grandstand are enclosed in wood and form a kind of arcade, roofed over above a certain height and leading to the three floors of the stand. Spectators occupy the first floor, guests of honor and the press use the second, while the top floor is re-served for radio and television commenta-tors and their equipment. A post office, restaurant, first-aid station and toilet facili-ties are located on the spectators' floor, where there is also a boat exhibition showing the development of rowing boats and canoes. The grandstand has 8,000 seats, half of which are covered by a roof which projects as far as the middle row. For the Olympic Games, a provisional grandstand with standing room for 16,000 spectators was erected at the starting point.

A prominent landmark is formed by the massive concrete finishing tower in front of the grandstand.



Stands, Section Northwest Southwest



Finish Tower, view from the southwest

3

Finish line judges' room
 TV camera stand
 Photo finish evaluation
 Announcers, Jury
 Upper platform

The participants' building which contains changing rooms, medical rooms, a sports hall, a conditioning hall, a sauna and several team rooms, will be used as a training center for rowing and canceing after the Games. Between the building and the water there are a flat meadow and the athletes' grandstand with 1,000 seats. Adjacent to this grandstand a long wall was piled up and covered with lawn.

During the Games, this wall served as provisional standing room for about 15,000 spectators.









The finish area is bounded on the northeastern side by three boathouses at the head of the regatta course, a large one flanked on each side by a smaller one, with a space for boat trailers in front of the sheds and a paddock near the water. Storage accommodation for 400 boats is provided in 36 compartments. The changing and massage rooms and sanitary facilities for the competitors are on the upper floor.







Layout diagram

- 1 Main entrance and
- information 2 Spectators' and

- Spectators and organization area
 Tent No. 1 women athletes
 Tent No. 2 male athletes
 Tent No. 3 organization
 Toilet facilities
 Grandstands with seats
- seats 8 Stands for VIPs and

- 10 11
- 12
- 13
- Stands for VIPs and the press
 Archers' line
 Shooting range -women's competition
 Shooting range -men's competition
 Individual scoreboard -women's competition
 Individual scoreboard— men's competition
 Evaluation and scoreboard overall 14 15
- scoreboard overall women's competition Evaluation and scoreboard overall
- 16
- men's competition 17 Control side entrance

Although at first sight an English landscape garden and the sport of archery hardly seem to have anything in common, both are colored by the hue of history.

Archery has been known from classical times, primarily as a means of war. In the late Middle Ages it became a favorite sport at the courts of kings and nobles and continued to be so up to the 19th century. The idea of the English landscape garden was not born until the end of the 18th century. It was an attempt to replace the trigity formal gardens and parks which century. It was an attempt to replace the strictly formal gardens and parks which had been the fashion up to that time by a garden that imitated the informality of nature through intentionally planned hills and hollows, winding paths, groups of trees and bushes, brooks, and lakes with inlets and islands. Games, riding, hunting, and pocede environ their locicus imparted and people enjoying their leisure imparted life to these artificial landscapes. The Munich "English Garden" was no exception. A colorful archery tournament in this park was certainly quite a normal event for its architect and creator Ludwig von Sckell.

The planners of the Olympic archery range of 1972 thus had little trouble in unobtrusively suiting and adapting the necessary facilities for competitors, spectators and organizers to the character of this landscape garden without impairing it. Rather, they emphasized it. And thus, for a short time, the Olympic archery event became an integral part of the "English Garden".





The Olympic archery range was constructed, as a provisional installation, on the Werneck meadow south of the Kleinhesseloher lake.

It covered about 5,000 sq. m. and was approximately square in shape. In accordance with the regulations for this sport, the targets were situated on a level meadow so that the competitors faced them from south to north, in order to reduce dazzling by the sun to a minimum. The southern end of the range was terminated by the informally grouped auxiliary buildings, constructed of prefabricated wooden and metal components and roofed over with light-grey awnings. Standardized partitions or cells made of asbestos cement panels were used for the interior walls. These so-called "flying buildings" (a term used in German building regulations to distinguish them from permanent buildings) housed the organization staff, changing rooms, press and film offices, a snack bar and a first-aid station. The toilets consisted of prefabricated units. The most important rooms for the event were located adjacent to the competition area.







Viewed from the grandstands at the end, the range was divided into four rows:

First came the bright green umbrellas, 2 m. in diameter, which gave welcome shade to the competitors when they rested in the intervals. Chairs and a table for groups of three archers were provided under each umbrella. The second row was formed by the stands for holding the bows, the third by the dividing line from which the competitors shot at the white targets. These, with their blue and red circles, far away and slightly tilted, made up the fourth row.

The different shooting distances, from 30 m. to 90 m. were arranged by moving the targets.

Signal lamps were set up on both sides of each range adjacent to the archers. These, together with acoustic signals, indicated the time of preparation and the moment to start shooting, the warning that shooting time was about to end, and the end of shooting time. After each round of shooting, the archers went to the targets to collect their arrows, after the referee had determined the number of hits.

These buildings were separated from the field of competition by four low grandstands with seating accommodations. One of them, the stand for guests of honor and the press, was covered with a yellow awning. Two other open stands with seats were located at an angle to the two ranges, so that a total of 1,100 spectators could be accommodated. All grandstands offered the spectators a good view of the two ranges. The larger range at the east for men, with twenty targets, was located a short distance away from the smaller range to the west for women, with twelve targets.





Layout diagram

- Layout diagram
 Nymphenburg Palace
 Sports organization in the School of the Order of the Blessed Virgin Mary
 Northern stands
 Contest area 20 m. x 60 m.
 Southern stands
 Contest area exit
 Fountains
 Contest area entrance
 Temporary buildings for press, radio and television
 Stand-by area 13 m. x 50 m.
 Stinde path from the stables to the contest area
 Bridle path from the stables
 Parking area for the organization and horse transporters
 Temporary stables



The palace of Nymphenburg, the former residence of the kings of Bavaria, provided a brilliant setting for the Olympic Grand Prix de Dressage. The temporary facilities for competitors and spectators were created without making any extensive alteration of the general picture of the palace grounds. It was possible to arrange the whole competition area, including the accommodation for spectators, on the lower level of the French Garden. The arena itself, measuring 20 m. x 60 m., lay between the central facade of the baroque palace and the large fountain without disturbing their axial relationship. Thus the dressage events could be held at a place which had witnessed many other colorful gatherings in its history.

The riders began their preparation for the event after the horses had been transported from their quarters in Munich-Riem to temporary stables in the large Zuccalli Garden in the palace park. These stables could hold twenty horses at a time. Tent stables were put up for horses waiting to be returned to Riem after the events. The route for the competitors and their horses went in a curve from the south wall of the park through the English Garden to a large clearing which was used as the first practice arena. From here, there was a good view of the small rococo palace of Amalienburg. Up to here, the riders followed the normal pathways of the park, but from this point specially laid paths made of a mixture of sand and sawdust led to the arena. The second practice arena lay more or less at a right angle to the first, with its long side facing the Amalienburg Palace. Here a first impression could be gained of the harmony of the riders and horses with the historical buildings and park landscape.

A wooden bridge connected the practice arenas to the competitors' assembling point, which is lined on its longer sides by high beech trees.





The horsemen emerged from this shady spot onto the lawns of the palace gardens, riding past the large fountain to reach the dressage arena.

Two grandstands, each seating 4,000 spectators, were erected at a distance of 20 m. from the long sides of the arena and rose as high as the tops of the chestnut trees which form avenues separating the formal French Garden from the parkland of the English Garden. Immediately behind the south grandstand, sheltered by trees and nestling between the bushes, were the wooden pavilions for press, radio and television reporters.

In the dressage competition, the horses and their riders drew skilfully executed designs in the sand of the arena, watched from both sides by crowds of gaily dressed spectators, some of them under slightly vaulted awnings of transparent sheeting. With the green trees in the background, the straight lines of the canal on one side and the graceful symmetry of the palace on the other, the whole scene presented a picture in which the courtly atmosphere of bygone days was successfully combined with the Olympic Games of modern times.



Riding Facility in Riem Architects: Atelier Kleineichenhausen Peter F. Miller and Associates, Kleineichenhausen



Layout diagram

Large riding hall Olympic stables Casino

Small riding hall

- Performance circle Old stables of the Racing Club Landshamer Strasse
- Temporary parking lot Stadium plaza Ticket window area
- Access ramp to the
- Access ramp to the grandstand rampart Branch post office
- Sheltered stands
- Temporary buildings for the organization
- Open rampart Inner area of the
- stadium 18 Judges' tower and
- scoreboard Pond
- Stand-by area (grass) Preparation area
- Preparation area (sand) Jumping area (grass) Jumping area (sand) Dressage area (sand) Temporary jumping area (grass) Training track for colloping

- galloping Exercise area (sand) Exercise area (grass) Stables of the Racing
- Club
- Club Farm buildings Trainers' living quarters Old grandstands of the Racing Club New grandstands of the Racing Club Entrance to the alloning track

- galloping track Galloping racetrack Infirmary stable

Original planning called for the provision of temporary competition facilities for all equestrian contests with the exception of the "Prix des nations", which was to take place in the Olympic Stadium. The horses were to be sheltered and trained in Munich-Riem on the grounds of the Munich Riding Club and the Riding Academy. A temporary stadium for 30,000 spectators was to be built south of Olympic Park, west of the Olympiaberg.

In Riem the stables, two riding halls, two race tracks and a two-hectare horseshoe shaped area for jumping and training were already available. However, later inves-tigations showed that the greater portion of the stables were no longer adequate for contemporary requirements While a renovation of the Riding Club's stables was sufficient, it was still necessary to build eight new stables for some 400 additional horses. The eighty horses for the pentathlon on the other hand were to be sheltered in a temporary stable be sheltered in a temporary stable.

The repair of the larger riding hall was no longer feasible. It had to be torn down because of structural weaknesses due to age. In its place a 30 m. x 75 m. hall was built which contains 1,500 seats intended especially for post-Olympic use.

The southern part of the over forty hectares of grounds was chosen as the site for five stables, the northeastern part for three stables for the Riding Club. Nine jumping areas and seven training areas were to be newly laid out for the outdoor facilities.

At the end of 1970, when the construction work on the stables and halls was already in full swing, the Organizing Committee, together with the Bavarian State Ministry of Agriculture, decided to build a permanent 20,000-seat stadium in Riem instead of the temporary stadium in the Olympic Park. This decision necessitated a revision of all plans for the outdoor facilities and an extensive reorganization of the entire grounds, in addition to designing the plan for the riding stadium.

The stadium was placed in a central position and was lined up lengthwise on a north-south axis. A covered grandstand for 8,000 is located on the western side.

Adjoining the southern and eastern sides is an open air embankment for 12,000 seats. In the north, the stadium opens to the free landscape. It will be surrounded by a broad arch of stand-by areas and six jumping areas.

Finally a 54 m. x 23 m. stable for sick or injured horses is located on the eastern side of the grounds. It is equipped with a quarantine section, twenty stalls, an operating room and X-ray equipment.



The Olympic stables can be called model living quarters for horses. They have been designed according to the most up-to-date findings of experts and incorporate all possible conveniences.

Each stable measures 30 m. x 68 m. Laminated wood was chosen for support-ing structures. Next to the forty-eight horse stalls are twenty apartments for stable personnel, as well as saddle, feed, hay and straw storage areas, a mash kitchen and facilities to wash the animals.

The horse stalls are lined up along two passages, the first having a row of stalls on each side, the second only on one side. On the other side are located the feed and storage areas and the mash kitchens. At right angles to the passages are connecting passages which divide the area into four clusters, each with twelve stalls. Each of these can be further subdivided into four stalls. This flexibility of layout takes the varying sizes of the participating national teams into consideration. Each stall is a



Olympic Stable Ground floor plan

- Stable alley
- Cross passage Storage room for hay and straw Horse stall Toilet Fodder room and mash 2
- 4 5 6
- kitchen Saddle room
- Equipment room, ventilation intakes
- Wash box Ventilation exhausts Staircase

roomy square of 3.50 meters. In addition to partial air conditioning, each stall has a ventilating duct to remove ammonia fumes.

An observation walkway was built along the long side of the stable on the upper story where the grooms have their rooms. From here it is possible to see the entire stable and to watch the horses in their stalls.

Jockeys' rooms Observation passage Archway Auxiliary rooms (e. g. fodder room, equipment

room) Stable alley

3

56 7

straw

Horse stall Store rooms for hay and

8 2 9 7 610 2 4 6 7 9 2 8

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7 65

67

A new riding hall of laminated wood construction with a sloping roof was built on the site of the old hall which dated back to the 1930's. Daylight is admitted at the north side by an eight meter wide continu-ous window covered with translucent plastic sheets. The balanced illumination into the depths of the enclosed area is achieved by an additional narrower strip on the southern side. The plastic panels are concave in order to diffuse the light better.

The proper intensity of artificial illumina-tion at 350 to 400 lux is provided by fluorescent lights built into the ceiling.

The hall has seats for 1,500 spectators along one broad and one long side. All necessary facilities such as toilets and technical rooms are located under the bleachers. There is also a ground level store room for hurdles and other equip-ment at the east end. Visitors can get an overall view of the hall from one of the rider's rooms located on the upper level.







During the Olympic Games, the riding contest of the modern pentathlon, the threeday event, military jumping competition and individual jumping contest were held in the stadium. The military cross-country race started in the riding facility and was completed in the region of Riem/Poing.

The stadium is reached from Landshamer Strasse. By crossing a chestnut tree shaded plaza, visitors approach the ticket booths which are arranged in a semi-circle. Each of the five gates has ticket booths on both sides. The gates are constructed on a central pivot and the ticket booths are set on wheels. When the event is finished, the gates are opened all the way and offer no hindrance to the spectators leaving the arena. Almost the entire semi-circle can be opened up in this manner. A mound breaks the semi-circle of ticket booths between the second and third gates. It also divides the entrances. On the western side a concrete ramp leads to the covered grandstand, and a ramp at the eastern side leads to the open air bleachers.

The plaza and the ramps are decorated with colored friezes, paintings and figures made of bitumen on the sidewalk. The embankment has two bends in it and extends from the west to the north and east and separates the stadium from the south and east. An artificial pond lies between the embankment and the sheltered stands. This pond, together with two others in the north of the inner area, is part of the course for the modern pentathlon event. This course consists of an eight-meter wide sandtrack, which surrounds an approximately 80 m. x 140 m. lawn area and led over the four to five-meters high longitudinal mound on the northern side.



The 137-meter long covered western grandstand is composed of 24 laminated wood sections. The longest beam is a 31 -meter cantilevered construction. The symetrically arched roof is covered with transparent acrylic glass panels because color television requires the contest area to be free of sharp shadows.

Underneath the grandstands are the business offices with a driveway into the arena. The VIP and press sections are also accessible from here. The spectators reach their seats by climbing the ramps at the entrance to the upper level and walking from there to their places. The second level contains a restaurant. The rest-rooms in the tower to the back can be reached from both levels through a mezzanine. A concrete stairway leads from the northern corner of the first level grandstand to the judges' tower. The Scoreboard is hung from the turret. The rooms for the organization were located in temporary buildings behind the western grandstand on what will be a parking lot.













Layout diagram

- High water sluice Temporary post office
- Saddle area
- Saddle area Starting building The bank of the Lech River Arm bulwark Ice canal
- 5
- 67
- Practice canal Press and organization buildings Slalom canal
- 10
- 11
- Spectators' embankment Temporary toilet installation 12
- Restaurant Boat houses and 13 14
- shelters 15 Parking lot



Boathouses and Living Quarters Cross Section

4

- 1 Entrance
- Boathouses
 Sanitation area, boat workshops,
- measuring room, storeroom, sauna, canoe pool Saddle area

- 5 Quiet areas (post-Olympic as double bedrooms)
 6 Sanitary area

Section N-S Organization Building

- Organization rooms
- Corridor
- Press information Press workroom Inner courtyard
- Judges tower

For the first time ever, the canoe slalom takes its place as an Olympic discipline! Originally it was Munich that was envisaged as the scene of the contests in this fascina-ting branch of sport, but problems of hydraulics and water control weighed against a construction of this sort on the Isar. The Augsburg "ice canal", formed by the damming of the Lech to the south of Augsburg, and already much used for canoe slalom events, suggested itself as a basis for development. The International Canoe Federation, after investigating the funda-mental suitability of this stretch of water, gave its consent to the project, and the International Olympic Committee also finally agreed to the proposition.

In this way it was possible to construct an artificial stretch of water which presents all the hazards of a natural torrent but whose difficulty the organizers of a race can vary by adjusting both the speed of the water and the position of the gates.

The slalom course can be reached in about 30 minutes by special trains from the station at the Munich Olympic Center. It is situated south-east of the city of Augsburg in a near-by recreational area on the west bank of the Lech.

Before construction work began, extensive Before construction work began, extensive research was carried out by the depart-ment of hydro-engineering of MAN Ma-schinenfabrik Augsburg Nürnberg in their Gustavsburg works: the lay-out of the course, the type and form of the obstacles for the 660 m. total canal length, were determined with the aid of a 22 m. stretch of water used as scale model. (No alteraof water used as scale model. (No altera-tions were made in the upper section of the canal, but the structure was renewed and it was provided with a triple sluice weir.)

A piece of ground near the start, where a number of ancient chestnut trees were standing, was turned into a stand-by area for the canoeists by the erection of three temporary sheds. The building from which the competitors actually started remains in permanent use after the Olympic Games. Approximately 180 m. below the start stands the administrative building, also used by the press, containing rooms for data processing and evaluation and for interviews. The tower of this building juts out over the canal and permits a view over 80 % of the course for television trans-missions and direction of the events. Built missions and direction of the events. Built around a quadrangle, these premises are now, after the Games, the Club Center of the Augsburg canoeing societies. The two-story restaurant, catering for 200, is located near the finish and offers a good view of the course. Grouped around an inner courtyard are, on the ground floor, a snack bar and rooms for restaurant management and administration, and on the first floor the restaurant itself with the kitchen, a terrace facing south built out towards the canal, and an open, roofed-in balcony. During the Games the restaurant was open to competitors, officials and guests of honor; now it may be used by anyone visiting the bathing place situated north of the building.





To the west of the restaurant, under a group of trees, are boathouses and accommodation buildings which contain any accessory rooms and installations required for post-Olympic use as a training center for Canoeing.

The recreational character of the whole area was preserved: the park and the canoe slalom buildings were designed to include the trees already standing. The undulating contours of the site and the steep banks on either side of the canal, together with earth terraces edged with bongossi wood, formed a stadium with standing room for about 25,000 people. Spectators were not tied to any particular section of the stadium, but could move from one place to another during the competitions, all entrance tickets being issued as "promenade" tickets.

The entrances for spectators were located at the south sluice (the "upper discharge" of the Lech), and at the northern end of the course. The paths for spectators and competitors were kept separate, partly by means of provisionally erected bridges and overpasses. Apart from the transportation of boats between boathouses, starting and finishing points, no traffic is allowed within the area.



Between starting point and finish, the canal drops 3.70 m. over a stretch of 600 m., and the speed at which the water flows may vary between 3 m. and 6 m. per second. The average width of the channel is 10 m. to 12 m., and the depth, 0.40 m. to 1.20 m. 35 concrete blocks produce the back currents, whirlpools and rapids characteristic of a natural torrent. On either side of the canal, there is a 1 m. wide gangway for the organizers who erect the gates and for use by referees and the life-saving team.

In 1971, parallel to the construction work on the canal, permanent and temporary buildings were erected which, because of their design and because the materials used blended with the landscape, were in perfect harmony with their surroundings.





From the boathouse located in the north of the stadium, the competitors' canoes are transported to the assembly area south of the building where the race starts. This is the area where the competitors prepare themselves for the race and from which they make their way to the starting point The light beam operating the start is positioned roughly 40 m. above the sluice letting the water into the canal.

The finishing point is reached, after the passage of 30 gates, in the curve in front of the restaurant. Behind it and immediately before the point where the canal flows into the Lech, is the landing stage.

The first gate is placed immediately below the sluice. There are further gates on the straight stretch of water which is otherwise free of obstacles and which bends slightly at the level of the administrative buildings, and merges 50 m. further on into the curving section where the artificial obstacles are placed.

Interim times in the middle section are registered by a light beam system combined with a computerized stopwatch. Also near the finish are the Olympic flame and the victors' rostrum.

All permanent buildings are mainly wood or reinforced concrete frames faced with redwood. The sheds are roofed with anthracite-colored tiles made of asbestos cement.



For setting up the gates for the slalom, sockets have been inserted into each side of the canal at three-meter intervals, so that the gate hanging devices can be fixed in any position required.

Immediately behind each gate stands have been erected for the gate judges. Interim times are communicated by two-way radio to the judge of each section, who in turn passes them on to the central computer. The final results are known directly after the finish of each competition.

At the last bend in the canal, to the southwest of the restaurant, a temporary roofedin stand was constructed to seat 500 competitors and guests of honor, 100 journalists and 30 television and radio commentators.







- 1 Harbormaster 2 Harbor shore 3 Sauna 4 Northern boat house 5 Indoor swimming pool 6 Regatta direction 7 Boat house 8 Promenade 9 Row of stores 10 Apartments 11 Connecting bridge 12 Road 13 Stairwell 14 Apartment house



In July, 1972, Kiel was the meeting place for sailing enthusiasts from all over the world. They had gathered for the tradi-tional "Kiel Week", held for the 90th time. The yachting competitions of the 1936 Olympic Games also took place there. Thus it was not hard to imagine that the 1972 Olympic sailing competitions would also be held on the deep inlet at Kiel. A five-member panel commissioned by the Organizing Committee examined the sporting prerequisites and on March 8, 1967, the full Committee decided that Kiel should be the site for the sailing compe-titions once again. titions once again.

It was just as necessary in Kiel as in Munich closely to coordinate functions involved in the manifold complicated preparation, planning, construction and completion in a relatively short period of time. In Septem-ber of 1969, it was possible to begin pile driving. The foundations and slabs were produced according to methods appro-priate for winter. The assembly of the prefabricated components, the installation of facade elements, and both the interior

and exterior completion of all the buildings was programmed to begin in June, 1970. The brevity of the planning time demanded that even the preliminary designs be drawn up at a scale of 1:1 so that they could simultaneously serve as a basis for coor-dination planning by the various craftsmen. What made things even more difficult was the fact that six different partners were at work on a single building complex. The city of Kiel was responsible for the indoor pool, the boathouses, the recreation center, the regatta administration, the information center, the contest jury and the press center as well as for the harbor and underground installations. Meanwhile, the apartment hotel, the other apartment buildings and the single family houses were financed by several apartment construction companies.

The following functional clusters were

necessary: The yachting center, a building or building complex to house locker rooms, massage facilities, a sauna, a swimming pool, a recreation center (lounges with restaurant), and boathouses:

The administration buildings for the regatta officials and the contest jury, as well as business offices and a press and information center;

The various facilities for spectators; that is, promenades, concession stands, rest rooms, a bus station, parking lots, and shelters for the Red Cross and police authorities at the camping site;

Quarters for the competitors, such as apartments, flats, and single family dwell-ings as well as an apartment hotel;

The public utilities, various stores, restau-rants, cafés, etc.;

The harbor itself with berths and dry docks, an area for ceremonies and for the Olympic fire.

These buildings formed the architectural background for the realization of the Olympic sailing competitions. Simulta-neously, they were so conceived that some of the buildings could be used as training centers for sports events after the Olympics themselves were over. The majority of these buildings would be used either as dwellings or as recreational facilities.



The designers of the Olympic Center at Kiel were chosen through an architectural design competition. The winning plan envisaged of an approximately 465 meter long series of building units parallel to the shoreline, supplemented by smaller clusters of buildings of varying heights. The bottom floor of this main building approximates the contours of the steep banks of Schilksee. At this level the general public are admitted without charge as far as the embankments north of the Olympic Center.

Situated on this bottom floor are the boathouses, the regatta officials, the administration offices, the press center, the indoor swimming pool, sauna, recreation room, and the multi-purpose hall. The apartments are terraced and consist of building units set staggered on the bottom floor. At the level of the promenade are the entrances to the apartments, a row of stores, and a restaurant seating 200 which was open to the public during the Olympics. During that time, a second restaurant was open only to journalists, special guests, and employees. The sportsmen were served in a cafeteria temporarily set up in the multi-purpose hall.

There were about 450 berths on hand in the harbor. Four cranes with a lifting capacity of between one and four tons and a seventy-meter wide ramp with a winch of fifty tons capacity covered the technical needs of the boaters.









 Regatta course B (Flying Dutchman, Star, Tempest)
 Regatta course A (Drachen/Dragon, Soling)
 Regatta course C (Finn-Dinghy)
 Olympic Center
 Olympic Youth camp
 Moorings for Tall Ships
 Water Skiing
 Olympic-Exhibition "Man and the Sea"

B 21





The end point of the harbor area is marked by the ceremonial plaza to the south. It can hold approximately 8,000 spectators on its terraces.

During the seven days of the competition, approximately 210 boats sailed the Olympic course which was located between three and six nautical miles from the Olympic Center.

Some thirty vessels were available for towing the boats out to the starting point and back to the harbor. Around 220 vessels of the German navy and merchant fleets, as well as those of various organizations, were at the disposal of regatta officials as escort boats.

For the first time in Olympic sailing, landing craft (approximately 40 m. long and 10 m. wide) were on duty along the periphery of the racing lines for salvage and rescue operations. They were able to render immediate help if boats became immaneuverable or if any sailors fell over board.



To the south, an information center marks the beginning of the promenade. At the end of the complex at the level of the embankment was a cluster of concession stands for the visitors to the center. The apartment hotel to the north marks the counterpoint to the two high-rise buildings of different height in the south. These were complemented by a cluster of various-sized bungalows which formed the Olympic Village for the boaters. The apartments are arranged in three stories and are terraced towards the Baltic. Parallel with these there are terraced apartments facing inland, which are also set back. The bungalows, the low apartment buildings and the main cluster in front of the harbor area form a pleasant sequence. From the promenade, the visitors had a magnificent view of the harbor and could watch the preparations for the races without interfering with the boaters.

Every day, 4,000 spectators on fourteen steamers were able to experience the regatta on the open seas. On board they received expert explanations about the competition. The services of the post office, stewardesses and doctors were likewise available.

The passengers aboard the escort boats were kept informed of activities in Munich by means of color television sets.



In Munich, it was possible to plan and construct the practice and contest facilities, the radio and television center, and the Olympic Village in independent installations. This was impossible in Kiel-Schilksee, since all of the Olympic functions had to be concentrated in one complex.

The concept of planning chosen enabled the organic merging of the building complexes into the site on the coast. The flowing succession of hilly landscape with steep banks and low-lying shore areas remained undisturbed and perceptible. The unbroken promenade from Schilksee to the beach created a new center of attraction for both Olympic fans and later visitors. Spectators could watch the events while either strolling or lounging. The elevated walk-way was the gallery overlooking the harbor, and also offered supplementary vantage points for the opening and closing ceremonies as well as for the victors' celebrations. The Olympic Village on the south grounds consisted of 120 apartments in multi-storied buildings and 32 single family houses of various types. The apartment building built over the shops and restaurants contained 400 apartments for the press, regatta officials, and the contest jury. The apartment hotel was reserved for VIPs. It had 140 vacation apartments and a sixty-bed hotel.

The reception room of the Olympic Village was connected at the bottom floor to the information center to the south-east. Then followed the rooms for the contest jury, the regatta officials, and the press center. The indoor swimming pool (12.5m. x 25m.) adjoins the promenade, and it is possible to see into it from there. During the Olympics, the pool served as a leisure sport area for the boatmen. It has a direct entrance from the harbor. Today the entire installation with sauna and medical section is open to the public and is used by the training centers also. The recreation center consists of an 18 m. x 36 m. gymnasium, seven groups of rooms which serve as clubrooms, and a self-service restaurant for approximately 300, which can be subdivided into four smaller rooms.

This is where the participants in the Olympic Games had their dining rooms, lounges, and quiet areas. After the Olympics the clubrooms will be available to the various sailing clubs. The gymnasium will be used by schools and societies, and it is possible to use it, after minor alterations, for smaller cultural events.







A hall with an area of 6,700 square meters was furnished with technical conveniences for the efficient performance of the regatta. There were, for example, a temporary post office, a center for radio, television, and the press, etc. Afterwards this hall will serve as a winter storage area for boats and in the summer as a garage for the tenants' automobiles.











For active athletes, refreshment stands, rest areas, and game boards were provided.



Within the overall picture of municipal improvement planning, the press complex project northwest of the Olympic Park was just as much a part of the growth and development of northern Munich as was the Olympic Village. Similar plans as for the athletes were designed for the housing of more than 4,000 newspaper, radio and television men. The apartments that were used by these correspondents were on the average the same size and quality as those used by the athletes. The possibility to work in the immediate vicinity of the press center, the Olympic Center for German Television and Radio, and a large part of the contest sites was seen as ideal.

The location and the transportation oppor-tunities were especially appropriate for press purposes. The main arterial roads with feeders to the expressways were located to the north and south. The rapid transit station located between the press complex and Olympic Park offered direct connections to the entire local public transit system and to the main railroad station for other more distant points. Olympic Park could be easily reached by walking over a bridge and the Kusoscinski-Damm. Damm.

Layout diagram

- Reporters' living quarters
 Olympic shopping center
 Press Center
 Ries Strasse
 Rapid transit station
 Footpath and driveway to the Olympic Park




Every comfort and convenience was provided for the journalists living in these apartments. The rooms, similar to the athletes' lodgings in the Olympic Village, were furnished simply and practically with furniture from the German Army. There were both room service provided by stewards and a restaurant in the adjoining presscenter. The buildings, ranging from a twenty-two story highrise to two-story low houses, were so designed that courtyards closed to traffic, and lawns where the inhabitants could relax and refresh themselves, were created.







The residents were also able to stroll and shop in a roofed-over shopping center large enough for its later use. At this time most of the other facilities planned for general patronage (such as lunchrooms, medical center, drugstores, indoor swimming pool with sauna, churches, etc.) were already in use. The terraces and recreation areas in the courtyards and lawns offered the reporters opportunities to meet or relax after their hectic work day at the Olympics.

















Press Center

Architect: Design Corporation for Regional, Archi-tectural and Engineering Planning, Munich







East-west section

- Restaurant Counter Hall
- accreditation information Communications center
- 3
- Lockers Printing shop On the upper floors: Agencies







- Ground floor plan

(post-Olympic use as vocational school center)

- Entrance Milk bar Recess hall, forum
- Supply room Classrooms.
- practice rooms, workshops Toilets
- Auditorium
- Room for student government Students' library
- - Teachers' library Teachers' workroom

The headquarters for the 2,800 reporters and photographers was situated to the and photographers was situated to the south of the press complex and on the west side of Olympic Park. It was accessible from Ries Strasse. It was easy to reach the city's main arterial streets by way of Hanauer Strasse. This ideal location was the basis of a fast and smooth shuttle bus system to all of the sites outside of Olym-pic Park.

The Press Center was supposed to be tempo-rarily housed in the new Munich city office buildings. It was only in the autumn of 1970 that this solution proved to be un-workable. Further calculations showed workable. Further calculations showed that a temporary building near the press complex would cost almost as much as a permanent one. Therefore it was decided to build a multiple purpose building. This building had to be completely practical for use by the press and at the same time be oble to be completed without departies be able to be converted without drastic remodelling into a secondary school for some 2,000 students. Planning began at the end of 1970.

It was decided to build a four story build-ing of steel and steel re-inforced concrete construction. This way it would be possible to achieve the broad flexibility demanded in furnishing and later re-dividing the rooms

During the Olympics, this building was at once meeting place for journalists, news-room, club, communications center, work room, news agency, office, photo labora-tory, and central station for telephone, teletype and telephoto systems. All of these facilities were distributed through these facilities were distributed through four stories with a total of 18,000 square meters. This was done in such a way that they would be able to communicate the Olympic events to the public in the best possible way.

These rooms are arranged around a square inner courtyard. Each inside corner has a stairway and an elevator. During the time that it was used as a press center, the courtyard was covered by a roof that could be walked onto from an upper story. The work rooms underneath had natural lighting with sky lights. After the Olympics this roof was removed: the school has an open roof was removed: the school has an open courtyard and the inside classrooms enjoy daylight.











Architecturally this square building was simply constructed. Each story is marked by a row of identical windows alternating with a white facade. The facade was constructed of 1.20 meter panels. The aluminum construction was completed with window and windowsill elements.

Immediately upon entering, the visitor was able to view the centrally located communications center. This was a large area sunken below the entrance level which seated 120. It was equipped with numerous TV monitors which carried the happenings of twelve sports events. Around this center were the counters for processing credentials, information, a post office, travel agencies, a newspaper stand, and a bar. Each journalist had a private mail box and was also provided with results of the various events by a printing office located behind the boxes. Near the entrance, the stand-by drivers and doctors had their rooms. Lastly, the Organizing Committee had a closed-off work area in the northeastern part of this floor.

Adjoining at ground level on the east side was a 1,100 seat restaurant. Although it was only set up temporarily, it was, nevertheless, equipped with all the necessary kitchen facilities to prepare a meal to satisfy even the most discerning palates. This building is presently used for school rooms, and when necessary it serves as a cafeteria.

On the second floor almost 1,000 square meters of usable space stood ready for 350 workers as a press room. Besides these, there were rooms with teletype machines, television sets, telephone booths, with 110 direct lines, as well as film and photo processing laboratories and the office of the national photo-pools.

Twenty-six news agencies had their offices on the two upper stories.







Layout diagram

- Parking lot on Homer Strasse 1
- 23
- Entrance Eastern structure with restaurant and administrative areas Stands

- 5 Diving pool
 6 Swimming pool
 7 Western structure with dressing facilities for
- treatment installation Spectator facilities (snack bar and rest 8
- room area)
- 9 Temporary stands 10 Existing dressing wing for winter use 11 Grass area for playing
- and sunning Pool 3 Pool 2 Pool 1
- 12 13 14 15

- Dressing facilities and service areas for summer use Entrance to outdoor
- 16 pool for summer use

When the city of Munich was competing for the Olympic Games at the IOC meeting in Rome in 1966, among the existing sports facilities, the Dante Swimming Pool was rated as preferable to all other pools in Munich. Although it was built at the turn of the century ad head head and and of the century and had been expanded and partially remodeled several times, it was predestined for Olympic use because of its size, seating capacity for spectators immediate proximity to Olympic Park. In addition, it was one of the first heated outdoor pools in Germany, was supplied with warm water from the nearby gasworks, and was open year-round for outdoor swimming.

According to the rules of the International Swimming Association (FINA), the swimming and diving events at the Olympic Games had to be held indoors; so the Dante Pool was not considered for the competitions. At the beginning of the planning for the Olympics, the renovation and preparation of the pool was considered only in the light of providing the major training focilities for evidence, diving only in the light of providing the major training facilities for swimming, diving, and water polo. As it turned out, however, most of the water polo competitions had to take place there because of the schedule for the swimming events: the swimming pool in the auditorium of the Olympic Park was scheduled for such heavy use that only a few evening water polo games could be held there.

In remodeling the Dante Swimming Pool, it was decided to give maximum possible consideration to post-Olympic interests. Attention was concentrated on the eastern part of the complex with its facilities for competition: the swimming pool, diving pool and grandstands. The relatively new winter locker rooms here could be included practically unchanged in the restorations. The summer locker rooms remained untouched the southern pool for nonswimmers and the multi-purpose pool were remodelled.

Of the three older pools which are located on the southern edge of the Dante Pool complex, two, each 100 meters long, were subdivided by the addition of extra starting bridges. The result were two fully functional 50-m. swimming pools and two 49-m. pools for training. The pools were sealed with plastic film. To allow for water circulation, pipes for inflow and outflow were built into the starting bridges. This resulted in a considerable improvement in both the flow and the quality of the water.







The two main structures to the east and west of the swimming stadium were newly built. On the ground floor of the eastern building rooms were provided for organization personnel and for the communication media. Upstairs are the restaurant and the sauna. The floor plan and layout in relation to the winter locker rooms of the heated outdoor pool take the later use of the facility into consideration. In the western building, there are new facilities for water

processing in the basement, and locker rooms for the athletes on the first and second floors. There is also a garden restaurant as a one-story addition. The swimming-pool, diving pool and diving tower were remodeled. Even underwater spotlights, underwater windows and water circulation equipment for the diving pool are not lacking at this pool. A four-masted floodlight system with 600-lux illumination allows for possible use until late at night. A temporary wooden grandstand was erected across from the northern reinforced concrete grandstand.



Location: 8000 Munich 40

bounded by Lerchenauer Strasse to the east, Moosacher Strasse to the north, Landshuter Allee to the west, Nymphenburg Canal and Schwere Reiter Strasse to the south.

The following contest and training areas and other assorted facilities were con-structed in the Olympic Park in connection with the Olympic Games: Olympic Stadium Sports Hall Swimming Hall Boxing Hall (remodelling of the existing Ice Sport Hall) Cycling Stadium Volleyball Hall in the ZHS Hockey facilities Warm-up hall at the Olympic Stadium Training and warm-up areas Press complex and press center Men's Olympic Village Women's Olympic Village Avenue of Entertainment **ZHS-Radio and Television Center** (Deutsches Olympia Zentrum, DOZ) Rapid Transit System Station (S-Bahn) Subway station (U-Bahn) Visitors' Restaurants Concession stands and kiosks Gardeners' courtyard Offices of the Olympic Construction Company, Ltd. Garages and Parking Lots

Team director for the Olympic Construction Company, Ltd: Dipl.-Ing. Robert Strunz

Project director for the Olympic Construction Company, Ltd.: Landscape architect Siegfried Lukowski, Darmstadt Building Engineer Jens Petzold, Munich Munich

Design, planning and total concept: Behnisch and Associates, Independent Architects, Munich/Stuttgart Prof. Günter Behnisch, Fritz. Auer, Winfried Büxel, Erhard Tränkner, Karlheinz Weber

Northern embankment area, southern area with Olympiaberg, planning of the green zones and paths: Office of Prof. Grzimek, Kassel

Traffic planning: Engineering Office of Dipl.-Ing. Hundsdorfer, Stuttgart

The planning of the Olympic Lake and water drainage, as well as the public utilities for the Olympic Park: Engineering Office of Civil Engineer and Architect Schlegel, Munich

Bridge design: Engineering Office of Dr. Grimme, Munich

Electrical installations: **Engineering Consortium BMS, Munich**

Planning of the watering system for the green zones:

Brandi Engineering Office, Frechen near Cologne, and Karl Bauer Company, Schrobenhausen

Area of the Central University Sports Facilities

General over-all planning: Prof. Erwin Heinle, Dipl.-Ing. Robert Wischer and Associates, Independent Architects, Stuttgart/Munich

Planning of green zones and sport areas: Landscape architects Wolfgang Miller and Hans Luz, Stuttgart

Sewer planning and coordination of public utilities:

Engineering Office of Civil Engineer and Architect Schlegel, Munich

Lighting and floodlight planning (elec-trical facilities): Engineering Consortium BMS, Munich

Street planning: Engineering Office of Billinger and Associates, Stuttgart

Pump station planning: Engineering Office of Aschl, Munich

Planning for watering the outdoor sport areas:

Brandi Engineering Office, Frechen near Cologne

Building Supervisors: for the northern embankment area, the southern area with Olympiaberg, the Central University Sport Facilities (ZHS): **State Capital City of Munich** Building Commission of the municipal department of parks **Engineering Consortium for Olympic Buildings, Munich** Rüping Engineering Office, Düsseldorf, Dr. Walter Engineering Office, Essen

Characteristics of Design and Construction

Before construction work began for the Olympic Games in Munich, Oberwiesenfeld was a nearly level area of approximately 2.8 million square meters. A television 2.8 million square meters. A television tower was the only constructed accent and the rubble mound in the southeast domina-ted the landscape. The basic plan proposed the dividing of this property into manageable lots and the extension of the municipal transit system into the Olympic grounds. The separation of vehicular traffic and pedestrian walkways results in an essential constituent for the future structure of the landscape. Embankments for walkways, viaducts, bridges, depressions and elevations, aquaducts, a lake and the buildings form the overall image of the Olympic landscape. The landscape lines are taken up in the taller buildings which extend and intensify the forms of the modeling of the grounds. In this way any undesired monu-mentality of the buildings was avoided. The landscape continued to dominate despite the extensive volume of the buildings. The various individual areas which are grouped around the central plateau constituting the forum of the main competition sites, the theater and recreation area, the training area, and the Village with its facilities serving various functions, form a large area of experience with human dimensions. It is a park for visitors.

External Access

External Access Vehicular traffic: By widening the Middle Ring, Landshuter Allee, Moosacher Strasse, Dachauer Strasse and Ackermann Strasse, Olympic Park was served by the inner city by-pass system and thus connected to the main highways leading out of the city, the autobahns to Stuttgart, Nuremberg, Salzburg and Gar-misch. The location of Olympic Park approximately four kilometers from the approximately four kilometers from the center of the city, together with the high-ways and inner city street network, offered an optimum external connection with the city. Public transit:

The subway station at the Olympic Village and the bus and streetcar station to the south of Oberwiesenfeld supplied the connection to the inner city transit lines. The rapid transit station to the west connected Olympic Park with the public transit system of the entire Munich area.

Internal Access

Twenty-three bridges of various types, some temporary and others permanent, were constructed. This made frictionless internal movement within the Olympic Park possible. It was necessary that the walkways from the public transit stations and parking lots to the various contest sites be without street crossings. At the same time reasons of organization and protocol required vehicular access for employees, administration officials and VIPs. The administration officials and VIPs. The greater problems presented themselves in laying out the pedestrian paths which in-terconnected all parts of the Olympic Park. These had to cope with an influx of at least 80,000 spectators per hour for the main events. This influx concentrated on the so-called central plateau, an enclosed area of approximately 42,000 square meters around which the swimming hall, sports hall and stadium were clustered. These were the most popular sport sites and counted a total of 100,000 spectators. This high attendance called for the construction of bridges up to 25 meters wide. In spite of the calculation of all determining factors, the unaccountable behavior of pedestrians the unaccountable behavior of pedestrians in crowd situations left room for the possibility of disruptions and therefore for problems. A good street sign and public address system in the areas of congestion was to facilitate movement and allow for traffic control when needed. The internal street traffic, which was completely separated from the pedestrian walkways, consis-ted mainly of the shuttle buses from the Press Center and Olympic Village to the sport sites, as well as of administration service, VIP and emergency traffic. A minimum street width of 6 meters sufficed to provide adequate and troublefree transportation. Parking:

Inside Oberwiesenfeld 5,000 to 8,000 parking spots were available. These were not open to visitors during the Olympic games, however, but were rather used for special purposes, for example, VIPs and officials. Around Oberwiesenfeld about 30.000 parking spaces were constructed for visitors.

Green Areas

About 2.2 million cubic meters of fill were required for landscaping purposes. A total of approximately 350,000 cubic meters of top soil was prepared and used to cover a green area of 1,440,000 square meters. Forty tons of grass seed were needed to

sow this area. 3,100 large trees were planted as well as thousands of smaller trees, bushes and shrubs. Different species of trees were used for the various outdoor areas and thus facilitated orientation. Lindens were planted in the pedestrian areas; maples, ashs and poplars beautified the traffic areas: willows and alders graced the lake, and stone pines were planted on the rubble heap. It was possible to walk on the level lawns and all slopes were cultivated as meadows.

Olympic Stadium

Location 8000 Munich 40 Olympic Park

The roofing of the Olympic Stadium, sport hall and swimming hall

Director for the Olympic Construction Company, Ltd. Dipl.-Ing. Volker Jansen, München

Project director of the Olympic Construction Company, Ltd.: Dipl.-Ing. Volker Jansen, München

Concept and Design: Behnisch and Associates, Independent Architects, Munich/Stuttgart Prof. Günter Bennisch, Fritz Auer, Winfried

Büxel, Erhard Tränkner, Karlheinz Weber

Development: Prof. Frei Otto, Warmbronn

Construction and Statics: Prof. Dr.-Ing. Fritz Leonhardt, Dipl.-Ing. Wolfhard Andrä and Dipl.-Ing. Dr. Jörg Schlaich

Arrangement: Prof. Dr.-Ing. Klaus Linkwitz, Institute for Applied Geodesy at the University of Stuttgart and Prof. John H. Argyris, Institute for Statics and Dynamics of Aero-space Construction at the University of Stuttgart

Construction Physics Advisor: Prof. Dr.-Ing. Wilhelm Schaupp Institute for Applied Building Studies and Construction, Munich-Grünwald

Building Supervisors: Engineers Team Olympic Buildings, Munich

Engineering Office Rüping, Düsseldorf Engineering Office Dr. Walter, Essen

Characteristics of Design and Construction

The tent roof extends over the western stands in the stadium, the sport hall, the swimming hall and the pedestrian areas in between. The tent roof can be designated as a continuation of the grounds' modeling. It caused the main sport areas to merge into a cohesive structure. The chosen prestressed cable network construction made the realization of the planned dimensions (spans) of the canopy possible. A surface of approximately 75,000 sq. m. with spans up to 450 meters had to be suspended over the various contest sites. Pylons, freehanging supports (air suspenders) numerous foundations (heavy-duty foundations, slit wall foundations - comparable to oversized tent pegs — and compressed tension anchors at less important parts of the structure, and pre-stressed acrylic glass panels 4 mm. thick and mostly 3.00 m. x 3.00 m. in size (at the tops of the masts $1.50\mbox{ m. x } 1.50\mbox{ m. and smaller})$ formed the translucent skin. This seemed to be the most practical material to meet the require-ment of the German Olympic Center for Radio and Television (DOZ) that shadow contrasts be kept to a minimum to insure trouble-free television transmission. The visible inner lining of the tent roof closely followed the form of the outer roof skin followed the form of the outer roof skin.

The temporary stands in the swimming hall were covered by a temporary roof. It was surfaced with PVC coated polyester fabric which was draped over randomly strung cables from the main pylon and the tempo-rary masts outside of the stands. The cables lying on the roof surface prevent its being inflated by the wind.

Dimensions of the Facility

I Otal area
Stadium
Sport hall 21,750 sq m
D_{pot}
Roois in-between 6,600 sq. m.
Swimming hall 11,900 sq. m.
Temporary roof above the
temporary stands 3,200 sq. m.
Number of main pylons 12
Number of masts
Longest mast
Greatest diameter 3.5 m
Movimum wall thicknoon 75 mm
Maximum wan unickness
Number of air suspenders 10
Length of air supports up to 20 m.
Network cables:
Size of mesh
Diameter of cables 2 x 11 7 mm
or 2 x 165 mm
l lotal length of cables 400,000 m.
Border capies:
Diameter of the seam-
cables:

No. 1 through No. 4 Total length approximately . . . 15,000 m. Foundations:

Number of tension points: More than 100 stress foundations (heavy-duty foundations, slit wall foundations, tension anchor foundations)

Construction Components Tension foundations:

- Three kinds of foundations were used:
- Slit wall foundations, which act on the same principle as tent pegs.
 Heavy duty foundations: The great weight of these foundations and the pressure of the earth which lies over them counteract the stress exerted on them
- Ground anchor foundations, on account of difficulties in approval, were only used for subordinate building elements.

Masts and pylons: These consist of cylindrical pipes with a diameter of up to 3.5 meters and a wall thickness of 75 mm. During installation the masts were set up on steel-reinforced concrete footings and ball bearings which al-lowed the mast to be moved in any direction. After the entire roof was installed the steel ball bearings were buried in concrete. The movements of the masts caused by the shifting of the roof were absorbed by the rubber grommets above the steel ball bearings.

Main cables:

The cables consist of bundles of parallel laid strands with a 15 mm. diameter. The cable heads were cast from a newly developed diameter of 130 mm. were coupled at the principal edge cable of the stadium. A bundle of strands consists of 55 individual strands.

Border cables: These were produced as a patented spiral cable with a diameter of 81 mm. All lines were pre-stressed at a specific temperature, hung exactly and provided with the necessary assembly marks. Network cables:

These consisted of double strands which

formed a mesh with 75 cm, wide spaces and were fastened with aluminum clamps. By screwing together two clamp elements at the crossing point of two lines a net knot was formed, on which the roof surface (acrylic glass panels) was fastened with rubber cushions.

The junction points of the construction systém:

The junction points (high points, mast heads, turning saddles) consist of cast steel. The heaviest construction weighs approximately 27 tons.

Roof Area

The Stadium:

Nine saddle-shaped curved roof surfaces, enclosed by border cables, were positioned in a continuous series. The roof is supported by eight masts, each with guylines leading by eight masts, each with guylines leading directly to the foundations, by high junction points hung from the masts, by free hanging air suspender cables, and by the large edge cable, which connects all inner cable junctions and is further supported by both of the ball bearing foundations to the south and the northeast.

Sports Hall: The roof consists of five saddle-shaped curved segments, which are all joined to each other and are suspended between two

each other and are suspended between two mam pylons (in the north) and are held by direct guylines to the other foundations. The Swimming Hall: This roof has a free form surface geometry. The segments are hung on the main pylon and curve down to two low points. The tem-porary stands were covered by the temporary roof described above roof described above.

Olympic use: Opening ceremony, Track and Field, Modern Pentathlon, Football, Equestrian Sports (Prix des Nations), Closing ceremony

Location: 8000 Munich 40 Olympic Park

Team director for the Olympic Construction Company, Ltd.:

Dipl.-Ing. Adolf Hillmeier, Augsburg

Project director for the Olympic Construction Company, Ltd.: Buildings

Architect Gerhard Riegert, Munich Competition and training grounds: Building Engineer Jens Petzold, Munich

Design and Planning: Behnisch and Associates, Independent Architects, Munich/Stuttgart Prof. Günter Behnisch, Fritz Auer, Winfried Büxel, Erhard Tränkner, Karlheinz Weber with Jürgen Joedicke

Project director for Behnisch and Associates: Dipl.-Ing. Hans Beier, Munich

Dipl.-Ing. Heinz Isler, Burgdorf, Switzerland

Landscaping: Günther Grizmek, Kassel

Direction of Construction: Engineering Consortium for Olympic Buildings, Munich Engineering Office Rüping, Düsseldorf Engineering Office Dr. Walter, Essen State Capital City of Munich Building Commission of the Direction of City Gardens

Characteristics of Design and Construction

The almost perfectly round Olympic Stadium is set into the western slope of the cen-tral plateau (forum). The single gallery spectator stands are enclosed by earthworks (about 2/3 of the shell) and by the stadium structure itself (about 1/3 of the shell). The long axis measures 260 m. The cross axis of 245 m. deviates 10° to the west of true north-south. The edge of the stand has step-like elevations on both straight sides. The slope of the steps is plotted to present an unencumbered line of sight. The maximum distance from a specta-tor seat to the farthest point of the playing fields is 195 m. The height of the individual steps ranges from 20 cm. to 48 cm. Because of special seating demands during the Olympic Games the normal spectator capacity of 81,000 was reduced to 77,000. Filling and emptying the stadium are ac-complished through a common access level Filling and emptying the stadium are ac-complished through a common access level. The grandstand structure on the western side is built upon a 34 m. high frame, on which 1,280 prefabricated steps with a maximum length of 16.05 m. are mounted. The landfill grandstand with earthwork up to 18 m. in elevation is covered with 30 cm. — thick poured concrete slabs, which support a total of 24,700 running meters of cast concrete steps. The stands contain three floor levels, on which all necessary auxiliary rooms are arranged. A lower corridor connects the athletes' areas to the prepara-tion rooms and to the warm-up hall.

Dimensions of the Facility

Stadium site including all
tion 250,000 sq. m.
area
Space for spectator
(outer periphery). 27,600 sq. m. Infield area
Spectator surface 37,500 sq. m. Sport field 105 m. x 68 m. 7,140 sq. m.
Parking area

Access

By car: The stadium is integrated into the internal road and driveway network of Olympic Park. A strict separation is maintained between vehicular and pedestrian traffic zones. Internal vehicular traffic to the stadium is restricted to the western side of the structure and to authorized groups. In post-Olympic times, spectators arriving by car are directed to the parking lots on the western side of the stadium. These spaces, however, were reserved for VIPs and organization personnel during the Olympics. Public transport:

The pedestrian walkways from the rapid transit and subway stations in the northern parts of the Olympic Park and from the streetcar and bus station south of the stadium lead to four passage zones (northwest, northeast, southeast, southwest) and feed from there into the stadium access level

Total Cost excluding Incidentals

Stadium exclusive of r	root			
and inner area		80.0	million	DM
Inner area		2.3	million	DM
Roof		55.0	million	DM
Warm-up hall		5.8	million	DM
Training grounds		2.1	million	DM

Utilities Heating

The grass grounds and the grandstand structure as well as the rest-rooms under the periphery are heated.

Ventilation:

All rooms in the grandstand structure are mechanically ventilated. The technical sy-stems are divided into the following zones: grandstand structure

2. service garage

3. spectator rest-rooms under the periphery 4. direction booth

The rooms in the grandstand structure are ventilated in the summer. The VIP and press areas are supplied with cooled air (warm air heating in the winter). Cooling capacity in the VIP and press areas is 300,000 kcal/h. On level 1 (VIP and press areas) space heaters provide warmth along the glass facade. The operating zones can be separated from each other in accordance with various uses.

High voltage electrical installations: The floodlight system consists of a fourmast installation which delivers a vertical illumination of 1875 lux (new value) Two floodlight banks, each with 144 spotlights, are mounted on scaffold-type masts at the northern and southern ends of the eastern grandstand. Two floodlight banks,

each with 78 spotlights, are mounted on the forward cast of the edge cable of the western grandstands. To illuminate the infield (western broad jump field) six smaller banks, each with 20 spotlights, have been attached to the trusses of the roof struc-

ture. There are also supervisory installations to check electrical capacity, installed transformer output, safety transformer reserves and connection values.

(The following values are mentioned in this order:)

Total, 9,100 kVA, 2,485 kVA, 6,356 kW
1,855 kVA
direction 1,100 kW
Ventilation, heating and hygienic installations, 2,060 kVA 1,000 kW Scoreboards — 1,150 kVA 1,100 kW
vehicles, stadium subcenter) . 250 kW
television monitors
1,260 kVA 630 kVA 500 kW
systems 30 kW
630 kVA

Low voltage electrical installations:

Communications technology Telephone system with 240 main circuits

and 2,800 extensions. This installation was the central exchange for the whole Oberwiesenfeld.

Intercom systems

Terminals for data processing, data input, data recall, fire alarm system, commentator network, clock system, antenna facility, pneumatic messenger system.

	I low voltage installation	<i>31</i> 3q. m.
	outlets	95 sg. m
	Heating and ventilation	
	stations, total	805sq. m.
	Battery room	53sq.m.
	Emergency power supply	148sq.m.
	Porter	60sq. m
I		

Technical Installations for Sports Time measurement:

The timekeeping system was temporarily installed. No measurements were taken by hand.

The starting gun delivered an electronic an optical and an acoustic signal. This signal set off the crystal clocks of the electronic timing system (primary system). The starting impulse was simultaneously transmitted telemetrically to the direction booth (secondary system).

The finish was marked by a dual electric eye. For the measurement of middle times, additional electric eyes were set up at every 200m. Three finish líne cameras, which were controlled from the timing booth on the upper edge of the stands, recorded the finishes for final decisions. The elapsed times were blended onto the films and onto the television pictures which were taken by an additional camera.

Measurement of throws:

Distances were not measured by tape, as in the past, but rather by electronic instruments. The point of impact of the javelin, hammer or discus was marked by a prism reflector, which was aimed by two telescopes in the

direction booth. The results were determined by measuring instruments linked to vertical and horizontal triangulation components and processed by a connected desk computer.

Measurement of jumps:

Distances were measured by means of an optical telescope which could be moved along guiding rails mounted parallel to the sand pit. Scoreboards:

Two electronic Scoreboards (for Olympic and post-Olympic use), executed in "matrix technique" and fixed on the northern and southern sides of the upper grandstand edge, consisted of

a subsidiary board . . . 19.80 m. x 8.60 m. a clock for normal diagonal and a subsidiary board . . . 7.64 m x 3.40 m. a clock for normal time,

diameter 4.00 m. The following information could be displayed on the main board:

starting lineup, numbering, names and nationalities of the athletes, interim results, end results and order of athletes according to end results.

The subsidiary board contained the digital stopwatch and displayed Olympic and world records.

Four Scoreboards (light chamber technique) were located in the infield. These were 2.58 m. wide, 1.20 m. high, and could be swiveled 90°. These boards showed the individual results of the jumping, shooting, and throwing competitions, and were set up in the corresponding contest areas.

Competition Area

Infield surface 18,800 sq. m. The reporters' trench, 2 m. deep and 3 m. wide, surrounds the entire infield. There is a 400 m. track with eight lanes and with eight sprinting lanes on the straightways. Water trenches for the 3,000 m. steeple-chase were provided in the northern segment.

Pole-vaulting was assigned two fields in the northern segment; high jumping two fields in the south.

Broad jump, two running start lanes in the west, parallel to the sprinting lanes. Broad jump and triple jump, two alter-nating running start lanes on the eastern side parallel to the track.

A grassy field, 105 m. x 68 m. for discus, shot put, hammer and javelin events at each end of the stadium. The 400 m track, the straightaways and

the running start lanes of the jumping areas, as well as the northern and southern sectors behind the goal line boundaries are done in "Rekortan", a massive plastic coating with a bitumen base (7,225 sq. m. total).

The main playing field has a grass surface, which is heated by a warm water system. The buildup from bottom:

20cm. drainage layer (medium thickness) of gravel 0—30, 16 cm. filter layer of sand and gravel 0-3 (grass fertilizers and "Montigel" are mixed in), 10 cm. supporting layer of a 40:60 peat moss and sand mixture (grass

Grass mixture: 70 % poa pratensis "Merion", 1 5 % phleum nodosum "S 50", 15 % cyno-surus cristatus "Credo".

surus cristatus "Gredo". Boundaries and drainage of the playing field: The playing field is executed as an even surface without grade. A drainage system was dispensed with in view of the permeable gravel base. Only the two straight ways were drained. The water which collects on the Rekortan surfaces is collected by a

plastic concrete gutter along the inner track edge and is sluiced off into cisterns. The coating of the gutter is of a piece with the track. A collapsible bar, which is built of squared tubing with a plastic coated profile of 5 cm. x 5 cm., serves as the track boundary.

Sprinkling: The automatic system has six-teen countersunk sprinklers. Each long side has four and each end has three semicircular nozzles, while there are two circular nozzles in the middle.

Heating: A warm water heating system extends the grass growing season into the spring and fall and keeps the field virtually snow-free in winter. (A snowfall of 1 cm. per hour can be melted.) The heating consists of plastic tubing which is laid 25 cm. under the turf at 40 cm. intervals. The provisional maximum temperature is 36°C. The competition office 39 sq. m. is located in the western

direction booth 424 sq. m. on the upper edge of the stands. The center is built on a platform which fits well into the geometry of the stadium. This booth is the coordinating center for all events in the stadium.

Confer the training grounds.

Olympic Use From August 26, 1972 (opening ceremony) to September 11,1972 (closing ceremony)

Athletes' Area

Entrance area — level 2: 1 2 dressing rooms, each with . . . 38 sq. m. Each dressing room is provided with a shower room with 32 sq. m. and two toilets, each with 7 sq. m. 7 sq. m. Medical supervision and doping control: 1 doctor's office, 2 treatment rooms, 1 massage parlor and lounge, 1 X-ray room and 1 lab with a total of. . 285 sq. m. 2 hygienic stations for athletes at both Marathon (divided into 40 cubicles) Athletect attacks Athletes' stand-by room before competitions on level 3 by the Marathon: Level 4: 1 room 2 locker rooms for soccer with a total of 200 sq. m. (dressing rooms, showers, toilets, and relaxing pools) Access: By bus to the athletes' entrance on level 2; then directly to the changing rooms (hygienic rooms), medical facilities, lounge and massage; via staircase to level 3 and the stand-by room; there is the assembly area and call-up for the contests. (There is a tunnel connecting this stand-by room to the preparation zone, the warm-up hall and the warming-up area).

Spectator Area

na-
77,000
44,000
33,000
r of

Invalids 70 participants 2,452 post-Olympic capacity 81,000 The Olympic press and commentators seats account for the difference. The western half of the stadium, with about 54% of all spectator places, is sheltered. 300 places under the roof were assigned to the main VIP stand, whose central section was reserved for IOC members and official representatives of the various nations. More VIP places were located above both to the left and to the right. 135 commentators' tables, each with two chairs and equipped with a television set and a commentating unit, were also sheltered. 413 press tables with two seats each were available, as well as 870 press seats without tables for non-accredited newsmen. There were also 70 seats for handicapped spectators and 2,452 places

VIP stands, the lounge and the restaurant with its 228 seats, as well as to the con-ference room to the right of the foyer, the office areas, the hostesses' rooms, the coatrooms, and the telephone booths. (An information desk is set up in the foyer.) Spectator stands:

The grandstands are divided into 28 blocks which are designated by letters A to Z. The capacity of each seating 2.400-3,600 block Standing room blocks 3.000-3.400 Size of one seat 0.50 m. x 0.80 m. Size of one standing

. 0.50 m. x 0.40 m. place The all-plastic seats are of the individual bucket type and have no backs.

Meal service for spectators: Spectators were served from 53 sales units. which were grouped into nine clusters. These offered snacks, refreshments, and sundry small articles. The clusters were equally distributed around the periphery. Hygiene:

The hygienic areas, toilets and wash-rooms are located directly off the access stairways to the blocks. The stadium has a total of twenty toilet installations with 106 seats and 598 urinals for men and 144 seats for women.

First aid:

Four first aid stations are located along the through-passageways. Two of these measure 80 sq. m. each and two 20 sq. m. each

Spectatoraccess:

Spectatoraccess: Admission to the access level is through the four passage zones. The western stand (above-surface structure) offers entrance via centrally placed openings, from which seats are reached from above and below. In the eastern stands (earthwork section), however all seats are reached from above. The blocks are partitioned by 00 cm bane The blocks are partitioned by 90 cm. banissealed off from each other by 90 cm. bans sealed off from each other by 130 cm. security glass panels. Breakwalls of 1.10 m. height and 3.10 m. length are installed at every tenth step in the standing room areas

Ticket sales for spectators and inspection:

The four passage zones from the pedestrian walkway network have a total of 74 ticket windows, 77 inspection gates, and 21 exit gates. The inspection facilities are built

into the 2.25 m. fence which surrounds the stadium. Two central box offices are provided for final accounting.

Communications Area The press area, which covered

a lotal of 1,980 sq. m. was subdivided into working and telephone rooms and telephone rooms and a press block in the

stands. Press driveway on level 1 : A snack bar with 80 seats was installed left of the foyer. To the right of the foyer the press offices with 100 desks were located, followed by the telephone room (20 boothe) and the telephone room (20 (50 booths) and the teletype room (20 machines). An information booth and lists of contest results were to be found in the lobby. The press seats were in the stands. There were direct stairways from the press area both to the press seats in the stands and to the reporters' trench. DOZ editors' rooms:

direction booth was reached via passages in the upper stands, the editors' rooms ABC was allotted a total of. . . 650 sq. r which consisted of 14 rooms, direction console booths, studios, and information 650 sq. m.

rooms. Transmission facilities: There were 14 permanently built-in camera platforms in the grandstand area (11 for television, 3 for movies). Up to five por-table cameras could be connected in the infield. The 155 microphone desks (135 open places in the stands and 20 commentaposts in the direction booth near the DOZ subcenter) covered a total of 200 sq. m. A 3 m. x 7 m. platform was installed under the direction booth for an ABC camera.

Parking space was provided for technical vehicles underneath the western stands. Access was through the Marathon gate. A total of 16 vehicles from radio and television services, as well as service units of the police, fire department and the Red Cross could be accommodated. The post office technical rooms

271 sq. m. covered Data processing system in the Olympic Stadium (Computer Center):

The system was installed on the technical level of the grandstand story. There were three Siemens Type 4004 computers, of which one was in reserve. The purpose of which one was in reserve. The purpose of the installation was to provide the press, radio, television, and the spectators with fast and accurate information about the results of the Olympic contests. Here the results of all competitions were collected, processed, and passed on by teletype and data monitoring stations continuously and on demand to any contest area.

Competition and General

Organization Grandstand structure, level 1 : 1 Room for the president of 28 sq. m. the IOC 1 Room for the president of
the German NOC28 sq. m.28 sq. m.28 sq. m.29 Stadium direction office25 sq. m. OC technical staff— 6 rooms, totalling 212 sq. m. OC short term help — 365 sq. m.

1 3 offices for national and international sports associa-

tions	482	sq.	m.
OC security guard	191	sġ.	m.
Grandstand structure, level	3:	•	
Personnel rooms for			
Medical personnel	. 48	sq.	m.
Firefighters	. 46	sġ.	m.
Police	. 45	sġ.	m.
4 workshops, totalling	391	sġ.	m.
Grandstand structure, level	4:	•	
Preparation room for victory			

Restaurants

VIP restaurant with 228 seats
(level 1)
Lounge with bar (level 1) 228 sq. m.
Kitchen and side rooms
(level 3) 440 sq. m.
Press snack bar (level 1) 244 sq. m.
Kitchen
Canteen for short-term
help, including preparation
room
There were 53 sales areas for spectators
to huv refreshments drinks and small

efreshments, drinks, and sma sundries.

Training grounds

A training hall (warm-up hall), a modified type B track and a throwing field are installed on a three-hectare site.

The training hall which is set into the ground, measures 95 m. x 50 m., and has a net inside height of 5.50 m. The usable inside surface is 5,200 sq. m., the total volume 34,800 cu. m. Sporting installations in the hall:

a 200 m. track with banked curves, equipment and space for broad jumping, and triple jump, shot put field, 6 m. x 60 m. sprinting track, and a high jump facility (in this area the hall is 8.50 m. high). Side rooms:

2 locker rooms, each with	30 sq. m.
2 Washrooms, each with	24 sq. m.
2 Toilet facilities	•
2 Training rooms, each with	15 sq. m.
1 First aid room	13 sq. m.
1 Technical room	40 sq. m.
1 Equipment room	130 sġ. m.
1 Toilet facility for the	•
· · · ·	40

fields 40 sq. m. The track has six 400 m. lanes and eight sprinting lanes. There are two high jumping facilities and one throwing circle for discus and hammer in the southern contor. The perthern sector is provided sector. The northern sector is provided with 1 hurdle ditch, 2 pole-vaulting facilities, 1 area for broadjumping, 1 com-bined broad jumping and triple jump field, and a throwing circle for discus and hammer.

Grass area 105 m. x 68 m. Construction of the lawn and the tracks is the same as for the stadium.

is the same as for the stadium. The throwing field has two javelin and two shot put areas. This field is a mixture of sand and topsoil. The construction of the javelin runway is the same as in the stadium. This whole outdoor area is lighted by a seven-mast floodlight system which produces an illumination of 150 lux (new volue) In the coutthwastern corport of the value). In the southwestern corner of the total area there is a manually operated athletes' call system.

Types of Sport: Gymnastics and Handball finals

Location: 8000 Munich 40 Coubertin Square

Team director for the Olympic Construction Company, Ltd.: Graduate Engineer Bernd Krönert, Munich

Project director for the Olympic Construction Company, Ltd.: Graduate Engineer Hans Korn, Munich-Grafing

Design and Planning: Behnisch and Associates, Independent Architects, Munich/Stuttgart Prof. Günter Behnisch, Fritz Auer, Winfried Büxel, Erhard Tränkner, Karlheinz Weber

Project director for Behnisch and Associates: Dipl.-Ing. Architect Bernd Rosewich

Statics and Construction: Engineering Office of Dr. Günter Scholz, Munich and Leonhardt and Andrä. Consortium of Consulting Engineers VBI, Stuttgart

Heating and plumbing installations: Engineering office of Brandi, Frechen near Cologne

High and low voltage electrical technology: Engineering office of Roland Gackstatter, Stuttgart

Direction of Construction: Engineering Consortium for Olympic Buildings, Munich Engineering Office Rüping, Düsseldorf Engineering Office Dr. Walter, Essen

Characteristics of Design and Construction

The sports hall or multi-purpose hall lies between the swimming hall and the stadium and forms the northern boundary of Coubertin Square (the central plateau). The nearly oval layout plan of the single The nearly oval layout plan of the single level of stands, which surrounds the building, gives the entire construction its distinctive form. In the same manner as the stadium and swimming hall, the sports hall with its shell of stands is set into the partly artificial topography of the Olympic Park. The building can only be seen in its full height from the north. From the south only the roof with its enclosing facade is visible above the terrain is visible above the terrain.

The grandstands rise on all sides from the central arena (level 1) up to the visitor access on level 4, and constitute a transition through the glass facade into the Olympic Center, that is, the central plateau. The auxiliary rooms are located on levels 2 and 3 underneath the slopes of the stands. The only exception is the warm-up hell or gumnesium which is onloced in its hall or gymnasium which is enclosed in its own underground structure set on the continuation of the lengthwise axis to the west. The entire building is constructed of reinforced concrete. The prefabricated steps in the stands are mounted on poured concrete beams.

Dimensions of the Facilit	V
Total built-over space	427,300 cu. m.
including air space	,
over the hall	288.000 cu. m.
Total usable surface	46,000 sq. m.
Axis of the total complex	, I
(less warm-up hall),	
lèngthwise	about 150 m.
Axis of the sports hall	
crosswise	about 120 m.
Greatest height from arena	
floor to lower roof surface	about 42 m.
Arena area (inner area)	
with temporary stands for	
Olympic use	. 2,000 sq. m.
Arena area without temporar	'y
stands (post-olympic use)	4,000 sq. m.
Total surface of the podiums	
for Olympic gymnastics	
competitions	
Handball court	
20 m. x 40 m	800 sq. m.

Access

By car: Coming from the Olympic Village, motorists use Lerchenauer Strasse, the Middle Ring, and Spiridon Louis Ring. From there the entrance driveway on level 1 (arena) is reached by a ramp. Public transit:

The subway station of the Olympic Park lies about 600 m. to the east. A connecting path leads over a footbridge to the access level of the hall. The rapid transit station for the Olympic Park is about 800 m. to the northwest. A footpath connects with the sports hall. The streetcar stop is on Schwere Reiter Strasse, about 1.2 km. away. Again footpaths connect to the sports hall.

Parking lots: During the Olympic Games parking spaces near the sports hall were provided only for VIPs, functionaries and service groups.

Total Cost (Excluding Incidentals and **Roof Construction**) 72 million DM

Utilities

Heating, cooling, ventilation: Heat connection value 6.6 Gcal/h. Connection to the urban hot water heating network Cooling capacity 2.5 Gcal/h. Ventilating capacity 800,000 cu. m./h.

the hall comprises. 288,000 cu.m. The entire sports hall is heated by warm air. Only the administration rooms are equipped with supplementary radiators. The actual hall area can be cooled in sum mer. The air which is needed for heating or cooling is drawn in from intakes located under the stands in the north and south of the hall. It is either preheated or precooled before being passed on to the eighteen adjustable vents above the stands, from which the treated air is blown into the hall or the foyer. The exhaust air is removed to 70% through the steps in the stands, to 10% through the arena floor, and to 20% through the two high points of the roof. Eighteen stations for ventilation machinery are symmetrically distributed around the arena on the administration level. They can be operated alone or in groups. The warm-up hall, the restaurant and the auxiliary rooms are served by their own stations. The exhaust air is collected in a duct ring under the arena level and

is blown out about 25 m. away on the eastern and western sides of the building Vestibules on the western and eastern facade create an air curtain and separate the heated hall from the outside air. The following room temperatures are achieved: Foyer, warm-up hall, 18°C. workshops Dressing rooms, doctors' offices, administration .24°C. Press, rooms, restaurant, 22°C administration Storerooms, auxiliary rooms. 12°-15°C. High voltage installations: Installed transformer power output. Emergency generator power 4,870 kVA .300 kVA output. Illumination (floodlight installation): sixteen lighting platforms with a total of 126 spotlights (each bulb 2 kW) for the direct lighting of the arena are situated on the uppermost edge of the stands above the spectator banks. 64 more spotlights (each bulb again 2 kW) illuminate the edge of the roof. On the central lighting platform, which is joined by a catwalk to the upper direction booth and to the four cross walkways, 144 more spotlights are mounted. These platforms provide for the special post-olympic lighting needs of the cycling track, boxing ring, and stage per-formances. The glare-free lighting de-manded for color television has an intensity of 1,875 lux (new value) vertically and about 4,000 lux horizontally.

Stage lighting system: This consists of sixty light intensity-con-trolled circuits, electronic programming of all circuits for 100 different lighting arrangements and a control box with a "blind' rangements and a control box with a blind schematic. The lighting can be directed from two switch consoles, one of which is portable. According to the needs of each individual event, the lighting is controlled either from the direction booth on the long northern side of the arena level or from the booth built above the foyer on the southern side. The portable console can be put into service on the lighting platforms or at other connection points, while the master switch console in the control

booth maintains priority. Low voltage installations: PA system: sixty loudspeaker clusters are located on the lighting platforms to serve the spectator area and playing fields. The speakers for the fover, the dressing rooms, and preparation rooms are collected into separate groups. The restaurant and the warm-up hall possess their own stations, which are connected to the main amplifier center. At post-olympic stage performances, any desired effects can be achieved by switching in special PA systems. Direction can alternate between the central booth and the sports booth. The control console in the sports direction booth can also be used in the arena. There is also a telephone system with 150 extensions from the central exchange in the Olympic Stadium. In addition there are six intercom systems for important communications posts, a clock system, an antenna installation for television, electronic data processing and data transmission facilities, data monitoring stations and a fire alarm system.

Technical Installations for Sports Scoreboards:

Four main scoreboards are hung above the middle of the arena at a height of 16 m. and at a distance of between 40 m. and 65 m. from the spectators. Each scoreboard consists of a main board (11.82 m. x 2.94 m.), a moving headline band (6.72 m. x 0.45 m.) and a running lane indicator (0.70 m. x 2.94 m.) which is mounted on the left side of the scoreboard in front of the PA system columns. Main Scoreboard: ten lines each with 41 characters of 231 mm. height. Moving headline band: Complete screen of lights with character height of 231 mm. Running lane indicator: One symbol band with white characters on a black ground for individual gymnastics disciplines and handball. Height of characters 330 mm., one black covering band for partial concealment of the figures.

Input of information and results from data monitoring stations in the field direction booth or from the central booth, depended on the competition. A closed-circuit television system with three cameras transmitted pictures of the main scoreboards to monitors in the field direction booth.

Six individual scoreboard installations for the various competition areas supple-mented the four main ones. These consisted of three-sided portable point score-boards in "light chamber technique". Each supplementary board was supplied with four input consoles for use by the judges. The final score was transmitted to the main control station through an input board operated by the referee (chief judge). The clearing of the individual scoreboard was regulated by a light signal.

Competition Area

Gymnastics:

In the inner area of 2,000 sq. m. the podium for gymnastics was erected. On a total surface area

1,103 sq. m. of 47.58 m. x 23.18 m. a gymnastics podium was built, divided into five areas

with a total surface

area of

The dimensions and execution of these podiums met the specifications of the International Gymnastics Federation (FIG) The podium consisted of fields of 1.22m. x 0.61 m. size or of 0.61 m. x 0.61 m. in areas of particularly heavy loads. The highest possible stress was set at 400 kg./sq. m. The height of the podium was 91 cm.

The framework consisted of a collapsible steel structure. The gymnastics floor surfaces were constructed of 25 mm. thick Oregon pinewood slats, a 14 m. square area of which was covered with heavy-duty carpeting. The running start lanes for the horse vault were covered with a 25 m. x 1 m. all-plastic mat. Ten stairways provided access from the arena floor to the podium. Seats for the participants and their coaches were arranged in their respective competition zones. The podium was divided into six parts for the men's gymnastics, and into four for the women's.

Each area was equipped with five intercom installations and five input boards for use in the individual systems or for directing final results to the main scoreboards. Seats were provided for four judges, a referee and a technical observer each.

Handball:

For handball a removable elastic wood floor covered with PVC (polyvinyl-chloride), was inserted into the arena floor. The handball court itself measured 20 m. x 40 m 800 sq. m.

After the Olympics, the sports hall will be used for gymnastics and handball competitions, as well as for track and field, cycling equestrian sports, boxing, fencing, roller skating, etc. It can also be utilized for stage performances, ice revues, concerts, con-ventions and exhibitions. Two arena partitionings are possible for track and field: a shortened round track if the cycling track is built-in, or a 200 m. track (4 m. x 200 m.

is built-in, or a 200 m. track (4 m. x 200 m. oval, 6 m. x 60 m. sprinting track) with an expanded cycling track. A shot put and broadjump trench which can be adjusted both horizontally and vertically by a hydraulic mechanism, was built within the track. Running lanes and starting lanes for polevaulting, sprint-ing, broadjumping, and highjumping are constructed of Rekortan and are laid out on the area floor. The ice rink for hockey the arena floor. The ice rink for hockey or ice revues is formed on the unprepared arena floor. Cooling ducts and ice machines are provided.

The arena floor is covered with a removable hardwood floor for other events. The necessary technical equipment for stage productions (lighting platforms, machinery for curtains, projection screens, and stages) are available. 300 sq. m. of storage space on the arena level may be used for gym equipment, stage components, etc

Olympic Use

August 27, 1972 to September 1, 1972 for gymnastics. September 6, 1972 to September 10, 1972 for handball finals.

Athletes' Area

The rooms for the athletes were located on the arena level (level 1) in the northwestern sector. 8 dressing rooms, each with 1 6 running meters of benches there is a hygienic unit, .32 sq. m. and 2 washrooms with 2 massage tables Doping control area - level 1 at the entrance hallway: 1 doping control room in the hallway: Hygiene room. 21 sq. m. Examination room. 14 sq. m. Doctor's office. 14 sq. m. (with corresponding toilets) Preparation for competition: The warm-up hall is located in an annex on the western curve of the sports hall Surface area 21 m. x 42 m. 882 sq. m. The net height of the The whole space can be divided into three rooms by folding walls. The floor con-sists of a removable elastic wood base 5.62 m. coated with PVC. The calisthenics hall is contained in the same annex as the warm-up hall. Surface area 12 m. x 16 m 192 sq. m.

with a net height of 4.30 m. The floor is a removable elastic wood base coated with PVC. For acoustic reasons parts of the ceiling were lowered. The walls are of unfinished masonry. A common equipment room with 61 sq. m. is available for the warm-up hall and the calisthenics hall

Conditioning room: Facing the calis-thenics hall but in the western sports hall is the conditioning room with a 390 spectator seats are at the disposal of participants. These were located in the western curve of the sports hall and were linked to the athletes' rooms by a separate passage.

Access

Admission is on the northwestern side of the sports hall on level 2 (administration level). This entrance is also used by the personnel. From here the athletes pass the doorman's room and descend the separate staircase to the entrance hall on level 1 (arena level). The dressing rooms and hygienic units are accessible from this point. Farther on, under the middle of the curve of the western stands, one reaches the doping control and medical areas as well as the warm-up hall, the conditioning room and the gymnastics hall. From here one proceeds on the same level to the western entrance of the arena.

Spectator Area

Total spectator capacity 10,563
Seats in the permanent stands 4.771
Seats in the temporary stands 1.800
Standing room places 3.992
Seating in the stands consists of individ-
ual folding chairs with upholstered
backs and cushions.
Breakdown of the grandstand capacity:
VIP seats in the northern stand. 198
(accessible via separate vestibule
and fover with a passageway to
the VIP lounge.)
Participants' seats 390
Press seats with tables 200
Press seats without tables 100
Commentators' seats 104
Meal service for VIPs:
There was a refreshment bar in
the VIP lounge with 160 sg. m.
Meal service for spectators:
There were two stationary concession
stands on level 3. Fifty mobile refreshment
carts were formed into groups of two and
distributed equally throughout levels
3 and 4.
Hygiene:
25 spectators' toilets,
each with
are located on level 3.
First aid:
2 hygienic rooms for first aid
on level 3
1 examination room 16 sq. m.
1 waiting room
Hat and coat check:
After the Games, 57 portable coatracks
with a total of 5,000 hangers are available
on level 3.
Spectator access:
Spectators are led from main entrances in
the southwest and southeast (admission
control) on level 4, from where they go
directly to the upper seats. The lower
seats are reached through access mouths
on level 3. Forty-eight emergency exits

Communications Area

Arena level (level 1).
1 interview room 62 sq. m.
1 Interview waiting room 62 sq. m.
1 Studio
1 Direction room (DOZ) 34 sq. m.
1 Radio room 12 sq. m.
1 Television room 12 sq. m.
1 Data evaluation room with
copying and mimeograph
machines and teletype 24 sq. m.
Administration level:
1 Press office with information
booth
Data monitoring station 76 sq. m.
Post and telephone room 76 sq. m.
1 Darkroom 21 sq. m.
1 Press snack bar with coat-
room and toilet 76 sq. m.
Transmission facilities:
4 DOZ television cameras, 1 ABC tele-
vision camera, 4 DOZ film cameras, 8
technical transmission vehicles with
300 sq. m. parking area in immediate
vicinity of the sports hall.

Competition and General Organization

Rooms for national and international sports associations on level 1:			
Fédération Internationale de Gyn) Inas	stiqu	ie
FIG President	.35	sq.	m.
FIG business manager	.22	sģ.	m.
FIG and DTB secretarial staff	50	sq.	m.
Deutscher Turnerbund (DTB)	~ .		
DTB President	.24	sq.	m.
DIB secretary general	20	sq.	m.
Hendhell (IHE)			
IHE President	27	en	m
IHF business manager	18	sq.	m
IHF and DHB secretarial staff.	41	sa.	m.
Deutscher Handballbund (DHB)	•••	۰۹.	
DHB president	23	sq.	m.
DHB secretary general	.19	sq.	m.
1 room security guards			
(police).	300	sq.	m.
10 referee dressing rooms,			
each with	.19	sq.	m.
and every two locker rooms			
1 referee lounge (directly off			
the arena)	24	sa	m
Administration level (level 2)).	99.	
1 Room for management of the	/.		
sports hall	.64	sq.	m.
2 Rooms for technical area		•	
management, total	.72	sq.	m.
2 Rooms for subdirection for			
sports (gymnastics), total	64	sq.	m.
1 Room for subdirection for	40		
1 Beem for subdirection for	.40	sq.	m.
traffic movement	64	e a	m
2 Booms for ticket takers	.04	sy.	
each	.67	sa.	m.
1 Dressing room for female			
personnel	.67	sq.	m.
1 Dressing room for male			
personnel	.67	sq.	m.
1 Room for hostesses	.37	sq.	m.
1 Room for porter (at entrance			
for participants and	04	~~	m
1 Boom for technical personnel	24	sy.	m.
Workshops	00	34.	
2 Carpentry shops, each	.50	sa.	m.
1 Metal working shop	.50	sq.	m.
1 Painting shop	.50	sq.	m.
1 Electrical acoustic systems		•	
shop	.50	sq.	m.

1 Room for low voltage

electrical equipment	.36 sq. m.
Printing shop	.36 sq. m.
Competition office	.36 sq. m.
Waiting room for victory	
celebrations	45 sq. m.

Restaurant

Restaurant (bowling alleys): At the service of the Olympic short term workers with 300 places; including kitchen, bars, pantry and personnel dressing room. . 530 sq. m. (western curve above the annex for the warm-up hall) Press bar, cafeteria 64 sq. m. on level 2, north VIP snack bar 25 sq. m. on level 2, north Meal service for spectators: Two built-in snack bars, as well as fifty mobile refreshment carts on levels 3 and 4.

Types of Sport:

Swimming, Springboard diving, and Platform diving, Water Polo, Modern Pentathlon (swimming)

Location. 8000 Munich 40 Coubertinplatz

Team director for the Olympic Construction Company, Ltd.: Graduate Engineer Bernd Krönert, Munich

Project director for the Olympic Construction Company, Ltd.: Dipl.-Ing. Eckhart Reissinger, Munich

Design and Planning: Behnisch and Associates, Independent Architects, Munich/Stuttgart Prof. Günter Behnisch, Fritz Auer, Winfried Büxel. Erhard Tränkner. Karlheinz Weber

Project director for Behnisch and Associates:

Dipl.-Ing. Architect Jörg Bauer, Munich

Stressing and building construction: Engineering Office of Dr. Engineer Otto Höllerer, Munich

Heating and plumbing components: Brandi Engineering Corporation, Frechen near Cologne

High and low voltage electrical installations: **Engineering Office of R. Barth,** Munich

Director of Construction:

Engineering Consortium for Olympic Buildings, Munich

Rüping Engineering Office, Düsseldorf Engineering Office of Dr. Walter, Essen

Characteristics of Design and Construction

The swimming hall closes off the eastern side of the plateau of the forum and the Coubertinplatz. Like the Olympic Stadium and the sports hall, the swimming hall is not conceived as a monumental architec-tural work in itself, but rather as an integral part of the total design concept of the main sports arenas. From the plateau level, the fover of the three-story building attracts the viewer's attention, whereas from the first level the roof and the enclosing glass facade dominate the view. The foyer constitutes a transition from the central square of the plateau to the stationary spectator stands. These drop off toward the east and are set off from the competition level by a curved breastwork. Deeper still is the poolside level, on which the diving pool and tower and the racing pool adjoin each other on a southnorth axis. The eastern edge of this competition area was enclosed by the temporary spectator stands. In the forum area north of the pools, the snack pavilion was set up in the immediate entrance area on the foyer level. The dining areas were grouped in free forms around the vertical middle axis of this pliant building. The platforms and breastworks were constructed of steel tubing which was covered with a web of stainless steel.

lead from the foyer into the open.

The middle story of the swimming hall lies beneath the stationary western grandstands and extends, like the pool level, from south to north. On the south side under the stands is the warm-up pool for the divers. Adjacent to this are the training and teaching pools. On the northern side are the dressing rooms and the side wing. Underneath these, on the zero level under the poolside level, are located the dressing rooms for summer use, as well as all technical apparatus. During the Games, a large part of these rooms were occupied by Olympic personnel and officials. What remained served as lounge areas for the athletes. All levels of the swimming hall, from under the foyer to the zero level, were constructed of poured concrete. The supportive elements consist of reinforced concrete beams and columns. The permanent stands received prefabricated concrete steps. The swimming pools are built up of reinforced concrete and are inde-pendent of the hall itself with regard to statics and structure. The temporary bleachers, on the eastern side of the hall, were also independently constructed of steel tubing with wooden overlays, wooden benches, and their own temporary roof. The rear side (that is, the eastern side of the temporary bleachers) left a clear view the temporary bleachers) left a clear view into the supporting steel framework and the ventilation installations. The tone for the whole swimming hall was set by the sweeping curved roof, with its glass facade almost encircling the area, and by the soft depression of the artificially formed land-scape, which defined the structure along with the competition curfaces and the with the competition surfaces and the diagonal slope of the stands. (The dis-mantling of the temporary stands and the extensions of the glass facade after the Games have created a different optical impression which is oriented more toward the open area and is more in keeping with the needs of public use).

Dimensions of the Complex

Total space 2	22,000 cu	.m.
Air space of the swimming		
hall	10,000 cu.	m.
Axis of the total complex,	155	-
Avis of the total complex	155	m.
crosswise	120	m
Competition pools:		
21 m. x 50 m	1,050 sq.	m.
Depth 2.5 m.	2,700 cu.	m.
Diving pool:		
21.5 m. x 20 m	430 sq.	m.
Depth 5.0 m	2,150 cu.	m.
	100 00	-
Denth 1 85 m	250 cu	Ш. т
Training pool	. 20000.	
12.50 m. x 50 m	625 sa.	m.
Depth 2.00 m. to 3.50 m	1,700 cu	.m.
Warm-up pool for divers:		
Semicircular	.10 sq.	m.

Access

By car: By car: The swimming areas could be reached from the Olympic Village by way of Lerchenauer Strasse, the Middle Ring, and the Spiridon Louis Ring. At this point, there was an entrance to the swimming hall. (During the Games this was reserved for personnel, ethology and pagedal athletes, and special guests.) Public transit:

The subway station for the Olympic Park is about 600 m. to the east. Pedestrians can reach the entrances to the swimming hall

by way of Lillian Board Weg. The rapid transit station of the Olympic Park is about 800 m. to the northwest. Pedestrian paths provide access to the sports hall and swimming hall. The streetcar stop south of the swimming hall is about 1,200 m. distant on Schwere Reiter Strasse. Pedestrian walkways likewise provide access. Parking lots:

During the Games, parking spaces were provided only for special guests, functionaries, and various service groups.

Total Cost excluding Incidentals (without roof construction) 58.3 million DM

Utilities

Heating, cooling, and ventilation: The heating system is connected to the urban distant heating network. Heating connection value . Permanent cooling 6.9 Gcal/h.

capacity (Temporary capacity for .500,000 kcal/h.

Amount of air circulated . . . 620,000 kcal/h. Amount of air circulated 620,000 cu.m./h. The entire swimming hall is heated and, when necessary, cooled through the venti-lation system. Radiation plate heaters are installed horizontally five meters up only along the facade to compensate for cold air penetration of the glass front. Fresh air is drawn in through two intakes (on the east and west ends of the north side) and is channeled through ducts to the central air conditioner. The air current on the facade is conducted from the bottom 700.000 kcal/h. stands) the facade is conducted from the bottom upwards. The main air input to the hall is introduced through blowers in the neighborhood of the temporary bleachers. The ventilation of these temporary stands is accomplished with apparatus provided for ventilation after the Games. The air is here blown in through slits in the bleacher steps. Air is directly exhausted into the open through axial ventilators directly above the upper bleacher edge. A visible ventilation duct on the lowest stationary partition directs air upwards as well as horizontally across the competition pool and thus forms an air barrier, which shields the spectator areas from the smell of chlorine. The restaurant also enjoys ventilation installations which produce a separating air barrier. In the stationary part of the hall, up to 60% of the air is blown into the inner area and up to 40% onto the facade. The exhaust for this part is accomplished to 50% through ventilators on the tent roof, to 20% through poolside exhausts, and to 30% on the facade. The public on the temporary bleachers were provided with cooled air according to need by a tempor-ary air conditioner. The dressing room lockers are separately ventilated. The relative humidity is set on the basis of 60-65% in the hall. All barefoot walkways are supplied with floor heating registers. Water treatment:

Total water capacity of

all pools. .6,800 cu. m. all pools. 6,800 cu. m. Competition pool 2,700 cu. m. Diving pool...... 2,150 cu. m. 25.5—26°C, diving pool 28°C, training pool 25.5—26°C, warm-up pool 28°C. The room temperature averages 28°C. The heating of the pools is accomplished

by a counter-current system operated by a

distant heating facility. Water purification is performed by an electric chlorifying installation which electrolytically changes sodium chloride solution to sodium hypochlorite solution. Acidic preparations are added to the water to stabilize the pH-value. Copper sulfate is used as an algicide. The entire water supply can be recycled through the closed gravel filters in the

ionowing time perious.		
Competition pool	3.5-4.7	hours
Diving pool	7.5–11	hours
Training pool	.3 -4.7	hours
Teaching and warm-up		

pools. .1.3-1.7 hours. Water purification is double checked by the use of redox voltage measurements Water currents are induced horizontally across the pools through radiation turbu-lence devices. Input nozzles are installed in two levels along the length of the side walls, in such a way that they correspond wans, in such a way that they correspond to the spaces between the nozzles in the wall directly opposite. The water returns partly through drains in the pool bottom and partly through the overflow gutters. A specially developed overflow gutter, which resembles the fin gutter, is installed in the swimming hall swimming hall.

High voltage systems: The power output of the transformers installed is 3,465 kVA.

The stand-by machinery has a power out-put of 300 kVA.

Lighting: The lighting for the swimming hall (competition pool, diving pool, and grandstands) consists of rows of fixtures hanging by a trussed cable system from the roof. Five cross trusses are arranged over the main pool, with the lower edge 14.70 meters above the surface of the water. Two cross trusses are placed over the diving pool at a height of 16.70 meters. An additional truss connects all other trusses lengthwise.

The floodlights are controlled from a console in the poolmaster's room. To protect both spectators and athletes from direct and reflected glare from the surface of the water, reflection-free mixed lighting by halogen metal vapor lamps (2 kW) and high performance fluorescent lamps (120 W) is employed. The vertical light intensity for competitions covered by television is 1,875 lux new value. For post-Olympic competitions without television coverage the intensity is 500 lux at the starting posts and 650-700 lux around the diving tower.

For normal bathing and practice use after the Olympics, only fluorescent lighting with an intensity of 320 lux is planned. The mixed lighting is only used for tele-vision coverage. 750 lux illumination for the temporary bleachers up to a height of eight meters was provided from the trusses by means of fixtures hanging from the tempo-rary roof. Lighting became progressively dimmer until the highest rows received only 80 lux. The stationary stands are illuminated from the trusses by horizontal lighting of 400 lux intensity. The training and teaching halls, the dressing rooms and other areas are provided with humidity resistant fluorescent tubes.

Low voltage systems: Loudspeaker installation: The PA system is divided according to the requirements of space into the following areas: competition area, western stands, and passageways. These areas are served from the lighting trusses by groups of loudspeakers which are protected from humidity and chlorine

damage. The swimming-pool and diving pool are equipped with twelve underwater speakers

Temporary bleachers: This area was served by decentralized speaker clusters: the lower third of the stands by speakers mounted on the eastern edge of the lighting trusses, the middle third by speakers mounted on the roofedge cable, and the upper third by speakers provisionally mounted at the roof. Training pool, teaching pool, dressing rooms: Loudspeakers for these zones are arranged in conjunction with the ceiling lighting. Waterproof funnel speakers are used in the shower rooms.

Gymnastics room, conditioning room, office, work and lounge areas: In these areas wall or ceiling speakers are used. The operation and control of the entire PA system during competitions in separate zones is centered in the direction booth on the pool level under the western stands. Announcement could be made from two speaker's places and twelve microphone jacks within the area of the arena. After the Olympics, a speaker's station located in the poolmaster's room can be switched to

the whole PA system. Telephone network: The switch board for all extensions was located in the stadium.

A total of 1 20 extensions were available in the swimming hall. Clock system: The clock center was located in the stadium. The entire clock system of the

swimming hall was controlled by that center.

The fire alarm system: connection to the city fire department. Antenna installation:

The antenna installation was calculated in such a way that the required minimum voltage of every line was guaranteed even at full usage,

EDP network: The data processing facility was installed in the stadium, from which the subdistribution in the swimming hall was served.

DOZ intercommunications network: Three systems each had specific functions to ful-fill. The intercom system "Diving Tower" was to contribute to the smooth functioning of the diving competitions. Another inter-com system was placed in the swimming pool area. The third was reserved for emergency and technical use, comprising connections to the security guards, fire department, doctors, hygienic service, technicians, as well as the swimming master and direction booth.

Utilities rooms: Poolside level: seven transformer rooms, one low voltage and mains room, as well as two chlorine rooms (electric chlorifying equipment) are located off the athletes entrance corridor.

Basement (technical level): Heating and ventilation centers are installed below the training hall. Other ventilation centers lie in the northeastern and northwestern corners of the building. Battery room, low and high voltage switching units are loca-ted on the northern side in close proximity to the access driveway.

Technical Installations for Sports Scoreboards:

Two large scoreboards measuring 9.50 m. x 4.40 m. were mounted above the permanent stands at the western and eastern ends of the swimming hall. Both boards were built in "light chamber technique". For the information of the visitors on the temporary bleachers a 4m. x 3m."Eidophor" projection screen was suspended from the eastern edge cable of the roof above these stands. The input and operation of the scoreboards was controlled from a main console unit in the direction booth. The data input from the various sources, such as data checkpoints in the sports direction and in the diving and water polo facilities, punch card readers, digital time keeping, etc., was recoded and further processed at this main control console. The scoreboards could accordingly be employed for all the swimming events, as well as for the diving contests and water polo matches. A single scoreboard, mounted on the eastern facade facing the permanent stands, remains for post-Olympic use.

The following information was communicated: Main display: state of competition in eight lines corresponding to the eight swimming lanes. Starting number, name of the participant, nationality, interim times, and end times were displayed. In posting the final results, the participants were no longer ordered according to starting numbers, but rather in the order of finish. Subdisplay 1: name of competition, two lines; sub-display 2: records, two lines; subdisplay 3: digital short time clock; subdisplay 4: penalty times, two lines; moving headline band: one line was used for running reports from simultaneous events in the swimming hall; clock with normal time: diameter 1.5 m. The characters measured 231 mm. in height.

Time measurement:

Primary system: The start signal was given acoustically by the starting gun which was connected to the measuring device, an electronic crystal-controlled, ten-column printer. The primary system was connected with the data processing installation, the scoreboard and the television camera, and registered the interim and end times down to 1/1000th of a second. An acoustic recall signal for false starts was provided in conjunction with the start signal. Secondary systems: The finishing phases of all competitions and participants, as well as the handoff in relay races were checked and recorded by electronic video tape cameras. The pictures could be projected onto monitors, along with time readings. Accuracy amounted to 1/100th of a second. The contacts for the interim and end times were released by touching a contact strip on the pool. The timing was transmitted directly to the scoreboard.

Intercom systems:

See Utilities, Low voltage installations. Pace setter system for the swimming pool: 200 successive lights are built into the long edges of the pool. These are controlled from a central console which can give impulses for various swimming speeds. The start signal is given acoustically from the control console.

Water turbulence system for the diving pool: This was installed so that the athletes could see the surface of the water during diving competitions. Water can be injected through upper side jets; air through twenty jets on the pool bottom.

Competition Area

Swimming and water polo:

Swimming pool 21 m. x 50 m

 21 m. x 50 m.
 1,050 sq. m.

 Depth.
 2.50 m.

 Adjustable bottom
 21 m. x 16.67 m.

 Underwater spotlights — 41 units, underwater loudspeakers — 12 units, under
 water windows — 2 units each 2.00 m. x

0.50 m. and 3 units each 1.00 m. x 0.50 m. A pacesetter system was built in for training purposes (confer Technical Installations for Sports). The competition pool consists of eight swimming lanes, each with an axisto-axis width of 2.50 m. The pool ends were each fitted with a contact strip covering the whole width of the pool to a height of 0.30 m. above the surface. This was necessitated by the fact that all pools were equipped with overflow gutters and the water surface was level with the walkway around the pool. The starting blocks were set up at both ends of the pool and were structurally linked to the contact strip. A A loudspeaker was built into the starting blocks to amplify the acoustic start or false start signal. The blocks were also furnished with green lights which indicated whether time measuring device was functioning, and with a lap counter with luminous digits. The pool walls were done in white flagstone, the bottom in blue, and the stripes in black, in accordance with FINA regulations. Five meters from each end were the turning lines for backstroke swimmers; fifteen meters from the start was the false start line. All lines consisted of flag-bedecked ropes, which were stretched at 1.80 m. directly across the pool. Within the competition area there were chairs for the participants between the swimming and diving pools, as well as seats on both ends of the pool for the referees, the starters, the turning judges, and the swimming judges. Boundary lines and goal cages were installed in the swimming pool for water polo matches, and a thirty m. long referees' catwalk was erected on the western length of the pool. The diving pool was available to the water polo players for warm-up. Springboard and platform diving:

Depth 5,00 m. Underwater windows — two units, each 2.00 m. x 0.50 m., and four units, each 1.00 m. xO.50 m. Diving boards:

three springboards at 1 m. height, three springboards at 3 m., one springboard at 3 m. (hydraulically adjustable), one diving tower with elevator on the southern side of the pool and equipped with platforms at 1 m., 3 m., 5 m., 7.5 m., and 10 m., height. A warm-up room with 56 sq. m. of space, three warm showers, and six warm-up pools were at the disposal of the participants.

Seats were provided for the competition jury, the diving judges and the recording clerk in the area of activity. The competition area will be turned over to the public unchanged after the Olympics.

Competition preparation (poolside level): This area is separated from the swimming

hall by a glass wall. Training pool

12.50 m. x 50.00 m .625 sq. m. Depth. 2.00m. to 3.50m. Adjustable bottom 12.50 m. x 16.67 m. 1 underwater window - 1.50 m. x 0.50 m. The training pool can be divided at the 25 2.00m. to 3.50m. meter mark by a folding wall. Two collapsible 1 m. boards were installed along the western side of the pool. The athletes have five warming benches at their disposal.

Warm-up pool (teaching pool) 8.00 m. x 16.66 m 133 sq. m. Depth 1.85 m., bottom adjustable by 0.30 m. By means of a separate stairway on the western wall of the teaching pool hall, the

following rooms on the lower level could be reached:

Gymnastics room with elastic floor

210 sa. m. Anteroom with equipment room 60 sq. m. 2 rest rooms.

The dressing rooms belonging to the training and teaching swimming halls were only partially needed for use by Olympic athletes (readying rooms). The remaining space was placed at the disposal of the organizing personnel.

August 27, 1972 to September 4, 1972

Athletes' Area

Olympic Use

Competition area, swimmingand diving pools with 4,500 sq. m. surrounding surfaces. Competition preparation area with training and teaching pools and surrounding surfaces. 2,400 sq. m. Warming rooms, showers, and pools for divers .56 sq. m. Dressingareasforparticipants with 108 changing booths and 396 lockers, as well as 3 circular shower units, each with 24 showers and 6 toilets, foot disinfection points, the doctors' office and the doping control, total Sauna area with 2 sauna baths .1,650 sq. m. each for 40 persons, consisting of sauna room, cold water room, massage parlor, dressing room, shower room, and toilet facility _____350 sq. m. and toilet facility The four collective dressing rooms of the teaching swimming hall were reserved for athletes' readying rooms total. .270 sq. m. 540 places were reserved for participants and athletes in the spectator area of the eastern grandstand. The athletes had a competition preparation area at their disposal on the lower level (gymnastics room, anteroom, equipment room, conditioning room and massage parlor) . . 510 sq. m. Access

There was an athletes' entrance on the northeastern corner of the swimming hall for buses from the Olympic Village. The athletes reached the grounds by means of a ramp. From this point there was direct access to the dressing rooms, lounges, massage parlors, showers, toilets, and readying areas. The doctor's office and the doping control were east of the showers between the dressing rooms and the swimming hall. A make-up or powder room, behind the swimming master's room between the training and teaching pools, could be used by winners before the victory ceremonies

Post-Olympic use of the three swimming hall areas:

Swimming hall with competition and diving pools: These halls will also be used for future national and international competitions in swimming, springboard diving, high diving, and water polo. Primarily, though, they will be used by the public for swimming after suitable modification. From the forum between the swimming hall and the

sportshall visitors go into the entrance hall in the northwestern part of the swimming hall (foyer level). From there they go past automatic ticket sellers and checkers to the stairs leading to the dressing area with 108 cubicles and 396 lockers, 3 circular shower units, each with 24 showers, 6 toilets, 2 sinks and corresponding foot disinfection points, 1 double sauna with 350 sq. m. separated for men and women, each for 40 persons, as well as to the central dressing area on the lower level with 2,500 closets (used as organization area during the Olympics). In all areas there are separable passageways for street shoes and bare feet. The eastern facade borders on a grassy area for sunbathing. This lawn will be joined to the swimming hall by means of two windbreaker installations, each with a walkthrough foot pool.

Training swimming hall in the area of the Central University Sports Facility: To the northwest of the entrance hall, in the covered area between the sport hall and swimming hall, there is a stairway down to the college sports area. Four general dressing rooms each with 51 lockers, 3 semicircular shower units, each with 12 showers, 3 toilets, 1 sink with corresponding foot disinfection facility are available. The gymnastics and conditioning rooms on the technical basement level are reached by stairs. Teaching swimming hall (used at the Olym-pics as a warm-up pool): The area of this pool offers the same facilities as the training area and can be used in conjunction with it. The swimming master's room and the overseeing room are enclosed in a glass booth between the three parts of the halls to enable easy visibility. The first aid station is located between the shower units, the dressing area and the swimming hall.

Spectator Area

Total spectator places 9,182
Seats (mostly in temporary
bleachers)
Standing room places 2,830
VIP places in the temporary
bleachers
Spectator places for participants and
officials in the temporary bleachers . 540
Commentators' seats in the
temporary bleachers
Press seats with tables in the per-
manent stands
Press seats without tables 208
Post-olympic use — upon removal of the
eastern bleachers, the following spectator
praces in the permanent western grandstand
are available.
Sedis. 1,502
Seals for common totors 100
Proce costs with tables
VIDeenvice: 42
Snack bar for VIPs under the tem-
norary bleachers 225 cg m
There was direct access from the VIP spec-
tator seats to the VIP snack har
Spectator service:
Six refreshment stands and kiosks were
act up on the main traffic level. Two

set up on the main traffic level. Two portable snack bars were available on the foyer level behind the permanent grandstands. Hvaiene:

The temporary eastern spectator stands were served by rest rooms on the main traffic level under the bleachers. Rest rooms for the press and VIPs were provided separately in their respective areas. Facilities for the permanent western stands were located under these stands.

First aid:

The first aid station could be reached from the main access to the temporary bleachers. The doctor's office for the western spectator area was built into the stands. Access for spectators:

The entrance to the main spectator area was located at the northeastern corner of the swimming hall at the northern side of the stands. After passing through the ticket check, the spectators reached the main traffic level, proceeded to the seven entrances of the main stands, and finally arrived at their seats.

A separate entrance and driveway was established for the VIPs and the press. The spectators in the western stand reached these via the central plateau and upper foyer and from there went down to their seats.

Communications Area

Under the stationary stands:

DOZ subcenter for radio and television. 140 sq. m. Printing shop. 140 sq. m. Poolside level: Press subcenter, total 880 sq. m. With the following rooms: 1 office with 44 places, 2 interview rooms, 1 television studio for ABC, 1 television

studio for DOZ, 1 director's office DOZ, 1 lounge, press information center, post office and teletype room, 1 storeroom printing shop, press snack bar . 100 sq. m. Post office 310 sq. m. Transmission installations:

6 DOZ television cameras, one of which was movable along a poolside track.

1 ABC camera 4 DOZ movie cameras

A parking lot for 10 technical vehicles with 350 sq. m. surface was provided in front of the swimming hall entrance on the northern side.

Competition and General Organization Poolside level:

Referees' lounge on the
southern side of the training hall 85 sg. m.
Duplicating room 20 sq. m.
Swimming master's room
between swimming hall and the
teaching and training halls,
with views of all three parts 50 sq. m.
Referees'andassistants'
dressing rooms in the four
general dressing rooms of
the training hall 270 sq. m.
Main traffic area under the temporary
bleachers:
Hostesses 25 sq. m.
Securityguards, irredepartment 60 sq. m.
Management of sports aronas
Area sports directors
and socretariat of the
organizing committee 70 sg m
3 Conference rooms each with 35 sq m
National and international associations.
President of the Fédération
Internationale de Natation
Amateur (FINA), 4 rooms each
with a total of 108 sq. m.
President of the German
Swimming Federation (DSV) . 24 sq. m.
2 lounges, each with 30 sq. m.
Technical area direction.
2 rooms each with 16 sq. m.
Army chautteur pool 10 sq. m.
Hostessesandtranslators,

2 Maintenance workers stand-by rooms, each with by rooms, each with 30 sq. m.

Restaurant

VIP snack bar. 225 sq. m. Press snack bar. 100 sq. m. Meals for personnel were served in the restaurant pavilion of the swimming hall. The auxiliary rooms and stars The auxiliary rooms and storerooms of the pavilion are grouped in the basement. The meal service pavilion is connected by winding stairs (arranged around an elevator shaft) both the poolside and dressing room levels as well as with the technical level. Visitors in the temporary bleachers were served by six refreshment stands on the main entrance level. Visitors in the western stands were served in the foyer area from two portable snack bars.

Type of Sport: Cycling

Location 8000 Munich 40 Toni Merkens Wea

Team director for the Olympic Construction Company, Ltd.: Dipl.-Ing. Adolf Hillmeier, Augsburg

Project director for the Olympic Construc-tion Company, Ltd.: Graduate Engineer Wolfgang Korge,

Munich

Design and planning of the cycling stadium: Engineers and Architects Beier, Dahms, Grube, Harden, Kaiser, Laskowski, Braunschweig

Design and construction of the cycling track Architect Herbert Schürmann, Münster in. W.

Director of Construction: **Engineering Consortium for** Olympic Buildings, Munich Rüping Engineering Office, Düsseldorf Engineering Office of Dr. Walter, Essen

Characteristics of Design and Construction

Construction Cycling stadium: The cycling track is surrounded by covered grandstands for the spectators. An auxili-ary wing which forms a courtyard is con-nected to the western curve of the stadium. Auxiliary rooms are provided under the grand-stands and in the above-mentioned wing (racers' quarters). A construction of fifty-six laminated wood beams forms the frame-work of the stadium. The ring girders, the ceiling of the ground floor, the walls, supports, ramps and stairs, as well as the foundations are constructed of reinforced concrete, poured on the site. The dominant concrete, poured on the site. The dominant materials are: wood constructions in a dark color, Eternit-Glasal (asbestos cement slates) and finishing panels of pre-cast concrete. The roofing consists of transparent Diolen (polyester) fabric covered with PVC (polyvinyl chloride).

Cycling track: The outline is determined by wooden dowels The track surface consists of Doussie-Afzelia wooden laths nailed to each other at the sides.

Track infield:

An open area of 2,200 sq. m. with four tennis courts (with a hard Everplay-bitumen-caoutchouc surface) for post-Olympic usage.

Dimensions of the Facility

Totalarea: Stadiumandauxiliary structures 8,500 sq. m Enclosed space 17,400 sq. m. Boof area

5,800 sq. m. Roof area Net riding surface of the 2,408 sq. m. cycling třack Length 285.714 m. Width 7.50 m

Access

By car: Connéction to the Middle Ring: Toni Merkens Weg. Parking: At the parking facilities in the southwest of Olympic Park; in addition, spaces for twenty cars on the northern side of the stadium.

Pedestrians and public transit: Streetcar on Dachauer Strasse, subway to the eastern side of Olympic Park, rapid transit on the western side of Olympic Park; access via pedestrian walkways.

Total Cost, excluding Incidentals 18 million DM.

Utilities

Heating of cycling stadium: 12,200 cu. m. of the enclosed space are heated. Warm air heater operated with natural gas; equipment for recirculation of air or fresh air ventilation allows a fresh air percentage of 20%—100%; temperature control by thermostats; hygrostats regulate the humidity. Total circulated air mass: 52,300 cu. m. Heating of racers' quarters: A warm water pump heating system is em-ployed - energy required: 750,000 kcal/h. Pressurized air for tires: System pressure: 161 atmosph. Intake capacity: Irrigation and drainage: 30 cu. m. Branching out system Power installations: Transformer capacity. 2,060 KVA emergency power system . . . 210 KVA Current capacity for general lighting, radio, television, post office, heatingventilation system, water heating, kitchens, restaurants and track restaurants and track. lighting: 580 kw 261 mercury vapor lamps = 1,500 lux (new value), 1 m. above the track. The track light-ing is supplied with current by two sepa-rate supply systems; a power failure leaves 50% of the lighting in operation. Low voltage installations: The PA system can be controlled from the The PA system can be controlled from the referees' table and the direction booth.

Announcements can be made from the referees' table, direction booth and winners' platform. Equipment includes 20 speaker clusters, 3 horns, and 2 sound columns. The telephone switchboard has 52 exten-sions in the stadium. Other equipment includes the clock system, fire alarm boxes, 8-station intercom, DV data processing equipment in the press subcenter, printing room, timekeepers' desk, direction booth, and the lightning protection installation.

Technical Installations for Sport Scoreboard:

10.47 m. long, 3.00 m. high, 6 lines, each with 24 units, size of characters - 31.3 cm., and two digital timing clocks, a clock with the time of day, and a completely electronic installation. Data input from teletype, from the data display station, and, direct from the timing devices. Timing:

Pneumatic track contacts at the start and finish lines, starting gun, timing desk and timing clock (furthermore, time is measured via connection boxes in the supporting wall of the timing tower).

Competition Area

Remains the same after the Olympics.

Cycling racing section, wooden track: 285.714 m. long, $3\frac{1}{2}$ laps = 1,000 m. 7.50 m. wide all around. Banking of riding surface from 11°56-48°32. Maximum speed: 90 km/h 48.348 m. = distance between the two inner edges of the straightaways. 57.10 m. = length of a straightaway, 75.757 m. = length of a curve, 281.72 m. = length of the inside edge "Côte azur", 320.30 m. = length of the outside edge of the track, 301.01 m. median length of the sur-face (track and Côte azur). Trackmarkings: Colored marking lines, numbers in skidproof later paint

latex paint.

Competition preparation: There is a warm-up area of 500 sq. m. in-side the eastern curve (no roof), as well as a covered area for the racers inside the western curve, also 500 sq. m.

Olympic Usage August 31 - September 4, 1 972

Athletes' Area

Atrium of racers' quarters, 73 sq. m. west 11 racers' quarters, ground floor, stadium-west, each approximately 28 racers' quarters, western 50 sq. m. auxiliary wing, each 1 workshop with work bench 26 sq. m. in each racer's quarters, wash basin and shower in each of the quarters 1 common workshop 64 sq. m. Health: 1 health room, 1 doctor's office, 1 infirmary room, doping checkpoint, 1 toilet 46 sq. m. total . . . Preparation area: Unroofed area for the various teams in the stadium infield, partitioned into 2,200 sq. m. stalls. Covered racers' area, western infield 500 sq. m. with 14 motor stalls, each 5 sq. m. (not for the Olympics, but rather for long distanceraces). Access: Access: Ride to the racers' courtyard by bus from the Olympic Village (this is also the drive-way for the fire department, police, sanitation vehicles, technical personnel). Corridors from the racers' quarters (where they are paged by loudspeakers) lead through a tunnel to the covered racers' area to the team stand by areas (uproofer area, to the team stand-by areas (unroofed

Spectators' Area

infield) and to the track.

 (Plastic Individual seats)

 Standing room
 1,106

 Seats for guests of honor
 182

 Press seats with desks
 96

 Press places without desks
 190

 Commentators' places
 80

 All places are sheltered.
 The encodeteend from the

 The grandstands are separated from the track by a 90 cm. high breastwork. After the Olympics:

 Total spectators.
 5,1 59

 Seats.
 3,969

 Standing room.
 1,1 90

 Refreshments for VIPs:
 1,1 90

 The guests of honor used their own driveway with entrance stairs (north) leading to a reception and refreshment room for seventy persons on the second floor, north side. From here there was a direct access to their places in the grandstand. Spectators' facilities:

Toilets, kiosks, refreshment stands on the

distribution corridor levels: upstairs in the northern area, on the ground floor in the southernarea. Hygiene station Access for spectators:

Northern approach via ramps to the distri-bution corridor level, then to the places. Southern grandstand, access via stairs. Ticket windows and ticket takers in the southeast of the cycling stadium - on the accesspaths.

Communications

Press area: (Ground floor, north side of stad	ium)	
Office area, lounge and lunch room with bar. Interview room. Printing. Auxiliary rooms, cloakroom and rest rooms, press, mail,	245 44 44	, sq. sq. sq.	m. m. m.
telephone room, total 1 Accounting rooms.	75 10	sq. sq.	m. m.
Hostesses DOZ-subcenter Post office transmission room	′18 44 45	sq. sq. sq.	m. m. m.
Four camera stands - northern gi and stadium infield.	ranc	lsta	nd
field units, 1 equipment truck, 2 vehicles.	star	nd-b	у
General and Competition Orga Stadium, ground floor:	aniz	zati	on
Superintendent of sports facilities Organizing Committee	26 37	sq. sq.	m. m.
Technical Supervision, OC Referees 1 referees	20	sq.	m.
1 jury deliberation room 1 conference room, total Direct access from the referees' a referees' places above the starting	147 Irea	sq. tot	m. he ish
line.	un		1011
Internationale Amateur de			
tional Amateur Cycling	20	60	m
Office of the German Cycling Federation (BDR)	20	sq.	m.
Stadium, upper floor: Track custodian	13	sq.	m.
Police	12 21 27	sq. sq.	m. m.
Electronic data processing maintenance personnel	21	эч.	
(Equipment and tools). Security guards and ticket	37	sq.	m.
takers Electrical and display	30	sq.	m.
board technique Chauffeurs' room and adjoining	43	sq.	m.
rest rooms and auxiliary rooms.	57	sq.	m.
(Announcements, Scoreboard ing transmission, lighting)	15 out,	sq. mus	m. sic
Restaurant Upper floor, north: Kitchen with storeroom and pantries. for the VIP cafeteria and spec- tators' restaurant (including personnel rooms)	140	sq.	m.

VIP cafeteria with service:

approximately 70 people 110 sq. m.

next to the kitchen and auxiliary rooms, connected to the VIP grandstand by a corridor. Spectators' refreshments (selfservice) next to the kitchen and auxiliary . 110 sq. m. rooms, separated from VIP area. In addition, 1 food kiosk 10 sg. m. on the entrance level of the grandstands. Exterior, south: 2 food stands for spectators, Ground floor, north: together Press refreshments: A snack bar in the press Buildings lounge. Lunches for personnel: Central personnel restaurant, Olympic Stadium. architects, Stuttgart/Munich

Central University Sport Facility - ZHS-in Olympic Park including its outdoor facilities (volleyball hall excluded)

Function during Olympic use

Buildings

German Olympic Center (DOZ) Radio and television arrangement for the Games of the XXth Olympiad in Munich Outdoorfacilities: Training fields for various sports

Location: 8000 Munich 40 ConnollyStrasse

Team director for the Olympic Construction Company, Ltd.:

Architect HBK Klaus Jürgen Kluge, Munich Outdoorfacilities:

Dip).-Ing. Robert Strunz, Munich

Project director for the Olympic Construction Company, Ltd.: Buildings: Engineer Wilhelm Pankow, Munich Outdoorfacilities: Garden and Landscape Architect Siegfried Lukowski, Munich

Design and Planning: Prof. Erwin Heinle, Dipl.-Ing. Robert Wischer and Associates, independent

Sport technical advisors: Dr. Otto Vogt, Bavarian Sport Academy, Munich Richard Vorhammer, Bavarian Ministry of Education and Culture, Munich Heinrich Zech, University Institute for Physical Education, Munich Munich

Statics and Construction: Prof. Leonhardt, Andrä and Boll, Stuttgart

Building-director:

Engineering Consortium for Olympic Buildings, Munich Engineering Office Rüping, Düsseldorf, Engineering Office Dr. Walter, Essen.

Traffic Planning: Engineering Office Billinger and Associates, Stuttgart

Landscaping: Garden and Landscape Architects Miller and Luz, Stuttgart

The German Olympic Center for Radio and Television (DOZ) together with the volley-ball hall forms the highrise section of the Central University Sports Facility (ZHS). The building complex is situated in the middle of the long eastern side of the ZHS outdoor sports facility. It is in an extension of the south tract of Olympic Village. The outdoor sports areas are closely bound with the building in their post-Olympic function. During the Olympic Games there was no functional connection between the radio and television facilities and the outdoor sports areas. The ZHS outdoor sports areas were used as training sites for a variety of sports during the Olympics. The buildings were so conceived that after the games, they would be able to fulfill their function as a university sports facility. Olympic use was made possible by temporary furnishings.

Characteristics of Design and **Construction Highrises:**

The individual buildings are clustered around a forum whose surface level is the same as the pedestrian embankments. A bridge connects the enbankments with the forum level and approach level. This forum forms the visual center point of the entire complex by its position at the cross point of the north-south and east-west axes of the facility. All buildings were constructed with steel frameworks. "Cor-Ten-Steel" was utilized for all outdoor steel elements. The special property of this material lies in its developing a protective finish by corrosion during an interval of two years. This finish makes all further rust proofing measures superfluous. The dark brown color of the steel together with the white sandwich facing panels, is both a characteristic construction element and a decorative feature. The wall panels in the training, playing, and sports hall area are impact resistant. Another decorative feature is the symmetrical shed roof areas in the vicinity of the halls. The sheds were assembled from empty steel cases bound at a 60° slant. The approach level is paved with travertine. This establishes the visual relationship of the buildings among each other in connec-tion with the recurring material and con-struction features. The interior rooms of the building all had temporary walls built of removable plaster walls on wood or steel supports. The construction of the walls was either fire retarding or resistant in accordance with fire building codes. The walls between studios and administrative rooms had to meet high technical sound requirements and thus were equipped with additional sound conditioning materials. All ceilings were built-in as high quality mineral fiber acoustical ceilings. Metal acoustical ceilings were used in the already existing areas. In some places textile floor coverings were used, in others PVC coverings. The studios were equipped with textile floor coverings.

Access

By car: The German Olympic Center, was served by the internal Olympic Park street pattern and connected with the press complex, the Olympic Village streets and the approaches to all other Olympic Park contest sites. The city streets were usually reached via the Middle Ring.

Public Transportation:

The rapid transit station was located about 500 meters to the west and the subway station was about 600 meters to the east. These were reached by the pedestrian paths.

Parking places: Three hundred parking places were located in the immediate vicinity of the Central University Sports Facility. These were to be used by the technical stand-by personnel, interview guests, and the trucks containing broadcasting equipment.

Total Costs of the highrises excluding Incidentals

73 million DM Total cost Built before the Olympics . 47 million DM Remodeling of studios and technical facilities of the German Olympic Center (DOZ) pre-Olympic Removal of the DOZ facilities 14 million DM and the building measures needed for the permanent Central University Sport Center 12 million DM

Technical Data

(including the volleyball hall) Heating, ventilation, cooling: The DOZ (ZHS) buildings were connected

to the hot water pipe system of the Munich-Freimann district heating plant. Connection capacity post-Olympic 2.1 Gcal/h

4.2 Gcal/h Space heaters were provided in the following buildings: athletics hall, volleyball hall, calisthenics hall, the small halls, the entrance hall and central building (auditorium and music rooms). Additional ventilators were installed in the shed areas of the small halls to service the studios. The total volume of circulated air comes to 481,000 cu. m./h. The buildings' ventilation was provided by six centers. Radiators were installed in the central locker studios (including the adjoining control rooms) were completely air conditioned and a temperature of +23°C. was maintained. The air conditioning for the technical rooms determined the correspondingly high cooling effect during Olympic use.

High voltage: Installedtransformer capacity for kiosks, DOZ technical equipment, DOZ in general 4,410 kVA Emergency generator for post-Olympic use 80 kVA

Olympic Use

All essential rooms for television and radio were finished in March, 1971 and handed over directly to DOZ for the installation of technical equipment. The administrative rooms were completed in December, 1971 and afterwards handed over to their Olympic users. The volleyball hall area along with the remaining sport areas were handed over to the Organizing Committee in July, 1972. The actual Olympic use of the ZHS rooms began with the opening ceremony on August 26, 1972, and finished around the end of September, 1972.

Classification according to Function

Track and field athletics hall:

Dimensions			
Volume	26,700	cu.	m
Area	2,540	sq.	m
Generalhallclearanceheight	9	m.	
Overhead room per floor	3	m.	
(Olympic division)			

Olympic Use

The room which was conceived as a onestoried athletics hall, was divided into two levels by a temporary deck with a steel framework and prefabricated reinforced concrete slabs. The Olympic users had two floors at their disposal, each with three meters clearance. The height of the space inside the suspended ceiling was 1.5 meters. Room program for Olympic use: the following rooms are available, according to floor: 32 radio announcer rooms, each 10 sq. m

these were divided by a soundproof glass partition. 32 directors' rooms each 19 sq. m.

The editorial staff rooms are divided by an approach corridor, but nevertheless connected to each director's room, each . 17 sq. m. 2 supervisory rooms, each ... 17 sq. m. The following rooms are located on the lower story of the hall's eastern side (street level 507): DOZ-control room. 210 sq. m. Post office transmission room 2 technical measuring rooms, . 40 sq. m.

each. 6 rooms for broadcast super-

Post-Olympic Use

The hall will be used as an athletics hall without the dividing deck after the Olympics. The rooms on the eastern side of the hall will be rebuilt into one-story adjoining rooms, whereby the second level will remain as a gallery. The teachers' locker rooms, equipment storage rooms, conditioning rooms, storerooms and toilets will be housed in these areas. The hall will receive a solid plastic floor covering with an underlying cushioning layer. The entire thickness of the covering will be 20 mm.

The following sports will be provided: short distance running, broad jump, pole vault, shot put and discus throw (with net).

Triple, Playing and Sport Halls: **Olympic Use**

The volleyball courts were created by joining both hall areas and sinking the contest areas. For a detailed description see "Volleyball Hall" building data, likewise the "Warm-up hall."

Forum area (Lower story): Dimensions

Area 2,700 sq. m. The headroom in the areas under the forum measure between 2.50 m. and 3 m.

Olympic Use

The rooms for DOZ technical equipment, sound, offices and house utilities were set up in this area. The areas between the volleyball hall, house of studies and central building were designated as the forum area. The rooms used during the Olympics were set up according to requirements with the light-weight partitions described above and had three meters head room. The height of the space above the suspended ceiling measured 1.50 m.

Spatial program for Olympic use: Information service, mail rooms, customers areas and doctors' rooms were set up in 11 rooms with a total area of 490 sq. m. 11 rooms with a total area of 490 sq. m. 13 rooms with a total of 330 sq. m. were occupied by radio, sound mixing and directors' rooms of ARD (a West German broadcasting company). 11 rooms were available for the technical transmission facilities of the post office depart-**Post-Olympic Use**

The forum area will be used partially as a sport physicians' center within the ZHS. The ARD area will be occupied by music practice rooms and the post office transmission area will be a sauna.

The central building: Dimensions Volume including the courtyard above the auditorium 37,700 cu. m. Area. 2,200 sq. m.

Olympic Use

On four stories DOZ administration offices and information posts were located, and the schooling areas were in the auditorium.

Level 51 2 (entrance floor at forum level): The entrance hall in front of the auditorium was used as a general information area. The corridor areas north of the audi-torium contained DOZ accreditation windows. The rooms south of the auditorium were used as snack areas by DOZ and the broadcasting companies. The hall area east of the auditorium was

available for general service agencies, for example, post office, banks, travel agencies, etc. Level 517 and Level 521:

These were totally available to DOZ for administrative rooms and offices. A restaurant to meet special requirements (guests of radio and television companies) was set up for 100 persons.

Post-Olympic Use

Lower story: utilities, waste removal and storagespace.

Entrance hall, at the forum level as a lobby with doorman/desk clerk, hat check, snack bar and windows for student management.

Both upper stories are for the use of the Central University Sports Facility Administration.

The auditorium will be used as a large lecture hall. The seating arrangement as well as all other necessary technical facilities for lectures had already been installed before the Games. Other smaller lecture halls and the library will be located in both upper stories.

Central locker rooms (House of Studies): Dimensions

Olympic Use

Editorial offices were located in the two upper stories (over the forum level) and film processing laboratories and cutting rooms were set up in the lower story. The ZHS centralized locker area was divided into thirty rooms for Olympic use and the entire area together with sanitary facilities was available as film cutting rooms. The western part was remodeled as a central film processing laboratory. Two automatic film processing machines were installed in the main work room. Each machine had a base measuring 1 m. x 8 m. Wooden plat-forms 0.5 m. high were built to service the machines. The adjoining rooms on the west side were used to prepare the developing solutions. These areas were developed as wet rooms.

House of Studies:

All rooms in the house of studies were already set up for their permanent function before the Olympic Games. Thus no drastic remodeling was necessary in these areas after the Olympics. A total of 61 editorial rooms each with 20 sq. m. of floor space were available on both floors. A kitchenette and a lounge measuring 150 sq. m. were set up near the editorial rooms.

Post-Olympic Use

The entire Olympic installation except for the toilets was removed from the area under the forum level. Shower rooms were installed on the long northern side and changing rooms with lockers were built along the long southern side. The film processing room was converted into a central general changing room.

Post-Olympic use of the area over the forum level (House of Studies): Both stories will be used as study quarters. A total of 21 rooms on the first story and 29 rooms on the second story each with an area of some 20 sq. m. are available. In addition there are four kitchenettes and a lounge (as during Olympic Use) measuring some 150 sq. m. Four apartments for personnel will also be furnished.

Calisthenics Hall:

Dimensions

Volume	14,800 cu	J. m.
Area	. 2,300 ci	u. m.
Clearance	5.60	m.

Olympic Use

The main DOZ center, the world-wide supervision for radio and television, the post office department transmission room and the magnetic record center (MAZ) were located in this one storied hall. The calisthenics hall and all adjoining areas were divided by room-high light removable partitions into various areas for Olympic Use. Spatial programming for Olympic use: Television center, that is, center for all TV broadcasts during the Olympic Post office center, Transmission room of the post office department for with adjoining rooms total . . . 200 sq. m. Center for magnetic recording . 400 sq. m. 3 adjoining rooms, each 25 sq. m.
 Archives.
 26 sq. m.

 Store room.
 18 sq. m.

Post-Olympic Use

An area measuring 28 m. x 28 m. (784 sq. m.) will be set up as a gymnastics room with adjustable floor, mirrored walls and ELA facility. The partitions for Olympic use will be removed. The adjoining rooms will then be divided and changed into music and practice rooms.

Small sport halls:

Dimensions

Volume		 	23,000	cu.m.
Area		 	. 4,200	sq. m.
Clearance	• •	 	. 6	m.

Olympic Use

The television studios with the necessary directors' rooms and areas for the offcamera announcers were located in the onestory halls.

All studio areas were divided by lightweight acoustical partitions. The adjoining rooms which were formed by these acoustical walls and ceilings had 3 m. head space.

Spatial programming for Olympic use: Live broadcasts and sport reports were produced in eight TV studio areas measuring between 100 sq. m. and 200 sq. m. These studios were used by broadcasting companies of all nations. The rooms were 8 m. high and the walls and ceilings were built of high quality acoustical materials to meet the acoustical requirements of TV studios. A weight bearing ceiling grid system supported the necessary equipment required for the special lighting. The floors were covered with PVC covering. The recording background consisted of screens and additional acoustical material. Every studio had a directors' room a magnetic recording room and a small studio.

Post-Olympic Use

Building of the American Broadcasting Corporation "ABC": Dimensions

Volume 5,000 cu.	m.
Area 1,100 sq.	m.
Overhead clearance 3,00	m.

Olympic Use

Conference room	36 sq. m	۱.
1 2 offices, each between		
35 sq. m. and	17 sq. m	۱.
Teletype room	10 sq. m	۱.
Telephone room	10 sq. m	۱.
Film cutting room	72 sq. m	۱.
2 lounges, each	45 sq. m	۱.
Kitchen	50 sq. m	۱.
Store room	190 sq. m	۱.

Characteristics of Design and Construction (Outdoor facilities)

The outdoor sport areas are clustered around the north, west and south sides of the DOZ or ZHS buildings, respectively These facilities are located on the northern part of the Olympic grounds which was unified and built up with ten meters of hill in some places. All playing fields are arranged in a north-south direction. There are differences of elevation of up to three meters among them. The individual playing fields are separated from each other by strictly geometrically modeled embankments with a trapeze profile which run parallel to the boundary lines of the playing fields. A richly structured and distinctive open air sport facility was created by terracing and dividing earth embankments. The sculpturing of the landscape was intensified

by the plantings. Mounds of earth, slopes and strips between the fields are planted with both large and small crowned trees intermixed, in groups, on a grid or in rows. The plantings and landscape modeling provide not only a certain amount of noise control among the fields during simultaneous use, but also shade and shield the spectator area on the sloping area from the wind. Linden trees of various sorts were planted as the dominant trees on the embankments. Small crowned trees such as the ball maple (Acer glubosum) and ball acacia (Robinia inermis) line the paths. Sitting areas are marked by clusters of chestnut trees. Structure of the sports areas:

Lawns

The overall makeup of the intensively used grassy playing fields are as follows: leveling layer approximately 15 cm. thick made of gravel and sand 0/30, (8 cm. thick) drainage and filtering level made of foam lava grit-texture 0/15, the actual lawn bearing level of very lean soil and finally a sand and peat covering layer with a total thickness of 12 cm. Most lawns were built with an overall slant of 1 %. Only the four adjoining fields and the throwing contest fields did not have a slight slope. Surfaced areas

The surfaced playing areas were constructed and maintained according to the recommendations of the "Institute for Sports Site Construction" in Cologne. In general, highly water-permeable materials were avoided to the advantage of the stability of the surfacing.

Sites with plastic coverings The synthetic covering "Rekortan", the plastic combination covering "Everplay-Elastopor" (water-permeable) and "Akus Elastik" were used over a bitumen base.

Watering and drainage facilities: Automatic built-in sprinkler systems with hydraulic-electric control programs were used for the lawns. The surfaced areas were also equipped with sprinkler systems to moisten the covering. The synthetic and the combination plastic surfaces were drained by gutters. All grass and surfaced playing areas were equipped with drains that had a 1 % slope. The excess rain water was drained into cisterns.

Individual Functional Area Summary Athletics-contest facility

Athletics-pentathlon and decathlon Athletics-pentathlon and decathlon Athletics-practice facility Circuit-facility 4 volleyball courts 3 small playing fields Field for throwing contests All-weather large playing field (multipurpose division) 4 large grass playing fields 5 handball fields 4 large playing fields (surfaced) 2 hockey fields 5 basketball courts with a throwing practice area.

Descriptions of the Individual Facilities

Athletics contest sites:

Inclined curved track type B with 6/400 m. and seven short straight tracks, broad and triple jump area, pole vault site, two high jump sites, two discus throw sites, two shot put sites, one javelin throw site, water hazard for the steeplechase and a grassy playing field. The tracks and segment areas have a "Rekortan" (synthetic) surface. This competition site is located on the eastern side of the unroofed standing room gallery (concrete steps) with 3,000 places as well as on the western side of a roofed gallery section with approximately 250 seats.

A double-headed broad-jump and triple jump area is located between the roofed gallery and the 100 meter track.

Athletic pentathlon and decathlon facilities:

The pentathlon and decathlon area has a running area measuring 50 m. x 45 m. The surface is composed of a 13 mm. "Rekortan" covering on a bitumen base. The following sites for various sports are available: five pole vaulting sites, ten long jump sites, six high jump sites, one shot put site with five putting circles and an impact area measuring 20 m. x 45 m.

Athletics-practice facility Type C: Facilities for various sports are available: high jump, two sites; discus throw, two sites; long jump, three approaches, one sand pit; pole vaulting, one site; shot put, 1 site with five starting circles; javelin throw, one track; one grassed field. The athletic areas are surfaced

The athletic areas are surfaced. Circuit-facility:

The circuit-facility has an area of 1,250 sq. m. The following equipment is provided: one ball throwing wall 3 m. high; two parallel bars; three wall bars; three horizontal bars at various heights; three dumb bell stands; one climbing framework with ropes; one climbing tower with poles; one slalom pole field; one sand running area 20 m. x 5 m.

Volleyball courts: Are each 13 m. x 24 m. The courts are divided by 3-m. wide criss-crossing paths. The courts are surfaced with "Everplay-Elastapor" (water permeable) coating. A slight incline of 0.6% and drainage gutters were installed insuring a good playing surface.

Smaller playing fields: Northwest of the volleyball courts are three small playing fields for small field handball, that are also surfaced with "Everplay-Elastopor" coatings. Each measures 22 m. x 44 m.

Fields for throwing events: The throwing field has a grassy area of 13,000 sq. m. and has the following facilities: one javelin throwing track 36.50 m. x 4 m.; a javelin throw site 40 m. x 30 m. for group training. Both sites are surfaced. There are also two hammer throw sites and four discus throw sites. Along the outer periphery of the throwing field there is a sweat-drop track 1.50 m. wide, 600 m. long with five clusters of equipment.

All-weather playing field: The playing field measures 109 m. x 70 m. and is covered with a synthetic combination "Akus-Elastik" surface. There is a slight incline of 1 % and the surface is water permeable. Field markings are provided for the following sports: soccer, field handball, volleyball, and basketball.

Large grassy playing fields: The grassed playing areas measure 70 m. x 109 m. and have no incline. Portable goals are provided for field games. Faustballfields:

There are three faustball fields measuring 66 m. x 32 m.

Large playing fields with surfacing: There are four large surfaced playing fields measuring 109 m. x 70 m. located between the handball fields or relatively north of them.

Hockey fields: There are two hockey fields measuring 99.40 m. x 59 m. each. The lawn was built up as described above. Basketball courts:

There are five basketball courts each measuring 15 m. x 28 m. and a basketball throwing circle with a diameter of 36 m. The surface is covered with "Akus-Elastik"

Fields houses:

There are three shelters with toilets and an equipment storage room within the ZHS southern open-air sports facility.

Total Cost excluding Incidentals 21.6 million DM

Olympic Use

The facilities were used exclusively for training purposes and were available for the following sports: football, track and field and hockey.

Post-Olympic Use

The entire installation will be permanently used as the Central University Sports Facility of the Munich Technical University Facility of the Munich Technical University The facilities that were constructed exclusively for the Olympic Games will be removed. Purposes corresponding to current needs will be found for these free areas. Realization of the planned tennis facility (26 courts) will be temporarily postponed. It would be located in the southeastern area on the site of the temporary restaurant "North".

Type of Sport: Volleyball

Location. 8000 Munich 40 Connolly Strasse

Team director for the Olympic Con-struction Company, Ltd.: Architect HBK Klaus-Jürgen Kluge, Munich

Project director for the Olympic Construc-Construction-engineer Wilhelm Pankow, Munich

Design and Planning: Prof. Erwin Heinle and Dipl.-Ing. Robert Wischer and Associates, free architects, Stuttgart/Munich

Statics and Building Construction: Dip).-Ing. K. Boll as associate of the Partnership Leonhardt and Andrä, Stuttgart

Heating, Ventilation, Plumbing: Engineering Office Brandi, Frechen near Cologne

Electrical and Electronics: BMS Engineering Company, Munich

Landscaping: Garden and Landscaping Architects

Miller and Luz, Stuttgart Direction of Construction: Engineers' Pool for Olympic Construc-

tion, Munich Engineering Office Rüping, Düsseldorf Engineering Office Dr. Walter, Essen

Characteristics of Design and Construction

struction In regard to its spatial relations, its con-struction and design, the volleyball hall is an integral component of the building complex of the Central University Sports Facility (ZHS) which accommodated the "German Olympic Center" for radio and television (DOZ) during the Olympic Games. The hall lies to the west of the forum and is constructed, like the other parts of the complex, in a visible Cor-Ten steel skeleton construction. The wall components are built of suspended sandcomponents are built of suspended sand-wich panels (multi-layer sheets). The roof construction consists of Cor-Ten steel construction consists of Cor-Ten steel concave box rafters which, with an inclination of 60°, were assembled into symmetrical "sheds". The entry hall of the competition facility was situated at the east of the complex, on the level of the forum. Visitors entered from the forum. the forum. Visitors entered from the forum. For Olympic usage the level of the play area was temporarily lowered below that of the driveway, so that the hall obtained a total open height of 12.50 m. (from the upper surface of the floor covering to the lower edge of the rafters). Auxiliary rooms are under the grandstands, on the level of the driveway. The athletes' locker room area is situated under the entrance hall. After the Olympics, the height of the hall After the Olympics, the height of the hall will be reduced to 9.00 m.; the hall will be separated into two gymnasiums of 28 m. x 56 m. each by an immovable dividing wall.

Dimensions of the Facility

Interior space of the volleyball-Clearance neight of hall 1 Inner area, 20m. x 34m. Playing surface (for com-petition) 9 m. x 18m. Contest preparation: Total area under roof of 680 sq. m. 162 sq. m. warm-up hall 21.60 m. x 6,200 cu. m. hall Interior dimensions of the contest preparation area of the warm-up hall (two-fifths of the hall's floor space were used for the additional cooling installations) 21.00 m. x 21.50 m. (2 playing areas) Playing areas, each 9 m. x 451 sq. m.

Access

See access "German Olympic Center (DOZ)"

Total Cost excluding Incidentals See Construction Data DOZ/ZHS.

Utilities

Heating (warm air heating): Total circulated volume

Cooling: The hall was cooled by a temporary cooling machine with a capacity of 2 Ccal/h. Ventilation:

Air-intake is via the concave rafters in the roof; the air is blown straight down into the hall. The exhaust flows mostly through the permanent grandstands and partly (40,000 cu. m./h) through the temporary grandstands.

High voltage installations: Electric current was supplied via the ZHS

Lighting: The lighting bars for the 56 floodlight lamps (each 2 KW) were installed along the "shed-roof" rafters.

Low voltage installations: The following equipment was installed: PA system, clock system, fire alarm system, data processing and transmission system, 1 5 extensions of the stadium telephone system, intercom system.

Technical Installations for Sports Electronic Scoreboard:

For information concerning the current contest two electronic scoreboards, executed in light chamber technique, were installed on the eastern and western walls of the hall, along the axis of the hall between the gallery and the lowest edge of the ceiling. The boards were 2.30 m. x 1.10 m. The following data were displayed: the nationality of two teams in the current game, indication of the serve, time outs, score within the game, results of the individual games in the set.

Manual display board: Two magnetic display boards, each 3 m. x 2 m. were installed on the front walls of both warm-up cubicles. The following data were given: starting number and names of the players of the two participating teams of the current contest, as well as the names of the coaches. Intercom:

There were intercom stations for the referees, the competition director, the locker rooms, the control room, the practice hall, the jury, the records desk and the warm-up cubicles. An acoustical signal was installed to indicate the time outs.

Contest Area

The contest area was situated in the temporarily deepened part of the hall between the two temporary grandstands, and 3.50 m. below the grandstand access level. Inner area 20 m. x 34 m. Playing area 9 m. x 18 m. The entire inner area had an elastic playing floor with a polyvinyl-chloride covering. The competition playing surface inside the marking lines (9 m. x 18 m.) was set off by its dark green color from the rest of the light colored floor surface. Two practice cubicles with an area of 3.50 sq. m. each and a height of 5 m. were

erected on the middle axis of the hall, 8 m. from the two front sides of the playing

Outside of the playing area, on the exten-sion of the center line, the elevated seat of the referee was set up; additional seats for four line judges, the second referee, the record keeper (with desk) as well as

the record keeper (with desk) as well as six places for reserve players per team were available on the northern side. Contest preparation: Within the practice hall, a competition warm-up area of 21.50 m. x 21.00 m. was created with a playing floor and covering of polyvinyl chloride. This floor was divided into two playing areas of 9 m. x 1 8 m. marked in accordance with the com-netition playing area petition playing area.

Olympic Usage August 27 - September 9, 1972

Athletes' Area

complexes, each 66 sq. m. Each complex contained a locker room of 26 sq. m., a washroom, a shower room with 5 showers, and a toilet. 1 suite for doctor and doping control 80 sq. n The doctor's area consisted of a doctor's 80 sq. m. examining room, a room for doping control, a toilet and a waiting room. 228 spectator seats for athletes. Access: The entrance for the athletes was situated on the level of the forum. The main entrance was on the eastern side of the hall. From there the participants reached the

area of the locker rooms and showers, and the contest area. The locker rooms were on the eastern side of the hall and were separated by an access corridor from the auditorium área. The participants could get to the practice hall and to the contest ărea via the access corridor. The rooms for medical care and doping control were situated between locker rooms number 3 and 4 on the common access corridor.

Spectators' Area

Total spectator places 3.680 VIP seats 392 Press places with desks. Press seats without desks. Commentators' places. 36 64 40 Athletes' seats Refreshments for VIPs: 228

A refreshment bar (52 sq. m.) for guests of honor was installed on the east side of the hall on the level of the driveway. This was accessible from the VIP drive-way and from the access level of the central grandstand.

Refreshmentsforspectators: A refreshment stand in the main entrance area of the atrium catered to the refreshment needs of the spectators.

Toilet facilities:

In the entrance area, at both the northern and southern ends of the atrium, there were rest rooms and check rooms for the spectators.

First aid:

Medical personnel within the volleyball hall were available for first aid treatment of spectators. The doctor's room on the street level was used for treatment. Accessforspectators:

The approach to the spectator facilities was from the forum via the main access level of the entire complex. From the atrium the spectators came up temporary double stairways to the access corridor of the grandstands, and from there to their places in the northern and southern grandstands.

Communications Area

The temporary communications rooms were situated under the southern grandstands: DOZ-subcenter with 3 rooms,

each	32 sq. m.
4 interview rooms, each	50 sq. m.
Post office branch	67 sq. m.
Postal telephone room	33 sq. m.
2 postal auxiliary rooms, each	33 sq. m.
1 press cafeteria	52 sq. m.
Printing room	56 sq. m.
The sanitary facilities for these ro	ooms
were located in the southeastern	corner of
the building.	
Transmission installations:	
3 DOZ television cameras, 2 DO	Z movie

cameras. A total of 151 sq. m. parking area was required for 4 technical vehicles.

Contest and General Administration

Superintendence of the nall and a	irea		
direction Sports	49 s	g.	m.
Conference room	60 s	ä.	m.
International and national		-	
associations Fédération Inter-			
nationale de Vollev-Bail			
(FIVB)	30 s	a.	m.
German Volleyball Assoc		٩.	
(DVV)	26 s	a.	m.
Office room for the special		٩.	
sports associations	26 s	a	m
3 rooms for the security quards	-0 0	٩٠	
each	34 s	α	m
Hostesses' lounge	32 s	а. Л	m
5 rooms for short-term personnel	02 0	٩·	
police (2 rooms) general ser-			
vices (ticket takers) fire			
department and technical			
direction 1 room each with	20 0	n	m
Cleaning personnel	30 s	ч. :n	m
For the individual areas there wer	a toi	loto	2
and washroom or shower facilities		ail	5
and washioon of shower facilities	5 0 0	211-	
aute.			

Restaurant VIP-bar 52 sg. m. (Snacks and drinks) Pressbar. 52 sq. m. (Snacks and drinks) One kiosk in the atrium was available to supply the spectators with drinks and refreshments as well as with other small

articles

Type of Sport: Hockey

Location. 8000 Munich 40 The grounds are north of the Central University Sports Facility

Team director for the Olympic Construcfion Company Ltd.: for the highrise buildings: Architect HBK Klaus-Jürgen Kluge, Munich for the outdoor facilities: Dipl.-Ing. Robert Strunz, Munich

Project director for the Olympic Construcfor the highrise buildings: Building Engineer Wilhelm Pankow, Munich for the outdoor facilities: Garden and Landscape Architect Siegfried Lukowski, Munich

Concept, Design and Building Supervisors for the highrise buildings: Architects Schraud and Karg, Munich

Concept and Design for the outdoor faciities: Garden and Landscape Architects Miller and Luz, Stuttgart

Building supervisor: State Capital City of Munich, Building advisor, Municipal Gardén Bureau

Characteristics of Design and Construction

The hockey field is situated to the north-west of Olympic Park. It is bounded on the west by Landshuter Allee and on the north by Moosacher Strasse. The complete layout approximates a rectangle which is bounded in all four directions by earth embankments opposite the Olympic Village to the east, the open areas to the south, and the two streets mentioned above to the west and north.

Playingfields:

The six grass playing fields are set up as follows: Contest field 1 (final play site) was connected to the temporary grandstand (highrise) on the eastern side of the field. The remaining three sides received temporary collapsible bleachers. Playing field No. 2 adjoined the eastern side of the grandstand. North of this were fields No. 3, No. 4, No. 5, and No. 6 which were provided with portable bleachers. These four fields were used in rotation to save the grass. East of field No. 2 was a trainingarea.

Buildings:

The sloping areas of the grandstand which were arranged to resemble a gabled roof formed the dominating feature of the hockey facility. One area with six seating sections was set to face main field No. 1 in the west and one area faced field No. 2 to the east. The supporting construction in the three diagonally placed grandstands as well as the roof was built of visible collapsible steel pipe framework. Traffic areas, railings, sloping areas, and seats were mostly built of planed wooden planks. The roof was constructed of translucent PVC sheets. All necessary facilities for the hockey fields were located under the sloping areas of the grandstands. The partitions were formed by removable fire proof wall elements. Concession stands, toilets and ticket offices

were built into the grandstands. The middle connecting level of the grandstand provided the link between the entrances and the various stands

Dimensions of the Facilities

Complete area of the
arounds. 95.000 sa. m.
Plaving areas
6 contact fields
$\begin{array}{cccccccccccccccccccccccccccccccccccc$
61 m. x 101.40m 37,112 sq. m.
1 training field
61 m. x 101.40m 6.185sa. m.
Buildings:
Built — over area — total 13.01/ sg. m
larandatanda aanaasajan atanda
(granusianus, concession sianus,
toilets, ticket booths, bridge
buildings)
Enclosedspace
Grandstand 64 504 cu m
Adjagant stands
Aujacem, stanus 4,850 cu. m.
Concession stands 830 cu. m.

Access

By car: The hockey grounds were connected by the Kusoczinski-Damm to the Press Center. There is also an eastern approach to Moosacher Strasse by connecting streets between Strassberger Strasse and entrance to the hockey grounds at level 0.00 m. (level of the playing fields). Public transit:

The rapid transit system station could be reached by a pedestrian path from Werner Seelenbinder Weg and the Kusoczinski-Damm

Total Cost excluding Incidentals

Outdoor facilites including			
playing fields	1.0	million	DM
Buildings	3.4	million	DM

Utilities

High voltage installation: Installed transformers 630 Heating requirements were covered by 630 kVA temporarily installed electric space heaters and infrared radiators. Ventilation:

Exhaust ventilating ducts were installed in the various hygiene areas only.

Technical Sport Facilities

Scoreboard: At the main entrance to the hockey grounds a manually operated magnetic Scoreboard (2.00 m. wide x 4.00 m. high) was installed. A review of the day's games could also be displayed on this board. The following information was displayed: the starting numbers and names of the players, nationality, playing field, referee, playing time, and scores. Fields No. 1 and No. 2 had additional manually operated magnetic 1.50 m. x 2.00 m. scoreboards to display the scores.

Contest Area

The main playing field (for the finals) field No. 1, as well as five additional playing fields were all grass lawns mea-suring 91.40 m. x 55 m. There were 2 m. wide safety margins along the sides, and 4 m. wide ones at both ends. The playing surface was equipped with (hip-roof) slopes. The grade both in building and rough plan was 1 %. The contest sites were constructed from the bottom up as follows: follows:

15 cm. sand and gravel mixture 0/30 was laid as an equalizing and filtering layer.

then 8 cm. foam lava basalt 0/15 mm. as a drainage and holding layer, next the turf drainage and holding layer, next the turf supporting layer consisting of a mixture of 30% top soil, 30% peat moss, 30% fine lava basalt grit 0/17 and 10% sand 0/15; finally a 4 cm. top layer consisting of a mixture of 60% sand 0/5 (DIN 1045) and 40% peat moss soil with 60 grams of full fertilizer per square meter. The lawn was sown 20 grams per square meter with a mixture of 70% poa pratensis "Merion", 15% gynosurus crestatus "Credo" and 15% phleum nodosum "Evergreen". At the far end of each field, four high walls of wire netting were erected outside of the safety netting were erected outside of the safety

margins to catch stray balls. Preparation for competing: Provided by a training field east of playing field No. 2 as well as by two additional training areas (grass areas) situated approximately 250 m. south of the main playing field.

Olympic Usage August 27th until September 4th, 1972 September 7th until the 10th, 1972

Athletes' Area

Locker rooms 150 sq. m
Washrooms and toilets 38 sq. m
Doctors' area
Hygiene room 25 sq. m
Toilets 13 sq. m
Doctors' room 25 sq m
Doctors 100m
Treatment room 13 sq. m
Doping control room 10 sg. m
Poomeforball hove 50 cg m
Access:
There was also a shuttle bus service for
the athlates between the Olympic Village
the atmetes between the Olympic vinage
and the hockey grounds with an entrance
at 0.00 m level

Spectator Area

Total number of spectator places
including VIP places 21 900
Total number of spectator seats
including VIP seats 17.200
Main plaving field No. 1
Grandstand 3.960
Collapsible bleachers 4.500
VIP seats, field No. 1 149
VIP seats, field No. 2 150
Seats for the press with tables
Field No. 1. 52
Field No. 2 15
Field No. 3. 9
Field No. 3 9
Seats for the press without tables
Field No. 1
Field No. 2
Field No. 3 20
Field No. 4. 20
Seats for athletes
Playing area No. 1 149
Playing area No. 2 150
30 seats for commentators (roofed)
Playing field No. 1 and No. 2 30
Refreshments for VIPs:
There was a snack bar for twenty-five
VIPs under the grandstand at elevation
U.UU m.
Spectators facilities:
ROOTED TETREEMENT STANDS AT $\pm 5(0)$ m

of the grandstand as well as at elevation 0.00 m. west of the grandstand. Sanitary facilities:

Toilet facilities in the grandstand were installed at 0.00 m. elevation and at the connecting level + 5.00 m., as well as west of the grandstand under the collapsible stands at 0.00 m. elevation.

First aid: The medical facilities were located in the doctors' area under the grandstand. Access for spectator: The VIPs were provided with their own entrance at the middle area of elevation 0.00 m. of the grandstand. From there, a direct entrance led to the VIP snack bar and the special seats in the grandstand for urrect entrance led to the VIP snack bar and the special seats in the grandstand for playing fields No. 1 and No. 2. The entran-ce for other spectators was located south of the hockey grounds on Kusoczinski-Damm, where the ticket booths and ticket takers were.

Communications Area

Under the grandstand at
0.00 m. elevation the print
shop was located 12 sq. m.
At 5.00 m elevation were the
press area and interview room 12 sq m
the hostesses' room 19 sq m
DOZ subcenter 50 sq. m.
Hat check and toilet facilities
At 20.00 m algorithm ware a
At 20.00 m. elevation were a
temporary post office teletype
room with adjoining offices 25 sq. m.
2 telephone booths.
Television installations:
2 DOZ television camera stands
4 DOZ motion picture camera stands
For four technical equipment trucks, a
parking area of 160 sg. m. was required.
· · · · · · · · · · · · · · · · · · ·

Contest and General Administration

At 0.00 m. elevation of the g were the following rooms: Federation Internationale de	rano	dsta	Ind
FICKEY (FIF) FIH-President FIH delegates German Hockey Federation	38 19	sq. sq.	m. m.
(DHB). Sport areas administrator. Technical director.	31 25 12	sq. sq. sq.	m. m. m.
direct access to the fields.	37 19 19	sq. sq. sq.	m. m. m.
Guards and ticket takers. Technical maintenance personnel Electrical equipment room.	25 25 13.	sq. sq. sq.	m. m. m.
rooms for personnel	<u>.</u> 25	sq.	m.
Restaurant Under the grandstand at 0.00 m. elevation VIP's cafeteria with storeroom (no kitchen) Under the grandstand at 5.00 m. elevation Spectators'	63	sq.	m.
facilities.	100	sq.	m.

field 0.00 m.	
2 spectators' snack stands with a	100

total of 100 sq.m.

Types of Sport: Boxing and Judo (Finals)

Location: 8000 Munich 40 Spiridon Louis Ring

Team coordinator for the Olympic Construction Company, Ltd.: Graduate Engineer Bernd Krönert, Munich

Project director for the Olympic Construction Company, Ltd.: Building technician Georg Galli, Wolfratshausen-Deining

Concept, Planning and Building supervision:

Dipl.-Ing. Rolf Schutze, Architect, Munich

Characteristics of Design and Construction

Temporary bleachers were built over the existing grandstands and parts of the ice skating rink in the Munich ice sports hall. These temporary stands left a free rectangular inner area of approximately 21.40 m. x 18.80 m. The ring was set up 21.40 m. x 18.80 m. The ring was set up here for the boxing matches, whereas a platform of 16 m. x 16 m. was built here for the judo contests. The window strips were temporarily hung with lengths of blue cloth so that a new appearance was given to the interior of the hall by the optical interaction of the new stands, the partially draped ceiling and the revamped lighting (which was concentrated over the middle area according to the needs of the boxing or judo matches). The lighting for the television cameras was set up so that the vertical lighting would also include the audience. The temporary stands were constructed of steel pipes. The traffic areas were covered with wooden planks carpeted with coarse felt. carpeted with coarse felt.

Dimensions of the Installation

Built-over areas of the hall 5,870 sq. m. Space under roof	
Innerarea 21.40 m. x 18.80 m 402 sq. m. (Inner area for boxing ring,	•
mobile camera stands, special guests, referees, jury, doctors and the press)	
Boxing ring 7 m. x 7 m	
Judo mat 16 m. x 16 m 256 sq.m	•

Access By car:

There is a connection from the Olympic Village to the boxing arena via Lerchenauer Strasse. The main connection to the city traffic arteries is via the Middle Ring and the Spiridon Louis Ring. Public transit:

The subway station for the Olympic Park From there the boxing hall. It is also proximately the boxing hall. There are sidewalks leading from there to the boxing hall. It is also possible to use the street car stop at Schwere Reiter Strasse.

Parking lots: The available parking lots were only for

the use of VIPs and the necessary service personnel.

Total Cost excluding Indicentals 4.2 million DM

Utilities

Heating: The existing heating system was utilized for the various rooms (hot water heat). Ventilation: The shower and washrooms were temporrarily heated by electric space heaters. The rooms were also ventilated. The boxing arena was ventilated by ten roof ventilators. Ventilation capacity: The ventilators could be set at either one of two speeds. Stage I (minimum) 100,000 cu.m./h. Stage II (maximum) ... 200,000 cu.m./h. The fresh air was conducted through the existing blinds of the hall. Maximum ventilation was 30 cu.m./h. per person. High voltage installations: Installed transformer capacity . . . 1,030 kVA Lighting: Floodlights as required for color television E mean = 1.500 lx E mean = 3.1 00 lx Emergency lighting Low voltage facilities: Ela-system, clock system, fire alarm system, antenna installation, data processing, data transmitting, etc. Intercom system:

Boxing match directors and referees.

Technical Facilities for Sports

Technical Facilities for Sports Scoreboards: Two electronic scoreboards executed in light chamber Technique 5.00 m. x 1.60 m. were hung over the spectator stands on the northern and southern sides of the hall. The following information was displayed: the starting number of the current match, name, nationality, class and weight, points, match number, weight category, con-testant number, name, nation, individual evaluation total-result evaluation, total-result.

Contest Area

Inner area 21.40 m. x 1 8.80 m. 402 sq. m.

Inner area 21.40 m. x 1 8.80 m. 402 sq. m. Boxing ring: The boxing ring was located on a platform 7.00 m. x 7.00 m., 1.00 m. high in the middle of the inner area. 49 sq. m. The collapsible framework of the ring was constructed of steel pipe with a wood floor. In the remainder of the inner area were the referee seats of the Association Interthe referee seats of the Association Internationale de Boxe Amateur (AIBA), the Deutscher Amateur Boxverband (DABV), the physicians panel, seats for the doctors' commission, 2 standing places for mobile television cameras, and press seats. The directors' cubicles including that of the match supervisors were located on the western side of the hall over the

Olympic Use

Boxing — August 27 until September 8, 1972 Judo (finals) - September 9, 1972 Boxing - September 10, 1972

Athletes' Area

Inner area. 402 sq. m. 1 2 locker rooms, each 26 sq. m. with 4 sanitary areas, each 33 sq. m. with a total of 22 showers, 14 toilets and washrooms.

Hygiene area: In the athletes' locker room area Doctors' office with reception 20 sq. m. 13 sq. m. room 2 sports doctors' offices, each . . 18 sq. m. 37 sq. m. Doping control Examination room Toilets and washroom 13 sq. m. 2 boxing glove store rooms,

30 sq. m. each 1 refreshment stand in the locker

room area. Access:

The entrance was on the northern side of the hall at the contest level. From there the athletes proceeded to the locker rooms, hygiene areas, and through the boxing glove store room to the ring.

Spectators' Area

Total spectator seats	7,360
Individual bucket seats (as in	
Olympic Stadium)	6,038
Special seats	36
VIP seats	228
Participants' seats	. 283
Press seats with tables	. 153
Press seats without tables	. 106
Commentator seats with tables	124
Commentator cubicles with tables	36
Chairs for the press in inner area	195
VIP seats	54
AIBA Jury	5
AIBA	. 26
Referees'seats	. 43
DABV	12
Doctors' commission	. 19
Doctors' jury	3

VIP services: The VIP restaurant seating fifty was located on the third tier and included a refreshment service, kitchen, toilets, and other rooms

Spectator services:

There was a snack stand on the first level in the ambulatory. Sanitary facilties:

sides of the hall at the contest level. First aid:

One room at the contest level. . 14 sq. m.

Spectator access: Three main entrances on the southern side of the grounds, then over the plaza and up the two ramps to the middle encircling spectators' entry level; from here entry through one of ten doors to the seats. The ticket windows were immediately accessible from outdoors.

Communications Area

The entire communications area was housed in a single-storied temporary prefabricated building outside the boxing hall next to the western wall. Press writing room 87 sq. m. Press office 24 sq. m. Interview room 94 sq. m. Post office and teletype room 170 sq. m. 40 sq. m. ABC room 2 rest rooms (toilet and washrooms) total Lobby (for information and 40 sq. m. telephone booths). 150 sq. m. DOŻ room. 120 sq. m. .33 sq. m. northern side of the hall under the galleries.

Broadcasting facilities: Four DOZ television camera places were located on the stands or in the inner area, as well as one space for an <u>ABC TV</u> camera and four more spots for DOZ movie cameras. The post office transmitting room was located in the side rooms of the hall. 10 sq. m. Three hundred square meters of parking area had to be provided for eight technical equipment trucks equipment trucks.

Contest and General Organization Association Internationale de Boxe

Amateur (AIBA)	
AIBA President	43 sq. m.
AIBA Office	15 sq. m.
2 AIBA extra rooms, each	30 sq. m.
Conference room	40 sq. m.
Deutscher Amateur Boxverband	(DABV)
DABV Presidium	26 sq. m.
DABV Office	. 20 sq. m.
International Judo Federation	
(IFJ)	23 sq. m.
Deutscher Judo-Bund (DJB)	. 23 sq. m.
Contest area supervisor	20 sq. m.
Defenses' lacker room	22 sq. m.
Referees locker room	23 SQ. III.
herefees lounge	30 SQ. III.
	40 Sq. III.
2 security quards rooms each	1/ sq. 111.
1 room checking service	22 cg m
Fire department stand-by room	38 sq. m
Police stand-by room	11 sq. m.
Car pool drivers	20 sq. m.
Repairmen	50 sq. m.
Various store rooms	150 sq. m.
	· · · · · · · · · · · · · · · · · · ·

Access: The rooms of the national and interna-tional federations as well as those of the sport area supervisors had their own Other separate entries were reserved for the doctors and the press.

Restaurant

A restaurant to serve VIPs was located at the western side of the hall above the stands 180 sq. m. (with refreshment counter, kitchen and

otherareas). Six refreshment stands stood in the corridors under the stands on three sides to serve the spectators.

Location: 8 Munich 40

Olympic Park North

The Olympic Construction Company, Ltd. was responsible for the project "Olympic Village" only until the preliminary design stage. Afterwards, of the entire project only the amusement center (the eventual school and childrens' day care center) and the food service center remained under the control of the Olympic Construction Company. Five Munich building contractors were entrusted with the completion of the Olympic Village Center and the Men's Olympic Village (approximately 3,000 apartments for about 10,000 inhabitants) The DEBA, Deutsche Wohnbau, with an approximately 50% interest, the Bavarian Hausbau with approximately 31 %, the Public Benefit Bavarian Building Corpora-tion with approximately 9%, the Münchner Grund Gesellschaft with 5% and the Süd Grund Gesellschaft with 5% interest Village Project Corporation" (ODMG). For this area the ODMG awarded contracts for the approaches, external traffic and the community facilities. It was also respon-sible for the Park House, the pneumatic refuse removal system, and the interior and exterior building of all facilities required by the Olympics.

All construction projects in regard to houses and apartments were executed by the individual building corporations them-selves. Beyond this, the ODMG was com-missioned by its members to preserve the concept that resulted from the architectural competition and to guarantee the completion of the projects on time. Here the Olympic Construction Company had a

Company had a control function. The Women's Olympic Village which was built under the auspices of the Munich Student Works Company, made up 12 % of the total Olympic Village building project and was also included by the ODMG in the approaches and pneumatic refuse removal system.

Head business director of the ODMG: Karl Gerhard Hinderink, Munich

Department head for approaches and Olympic use: Ing.-grad. Manfred Lanzl, Munich

Deadline planning Dipl.-Ing. Arnt-Michael von Levetzow, Munich

Team director for the Olympic Construction Company, Ltd.: Dipl.-Ing. Wolfgang Boresch, Munich

Project director for the Olympic Construction Company for the food service center (cafeteria) simultaneously entrusted with the supervision of the Olympic use in the entire Village: Building Engineer Gerhard Gietz,

Munich

For the amusement center (school and childrens' day care center) Building Engineer Ernst Stahl, Munich

Olympic Construction Company- deadline supervisor for the entire village in relation to the ODMG:

Building Engineer Alois Kargl, Munich

General planning of the Olympic Village: Prof. Erwin Heinle and Dipl.-Ing. Robert Wischer and Associates, inde-pendent architects, Stuttgart/Munich

Olympic Village Center: Prof. Heinle, Wischer and Associates

Men's Olympic Village: Prof. Heinle, Wischer and Associates, in cooperation with Wiegand and Zuleger, independent architects, Munich

Amusement center (school and childrens' day care center):

Prof. Heinle, Wischer and Associates

Outdoor facilities of the Olympic Village Center Men's Olympic Village and amusement center:

Team of garden and landscape architects Miller and Lutz, Stuttgart, Garden and landscape architects Leitzmann and Kagerer, Munich

Church and community center: Christ and Karg, independent architects, Munich

Women's Olympic Village: Eckert and Wirsing, independent architects, Munich

Characteristics of the Design for the entire Project:

The Olympic Village is located in the northeast section of Olympic Park between Lerchenauer Strasse, Moosacher Strasse and the Georg Brauchle Ring. This small town with about 5,000 apartments and all other general furnishings was supposed to offer the Olympic participants suitable lodgings near the main sport sites. It thus had to have the best transportation arrangements to and from all areas and at the same time was expected to fulfill all the requirements of a modern residential district after the Games. The total separation of pedestrian and vehicular traffic produced a pedestrian and venicular traffic produced a pedestrian mall which extends from the village center through the streets of the housing wing and ends at the pedestrian path embankments in Olympic Park. It is possible to drive into every village area because there are viaducts under the pedestrian mall. The Olympic Village has its back to the noisy and busy streets in the north and east, and faces the sunny and quiet green zones in the south and west. The village center is situated immediately near the subway station on Lerchenauer Strasse. The two main entrances, which serve the pedestrian mall and vehicular traffic respectively, are located on both sides of the building complex. This forms the functional and architectural pivot of the entire ensemble. The traffic areas of the center on both levels are distributors and feeders to the housing tracts and other parts of the Olympic Village. Although the housing tracts form closed-off living quarters, they nevertheless receive optimal sunshine despite the housing density because of the terracing and angling. The terrace house type which was created for this residential area can be called a drive-in terrace house because the parking areas will be located under the pedestrian malls for its post-Olympic use.

Access:

General: During the Olympic Games the entire Olympic Village was closed to the public. Contact with the outside world was confined to the so-called "contact area" near the southern main entrance 1. Several buildings, for example, the administration building G1 and the hotel G3, were located in a semi-public or public area. Otherwise admission was allowed only to persons whose presence was required by administrative demands.

By car: Traffic was conducted mainly from Lerchenauer Strasse (eastern tangent) through main entrance 1 (southern) and main entrance 2 (northern). From street level, it went under the pedestrian level to the internal street level. A ring street connects both main entrances under the Helene Mayer Ring. From this circle of streets, other streets lead to the appropriate parking areas under the three housing tracts or U-turn loops. The feeder streets have traffic signals. There are accesses to the pedestrian level from all important points on the vehicular level. There are standing lanes for buses and taxis next to the regular lanes. A branching emergency traffic system which partially includes paved walkways is installed for fire engines and ambulances.

Public transit:

A station of the Munich subway system is located next to the villagers' main entrance 1. The rapid transit station is located about 1,000 meters from the village center. Both systems connect the village center with the city center in about fifteen minutes. Bus lines were furnished for Olympic participants from the village to all contest sites.

Pedestrians: The pedestrian area of the village begins at the ramp of main entrance 1 on Lerchenauer Strasse. Other paths from outside lead to the check point before the contact zone and from there to the village center. All pedestrian paths cross at the village center.

Parking lots: About 3,000 parking spots were available in free areas and under the pedestrian mall. Nevertheless, the automobile parking spaces were only used by persons carrying special permits during the Olympic Games. Eventually they will be at the disposal of the Olympic Village residents.

Dimensions of the total Project

Total area of the Olympic

Village	394,206 sq.	m.
Built-over area	210.000 sq.	m.
Total volume of the		
Village 3.2	2 million cu.	m.
Center	312,000 cu.	m.
Administration	,	
building G1	58,000 cu.	m.
Short term personnel G2	83,000 cu.	m.
Hotel-highrise G3	78,000 cu.	m.
Medical center G4	80,000 cu.	m.
Contact zone with	,	
shopping center	13,000 cu.	m.
Church center	20,000 cu.	m.
Amusement center	30.000cu.	m.
Food service center	20.000 cu.	m.
	,	

Village 2,64 Volume of Women's Olympic

Village 240,000 cu. m.

Cost

The ODMG stated that the construction cost including purchasing the site and all other incidentals was 500 million DM.

Utilities

Heating: Together with the Oberwiesenfeld sport areas, the Olympic Village was supplied with heat by the Munich-Freimann central heating plant which had a separate substation on the Olympic Village grounds. The total heating capacity is about 38 Gcal/h.

High voltage:

Twenty two transformers with a total capacity of approximately 15,000 KVA provide the Olympic Village with electricalenergy.

Refuseremoval:

The entire Village is provided with a pneumatic refuse removal system. There are rubbish chutes on each floor to remove waste materials. These chutes are connected to an underground collecting network, which forces it under pressure to the center. Here the refuse is compressed and removed by the Munich DPW in sealedcontainers.

Olympic Use

The Olympic Committee rented the Olympic Village from the ODMG after February 1, 1972 for Olympic furnishing. The opening and occupation of the Village followed on August 1, 1972. The last of the Olympic participants moved out between September 10 and 19, 1972. Afterwards the Olympic furnishings were removed The Olympic renting period ended October 31, 1972.

Description

G 1, the Administrative Building on Helene Mayer Ring 4

Location and construction:

The highrise G 1 is located immediately north of the main entrance to the Village next to the subway station. It is vertically dominant and a landmark designating the main entrance. The building is constructed of prefabricated concrete and white facing cement concrete. It extends sixteen stories above the pedestrian level.

Olympic function:

The following functions were located in G 1 : The Olympic Village mayor's office with the complete village administration, registration, reception of participants, functionaries and VIPs; the organization center for food and shelter service, security guards (police), accreditation, the press, and the paging service broadcasting center in a penthouse on the roof.

Post-Ólympic use:

The entire building will be rented out as offices.

Utilities:

All usable areas are air-conditioned.

G 2. Highrise for Short-Term Personnel on Helene Mayer Ring 10 Location and construction:

G 2 is the southernmost part of the northto-south highrise tract running parallel to Lerchenauer Strasse. It screens the open area of the center from the street area. The structure is made of steel reinforced gravel concrete (transverse wall system) and has a white prefabricated concrete facade attached. It extends 22 stories above the pedestrian level.

Olympic function:

All rooms in G 2 were used to house the short-term personnel. The printing plant for the Olympic Village newspaper was located in the cellar.

Post-Olympic function:

G 2 was planned and constructed in terms of apartment units. These units will be sold as condominiums. Utilities:

The building is heated by elements buried in the floor. All kitchens, bathrooms and toilets that are situated in the interior of the building are completely ventilated. Living rooms and bedrooms which are on the outer walls are mechanically ventilated.

G 3 Hotel Highrise at Helene Mayer Ring 12

Location and construction: G 3 forms the middle section of the northsouth highrise (see G 2). It was located in the public part of the Village, that is, it was open to outside visitors. It was built of conventional steel and concrete (transverse wall system). It extends seventeen stories over the pedestrian level.

Olympic function:

The lower stories were occupied by guests of the OC. It was the Olympic Village Hotel above the 14th floor and was available to

guests of the OC during the Games. Post-Olympic function: After the Games, the hotel will continue to operate as such. The lower stories will be sold as condominiums except for the ground floor which contains stores. Utilities

See G 2 for heating and ventilation.

G 4, Medical Center at Helene Mayer Ring 14 Location and construction:

G 4 is in the northernmost part of the highrise row on Lerchenauer Strasse. It was in the closed-off area of the Village during the Games. It has the same construction and number of stories as G 2. Olympic function:

Except for four floors the entire building was occupied by Olympic participants. These four stories housed the Olympic medical center which had the following facilities: central doping control, specialists for internal medicine, surgery, orthopedics, anesthesia, urology, dentistry, laboratory, X-ray section and a thirty bed infirmary. A whirlpool bath and sauna, gymnastics room, hydrotherapy and electrophysical therapy with underwater massage were installed in the lower story. Post-Olympic use:

The furnishings mentioned above will remain in their present condition after the Games and will be operated as a private medical center. Utilites:

The technical installations correspond to those in G 2.

Contact Zone and Shopping Center Location and construction:

The contact zone is located between G 1 and G 3 in the vicinity of main entrance 1, partially outside of the closed area. The shopping center extends from in front of the forum in a right angle to the north along Helene Mayer Ring. The contact zone and shopping center are situated on the pedestrian level. The row of shops is partially contained in highrises G 1 and G 4. Both structures are one story and are constructed of prefabricated steel concrete components and white facing cement on on multiple layered wall elements. Olympic function:

The contact zone includes the Rendezvous Cafe, interview rooms and a milk bar. The shopping center included the following shops and services: information center, finance company, customs house, service installations, hairdressers, barbers, laundry, dry cleaning, self-service stores, delicatessens, pharmacies, and souvenir shops.

Post-Olympic function: The Rendezvous Cafe was remodeled into a finance company and some areas of the shopping center underwent change of function. All in all, however, the shopping center has kept its various businesses open to fulfill the needs of the new occu-pants of the Olympic Village. Utilities:

The technical facilities are the same as those of G 2; only the heating utilizes radiators.

Church Center on Helene Mayer Ring

Location and construction: The church center is located on an extension of the shop street to the north. The one-story tract is connected with the churches at the pedestrian level. The lower level areas open to the west on a courtyard with daylight. The structure was conventionally constructed of steel and concrete in the lower level. The roof which extends over the worship areas is constructed of steel pipe framework.

Olympic function:

The one-story worship areas for different creeds were at the pedestrian level. Necessary adjoining rooms, community rooms and a library are located on the lower level in the open space that faces the green courtyard.

Post-Olympic function: This area will remain as ecclesiastical community center after the Games. The worship areas will serve the Evangelical and Catholic residents. Utilities:

See the contact area and shopping center.

Amusement Center on Nadi Strasse

Location and construction: The amusement center was located at the middle point of the center at the end of the middle tract west of the shopping center. The strongly accented two-story structure was constructed of conventional concrete and steel frame. Olympic function:

The amusement center had two areas: a quiet zone with reading rooms, the library, the record library, and the Bavaria Club; and the lively zone with a theater for cultural programs and shows, the Village Cinema, rooms and free spaces for sports and games, coinoperated games and television sets as well as the main post office.

Post-Olympic use:

The entire complex will be converted into a sixteen-class grammar school with two gymnasiums, a movie house and a children's day care center. Utilities:

The building was heated by radiators like G 2. Only certain areas had ventilators installed.

Food Service Center (Cafeteria) at Helene Mayer Ring 8

Location and construction: The cafeteria was located on the pedestrian level at the end of Connolly Strasse and connected to the central area. The structure was built with a visible steel or visible steel-concrete framework construction. The walls are partially glass and partially of multi-layer wall elements. The building has a total of three floors.

Olympic function: During the Games, all Olympic participants were served on the three levels. Post-Olympic use:

After the Games, the steel construction structure was demolished and thus the volume of the building was reduced by about a third. The remaining building serves the student population as a cafeteria. Utilities:

See G 2.

Men's Olympic Village Location, construction and dimensions:

Three tracts extend westward from the center along the crooked Strassberger, Nadi, and Connolly Strasse. The terraced highrises with ten to fourteen stories are located north of these streets and the one- to four-storied houses are situated to the south. The terraces face either the south or southeast. A total of 3,000 housing units were built ranging from single rooms to five-room apartments. Up to 10,000 occupants (participants and accompanying personnel) were sheltered during the Games.

General furnishing in the Men's Olympic Village:

Rows of showers with massage rooms were located under the pedestrian level and over the garages in the terraced highrises. Single showers were situated in the lowbuilt area for Olympic participants. These measures were necessary for hygienic reasons because all apartments in the Olympic Village were destined for future use. For the use of participants, three swimming pools each with an adjoining sauna were located in the breaks in the housing tracts. Store rooms for the centralized fruit and linen dispensaries were located on the garage level. The buildings were built of conventional steel and concrete with attached prefabricated white concrete facade elements.

Olympic function:

This building was used to house Olympic participants during the period between August 1. and September 19, 1972. There were four types of living quarters in the Men's Olympic Village:

- 1. A room for a single athlete
- 2. A room for two athletes
- 3. Studio and living room for the "Chef de Mission"
- 4. Studio and living room for the team captain.

The rooms were furnished as follows:

1. Furnishings for a single room in the Men's Olympic Village:

one clothes and personal effects cabinet with two doors; one table 78 cm. x 78 cm. x 72 cm.; one chair; one arm chair; one multipurpose book shelf, 78 cm. x 72 cm. x 38 cm.; one bed 200 cm. x 80 cm.; one floor lamp.

2. Furnishings for a double room in the Men's Olympic Village:

two two-door clothes and personal effects cabinets; one table 117 cm. x 78 cm. x 72 cm.; two chairs; one arm chair; two multiple purpose book cases, 78 cm. x 72 cm. x 38 cm.; two beds, 200 cm. x 80 cm.

 Furnishings for the studio and room in the Men's Olympic Village for a "Chef de Mission":

one two-door clothes and personal effects cabinet; one wooden chest of drawers; one table 117 cm. x 78 cm. x 72 cm.; one cabinet for the desk; one arm chair; one multi-purpose bookshelf, 78 cm. x 72 cm. x 38 cm.; one coffee table, 100 cm. x 60 cm. x 42 cm.; three arm chairs; one bed, 200 cm. x 80 cm.; one television set.

4. Furnishings for the studio and room in the Men's Olympic Village for a team captain:

one two-door clothes and personal effects cabinet; one wooden chest of drawers; one table, 117 cm. x 78 cm. x 72 cm.; one small cabinet for the desk; one multi-purpose book shelf, 78 cm. x 72 cm. x 38 cm.; one chair; one arm chair; one bed, 200 cm. x 80 cm.

Women's Olympic Village

Location and construction: The Women's Olympic Village consists of a highrise which is located south of the center parallel to Lerchenauer Strasse, four terraced buildings situated south of Connolly Strasse and the 11/2 story single room bungalows. The highrise with a maximum of eighteen stories contains eighty one-room apartments. The terraced houses have 127 large sized one-room apartments for married couples and the bungalows contain 800 one-room apartments. 1,800 women athletes and their accompanying personnel could be housed in the Women's Olympic Village during the Olympic usage. The highrise was built of prefabricated steel and concrete room cells. The terraced house and bungalows were constructed with conventional steel and concrete. All apartments in the highrise and bungalows were furnished with prefabricated "wet cells" (toilets, shower and sink units). These were produced from fiberglass re-inforced plastic and were especially designed for these buildings.

The one-room apartments housing one person in the bungalows and the highrise were furnished as follows: shower bath ("wet cell"); refrigerator; a bed formed like a "sleeping bench", 200 cm. x 80 cm.; a bench; a table, 78 cm. x 78 cm. x 72 cm.; a built-in closet; a book shelf with work area; a wall light.

Olympic function: The buildings were used to house the women athletes and accompanying personnel from August 1 until September 19, 1972. The rooms were equipped similarly to those in the Men's Village.

Post-Olympic function: The one-room apartments in the highrise and bungalows will be used as student housing. The apartment units of various sizes in the terraced houses will be rented to married students. The entire complex containing the cafeteria, highrise, terraced houses and bungalows will be called the "student quarter".

Utilities:

The rooms were heated by radiators corresponding to the arrangement in highrise G 2.

The selection of eating places for visitors: Southern Refreshment Center, Northern Refreshment Center, Beer Garden on the Lake opposite the Olympic Swimming Hall, Concession Stands for quick snacks, drinks, and fruit; the sale of sundry articles, photo supplies, newspapers, rain gear, etc.; bank services, information on television monitors, data display sets and telex projection.loudspeakers.

Location:

Olympic Park along the main access routes

Southern Refreshment Center at the south entrance, Northern Refreshment Center at the North Crossing, Beer Garden on the Lake on the southern shore of the Olympic Lake. Concession clusters along the visitors' paths, mainly at the subway station, rapid transit station, bus station on Ackermann Strasse, and at the boxing hall.

Team coordinator for the Olympic Construction Company, Ltd.:

Architect HBK Klaus Jürgen Kluge, Munich

Project director for the Olympic Construction Company, Ltd.: **Dipl.-Ing. Wolf Speer**

Design, planning and direction of construction:

Southern Refreshment Center Architect Dipl.-Ing. Peter Lanz, Munich

Northern Refreshment Center Behnisch and Associates Munich/Stuttgart, with Domenig and Huth, Graz

Beer Garden on the Lake

Architects Leyck and Hugle, Munich Concession stands

Architect Dipl.-Ing. Ray Lardschneider, Munich

Characteristics of the Design

The Northern and Southern Refreshment Centers, the Beer Garden on the Lake and the concession clusters were conceived as light temporary buildings. A standardized basic frame was produced partly of steel girders and partly of light tubing profiles. A 0.65 mm. thick, hardly inflammable PVC (polyvinyl chloride) soft foil was stretched over a web of tubing to form the actual roof. In order to minimize unwanted heat radiation, parts of the underside of the foil surfaces were coated with aluminum, without seriously reducing transparency. The soft PVC foil was also used on the outer walls. The static rib cage and the stretched foil formed the roof surfaces, which were extended, structured and partly staggered in height. The table areas, bars, and serving counters were thus sheltered by a light and transparent cover. The kitchens and preparation rooms were housed in winterfast structures which could be locked and were erected of prefabricated steel construction with asbestos cement curtain walls.

Southern Refreshment Center

approaches for buses and streetcars in the southeast. The visitors' entrance also served as an orientation point throughout the Refreshment Center. Rest rooms were set up in kiosks. Provisions were supplied to the western side of the kitchen wing.

Northern Refreshment Center

Northern Refreshment Center Enclosed surface. 8,200 sq. m. 3,000 seats, of which 1,000 belonged to the self-service restaurant and 2,000 to the self-service beer garden. The dining rooms were divided among three levels. Coffee stands augmented the services offered. Rest rooms for the particular areas were provided in self-contained units. The center was reached over a raised ori-entation ramp, which started from pedes-trian access paths (the Norddamm was the pedestrian artery between the subway and rapid transit stations) and then wound in a semicircle through the refreshment cen-ter before rejoining the foot paths. Entrances to the individual seating areas opened off the orientation ramp. The kitchens were added at the eastern side, from where they were also supplied.

The Beer Garden on the Lake

Enclosed area. 3,200 sq. m. 1,650 self-service places. The Beer Garden was partitioned in two by the Roopsingh-Bais-Weg. The table area and the dining area, each with a self-service counter, were on one level. The preparation kitchen in the western part supplied the entire beer garden. Rest room units were provided in both parts.

Access was via the footpaths. Provisions for the kitchen were brought in via the driveway to the southwest.

Concession Clusters (8 units) Total enclosed surface. 7,640 sq. m. The klosks for information and for the sale of visitors' supplies were furnished with information columns, showcases, and counters. Folding walls of heavy cardboard closed off the storage rooms. Plastic-coated cardboard sheds were set up as toilet units and rooms for short-term personnel

Access

Access These facilities opened only onto the foot-paths, and were strictly separated from vehicular traffic. Deliveries to the kitchens and sales areas were executed over the Olympic driveway network. No visitors' parking places were allotted to the refresh-ment centers and kiosk clusters. A few storage and short-term parking spaces near the kitchens were placed at the disposal of the personnel.

Total Cost excluding Incidentals

Southern Refreshment			
Center	6.9	million	DM
Northern Refreshment			
Center	4.2	million	DM
Beer Garden on the Lake	0.8	million	DM
Concession clusters	4.4	million	DM

Utilities

The refreshment centers, the beer garden, and the concession clusters were tempo-rary buildings without heating. Ventilators were installed in the kitchens and rest room areas only.

The Kitchens were powered by gas-produced low pressure steam and by electricity.

Electrical	Insta	llations
112.1		

High voltage: Illumination was supplied from along the roof and ramp lines in accordance with the architectonic concept of the buildings. Low voltage: Intercom units for the kitchens

Telephone lines	
Loudspeaker systems	
Installed transformer capacity	
Southern Refreshment Center. 1.000	kVA
Northern Refreshment Center. 1,500	kVA
Beer Garden on the Lake 250	kVA
Concession clusters total 950	kVA

Types of Sport: Wrestling, Judo, Weight lifting. Fencing

Location. 8 Munich 12 13 Theresienhöhe

Team director for the Olympic Construction Company, Ltd.: Dipl.-Ing. Herbert Weidenschlager, Munich Project director for the Olympic Construction Company, Ltd.: Construction Engineer Friedrich Schalk, Munich

Planning and supervision of construction: Architect Dipl.-Ing. Peter Lanz, Munich

Engineering and supervision of technical work (heating, plumbing, ventilation, electricity):

Plang, Ltd., Munich

Statics of the wrestling hall and consultation for the fairgrounds: Engineering Office Dr.-Ing. Otto Höllerer, Munich

Olympic Usage of the Exposition Halls Hall 5 (already available) —temporary installations for Olympic communications, organizational and technical personnel. Hall 16 (already available) — temporary installations for postal and short-term

Installations for postal and short-term workers.
Hall 17 (already available) —temporary installations for printing.
Hall 14 (newly built) —wrestling and judo competitions.
Hall 18 (already available) —temporary installations for judo training.
Hall 19 (already available) —temporary installations for wrestling training.
Hall 7 (already available) —temporary installations for weight lifting competitions.
Hall 9 (already available) —temporary installations for weight lifting competitions.
Hall 9 (already available) —temporary installations for weight lifting.
Hall 11 and Hall 12 (both already available) — temporary installations for training for weight lifting.
Hall 11 and Hall 12 (both already available) — temporary installations for use as Fencing Hall No. 1 (for final competitions).
Hall 20 (already available) —temporary installations for use as Fencing Hall No. 2 (training and semi-finals). (training and semi-finals).

After the Olympics, all the buildings are used as exposition halls.

Total Cost for the Fairgrounds

(excluding incidental expenses) Temporary adaptation of extant exposition

halle
Hall 5. 1.560.000 DM
Hall 16 320,000 DM
Hall 17. 60,000 DM
Hall 18. 750,000 DM
Hall 19 880,000 DM
Hall 7 2,960,000 DM
Hall 9
Hall 11 and Hall 12 2,170,000 DM
Hall 20. 2,410,000 DM
Grounds 640,000 DM
Construction of wrestling-
iudo hall 25.000.000 DM

Hall 5

(Communications, organization and technical installations)

Adaptation for the Olympics: By hanging lamellas of yellow cloth from the ceiling of the hall and lowering the lighting fixtures a lower ceiling was created optically. The walls of all the temporary rooms were constructed of collapsible prefabricated sections. All floors were covered with sisal carpeting.

Room allocation and functions:
lournalists' office area 286 sq m
Press mail incl counter area 394 sg m
Teletype room 63 sq. m.
Supervision 16 sq. m.
Counter service area 16 sq. m.
Public pay telephones 68 sq. m.
Press information area 128 sq. m.
Press interview room 105 sq. m.
Waiting room and cloak room 50 sq. m.
Fairgrounds central doning control
Waiting room 20 sg. m.
Adjoining room 10 sg. m.
Office
2 examination rooms for doctors 20 sq. m.
2 toilets with vestibule
Lechnical area of the fairgrounds:
Technical administration OC section
Data processing 80 sq m
Measuring 72 sq. m.
Scoreboard technology
Scoreboard technology 42 sq. m.
Spare parts 70 sq. m.
Stand-by personnel, manual
workers. 90 sq. m.
Stand-by personnel, electrical 70 sq. m.
Storeroom 2 30 sg m
Storeroom 3 91 sq. m.
Head hostess 20 sq. m.
Hostesses' room 40 sq. m.
Chauffeur pool
Plumbing:
I ollet facilities consisted of six individual
were set up in front of the northern side
of the hall between the press entrance
and the entrance for technical personnel.
· · · · ·
Hall 16

(Postal and short-term personnel) Remodelling for the Olympics: The walls of all the temporary rooms were constructed of prefabricated asbestos cement panels that could easily be dis-mantled. The entire floor was covered with a sisal carpet. The lighting was determined by the requirements of the individual rooms.

Room anocation and functions:
Area for short-term personnel
Chief of security guards 20 sg. m.
Security quards 66 sq. m.
Instruction room for security
guards 60 sg. m.
Police squad commander 21 sq. m.
Police 66 sq. m.
Coordinator of medical staff 30 sq. m.
Waiting room
Doctors' examining room 28 sq. m.
2 rooms of payroll office, each 15 sq. m.
Fire fighters' lounge and
stand-by room 34 sq. m.
Post office, fairgrounds branch:
Work area, including personnel
room
Service area, with 90 sq. m.
5 counters, 25 telephone booths, 9 pay
telephones, 2 telex windows, 12 teletype
machines, 1 supervisor.
Plumping:
ioliet facilities were provided by pretabri-

cated sanitary booths.

Hall 17

(Printing shop) Adaptation for the Olympics: The exposition hall remained basically unchanged for the Olympics, but all the electrical and water connections needed for the printing presses and other equipment were installed.

The exposition area of 730 sq. m. was used in its entirety as a printing shop.

Access for Short-term Personnel

Access for Short-term Personnel By car: From the Olympic Park the fairgrounds could be reached via the Middle Ring, from there along Heimeran Strasse and Gang-hofer Strasse to the fairgrounds parking lots, or to the various entrances to the individual areas of the fairgrounds. Public transit:

There are streetcar stops on Heimeran Strasse and on Ganghofer Strasse. From there one can get to the various entrances of the fairgrounds which are on Heimeran Strasse, and from there to Halls 5, 7, 16 and the other work areas.

Restaurants at the Fairgrounds In one part of the main fair-grounds restaurant, the guests of honor and the press were served 300 seats. In the restaurant in Hall 7, the competition personnel were 435 seats. served In the restaurant between Hall 18 and Hall 19, the short-term personnel were served 425 seats For the visitors, there were kiosk clusters at various places on the fairgrounds to sell refreshments and other small articles.

Type of Sport: Weightlifting

Characteristics of Design and Construction

Construction The already existing edifice of Hall 7 was an exhibition hall with three naves the middle one of which was higher. The interior was temporarily adapted to fit Olympic requirements. A massive wall divided the interior into the competition and spectator areas, and the auxiliary space needed. Competition hall area: The new, artificially illuminated compe-tition hall was created by covering the window areas and clothing the surfaces of the walls and ceiling with rolls of black and, in part, yellow material. The lifters' platform was erected in front of the newly built front wall of the hall. The spectators' places, temporary wooden

The spectators' places, temporary wooden stands built on a steel tubing framework, rose on three sides from the area around the podium. The floors of the entire audience area were covered with brown sisal carpets. The competition area of the lifters' platform was 1.00 m. above the floor of the hall. The entire podium was covered with brown velour. A new interior was also created in the auxiliary area by covering the ceilings with rolls of material (yellow ceilings, white walls). The rooms of the officials were carpeted with velour, the rest of the hall with sisal. The walls of all the temporary interior rooms were constructed of asbestos cement prefabricated panels so they could be dismantled after the Games.

Dimensions of the Facility

Area under roof	5,000	sq.	m.
Competition area	. 350	sġ.	m.
Podium surface	. 144	sġ.	m.
Competition surface,		•	
lifters' stage	. 16	sq.	m.
U			

Access

See wrestling-judo-hall, fairgrounds.

Utilities Ventilation and cooling: As an exhibition hall, Hall 7 was equipped with four air-intake installations (total capacity: 100,000 cu. m./h.). Two of these installations were equipped with a cooling register at the intake vents to take care of the competition area. The space under the main grandstands was turned into a high pressure chamber (two air-intake installations with a total capacity of 70,000 cu. m./h.). Pre-cooled air flowed into the audience area through slits in the platform steps of the grandstands. The warm air left through exhaust vents in the roof. High voltage installations:

High voltage installations: The entire power supply came from the northern transformer station of the fairnormern transformer station of the fair-grounds: five transformers with a built-in capacity of 400/600 kVA. Emergency power unit with a capacity of 125 kVA (switched in manually). An extra lighting system was installed in the hall, so that the average illumination was 400 lux. Special lighting for color television, con-sisting of 28 spotlights of 2,000 watts each, resulted in average horizontal illumi-nation of 4,000 lux and vertical illumina-tion of 2,100 lux in the area of the lifters' stage:

Low voltage installations: The PA system covered the entire hall with 40 speaker clusters, of which each rated

24 watts. The following additional installa-tions were available: intercom system with tions were available: intercom system with 5 speaker's stations, time system with 12 synchronized clocks, a common antenna for 20 users, 1 industrial television system with camera and monitor, 1 videotape installation with 1 camera and 1 video-recorder. The already available fire alarm system was expanded.

Technical Installations for Sports Scoreboard:

Scoreboard: The board was constructed in light chamber technique, 8.77 m. long, 3.63 m. high, and installed in the dividing wall of the hall. The following information was displayed: Name and country of the competitor, weight of the participant, number of the attempt, and results of the various contests sub-divided according to events divided according to events.

Time for the 3-minute rule was displayed on a digital clock with luminous digits. An acoustical signal was sounded after two minutes and after three minutes. Two clocks were available to control the display on the board. Red and blue lamps indicated the decisions of the jury.

Competition Area

Competition platform: Floor space 20.44 m. x 17.14 m. 350 sq. m. Platform 12 m. x 12 m 144 sq. m. The platform was 1 m. above the floor of the hall (two sets of stairs). Lifters' stage, hardwood 4 m. x 4 m., 10 cm. high; one table 6 m. long (to the right of the platform) for the competition direction, one table 10 m. long (in front of the platform) for the jury. Competition preparation:

Warm-up room (4 lifters' stages,	
each 4 m. x 4 m.)	y. m.
Hall direction 10 sc	j. m.
Equipment room 30 so	. m.
Training:	1

For training in Hall 9, twenty lifters' stages with the appropriate auxiliary rooms were built along with two sauna booths.

Olympic Usage August 27—August 31, 1972 September 2— September 5, 1972

Athletes' Area

Entrance for participants	45	sq.	m.
25 dressing and massage rooms, each	15	sq.	m.
each	. 9	sq.	m.
Competition preparation:			
lifters' stages) with 18 couches,			
otal	340	sq.	m.
Weighing room	61	sq.	m.
Competition area	350	sq.	m.
Doctor's area:			
Sports doctor	12	sq.	m.
First aid personnel	20	sa.	m.

(Doping inspection was centralized for the entire fairgrounds in Hall 5.) Access:

Hall entrance on the southwestern side, from there access to the locker room area, massage, toilet facilities, weighing room and medical area. From the competition preparation area to the competition area of the hall there was a direct corridor.

Spectators' Area

Commentators' places 60	
Participants' spectator seats 110	
Spectators 2,797	
VIP Area	

Arrival by car for guests of honor with entry on the southeastern side of the hall, from where they went past the administra-tive and organization area to the VIP lounge in the competition part of the hall. Refreshments for the spectators:

A refreshment stand was set up next to the cloakroom. Other kiosks were spread about the fairgrounds outside. Sanitation:

Sanitation: Spectators' toilets were set up under the grandstands: ten prefabricated sanitation booths of 9 sq. m. each. Access for spectators: On the northern side of the hall were two entrances which led into the foyer. The cloakrooms were on both sides of the way to the grandstands. The grandstands were reached by stairs from the foyer.

Communications

Press center, centralized in Hall 5 for the entire fairgrounds. entire fairgrounds. DOZ-subcenter of the weightlifting hall and mail room. 30 sq. m. DOZ-interview room. 24 sq. m. DOZ office. 18 sq. m. Transmission facilities: 30 commentators' desks for radio and television in the grandstands, 4 DOZ camera stands for television, 2 DOZ movie camera stands, 1 DOZ mobile transmission unit, 3 technical vehicles. Parking places required for the transmission and technical

Competition and General Administration

Competition area: In front of the platform, tables were set up for the jury and for the competition supervisors

Auxiliary rooms area of hall: Sport facilities direction of OC Fédération Haltérophile Internationale (FHI)

 (FHI)
 FHI President
 25 sq. m.

 FHI Secretary general
 20 sq. m.

 German Weightlifting Federation (BVDG)
 15 sq. m.

 Office
 15 sq. m.

 Office
 15 sq. m.

 Office
 15 sq. m.

 OC office
 21 sq. m.

 OC office
 17 sq. m.

 OC office
 15 sq. m.

 Office
 15 sq. m.

 Mimeographing room
 15 sq. m.

Restaurant

One kiosk in the entrance area was provided for the spectators. For other refreshment facilities, look under "Restaurant" in "Fairgrounds, general notes". Types of Sport: Wrestling and Judo

Characteristics of Design and Construction

The almost perfectly square wrestling-judo hall with its visible exterior steel skeleton is covered over by an external framework of threaded steel pipes which require no other support. The structure and surface of the roof are suspended under this framework. Stairwells with elevator shafts are constructed as external additions out of concrete. The high one-story auditorium will be remodelled into a twostory exposition hall after the Olympics by the construction of another floor inside the present hall. Later, the interior of the exposition hall will be illuminated by a horizontal strip of windows and approximately 100 skylights in the roof. For the Olympics the windows and skylights were all darkened by covers.

The facade is constructed of multi-layer aluminum panels. The floor of hard poured asphalt was covered with sisal carpets.

Dimensions of the Facility Interior space. 17,000 cu. m. 800 sq. m. Area of platform (Four mats for wrestling competitions)

Access

By car: From the Olympic Park the fairgrounds on Ganghofer Strasse could be reached via the Middle Ring.

Public transit:

Streetcar stop at the corner of Ganghofer and Heimeran Strasse, visitors' entrance to the fair-grounds on Ganghofer Strasse. Parking lots:

The fairgrounds parking lots outside of the fairgrounds proper were available to visitors.

Utilities

Heating:

There is a hot water boiler with a capacity of 700,000 kcal/h installed in the basement. This supplies heat for the ventilation facilities as well as hot water. In addition, radiators for the locker rooms and shower rooms are connected to the heating system.

Ventilation of the competition hall: The competition hall was supplied with 240,000 cu. m./h of fresh air, a fresh air ventilation rate of 40 cu. m./h per person. The exhaust air was withdrawn through gratings in the steps of the grandstands (60%) and through those in the ceiling (40%). For this purpose there were four exhaust ventilators on the basement floor. At the central air intake facility there were four gas-fired warm air heaters, each with a heating capacity of 400,000 kcal/h. To cool the air there were heat exchangers available with a total cooling capacity of 256,000 kcal/h. They utilized city water, with a consumption of around 60 cu. m./h. This equipment held the temperature around the wrestling mats between 24°C and 26°C. In the audience area a maximum temperature of 29°C could be measured in a few places under unfavorable conditions; normally it was 25°—26°C in the auditorium.

Ventilation of offices and areas for the participants:

These areas were equipped with their own intake and exhaust facilities. They also worked exclusively on a fresh air system. Plumbing:

Because of its later use, the hall was equipped from the beginning with a sprinkler system. The organization offices and the rooms for the participants were beneath and behind the grandstands and were not included in this system. There were supplementary hand fire extinguishers and fire hoses at all stairways, near the exits. Equipment to step up the pressure (located on the basement floor) guaranteed the water supply for the fire hoses

Besides the permanently built-in locker and shower rooms, prefabricated cubicles were installed in the areas for the participants and for the spectators. Temporary connections were made to the watering and sewage system which was planned for the building's later use as an exposition center.

High voltage installations: The wresting hall is supplied with elec-tricity by its own transformer substation (three transformers with 800 kVA). The emergency electrical system to supply the essential needs has an output of 400 kVA. The high voltage switching installation has fourteen circuits, the main lower voltage distribution center contains thirty-seven circuits. The special lighting installation for color television was constructed of eighty-three floodlights, each of which was rated at 2,000 watts, and could be switched to several different intensities. Measured in the reference axis of the television cameras, the median horizontal illumination was 3,000 lux and the median vertical illumination was 1,600 lux. Low voltage installations:

The auditorium was served by an 1,800 watt PA system with fourteen speaker clusters. The telephone installations of the fairgrounds used during the Olympics were increased to include forty direct connections to the telephone exchange in the Olympic Park and four hundred extensions. Additional communications installations included a fire alarm system with ten circuits, the two-way intercom with sixteen units, and the clock system with fifteen synchronized clocks. An industrial television monitoring system with four cameras and four monitors was installed, as well as a common antenna system with twenty connections. From a central switchboard (which also indicated any failures) all the lighting could be turned on or off.

Technical Equipment for Wrestling

Scoreboard: Execution in "light chamber technique", length 6.50 m., width 4.20 m., depth 0.60 m. The following information was displayed for all four mats (in the case of final matches, for both of the two mats used): type of competition, start number, name of the participant, countries, result of the competitions, and a complete summary. Above each mat a three-sided scoreboard was suspended displaying the following: points, duration of the match, rounds. The display was controlled from the referee's table. It was possible to transmit a monitor picture of the scoreboard to the referee's table by television. An acoustic signal was sounded at the beginning and end of every round.

Technical Equipment for Judo Scoreboard:

An electronic display board in "light chamber technique" was set up next to each mat. They were 1.20 m. long and 0.80 m. high. The following information was displayed: duration of the match (acoustic signal when time expired), points, length of pauses. Controls were handled by the timekeeper at the referee's table. The results were displayed as in wrestling.

Competition Area

Platform for wrestling and judo: Total area 58 m. x 16 m. or 928 sq. m. Useful platform space 56 m. x 14 m. or 784 sq. m. The platform, which could be dismantled, consisted of painted plywood sheets on a frame of steel tubing. The cross-section of the platform was quadrilateral. The four competition surfaces consisted of four wrestling mats with a diameter of 9.00 meters. The platform was 0.95 meters high and had five sets of steps leading to it. The competition area was approximately 22 m. x 64.5 m. (1420 sq. m.). The four referees' tables (between the grandstand for the VIPs and the platform) were assigned to the four wrestling mats.

Warm-up:

There were two rooms with warm-up mats, each about 150 sq. m. Training took place in Hall 18 forjudo and in Hall 19 for wrestling.

Olympic Usage

August 27 - August 31, 1972 - Wrestling. September 5 - September 10, 1972 -Wrestling.

September 1 - September 4, 1972 - Judo.

Participants' Area

Ground floor, east:
nineteen dressing rooms, each approxi-
mately
Two lounges, each approxi-
mately. 20 sq. m
Two bathrooms, each with three
prefabricated stalls (vestibule,
nine toilets and urinals)
Doctors' area:

Waiting room 25 sq. m. Bathroom (sink, toilet, shower) Basement:

19 massage rooms, each 19 sq. m. 4 rest rooms, each with vestibule and five stalls

1 massage and dressing room . . 25 sq. m.

The entrance for athletes is at the southeastern corner of the auditorium and leads to the adjoining quarters for the contestants-locker rooms, bathrooms, doctors' station and warm-up mats for immediate preparation for the events. From there a corridor leads under the grandstands to the place of competition. The massage rooms and the weighing-in room in the basement are accessible from the ground floor via a stairway within the athletes' guarters. From here those places in the auditorium which are reserved for participants may be reached.

Spectator Area

Total spectator capacity 5,750
Division of the spectators' seats:
VIPs
Press area with desks 100

Seats for the press. 120 Places for commentators 20 Places for participants in front of the

competition area 184 VIP area:

Arrival for VIPs was possible by car to a special entrance in the northwestern corner of the building, from where they had access to the

VIP lounge 25 sq. m. and to the places reserved for guests. The restaurant for VIPs was in building No. 7, centrally located for the entire fairgrounds.

Refreshments: Two concession stands were set up on the level of the entrances to provide refreshments for spectators. Additional kiosks were in the tents in front of the wrestling hall.

Sanitation:

There are toilets in the stairwells on the upper level that opens to the grandstands. Prefabricated toilets were set up temporarily on the entrance level.

Spectator movement: Two temporary open stairways on the southern side of the auditorium constituted the public entrance to the spectator entrance level (5.75 m, above the floor of the building). This was also the lower entrance level to the grandstands. The upper entrance was reached by a stairwell. Ticket booths were near the entrance to the grounds on Ganghofer Strasse. Tickets were checked at the main entrance on Ganghofer Strasse.

Communications Area

Ground floor, east side:		
DOZ-subcenter 31	sq.	m.
Office 19	sq.	m.
Interview room 25	sq.	m.
For the press subcenter for the entire		
fairgrounds, see building No. 5.		
Transmission facilities		

One mobile television camera along the entire length of the sports platform (on the side opposite the VIPs); three additional DOZ television camera platforms and two for movie cameras; parking places for mobile transmission units on the northern side of the building. Around 165 sq. m. of parking area was required for the five mobile units.

Competition and General Administration

Ground floor, west side: Direction of sport facilities 21 sq. m. Washroom 6 sq. m. Kitchenette 8 sq. m. 26 sg. m. 15 sq. m. each. Fédération Internationale des 21 sq. m. Luttes Amateures (FILA) 30 sq. m. 25 sq. m. Office. 24 sq. m. Deutscher Ringerbund (DRB) DRB room 25 International Judo Federation (IJF) 25 sa. m. IJF President 25 sa. m. IJF office Deutscher Judo Bund (DJB) 18 sq. m. . . . 16 sa. m. 15 sq. m. Meeting room. 2 rooms OK Sports, each 80 sq. m. 16 sq. m. 4 referees' dressing rooms, each 22 sq. m. 1 lounge 21 sq. m.

1 statistics room	32	sq.	m
1 mimeograph room	32	sq.	m
Hostesses' room and preparation			
for awards ceremonies	24	sq.	m
2 cloakrooms, each	30	sq.	m
1 prefabricated toilet for office			
personnel			
storage room	81	sq.	m
telenhone hooths			

auditorium administration 15 sg. m. A separate stairway led from the ground floor office area to the spectator entrance level

Type of Sport: Fencing Final Matches

Characteristics of Design and Construction

The already existing halls 11 and 12 were temporarily remodelled to form a competition hall. In Hall 11 were the spectators' entrance area, the fover, the cloakroom and the spectator services. The appearance of the entrance was changed by lowering the ceiling. The walls of all temporary rooms were constructed of prefabricated asbestos cement panels that could be easily dismantled. Show cases with a weapon exposition partitioned the foyer. In Hall 12 were the competition area and the spectators' viewing area. The main elements of the interior of this hall were the two grandstands which faced each other on the ground floor level (parallel to the long sides of the fencing area), four grandstands on the upper tier, a decorative suspended ceiling, and the special lighting for color television.

Dimensions of the Facility

Total area under roof	5,380 sq. m.
Hall 11	3,240 sq. m.
Hall 12	2,140 sq. m.
Competition area	. 607 sq. m.
Fencing surface	
9.20 m. x 46.00 m	. 423 sq. m.
2 fencing strips (final	

matches) 2 m. x 20 m., each . . . 40 sq. m.

Access

See "Wrestling-Judo Hall", Fairgrounds.

Utilities

Ventilation equipment, cooling: The already available air-intake installation (capacity: 60,000 cu. m./h.) was in-capable of eliminating the heat generated by 3,000 spectators and the 75 kW of lighting. The system was supplemented by a circular duct which ran along the gallery, and thus surrounded the competition area. In addition, axial ventilators were installed in the gable ends of the hall to draw the exhaust air from the upper part of the hall. On the hall's exterior more air-intake equipment with water cooling was installed. This increased the air intake capacity to a total of 100,000 cu. m./h. The room temperature did not exceed 25.5°C.

High voltage installations: The Fencing Hall 1 is connected to the northern transformer station of the fairgrounds with five transformers which produce 400/600 kVA. For stand-by emergency power a mobile unit with a capacity of 85 kVA was planned. It could be switched in manually, The already available general hall lighting was increased. In the competition area additional special lighting for color television was installed. This consisted of 24 floodlights, each of 2,000 watts. The average illumination was 4,000 lux hori-

zontally and 1,600 lux vertically. Low voltage installations: The PA system consisted of 64 speakers installed in the ceiling (each 10-12 watts), 24 speaker complexes of 24 watts each, and a wireless microphone system. Intercom system with switchboard and five units, clock system with ten synchronized clocks, a common antenna system with fifteen connections.

Technical Equipment for Sports Scoreboard

Two electronic display boards, using the light chamber technique, each board 6.00 m. wide and 2.75 m. high. The following information was displayed: Type of competition, starting numbers, countries, name of participant and individual competition results.

Scoreboard: The contact scoreboard consisted of a set of lights visible to the spectators with red,

green and white lamps as well as of the control cable. Fencing strips:

Metal fencing strips of phosphor bronze, 2 m. x 20 m. (for final matches). Timekeeping:

To measure the effective duration of a match, an electronic counter with light display for minutes and seconds was installed. Acoustical warning signal, 1 minute before the end of a period, acoustical signal when the time was up. Synchronized clocks for the public were set up outside the field of vision of the competition strips. The starting impulse was given manually.

Competition Area

(Final matches, Foil, Épée, Saber) Interior area, 13.20 m. x 46 m.. 607 sq. m. Competition surface, 9.20 m. x46 m. 2 metal fencing strips, each 423 sq. m. 80 sq. m. for the jury. The row of tables stood in the middle of the VIP grandstand. Competition preparation: Warm-up room with a total of

four fencing strips	378	sq.	m.
Hall direction 1	. 15	sġ.	m.
Hall direction 2	6.5	sq.	m.
Training:			
On the upper floor and ground t	floor	of	

Fencing Hall 2 (cf. "Fencing hall 2")

Olympic Usage

August 29 - September 9, 1972

Athletes' Area

Competition area 607 sq. m.
Grandstand seats (participants)
Warm-up room with four
fencing strips 378 sq. m.
2 locker rooms, each 20 sq. m.
1 lounge 24 sq. m.
Doctor's area:
Waiting room
Doctor's office
3 sanitary cells, each 9 sq. m.
Access:

Athletes' entrance on the northern side of Hall 11, from there access to the warm-up room, locker rooms, lounge, bathrooms as well as to the athletes' doctor, from there access to the competition area.

Spectators' Area

3,198 Spectator places, total On the level of the competition area there were grandstands on two sides of the hall, parallel to the length of the fencing strips. These included the VIP grandstand and the places for the press and commentators. On the gallery, which went all the way around the exposition hall on a higher level, there were grandstands on all four sides. Allocation of places:

Guests of honor	48
Press seats with desks	59
Press seats without desks	60

Commentators' places for

Spectators' places 2,870 VIP area:

The guests of honor were taken by car to the main entrance for spectators. From there they could go through the foyer of Hall 11 (with cloakroom) to the VIP lounge (28 sq. m.) before going to Hall 12. There was direct access to the VIP grandstand from the lounge. The guests of honor were served their meals centrally in the VIP restaurant of Hall 7 of the fairgrounds.

Spectators' refreshments: In the foyer of Hall 11 a kiosk was provided to sell refreshments; other refreshment stands were located at various places on the fairgrounds.

Sanitaryinstallations:

In the foyer of hall 11, four sanitary cells of 9 sq. m. each were set up to provide toiletfacilities.

Spectatoraccess:

From the main spectators' entrance on the southern side of the building, the visitors came to the foyer of Hall 11, where the cloakroom and toilet facilities were located. From the foyer, a passage led to the lower grandstands, and to the spectators' seats in the gallery.

Communications

The press center for the whole fairgrounds was set up centrally in Hall 5. The following rooms were enabled to be in the following the set of t rooms were available in this particular structure: DOZ-subcenter (Hall 12

2 0 1 0 a 2 0 a 2 0 0 (a 1 ,				
ground floor)		52	sq.	m
DOZ-office		14	sq.	m.
DOZ-auxiliary room		7	sq.	m
Mailing room		20	sq.	m.
Interview room		36	sq.	m
3 Press telephones				

2 DOZ telephones

Transmission installations:

2 DOZ television cameras, 2 DOZ movie cameras, 1 DOZ mobile transmission unit, 4 technical vehicles.

Required as parking area for the heavy technical vehicles were 138 sq. m.

General and Competition Organization

Competition area:

In the competition area there was a table set up for the competition direction and iurv. Hall superintendent, Hall 12 26 sq. m. Auxiliary room area, Hall 11: of OC-sports section: Fédération Internationale d'Escrime (FIE) 20 sq. m. (DFB).....

1 office Technical commission 15 sq. m. 50 sq. m. Statistical evaluation 15 sq. m. Jury deliberation room 25 sa. m. Auxiliary room 20 sq. m. Mimeographing 20 sq. m. 2 Referees' locker rooms, each 20 sq. m. Technical direction, QC - 2 offices, each 20 sq. m.

Restaurant

See "Fairgrounds, general notes" under "Restaurant".

Types of Sport: Fencing, Modern Pentathlon (Fencing)

The semi-finals took place on the ground floor and the other floors were used for training.

Characteristics of Design and Construction

Hall No. 20 which existed before Olympic planning began, was temporarily remodelled to function as a fencing competition and training hall. The ground floor contest area for the semi-finals received a suspended fabric ceiling. A stand for spectators was built in the center opposite the two fencing strips and the judges' podium. Stands for the participating fencers were set up along both ends of the hall and behind them were the booths of the various participating nations. A special lighting rig was installed over the two main fencing strips for color television.

Dimensions of the Installation

Built-over area of the hall. . . 6,350 sq. m. (Useful space on the three main floors including the mezzanines). Competition area 600 sq. m. Two competition fencing strips, 18 m. x 2 m. each . . . 36 sq. m.

strips, 18 m. x 2 m., each . . .

Access See wrestling-judo-hall, fairgrounds.

Utilities

Ventilation: The temperature of the hall was controlled by the ventilation system which utilized existing air intake and exhaust ducts. An additional water-cooled ventilation system was installed for the ground floor's inner area because of additional lighting and the large number of spectators. With an outdoor temperature of $+30.5^{\circ}$ C the maximum indoor temperature could be held to 26° C. The capacity of the existing ventilation system in Hall No. 20 was 100,000 cu. m. per hour. The additional system had a capacity of 70,000 cubic meters per hour. The cooling effect was approximately 2°C. The lavatories had axial ventilators.

generator. 75 kVA. On the main floor an additional junction box was installed to cover the increased power consumption in the competition area. The general lighting facilities of the entire building were either replaced or augmented.

The mean horizontal lighting intensity in the competition area was 600 lux. The intensity of the special lighting for color television for the two fencing strips with twelve 2,000 watt spotlights each had a mean value of 3,000 lux horizontally and 1,400 lux vertically.

Low voltage electrical installations: The existing public address system was used and the three subcenters were linked together.

The system consisted of the following components: Two-way inter-communications system with a total of 29 extensions, fire alarm system, 11 synchronized clocks, community antenna system with 26 connection outlets. The existing telephone system was extended.

Technical Equipment for Sports Scoreboard:

Every strip had a manually operated scoreboard 2 m. x 1.5 m. The names of the fencers, their nationalities as well as the results of the bouts were displayed. Touching signal system:

The touching system consisted of a set of spectator lights, each with a red, green and white bulb. Besides these, a combination signal for foil and épee plus a basic cable control were installed. Fencing strips:

The metal strips were 18 m. x 2 m. of phosphor-bronze and simply drilled. Timing:

An electronic time and light display of minutes and seconds was installed to measure the length of a bout. A horn was provided for the acoustical pre-signal one minute before time ran out. A synchronized clock for the audience was installed out of sight range from the strips. The signals were fed into the system manually.

Contest Area

The general contest area for the preliminaries had an area of 3,800 sq. m. and consisted of 14 strips each 2 m. x 18 m., which were paired off into units. A table and four chairs were provided for the messengers and writers, and there was also one place per strip for a judge. The podium for the technical direction of the hall had an area of 72 sq. m.

Contest Preparation:

On the upper and lower floors of the hall, there were 21 strips in a training area consisting of a total of 5,200 sq. m. in addition to 16 prefabricated sanitary units each 9 sq. m.

Olympic Use

August 29 - September 9, 1972.

Athletes'Area

Allieles Alea
Contest area on the ground
floor
Training area on the lower
and upper floors of the hall 5,200 sq. m.
16 hygiene facilities with toilets, sinks and
showers.
Locker rooms and toilets on all main floors
and mezzanines.
(Six mezzanines were located on both
sides of the three-storied fencing hall No. 2.)
36 Women's rooms, each 23 sq. m.
36 Men's rooms, each 23 sq. m.
8 lounges for contestants, each 23 sq. m.
1 TV room 35 sq m

	55	sy.	
Neapons (distribution)	23	sq.	m.
Repair shop	35	sq.	m.
Neapon control	35	sq.	m.
Weapons (collection)	23	sq.	m.
Fencing booths for disarming,			
each	. 5	sq.	m.
Spectator seats for contestants .			320

Doctors' Area: Physician's room and first aid .. 9 sq. m.

the entrance on the western side of the hall and from there proceeded to the various rooms, changing, picking up their equipment; then to their assigned strips.

Spectators' Area

Available seats total978VIP seats36Commentators' seats20Press seats86Spectators' seats856(320 seats for contestants included)
Guest service:

A snack bar was set up behind the spectator stands. Sanitary facilities:

All necessary sanitary facilities were

reachable from the spectators' exits.

First aid: First aid installations were located cen-

trally in the fairgrounds. For the Fencing Hall see Physicians'

Area - "Contestants' Area" above.

Spectator access: The entrance to Fencing Hall No. 2 was on the eastern side of the hall, and from there a passage led to the grandstand.

Communications Area

ables)	0
Press seats (without tables) 8	6
nterview room 23 sq. m	ı.
Office	۱.
Film storeroom	ί.
Transmission equipment:	
DOZ-motion picture cameras 4	
Post office. 11 sq. m	۱.
Parking lots for two technical	
equipment trucks 60 sq. m	ι.
Commetities and Comerci	

Competition and General Administration Contest site administration.

2 rooms cach 22 cg m	
	•
The means for the metioned and interest.	•
the rooms for the national and interna-	
tional tencing rederations were located in	
the eastern and western mezzanines.	
Fédération Internationale d'Escrime (FIE)	
FIE president 20 sq. m.	
FIE general secretary 20 sq. m.	
FIE conference room 20 sq. m.	
FIE cafeteria 23 sq. m.	
Deutscher Fechter Bund (DFB)	
DFB president 20 sq. m.	
Outer office	
DFB trainers, 2 rooms, each, 23 sq. m.	
DFB lounges 23 sg. m.	
DFB TV room 23 sg. m	
DFB technical rooms, four.	
each 23 sq m	
Mimeograph room 23 sg m	•
DEB cafetoria 23 sq m	•
A judges rooms with a total of 115 sg m	•
Television 23 cg m	•
Disquesion room	•
	•
Evaluation 2 rooms such 20 og m	•
Evaluation, 5 rooms, each	•
technical management,	
three rooms, each	•
Personnel, three rooms, each 23 sq. m.	•
Technical division OC,	
2 rooms, each 20 sq. m	•
Special post office, 2 rooms,	
each	
Cafeteria	
personnel, two rooms, each 35 sq. m	
Toilet facilities on every floor	

Restaurant

See "Fairgrounds, general notes" under "Restaurant".

| Basketball Hall | on Siegenburger Strasse

Types of Sport: Basketball, Judo

Location: 8000 Munich Siegenburger Strasse

Team director for the Olympic Construction Company, Ltd.:

Dipl.-Ing. Herbert Weidenschlager, Munich

Project director for the Olympic Construction Company, Ltd.: GraduateEngineerWolfgangGöhde, Munich

Design and planning: Architect Dipl.-Ing. Georg Flinkerbusch, Hagen i.W.

Characteristics of Design and Construction

This round hall is built of prefabricated reinforced concrete with a steel cone and shell-shaped suspended roof. The building has a diameter of 100 m. at the foundation level and 72 m. at the height of the stress ring. The grandstand forms a ring around the quadrangular contest area. The necessary ancillary rooms are under the grandstands, between the contest or warm-up level and the upper passage level of the stand. Two rectangular buildings are attached at opposite sides of the main circular hall. These are the lobby with two usable levels and a one-story restaurant. The construction of the hall itself is formed by 36 binders each consisting of a slanted outer truss and the girders bearing the stands. The binders are secured between each other by steel and concrete through a beam with a U cross section. The stress ring on which the steel cone roof is sus-pended rests on the outer trusses. The stress bearing structural components are made of prefabricated reinforced concrete. The partitions are formed by chalk sandstone faced brick walls. The facade is formed by beveled baked enamel sheet aluminum panels mounted on a steel framework. Suspended sheet metal paneled ceilings with built-in acoustic padding close off the rooms. The floor of the hall's inner area is a mechanically ventilated elastic floor with a PVC covering. The basketball court floor, which can be dismantled and is 6 cm. thick, is made of hard maple and is laid on the elastic hall floor. The individual fold-up seats are fastened to the prefab reinforced concrete steps with assisting tracks. The hall was built by a general contractor completely ready for occupation.

Dimensions of the Facility

Enclosed volume 104,500 cu. m
Built-over area 7,850 sq. m
Interior area of the hall
without the telescoping
stands 2,516 sq. m
Free area 32 m. x 40 m 1,280 sq. m
Basketball floor
19m. x 32m 645 sq. m
Basketball court
14 m. x 26 m 364 sq. m
Overhead clearance 12 m.

Access

By car: Connection from Olympic Village via Mittlerer Ring, Garmischer Strasse and Siegenburger Strasse to the basketball hall. Public transit:

Inner city bus lines, bus stop on Garmischer Strasse.

Parking (permanent):

Twenty places for cars belonging to VIPs and officials are available in front of the athletes' entrance. There are also thirty places for the press, communications personnel and officials in the western yard. During the Olympics 1,000 parking places were available to spectators on the grass west of Garmischer Strasse about 250 m. away from the hall and another 500 places south of the hall on Welser Strasse, about 500 m. away from the hall.

Total Cost excluding Incidentals 19 million DM.

Utilities

Heating, ventilation: Three gas-fired furnaces 3 x 1,400,000 kcal/h. for the warm air heating (operational heat 110/70°C). Standard and flat radiators were used in all other areas. The air regulating equipment was installed in the bottom panel at the middle point of the roof. Intake air is blown into the main hall through ring-shaped vents in the slanted ceiling. 50 % fresh air, 50 % circulated air.

50 % fresh air, 50 % circulated air. Total capacity 280,000 cu. m./h. The hall is quickly heated by four large ventilation vents above the playing area. There are additional decentralized ventilators in the main entrance totaling 45,000 cu.m./h.

The warm air heating has fresh air intake and exhaust ducts in the main hall and in the warm-up hall.

Ventilation:

Lobby, corridors, wash and changingrooms, massage and referee rooms, toilets, direction room, interview room, cafeteria, restaurant and kitchen have fresh air and exhaust vents.

The capacity of the cooling machinery which provided the cooling column with chilled water was 1.1 million kcal/h. High tension installation:

1,400 kVA installed transformer capacity. Emergency generator 68 kVA. Contest vertical illumination 1,875 lux (new value) for sports area (2,000 lux new value special lighting for the boxing ring) produced by halogen metal vapor lamps, each 2,000 watts, part of which are immediately relightable. The illumination of the other interior areas was according to DIN 5035. Low voltage equipment:

Telephone exchange with 64 extensions, Central clock system,

Intercom system with 18 instruments, Wireless microphone system (microport), PA system,

Terminals of the electronic data processing installation,

Data read-out station in the press-subcenter, telex in the press subcenter, Hall administration, Printshop.

Technical Sports Facilities

Scoreboards and timing devices: Two permanently mounted scoreboards in light chamber technique. Measurements: length 5.60 m., height 3.00 m. Integrated double parallel running installation with the following information: the countries, the score, the time past in minutes and seconds, the score time for each team, the personal fouls of each player, the last three minutes of play

(red light bulbs), light signals on the baskets for the 30-second rule. There is also an acoustical signal at the beginning and the end of the playing periods. Time out could be called from the players' bench with a button (light signal on the judges' table). The timing was backed up with manually operated stop watches. The Scoreboard was operated from the writing table on the court (or contest area). **Contest Area** Basketball floor 19 m. x 32 m. . 645 sq. m. Basketball court 14 m. x 26 m. . 364 sq. m. Hard maple court on the elastic hall floor 6 cm. high (suggestion of the International Basketball Federation). Mobile basketball net stands Hydraulic control of the basket Basket arm extends 4.00 m. Measurements of the base 4.10 m. x 2.10 m. x 1.00 m. The baskets are made of steel pipe, the back board is safety glass. Two tables for game evaluators opposite the press stand. One scoring table with the scoreboard controls One table for the FIBA. Two benches for substitute players. **Olympic Use** August 27 to September 9, 1972. Post-olympic Use Sport clubs, school sports Contests of various types of sports Hall inner area 32 m. x 40 m. 1,280 m. Athletes' Area Inner area: Two benches for substitute players Intermediate level: Six locker rooms, each. 31 sq. m. 15 sq. m. Two massage rooms, each. . . Three shower and wash rooms, each..... 57 sq. m. and corresponding sanitary facilities. Lower level: Warm-up hall 408 sq. m.

 Training area
 107 sq. m.

 Doctors' room
 20 sq. m.

 Doping control
 13 sq. m.

 13 sq. m.
 13 sq. m.

 Ancillary room 13 sq. m. Access: Entrance at the eastern side of the lobby, from there to the locker room in the intermediate level of the south side hall area with showers and toilets. Warm-up facilities are under the lobby. The lower level is reached by a ramp to the playing area through a separate players' entrance fover. Spectators' Area Total spectators' seats 6.635 Participants' seats 200 VIP seats 200 Press tables 50 Press seats. 190 Press seats. Commentators' tables 54 VIP dining facility: Cafeteria with 60 places 120 sq. m. Spectators' dining facilities: Two kiosks, each 36 sq. m. Sanitation: Four toilet facilities, each 74 sq. m. First aid: First aid room with an ancillary room and a quiet area, total... 43 sq. m.

Spectators' access:

Southern entrance hall (lobby). Four ticket offices at the corridor and access level. Raised entry way to the spectator seats. Ticket takers are at the entry ways.

Communications Area

Press subcenter on the intermediate level: nformation area 28 sg m

Information area. 28 sq. m. Interview room. 54 sq. m. Writing room. 105 sq. m. Press post office. 105 sq. m. Cafeteria. 105 sq. m. and corresponding sanitary facilities. Transmission equipment:	
Four DOZ TV cameras (camera platforms)	
One ABC TV camera Two DOZ motion picture cameras Permanent parking area for the	
One DOZ transmission truck One ABC transmission truck Four additional technical equipment trucks	
Contest and General Organization	
Playing floor, inner area:	
Two tables for the game evaluators	
One scoring table	
One announcer's table	
Direction booth 23 sq. m.	
Intermediate level:	
Fédération Internationale de	
Basketball Amateur (FIBA) Three FIBA offices.	
two, each 20 sq. m.	
one	
Deutscher Basketballbund	
Federation –	
Three DBB offices 21 sq. m.	
16 sq. m.	
Two referee rooms each 15 sg m	
Two medical rooms, each 10 sq. m.	
Two OC offices	
Copying room 1/ sq. m.	
Post office (technical) 39 sq. m.	
OC (technical)	
DOZ (technical) 28 sq. m.	
OC 33 sq. m.	
Printshop. 50 sq. m.	
Ancillary rooms. 30 sq. m.	
Fauipment rooms 505 sa m	
Cleaning equipment 40 sq. m.	
Personnel rooms 17 sq. m.	
Stand-by drivers 11 sq. m.	
Corresponding sanitary facilities	
Technical	
Scoreboard apparatus 22 sq. m.	
(Utilities, etc. 350 sq. m.	
Ground floor:	
Fire department 20 sq. m.	
Ticket office, accounting 15 sq. m.	
Two ticket offices, each 5 sq. m.	
Special post office, two rooms,	
Annex buildings	
Administrator's house 70 sq. m.	
Heating and cooling unit for	
the entire contest site in the	
tor's house	

Restaurants

Main restaurant (150 places) for spectators and for the officials in the northern restaurant annex. Serving areas including adjoining rooms 180 sq. m. A connected serving counter for spectators is located on the entrance level. Cafeteria for the press, radio and television personnel (56 persons) in the northwestern part of the lower level, next to the press area. 100 sq. m. VIP cafeteria (60 persons) in the northeastern part of the intermediate level at the entrance for guests of honor. . 120 sq. m. Two kiosks for spectators at the entrance level of the north-eastern and southwestern corridor, each. 36 sq. m.

Types of Sport: Shooting, Modern Pentathlon (Shooting)

Location: 8046 Garching Hochbrück

Team supervisor for the Olympic Construction Company, Ltd.: Dipl.-Ing. Herbert Weidenschlager, Munich

Project director for the Olympic Construction Company, Ltd.: Graduate Engineer Ralf Petry, Munich

Design, Planning, Supervision of Construction, and Engineering: Architect Committee Dipl.-Ing. Wolfgang Kleibömer, Hamburg/ Munich Dipl.-Ing. Michael Eberl, Munich Architect Erich Stein, Munich

Local construction supervision: Building Engineer Gerhard Hermel, Munich/Aachen

Landscaping: Gottfried Hansjakob, Munich

Characteristics of Design and Construction

The buildings, three shooting galleries for rifles and pistols, the grandstands, the restaurant and the administration building all together form a "T". The shooting galleries are mostly constructed of pre-cast reinforced concrete building elements. The restaurant was executed as a reinforced concrete framework together with wooden materials. The administration building has a skeleton of poured concrete finished with masonry. The dominant materials visible from the outside are: concrete, wood and glass. The construction of the shooting galleries: walls of acoustical clinker or cloth-covered, ceilings of sound-absorbing mounted panels, floors with textile coverings.

The safety blinds of the shooting ranges consist of a concrete and wood construction with fiber glass filling. Other protective walls and blinds are of prefabricated reinforced concrete with sound-absorbing ribbed sheets of light gas-concrete.

Dimensions of the Facility

Land area	240,000 sq. m.
Total enclosed space	40,200 cu.m.
Administration building	
and restaurant	14,700 cu.m.
Rifle range	12,500 cu. m.
Service trenches	2,000 cu. m.
Pistol range, incl.	
Scoreboard cover	4,500 cu. m.
Moving boar target range .	4,000 cu. m.
Grandstand interior rooms.	2,500 cu. m.
Total area under roof	4,300 sq. m.
Rifle range	1,900sq. m.
Pistol range	600 sq. m.
Moving boar target range.	550sg.m.
Grandstands	300 sq. m.
Administration building	. 600 sq.m.
Restaurant	
Contest area, total	76,500 sq. m.
Rifle range	27,000 sq. m.
Skeet and Trap	45,000 sq. m.
Moving boar target range.	2,250 sq. m.
Pistol range	2,250 sq. m.
5	

Access

By car: From Ólympic Park via the Middle Ring north to B 13, from there turn off into a private access road to the shooting range. Public transit: Bus station at B 13.

Total Cost excluding Incidentals 20.6 million DM.

Utilities

Heating: Oil-burning warm-water heating with radiators in the restaurant and administration building.

Total heating capacity: 730,000 kcal/h with warm water heating. In all the shooting galleries, the shooting stands are heated by electric floor heaters and by radiant heaters.

High voltage installations: Current supply network for the entire facility with a transformer output of 630 kVA. Mobile emergency generator unit

capacity 170 kVA. Lighting: Indirect lighting above every shooting stand with 50 lux illumination (on the contestant). Target lighting with spotlights at 80 lux.

Low voltage installations: Telephone system, extension system with 69 extensions.

Data viewing stations:

Central station in the administration building, monitor station in every part of the facility, data transmission throughout the grounds with an ELA installation.

Technical Installations for Sports Central Scoreboard:

Display of the scores and standings in all shooting events for the entire duration of the competitions. Notices were put up by hand on slips of paper.

Size of the Scoreboard: length 10.000 m., height 2.00 m.

Location: eastern wall of the rifle range near the winners' platform, western wall of the pistol range.

Scoreboard, skeet and trap area: A bulletin board with hand posted notices as above. The entire progress of the skeet and trap shooting competitions was displayed with scores and standings. Loca-

tion: southern side of the grandstands. Display installations for individual contests:

Rifle range: magnetic board at each shooting stand to show the results of the current individual competition. Pistol range: recording desk with a projector to display the results of the on-going individual competition. Range for moving wild boar targets: moni-

tor with recording desk and projector as above Modern pentathlon: magnetic board, as

above Target area:

Free rifle: target towing device, indication given by signal baton, magnetic board for spectators.

Free pistol and small-bore rifle: target system Gehmann, endless strip target, report by telescope.

Pistol range:

Silhouette target system with timing shifts and a light barrier backing target (phantom target). Moving target UIT -- wild boars, scoring

and target control, communication of the

point of entrance of the bullet through monitors and electronic displays. After the Olympics, the 300 m. range for free rifle, free pistol and small-bore rifle (50 m. and 100 m.), including the target towing system, are being operated as used during the Olympics. The same is true of the skeet and trap range and the accompanying automatic trap.

Contest Area

Rifle range:

Sheltered area 176 m. x 13 m. with 102 stands and judges' stands. 300 m. range:

Open area 75 m. x 300 m. with 43 stands, cover trench 75 m. x 2.50 m.

50 m. range: Open area 172 m. x 50 m. with 165 stands (of which 43 are combination stands for 50 m./300 m.), cover trench 75m. x 2.50 m.

Skeet and trap area:

Skeet and trap area: Shooting range 210 m. x 90 m. (total with safety area, 450 m. x 200 m.). UIT-wild boars moving target: Open area 38 m. x 50 m. with two stands, one judging stand and 43 m. x 13 m.

shelteredgallery. Rapid fire pistol: Open area 58 m. x 25 m. eight stands, one judging stand and 58 m. x 16 m. shelteredgallery. Direction booth:

On the grandstand 10 sq. m.

Olympic Usage

August 27 - September 2, 1972

Athletes' Area Hygiene:

Participants' building, ground floor-Doctor's office, anteroom, lounge, doping control with anteroom, showers and toilets 5 rooms Preparation: Participants' building, upstairs-43 team rooms and lounges, Under the grandstands— 7 team room 7 team rooms and lounges, each . 15.5 sa. m. Administration room 20 sq. m. Each team lounge is furnished with two

cots, one table, two chairs, one cabinet, one wash basin with shelf.

Common showers and toilets are provided for the various team rooms.

Access:

Shooting range complex main entrance, south - to the team lounges, locker rooms, showers and toilets - to lounges on the second and third floors of the participants' building (for skeet and trap shooters to the team lounges under the grandstands). Through the ground floor of the participants' building to the gun inspection, doctor's room, doping control, and via sheltered connecting corridors to the various ranges.

Spectators' Area

Rifle, pistol and moving target competitions. total: Seats and standing room in the various galleries for 4,500. Skeet and trap shooting: Grandstands for 1,700 people with

reserved seats and standing room for 2,3	300.
Allocation of spectators' places:	
VIP grandstand seats	80
Press places (observers' places)	
in the grandstands	25

Press seats without desks in theshooting galleries. 80 . . .

Restaurant with 230 places, refreshment stand beneath the grandstands.

Toilets in the galleries, under the grandstands and in the basement of the restaurant.

First aid: On the ground floor of the administration

building.

Main entrance south - ticket control dispersion to the galleries - and via the central courtyard to the grandstands at the skeet and trap range.

Communications

Press subcenter on the ground floor of the participants' building:

Office area, teletype room,

information, mail, four rooms restaurant.

DOZ film storeroom, basement restaurant, press places in the grandstands and in the shooting galleries. Transmission installations:

Two DOZ-movie cameras, two film equipment vehicles.

Parking area for technical vehicles: Parking space as required from among the 150 available parking places.

Contest and General Administration

rancipants bunding, ground noor.	
Scoring statistics, 1 room 139 sq. r	n.
Printing, 1 room 48 sq. r	n.
Gun smith, 2 rooms 32 sq. r	n.
Hostesses'room 23 sq. r	n.
Participants' building, upstairs:	
DeutscherSchutzenbund (DSB)	
4 rooms,total	m.
Union InternationaledeTir (UIT)	
3 rooms, total	m.
Sports facilities direction,	
O'C,	
technical direction, specialist	
direction 77 sq. r	n.
Meeting room 144 sg. r	n.
Security guards, ticket takers,	
police, fire department 69 sq. r	n.
(provided for in barracks outside	
the grounds)	

Restaurant

230 places inside (unsheltered terrace in addition)

Allocation: spectators, press area, VIP area. Rest rooms for guests, the kitchen and various auxiliary rooms in the basement of the restaurant.

Spectators'refreshments:

Sanitation:

Access for spectators:

Types of Sport **Rowing and Canoeing**

Location. 8042 Oberschleissheim near Munich on Federal Highway 471

Team director for the Olympic Construction Company, Ltd .: Dipl.-Ing. Herbert Weidenschlager, Munich

Project director for the Olympic Construction Company, Ltd .: Dipl.-Ing. Ludwig Kübler, Munich

Design Architects' Team Eberl and Associates, Munich

Earth moving and foundation planning: Engineering Office of Dorsch Consult, Munich

Traffic planning: Architects' Team Eberl and Associates, Munich

Drainage and sewage planning: Engineering Office of Kaiser and Lehner, Munich

Fresh water supply: Preuschel Engineering Office, Oberschleissheim

Regatta trench drainage planning: Engineering Office of Dorsch Consult, Munich and Preuschel Engineering Office, Oberschleissheim

Gas connection planning: Public Works Department, Munich

Electricity connection: Isar-Amper Power Works, Munich

Television, post office, and post cable planning: General Postal Administration, Munich

Landscaping: Architects' Team Eberl and Associates, Munich Landscape Architect, Georg Penker, Neuss

Stressing: Held Engineering Office, Germering-Munich

Surveying Bendel Surveying Office, Munich

On-site director of earth moving and foundations Engineering Office of Dorsch Consult, Munich

Characteristics of Design and Construction

The 2.230 km. long regatta course was incorporated into the local marshland landscape along a southwest (start) to northeast (finish) axis, along which the following buildings were erected: the starting tower for rowers was placed at the southwestern end of the regatta trench, 5 m. before the starting line (0.00 m. line). At the 1 km. mark on the southeastern bank is starting tower 1 for canoeists. The main group of buildings begins on the south-

western bank at the 1.5 km. mark. Here is starting tower 2 for canoeists, and here begin the standing room bleachers, which adjoin the sheltered stands to the northeast. The latter extend to the finish tower with the jury and organization building. Three boathouses are positioned at a right angle to the course axis at the northern end of the trench. The participants' house, with gymnasium, restaurants, and caretaker's living guarters, lies on the northwestern bank next to the boathouses at a 45-degree angle to the course axis. Besides the starting towers, eight timekeeping posts are spaced along the course to facilitate the organization of the boat races. The victors' bridge rises before the finish tower in front of the main grandstands. Boat landings extend into the basin at the northeast end of the trench in the finish area. The motorboat harbor is situated in the finish area on the northwest side.

Temporary buildings: Beer tents were set up east of the main stands and standing room bleachers to serve refreshments to spectators.

The following construction methods were employed:

The standing room bleachers consisted of pre-cast concrete steps with poured concrete breastworks. The main stands boasted of a cantilevered laminated wood roof, which was anchored at the back by a supporting steel structure. The steps were pre-cast concrete as in the standing room bleachers. The breastworks and main supports were built of reinforced concrete cast on the site. The jury building was likewise constructed of reinforced con-crete produced on-site. The boathouses are of reinforced concrete with pilings sunk in cement foundations. The roofs are of laminated wood beams. The participants' house is done mostly in faced concrete with laminated wood roofs.

The regatta trench lies in the ground water area of the Munich gravel plain. The trench bed and sides are of locally available gravel; only in areas of wave action was a dumping of 20 mm. coarse gravel deemed necessary.

Dimensions of the Facility

Size of the total site	850,000 sq. m.
Total surface area of	
buildings.	. 30,173 sq. m.
Standing room bleachers	10,140 sq. m.
Grandstands with seats	10,750 sq. m.
Jury building	686 sq. m.
Boathouses	. 6,162 sq. m.
Participants'house	. 2,110 sq. m.
Caretaker's house	109 sq. m.
Starting towers — 3 units,	
each with 54 sq. m	162 sq. m.
Finish tower	
Total space	. 73,660 sq. m.
Toilet facilities in standing	
room bleachers	. 2,129 cu. m.
Grandstands with seats	12,670 cu.m.
Jury	. 6,607 cu. m.
Boathouses	. 39,802 cu. m.
Participants'house	. 9,843 cu. m.
Caretaker	682 cu. m.
Starting towers - 3 units	
each303cu.m	909 cu. m.
Finishtower	1,018 cu. m.
Water surface in regatta	
trench 2,230m. x 140m	312,200 sq. m.
Water surface usable for	
sport 2,230 m. x 81 m	180,630 sq. m.

Access

By car:

The regatta course could be reached from the Autobahn Stuttgart in the west, using the Dachau exit and the federal highway B 471. Access from the north was from the Schleissheim exit of the Autobahn Nuremburg-Munich and by highway B 471 to the competition site. Lerchenauer Strasse led from the Olympic Village and points farther south to the site. Public transit:

By rapid transit to the station at Oberschleissheim, and from there by public buses to the site.

Parking lots:

2,340 parking spaces were built within the confines of the regatta course. These were situated north of the boathouses and east of the jury building. During the Games, a further parking lot for 5,660 automobiles was made available on the future autobahn from Munich to Deggendorf.

Total Cost excluding Incidentals 56 million DM

Utilities

Heating: The central heating installation in the participants' house is connected by ducts to the caretaker's house, the gymnasium, and the boathouses. Later, auxiliary electric storage heaters were installed in the jury building. In the boathouses, only the workshops and upper floor are heated. All other buildings are unheated.

Ventilation:

The participants' house and the gymnasium, as well as the locker rooms, showers and washrooms on the upper floor of the boathouses are fully ventilated. The cafeteria in the VIP section of the main grandstands is fitted with exhausts.

High voltage installations: Installed transformer output: 763 kVA. The facility includes the entire lighting installations of all buildings, the lighting of the course near the finish line, the transformer station in the jury building, and the emergency power supply in boathouse 3b, with an output of 105 kVA, which in an emergency controls the compressor for the fire extinguisher system.

Low voltage installations: The rented telephone switchboard in the jury building had 250 extensions, and was reduced after the Games. Checkpoints for the security guards are installed in all buildings, as well as a direct fire alarm connection to the fire department in Oberschleissheim. A clock system was also installed. All inside and spectator areas have public address speakers

Technical Installations for Sports

Electronic Scoreboard: This was executed in "light chamber technique" and measures 19 m. in length, 2.20 m. in width, and 5.65 m. in height. The entire Scoreboard is mounted on a special trailer and can be transported. (Confer the conce slalom course at Augsburg, where the regatta scoreboard was used.) Display capacity: 7 lines, each with 31 characters and a minimum height of 525 mm. The type of the current match, lane numbering, nations, symbols showing position of boat, and end times were posted. The scoreboard was placed opposite the main grandstand. The first sub-program had connections to a digital mini-computer for middle times and end results. The second sub-program provided for showing the position of the boats on the scoreboard. New values were posted every 250 m. along with timings reported by the timekeeping posts.

The direction booth was positioned in front of the scoreboard and measured 3.80 m. x 2.20 m. x 2.80 m.

Starting systems:

Six intercom stations were installed for rowing and nine for canoeing. Starting gates in the form of floating berths were also provided in the ratio of 6 to 9. Course markings:

The lanes were delineated by chains supported at intervals of 12.5 m. by buoys. There were seven of these chains for rowing and ten for canoeing. Steel cables were hung across the course. From these 1.00 m. x 2.00 m. lane markers were suspended.

Time measurement: The primary system consists of two film cameras at the finish, which automatically record the time on the film. The secondary system consists of stop contacts which are administered by the nine finish judges, and which, when tripped, show the elapsed time. Boards indicating distances covered were set up every 250 m. The finish line cameras were placed in the finish tower. The following timekeeping facilities were installed along the eastern bank of the course.

Input posts for the scoreboard, telephone connection and intercom system every 250 m. along the course, survey markers along the western bank with measuring and sighting equipment, starting towers, finish tower, eight timekeeping posts, and the starting tower for rowing, which was placed along the course axis 5 m. before the starting line.

0.000 km. starting line with single-story alignment post

- 0.250 km. single-story timekeeping post
- 0.500 km. single-story timekeeping post
- 0.750 km. single-story timekeeping post
- 1.000 km. two-story starting tower for canoeing
- 1.250 km. single-story timekeeping post 1.500 km. two-story starting tower for
 - canoeing

2.000 km. five-story finish tower The wind measurement post was set up on

the finish tower.

Competition Area

The regatta course: Length of the racing course: 30 m. + 2000 m. + 200 m. = 2,230 m.

Width: course bed 98.00 m., surface 140 m. to 143 m. Six lanes of 13.50 m. for rowing = 81 m.

Nine lanes of 9.00 m. for canoeing = 81 m. Depth: at least 3.50 m. along the 2,030 m. race course. The 50 m. x 270 m. basin lay in the finish zone to the northeast of the course by the boathouses. Here were also four landings of 6 m. x 30 m. dimensions and two landings 4 m. x 30 m. These served as launches for the boats.

Starting gates: These were of the floating variety. Six gates were installed at line zero and nine at the 1,000 m. and 1,500 m. lines. The victors' bridge, which measured 60 m. x 3 m., was anchored in front of the main grandstand. The main direction booth was above the main stand.

Preparation for competition: Gymnasium 15 m. x 28 m. ... 420 sq. m. Conditioning room 9.40 m. sq. m.
Equipment room

Olympic Use

August 27, 29, 31, September 1 and 2, 1972 for rowing. September 5 to 9, 1972 for canoeing.

Athletes' Area

Upper stories of boathouses: 19 dressing rooms for male 627 sq. m. rowers 10 dressing rooms for female 14 dressing rooms for male 4 massage parlors, together . . . 99 sq. m. 7 clothes drying rooms, Toilets, washrooms, showers, together. 238 sq. m. Auxiliary rooms for female canoeists: 2 massage parlors, together ... 76 sq. m. 1 clothes drying room 17 sq. m. Hygiene installations, together 110 sq. m. Auxiliary rooms for male canoeists: 2 massage parlors, together . . . 29 sq. m. 3 clothes drying rooms, together Hygienic installations, 20 berths for rowboats, each Female canoeists: Six berths at 6.35 m. x 26 m. 165 sq. m. Male canoeists: Nine berths at 6,35 m. x 26 m. 165 sq. m. dry berth 6.25 m. x 26 m. 162 sq. m. Parking lot for boat transports 50 m. x 270 m. behind boathouses. Participants'house: 20 lounges, each 15 sq. m. 2 massageparlors,each 23 sq. m. 4 washrooms and showers, Doctors' area: 2 hygiene rooms, each 15 sq. m. 1 doping control room15 sq. m.1 doctors' office15 sq. m. Athletes' bar: in the house restaurant. The entire athletes' area was fenced off from the spectator area. Access: The bus stop from the Olympic Village was near the finish area. The entrance for the competitors was west of the participants house. From there they could easily reach the boathouses, the dressing rooms, the berths, and the lounges in the participants' house

Spectator Area

Total places for spectators	41,000
Seats for participants in	
stands within the finish zone	2,000
Earthwork stands for standing	
spectators along the north-	
western bank of the course	15,000
Standing room bleachers along	
the southeastern bank	16,000
Sheltered grandstands:	
VIPs	1,000
Press seats with tables	. 198

	Press seats without tables	208
	Commentators' seats	. 140
	Sheltered spectators' seats	3,500
	Open spectators' seats Meal service for VIPs:	4,000
	A cafeteria was erected under the ma	ain
	grandstand for the VIPs.	
I	Maal aamulaa far anaatatara	

Meal service for spectators: A beer tent for the spectators was set up

behind the standing room bleachers. Rest rooms:

Spectators in the western stands could use the portable toilets which were mounted on trucks. The spectators in the main grandstand could use the rest rooms under the stand and on level zero of the bleachers. First aid:

The army supplied the necessary facilities for first aid to the spectators.

Spectators'access:

The main entrances were in the finish zone on the northwestern and southeastern banks. From there access was open to all spectator areas.

Communications Area

News rooms 18 sq. m.
Postofficetransmission room 18 sq. m.
Post office trouble shooting
room
Under the main grandstand:
Press information 115 sq. m.
2 offices 114 sq. m.
Public telephones 111 sq. m.
Public teletype room 111 sq. m.
Interview room. 160 sq. m.
Direction of subcenter 25 sq. m.
Transmission installations:
Mobile camera at the 1,800 m. mark.
Mobile camera on the grandstand roof at
the 200 m. mark.
Stationary camera under the grandstand
roof (for victory ceremonies).
Finish line camera; a camera room with
lab set up in the finish tower.
Under the main grandstand:
DOZ subcenter 46 sq. m.
Postofficetransmission room 32 sg. m.

Competition and General Organization

First lower level of jury buildi	ng:		
Direction of sports facilities	-		
for rowing.	. 24	sq.	m.
Direction of sports facilities for			
canoeing	. 20	sq.	m.
Sporting Associations:			
Fédération Internationale des			
Sociétésd'Aviron(FISA)	18	sq.	m.
Fédération Internationale des			
Canoe(ICF)	. 18	sq.	m.
Deutscher Kanuverband (DKV)	18	sq.	m.
Deutscher Ruderverband			
(DRV)	. 18	sq.	m.
Organizing Committee:			
Technical direction	18	sq.	m.
Data processing	. 28	sq.	m.
OC technical apparatus	24	sq.	m.
Inspection	. 42	sq.	m.
Printing shop	81	sq.	m.
Timekeeping	. 28	sq.	m.
Scoreboard technology	28	sq.	m.
Firedepartment	. 28	sq.	m.
Hygienic facilities and			
dressing rooms for personnel	115	sq.	m.
Second lower level of jury b	uildir	ig:	
Jury room	315	sq.	m.
Regattaoffice	. 56	sq.	m.
Policeandsecurityguards	61	sq.	m.
OCtecnnical apparatus,			
huriania facilitiaa	40	~~	
Fourth lovel of finish tower:	. 48	sq.	m.
lury deliberation room	04	~~	m
	24	sy.	111.

Restaurant

Participants' house-participants' restaurant seating 120. VIP cafeteria in the main grandstand seating

160. Cafeteria in the main grandstand for press,

radio and television seating 76.



Location: 8000 Munich-Schwabing Werneck Meadow in the English Garden south of the Kleinhesseloher Lake

Team director for the Olympic Construction Company, Ltd.:

Dipl.-Ing. Herbert Weidenschlager, Munich

Project director for the Olympic Construction Company, Ltd.:

Graduate Engineer Ralf Petry, Munich

Design, planning and building director: Dipl.-Ing. Architect Peter Lanz, Munich

Characteristics of the Design

The meadow in the park landscape of the English Garden used for the contest site was marked off by the clusters of trees already growing there and the buildings, tents and stands set up for the Olympic events. The tents themselves were e divided into various areas with asbestos cement partitions. The building components were the same as those used at the fair grounds. The bleachers were constructed of aluminium and wood. The archery range was temporary.

Dimensions of the Facility

Size of the entire area 200) m. x 250) m.
Built-overarea	2,000 sq	. m.
Total contest area	10,500 sq	. m.
Women 70 m. x 60 m	4,200 sq	. m.
Men 90 m. x 70 m	6,300 sq	. m.

Access

By car:

From Olympic Park via Mittlerer Ring or Ackermann Strasse, via Schwabinger Strasse to the main entrance of the archery range.

Public transit:

Subway at Leopold Strasse, city bus stop on Thieme Strasse.

Parking lots:

There were 150 provisional places on a closed off park path.

Total Cost excluding Incidentals 1.1 million DM

Utilities

Ventilation:

Mechanical ventilators were installed only in the prefabricated boxes.

Plumbing: Toilets were installed in prefabricated boxes.

High tension installations:

Every temporary building was connected to the city electricity system.

Emergency power generator:

A temporary generator was installed to provide emergency current. Low voltage facilities:

The following equipment was installed: one telephone exchange with thirty extensions, two data read-out stations, ten telex machines, one intercom, a public address system.

Technical Sport Facilities Scoreboards:

Manually operated magnetic scoreboards were used for each of the men's and women's contest. Individual contest results were posted on a central manually operated magnetic scoreboard (daily results).

Signals: Electrical lights with a parallel horn signal were used to announce the permission to shoot.

Intercom: The organization had an intercom system.

PA system: For announcements in the buildings.

Contest Area

The Werneck Meadow in the English Garden was prepared for the contest by grading. Women: 5 m. x 12 m. = 60 m. wide, 70 m.

long. Men: 5 m. x 14 m. = 70 m. wide, 90 m. long.

The archery range was set up so that the archers faced due north. The judges' table was between the two contest areas (signal to shoot and control).

There was one range for every three archers. Women: 24 ranges, each 2.50 m. x 70 m. Men: 28 ranges, each 2.50 m. x 90 m.

Olympic Use

September 7 to 10, 1972.

Athletes' Area

There were two bad weather tents for men and women participants each measuring 20 m. x 20 m. furnished with chairs and tables. The sportsmen's area between the stand and the waiting line along the entire breadth of the field was furnished with sun umbrellas, chairs and tables. The archers' medical facilities were located before the men's shelter tent.

Access: By bus to the eastern and western main entrances, from there to the tents and contest site (the archers' places at the waiting line were the equivalent of the stand-by areas at the other sport sites).

Spectators' Area

Seats on six stands total 1,100 VIP seats Press seats on the VIP stand and the press stand total VIP food service: 50

There was a temporary restaurant for guests of honor in the organization tent. Sanitary facilities and first aid:

These were accommodated in the prefabricated boxes.

Spectators' access:

Main entrances east or west with ticket offices and control (parking places were as far as 2 km. away). Unhindered admission to the stands

Communications Area

Press, information, telephone			
room, writing room	30	sq.	m.
Interview room, writing room	30	sġ.	m.
DOZ room	15	sd.	m.

Contest and General Organization

The contest and sports site administration had one area consisting of two prefabricated boxes totaling 24 sq. m. one room (2 prefab boxes) for the Fédération Internationale de Tir à l'Arc (FITA) totaling. 24 sq. m. One room (2 prefab boxes) for the Deutschen Schützenbund (Ger-man Archers Federation) (DSB) with a total of 24 sq. m. . 24 sq. m. withatotalof Organization tent 15 m. x 45 m. with the following equipment and rooms:

Telephone center.20 sq. m.Post office.15 sq. m.Storeroom.15 sq. m.Craftsmen.15 sq. m.Control personnel.20 sq. m.OC technical.15 sq. m.OC administration.15 sq. m.OC administration.15 sq. m.Docadministration.9 sq. m.Data processing.9 sq. m.Contest evaluation:Three booths for men, eachThree booths for women, each15 sq. m.Two booths for women, each15 sq. m.Furnishings: tables, chairs, telex machines.Medical area:Medical room.9 sq. m.Doctors' room.9 sq. m.Waiting room.9 sq. m.Hostess' room, preparation foryictors' ceremonies(women's bad weather tent)15 sq. m.
Restaurant

The VIP dining area was in the organization tent(self-servicekiosks). Kiosks for spectators. Food service for officials and personnel totaled 300 sg. m. Type of Sport: Equestrian Sports-Dressage

Location: 8000 Munich, 19 Nymphenburg Palace

Team director for the

Olympic Construction Company, Ltd.: Dipl.-Ing. Herbert Weidenschlager, Munich

Project director for the Olympic Construction Company, Ltd.: Graduate Engineer Hans Peter Alexander, Munich

Design, Planning and Building supervision Atelier Kleineichenhausen P. F. Miller and Associates, Kleineichenhausen

Characteristics of Design and Construction

The dressage facilities were built temporarily in the palace park within the wooded area at the western front on the axis of the palace's middle tract. The facilities consisted of the contest area, the three preparation areas and the temporary bleachers and buildings. The contest area of 20 m. x 60 m. was located on a park lawn. The spectator bleachers were placed parallel on both sides of the contest area. The entire facility was so planned that the background provided by the palace and park could be thoroughly appreciated.

Dimensions of the Facility

Total area used in the vicinity of the	
contest area 21,000 sq.	m.
the contest area itself	
20 m. x 60 m 1,200 sq.	m.
Length of the bleachers 125	m.
Width of the bleachers 16	m.
The auxiliary rooms in temporary woode	n
buildings in the nearby wooded area had	ł
a capačity of approximately 2,200cu.	m.

Access

By car: Nymphenburg Palace is connected to the city streets by the entrance driveway. Public transit:

Streetcar line and municipal buses have stops at Romanplatz and Verdi Strasse.

Total Cost excluding Incidentals

2.1 million DM

Utilities

All temporarily erected rooms were equipped with the required electrical and sanitary installations.

Sport Technicalities

Scoreboard: The scoreboard was manually operated (magnetic)

Width 2.83 m. The following data was displayed: Start order, numbers, name and nationality of the contestant, the horse's name, individual as well as complete summary of the results.

Timing:

The start signal was given by a manually operated device, and the finish was likewise manually measured.

Contest Area

Contest site: 20 m. x 50 m. Construction from top to bottom was as follows: mixture of sand and sawdust (6 cm.), cinders (4 cm.), and frost proof gravel. Five referee booths were built, one on

each of the northern and southern sides of the contest site as well as three on the eastern side.

The bandstand was built in front of the open stairway to the middle tract of the

palace. The contest officials were located on the southern grandstand together with those responsible for timing, results, teletype, and announcements.

Contest preparation: Two starting places

Olympic Use

The grounds were used for the Olympics on September 5, 6, and 8, 1972.

Participants and Horses

The participants were provided with five tents each 50 sq. m. washroom, toilet and snack bar were located on trucks in the stable area in the southern palace grounds. The horses were provided with: 350 sq. m. The feed was stored in two tents each 50 sq. m. The veterinarian had a tent with the doping 50 sq. m. control. Access:

Access: The contestants reached the riding areas No. 1 and No. 2 from the stables by park paths. From there they proceeded to the stand-by area where they waited for the signal to enter the competition area.

Spectators' Area

The spectators were provided with temporary stands and bleachers Total number of spectator seats 8.000 Seats that were sheltered 4,000 Southern stand: VIPs Press seats with tables 250 50 Press seats without tables. ... Commentator seats: thirty booths were 100 provided, fifteen for television and fifteen

for radio. Spectator Comfort:

The spectators were provided with re-freshment tents set up behind the stands. There were also mobile sanitary facilities for general use.

First aid:

Red Cross personnel were on duty on the stands and in the first aid rooms for possible emergencies.

Spectators'entrance:

The palace park gates on both sides of the middle tract served as entrances. The ticket booths and ticket control were located here. From the ticket control there was unhindered entry to the spectator stands. (The contest site was screened off.)

Communications

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DOZ commentators' subcenter 2 rooms each 15 sq. m. with direct connections to the commentators' booths on the south stand. Transmission facilities:

4 DOZ cameras

2 motion picture cameras For the five broadcasting company trucks approximately 200 sq. m. of parking space was provided in the vicinity of the temporary buildings.

Contest and General Organization

administration	20 sg.	m.
OC Technical	20 sa.	m.
Printing	40 sq.	m
Stand-by craftsmon	15 en	m
Data processing	15 sq.	m.
Advertising and personnel	15 54.	
Advertising and personnel	15 SQ.	
OC service	15 sq.	m.
Hostesses room	20 sq.	m.
Cleaning service	15 sq.	m.
Police, security force, fire		
department each	20 sq.	m.
Snackbarpersonnel	30 sq.	m.
First aid for spectators	40 sq.	m.
Additional toilet facilities and rep	resenta	-
tion rooms were located in Nym	phenbu	rα
Palace. The following specialized	craftsm	en
were available: smiths saddlers r	ainters	•
and carpenters Additional space	was	,
provided in the school near the n	alace	
Eddération Equestre International		
Doutscho Poitorlicho Voroinigung		
Office	20.00	m
	00 SQ.	
2 exercise rooms, each	25 SQ.	m.
Reporting office	50 SQ.	m.
Conterence room	40 sq.	m.
Room for Dressage	20 sq.	m.
Writing room	20 sq.	m.
Mimeograph room	15 sq.	m.
Lounge for interpreters	30 sq.	m.
Room for telephone exchange.	20 sq.	m.
Room for short-term workers	30 sq.	m.
2 Special mobile post offices	•	

Restaurant

Concession tents (snacks, beverages, and sundries) for the personnel, contestants, and spectators were located in the area behind the spectators' stands.

Types of Sport: Riding, Modern Pentathlon, Military Start for Military Cross-country, Grand Prize for Individual Jumping

Location: 8 Munich 81 (Riem) Landshamer Strasse 11

Team director for the Olympic Construction Company, Ltd.: Dipl.-Ing Herbert Weidenschlager, Munich

Project director for the Olympic Construction Company, Ltd.: Graduate Engineer Hans-Peter

Alexander, Munich

Design, planning, building direction and engineering Atelier Kleineichenhausen

P. F. Miller and Associates, Kleineichenhausen

Landscape design: H.W. Hallmann, H. Riese, Chr. Habeck, Munich

Characteristics of Design and Construction

The riding facility at Riem was constructed on the grounds of the Riding Academy and the Munich Racing Club. There are two distinguishable areas: the riding stadium with its surrounding area and the riding facility with stables and riding hall. The riding stadium was consciented as a "II" The riding stadium was conceived as a "U" which opened north to the training areas. The built-up earth embankment of the open air stands began in the north and extended bow-shaped around the contest site lawn to the southwest and ended as an entry ramp to the second level of the roofed stands, which marked the western boundary of the stadium. The 28 m. cantilevered roof had stadium. The 28 m. cantilevered roof had a laminated wood framework which was supported by stress and pressure joists. The sloping base for the spectator seats, as well as the entire supporting structure, is made of laminated wood beams. The stand enclosures and the mantling of the pillars were finished with reinforced concrete to meet fire regulations. The stands in the southern half are cut off on the third level by the restaurant tracts. The sanitary facilities are housed in a reinforced confacilities are housed in a reinforced con-crete tower which is erected in the open behind the stands. Foot bridges connect the free-standing judges' tower with the roofed stands. Training places for dressage and jumping close off the facility to the north.

Stables:

The existing stables north of the smaller riding hall were modernized for Olympic use. Two completely new Olympic stables were built between the smaller and larger riding hall. The "Olympia" type stable was laid out so there would be two rows_of stalls with one middle passageway. The stable building is covered with a double roof sloping from the middle up towards the sides. At a high point of the roof, that is, on one of the long sides of the build-ing, the rooms for the grooms are so ar-ranged along a connecting gallery that it is possible to look down into the stalls. Riding halls:

The stables and wide training areas are clustered around the large and small riding halls.

The large riding hall: The rectangular track which measures The rectangular track which measures 30 m. x 75 m., is enclosed by L-shaped viewing stands on the western and northern sides. A restaurant wing is attached to the eastern wall on the second level with a view of the track. The southern long side of the track was bounded by the hall's exterior wall. Sixteen three-jointed beams, with a folding roof on the topside, form the framework of the hall. The gable walls and the vertical southern side wall of the hall are constructed of prefabricated concrete elements. The slanting northern wall of the hall is constructed primarily of translucent material.

The small riding hall: The existing structure of the smaller riding hall was renovated for Olympic use. After the Olympics the riding facility will be used as the regional riding school. Three stables will be taken over by the Munich Racing Society.

Dimensions of the Facility

Entire property including lots

Societies 450.000 sq. m.	
Biding Facility at Biem 60,000 sg m	
Riding stadium:	
Area of the riding stadium 07 700 og m	
Area of the humy statium 27,700 sq. m.	
Built-over areas, rooted	
stands. 5,900 sq. m.	
Embankment areas, stands 6,600 sq. m.	
Stadium interior area 15.200 sq. m.	
Contest area 14 600 sg m	
5 Olympic riding stables:	
Enclosed space 60.000 cu m	
Built over eree 10,000 cu. m.	
The beautiel stables 10,000 Sq. III.	
i ne nospital stable:	
Enclosed space 6,200 cu. m.	
Built-over area . 1,250 sq. m.	
Longer circle:	
Enclosed space 600 cu. m.	
Built-over area 200 sg. m.	
3 Heating plants	
Enclosed snace 2 200 cu m	
Built-over area 550 cg m	
Training areas.	
15 training areas 62,600 sq. m.	
Large riding hall:	
Enclosed space 21,600 cu. m.	
Built-over area 3,275 sg. m.	
Small riding hall:	
Enclosed space 2 100 cu m	
Built-over area 950 sg m	

Existing buildings: Three houses, four stables, a casino build-ing, small riding hall.

Access

Vehicular traffic:

The riding facility can be reached via the Middle Ring and via the Daglfing Race Track exit off the airport expressway and from there along Landshamer Strasse to the main entrance.

Public transit: Ride to the Riem station of the Munich rapid transit and from there on foot to the stadium (about 500 m.). Besides the rapid transit, there are connections to the city center and other Olympic sport events by municipal bus lines (bus stops at Landshamer Strasse).

Parking lots: 5,000 parking places were temporarily set up for visitors outside the riding facility.

Total Cost excluding Incidentals 58.1 million DM

Utilities

Heating for the stadium areas: Electric hot water heaters were installed in the restaurant and the kitchen. Ventilation of the stadium areas:

Air intake and exhaust ventilation was provided for the restaurant area and the sanitary facilities in the towers.

Heating center No. 1 for two Olympic stables, the casino and the large riding hall

The heating plant was built next to the casino. A central hot water heating system with three high capacity boilers 800,000 kcal/h each served the buildings mentioned above. The stables and the large riding hall were heated with hot air heaters. The casino and the living quarters on the upper level of the stable were heated by radiators.

Heating center No. 2 for three Olympic stables:

A hot water heating system with two high capacity boilers 800,000 kcal/h heated three Olympic stables. The heating of the stalls and living quarters was the same as above

Heating the hospital stable: One high capacity boiler with an output of 80,000 kcal/h provided the central hot water heating system to temper the air registers for heating the stalls. The apartments were heated with radiators, as above.

Function of the hot air heaters: The stalls were ventilated by two separate systems; one intake, the other exhaust. It was heated to 12°C in winter.

Heating the ventilating system in each stall:

stall: 12,500/8,000/6,000 cu. m. of air per hour. Capacity of the air exhaust system per stall 5,000/3,750/2,500 cu. m. of air per hour. Heating capacity per stable "Olympic" type 125,000 kcal/h. The riding hall is heated by individual air heaters. These could be operated either with fresh air or recorded air. The capacity of the system recycled air. The capacity of the system could be controlled as follows: 8,000/ 6,000/4,000 cu. m. per hour. Heating capacity: 60,000 kcal/h.

Technical Sport Equipment

Scoreboard: The permanently installed electronic scoreboard measuring 13 m. x 3.30 m. with readouts using light cell technique is located under the judges' tower. The following data could be displayed: starting order, number, name and nationality of the rider, the horse's name, current results, end results and order of the riders and horses according to the final results.

Timing, stadium: The start and finish lines were equipped with electric eyes. An electronic timing device, counter with digital system would be started by the start signal. A second electronic timer independent of the first together with manual timing provided the necessary security, should the main systemfail.

Timing the military cross-country: The starting and finish lines were equipped with electric eyes. The timing mechanism had an accuracy up to 1/100 of a second. The calculation of phase times was done by tabulating machines. The intervening times were transmitted to the participants' center and to the measured stretch.

Contest Area

Individual jumping, Partial contest military, Individual jumping for the modern pentathlon: Contest area 14,600sq. m. Construction of the contest areas: frost guard gravel down to the natural soil, 20 cm. humus consisting of sand, peat and humus. roll lawn cover. Permanent obstacles: Three water hazards Judges' tower at the contest site: Contest director. 20 sq. m. Jury room 30 sq. m. Contest preparation: (Between the judges' tower and the training areas) Contest preparation area 2,000 sq. m. Stand-by area 2,000 sq. m.

Olympic Usage

(individual competition)

August 27, 1972 — modern pentathlon riding August 29, 1972 — military dressage August 30, 1972 — military dressage August 31, 1972 — military cross-country September 1, 1972 — military jumping September 3, 1972 — Jumping Grand Prix

Area for Contestants and Horses

Stables for horses with the exception of the horses used in the modern pentathlon. 5 Olympic stables totaling. . . 240 stalls Each Olympic stable (30 m. x 68 m.) contained the following rooms: Ground floor: 48 stalls, each 3.50 m. x 2 rooms for stable super-
 vision, each
 15 sq. m.

 4 feed rooms, each
 17 sq. m.

 2 equipment rooms, each
 21 sq. m.
 2 washing stalls, each 18 sq. m. Toilet facilities 12 sq. m. There are two lofts on each stable wall for hay and straw with a capacity of 900 cu. m. each. Upper level: Nineteen rooms for two grooms with an area of 15 sq. m. each, including three sanitary facilities with showers, wash basins and toilets. In the four existing stables a total of 139 stalls measuring 3.50 m. x 3.50 m. were installed.

Stables for the horses for the modern pentathlon.

80 temporary stalls 3.00 m. x 3.50 m. One hospital stable with twenty stalls 4.00 m. x 4.00 m.; five stalls are included in each section. Treatment room with X-ray equipment for large animals 49 sq. m.

Laboratory.25 sq. m.Quarters for stand-by doctors.30 sq. m.Kitchenette.10 sq. m.Conference room.30 sq. m.Waiting room.20 sq. m.4 studios for veterinarians fromoutposts.80 sq. m.2 washrooms, each10 sq. m.2 toilets, each10 sq. m.

Riding hall: Training areas during inclement weather. Area 30 m. x 75 m., 6.50 m. to 11.50 m. clearance (the ancillary rooms and the restaurant in the riding hall were not used during the Olympics). Readying area (warm-up site before competition)

to compete. 2,000 sq. m. Physicians' area (in the casino basement near the new riding hall):

I	
	total 130 sq. m.
	2 rooms for stand-by
	physicians
	2 treatment rooms, each 20 sq. m.
	Waiting room 20 sq. m.
	Office 15 sq. m.
	Laboratory. 15 sq. m.
	Toilets
	Parking lots for two ambulances.
	The doping checkpoint is
	included in the physicians' area.
	Veterinarian (stadium basement):
	Doctors and assistants have
	two rooms totaling
	SpectatorArea
I	Spectator places total 02.000

Spectator places total	23,000
Seats	20,000
Standing room (temporary	
stand on the embankment)	3,000
Sheltered seats (grandstand)	8,000
Division of places:	
VIP seats	500
Press seats with desks	. 250
Press seats without desks	200
Commentators' cubicles	. 50
(over the spectators' grandstand)	
Athletes' seats	. 350
VIP facilities:	
The VIPs were served refreshments	in the
stadium restaurant on the second le	vel
above the stands. There was a direct	t entry
to the VIP seats from the restaurant	
Spectator facilities:	

There were thirty concession stands southwest of the stadium and on the embankment stands to sell refreshments and sundry items. Sanitation:

There were mobile toilets set up for the spectators on the embankment stands. The spectators in the sheltered stand area had access to the toilet facilities in the tower. First aid

A doctor's room, treatment room and waiting room were set up in a temporary army field house with a total of 70 sq. m. to aid spectators.

Spectators' access: The spectators' entrance was located on Landshamer Strasse. From there, people passed ticket windows and checks to either the open-air stands on the embankment or they entered the sheltered stands via the ramp.

Communications

All communications areas were located in army field houses west of the stadium.
Press subcenter:
Press writing room
Press post office 140 sq. m.
nterview room 70 sq. m.
nformation including back
oom
Vimeograph room 20 sq. m.
The press and commentator area was
ocated on the viewers' grandstand.
DOZ-subcenter with post
office transmission and
nterference elimination 70 sq. m.
DOZ two offices and film
storage totaling 70 sq. m.
Special post office — field
nouse 140 sq. m.

Contest and General Administration

Riding Academy Casino:
Fédération Equestre Internationale (FEI)
Deutsche Reiterliche Vereinigung (FN)
Contest administration total 85 sq m
EL Presidium (two rooms)
rei riesiululli, (lwo loollis)
ioiai
FN Sports director, 4 rooms
totaling
Interpreters' room 20 sg. m.
Telephone exchange 20 sq. m.
Conference room 50 sq m
One room each for drassage
one room each for diessaye,
military, and jumping with 20 sq. m.
Training area and contest
supervisors 30 sq. m.
2 rooms for typing pool, each 20 sq. m.
One room each for mimeograph-
ing care and cleaning service
maintananaa aaah
maintenance, each 20 sq. m.
2 rooms for OC sports stand-by
personnel, each 20 sq. m.
1 room for OC technical
stand-by personnel 30 sq. m.
Telecommunications (two
reame) total
Defective and back
Refreshment room and back
room
Toilet facilities for men and women
Technical apparatus for
scoreboard 20 sq. m.
Data processing 30 sq m
Timing 20 cg m
Chand by renairman 000 as m
Stand-by repairmen 200 sq. m.
Field houses (German army):
FEI Presidium 50 sq. m.
Sports director 30 sq. m.
Reporting office 30 sq. m.
2 writing rooms each 50 sg m
Mimoograph room
Supervision stadium 50 og m
Supervision — stadium 50 sq. m.
Interpreters' lounge 30 sq. m.
Hurdle and equipment service
and custody 30 sq. m.
Men's and women's toilet.
Stadium grandstand lower level:
Police fire department and security
awarda had 05 ag m agab. The reams for
yuarus, nau 25 sq. m. each. The rooms for
the administration and modern pentathion
were housed in the pro Olympic build

	•
Black smith's shop 40 sq. m.	
Saddle shop 40 sq. m.	
Carpentry shop	
Painters' shop. 60 sq. m.	

Restaurant

The main restaurant in the stands (2nd level) was laid out for 200 seats (the restaurant and cafeteria were reserved for VIPs). The canteen for short-term employees was in the pre-Olympic Racing Club canteen and seated 300. Spectator service: there were thirty concession stands in the spectators' area to sell refreshments (entry area-ramp, embankment). Casino snackroom with kitchenette for employees (50 persons). Field house snack rooms with kitchenette (50 persons). Type of Sport: Canoe Slalom

Location: **8900 Augsburg** On Spickel Strasse

Team director for the Olympic Construction Company, Ltd.: Dipl.-Ing. Adolf Hillmeier, Augsburg

Project director for the Olympic Construction Company, Ltd.: Construction Engineer Eberhard

Regulski, Munich

Design, Planning and Supervision of Construction for Superstructures: Dipl.-Ing. R. Brockel and E. K. Müller, Augsburg

Planning: GottfriedHansjakob,Munich

Characteristics of Design and Construction

The competition course for the canoe slalom consists of a concrete canal built into the landscape. The obstacles, made of poured concrete, are built into the channel. The slopes along the course are reinforced in such a way that they can also be used as spectator grandstands. The following permanent buildings were erected within the sports complex: the starting building in the south; the press and administration building in the southern third; the finish line building, boat houses, participants' building and restaurant in the north. The buildings were constructed with reinforced concrete skeletons and partially with wooden construction. The dominant materials are: concrete, wood, Eternit (asbestos cement), glass. Additional buildings were constructed temporarily: four army field huts for the short-term personnel, three wooden stand-by halls. and VIP bleachers of tubular steel construction near the finish line.

Dimensions of the Facility

Course:
Length approximately 660 m.
Width 6 m-8 m.
Depth 0.40m3.00 m.
Starting building (two floors):
Enclosed space 60 cu. m.
Usable floor space 20 sq. m.
Press and administration:
Tower (3 levels)
Building (1 floor)
Enclosed space 5,300 cu. m.
Usable floor space 1,100 sq. m.
Restaurant (2 floors):
Enclosed space 3,900 cu. m.
Usable floor space 950 sq. m.
Boat houses and participants' building:
Competition center (3 floors)
Enclosed space 13,300 cu. m.
Usable floor space 3,200 sq. m.
Finish line building (1 floor):
Enclosed space 50 cu. m.
Usable floor space 15 sq. m.

Access

By car: From the Munich—Augsburg Autobahn via Friedberger Strasse and Spickel Strasse. Public transit:

The line from the Munich rapid transit station at the Olympic Village connects the Olympic Village with the railway station, Augsburg-South, which is located near the sports facility. The canoe slalom course is on the city bus line: bus stop, Spickel Strasse

Parking lot: Six thousand temporary parking places right next to the course.

Total Cost excluding Incidentals 14.9 million DM

l Itilitiae Heating

Gas-fired hot water heating for the press and administration building, the restaurant and the competition center. Ventilation:

Only in the restaurant and competition center.

High voltage installations: High voltage supply network along the slalom course as well as for all buildings. Installed transformer capacity 300 kVA: emergency generators on loan with 30 kVA and 15 kVA.

Low voltage installations: Telephone system with ten exchange con-nections and thirty extensions, clock system, antenna installation for television, intercom, PA system along the course, fire alarms, electronic data processing, data transmission, data monitoring station.

Technical Installations for Sports Scoreboard:

Mobile Scoreboard from the regatta course at Oberschleissheim (cf. idem). Timing:

Photographic timekeeping system. Judging facilities:

Judging stations installed along the course with manual input system and intercom system.

Contest Area

Slalom Course:

660 m. long, 6 m—8 m. wide, 0.40 m– 3.00 m. deep, a grade of 4.5 m. descent on

3 m.—6 m./sec. water speed, 30 judging gates, 35 concrete obstacles. Team stand-by rooms:

18 temporarily built rooms for men and women participants.

Bridges:
At the starting building and assembly area,
2 m. x 30 m. At the finish line 4 m. x 30 m.
Hygiene (along the course):
1 health room, parking area for ambulances.
Life-savers' area (course):
6 blocked-off places for rescue squads
along the course with entrance and exit.
Ambulance parking alogo

Ambulance parking place. Contest preparation in the participants' building — boat house (competition center):

1 training room, 8.40 m. x 16.80 m. 1 kayak pool, 5.00 m. x 8.50 m. x 1.80 m.

Post-olympic use as a training facility in canoeing.

Olympic Usage August 28th and 30th, 1972

Participants' building, 2nd and 3rd floors: 24 teams rooms(lounges) each 16 sq. m. 1 large lounge for all participants, including refreshment area 120 sq. m. Beverage serving area 24 sq. m. 2 temporary large dressing rooms 6 small locker rooms built for

permanent use and connected	~ .
with shower rooms and toilets. Participants' building.	61
ground floor:	20
4.00 m. x 2.70 m. high	20
1 measuring room with measur-	
13.00 m. x 5.00 m. x 4.00 m.	~`
high 65 sq. m.	2n
1 storeroom 23 sq. m.	fac
1 heating room fully equipped	3ro 1 r
8.40 m. x 16.80 m. 141 sq. m.	Fe
1 kayak pool room 100 sq. m. Sauna	1 4th
Vestibule, locker room, cold	1
total 50 sq. m.	Ati 1
Hygiene area:	4
Doctor's room 12 sq. m.	ł
Doping control 12 sq. m.	1
An ambulance parking place including entry	i
and exit ways.	1
An open area 20 m. wide with a parking	į
lot for 20 cars.	1 me
3 halls for the assembly of the teams.	2 r
7 team rooms with massage benches and rest rooms for each hall.	wa
Meals:	Re
Access and transport:	off
By bus to the south entrance of the com-	of
rooms, hygiene facilities, lounges. Boat	ba
transport to the assembly hall at the start.	Ki
by car from the finish back to the assembly	pr
hall.	
Spectator Area	
Standing room for spectators	
VIP seats 250	
Athletes' seats 250 Press places with desks 28	
Press seats without desks 70	
desks 60	
VIP meals:	
Spectator refreshments:	
Kiosks or tents along the course.	
Temporary toilet facilities for women and	
men.	
2 tents of the German Red Cross.	
Accesstorspectators: Spectator entrances in the south. east	
and north, ticket booths and control, from	
choice of standing position within the	
spectator area along the entire course).	
After the Olympics, the outdoor facilities	

will be used as a recreation area. The restaurant is open to the public.

Communications Area

Ground floor, administration	building:
DOZ subcenter	42 sq. m.
Mail room	14 sq. m.
Telephone switchboard	23 sq. m.
Interview room	44 sq. m.
Telephone and teletype room	89 sq. m.
Press working area with press	•
Information stand	89 sq. m.

Transmission facilities: DOZ television cameras and DOZ movie cameras. Parkingfortechnicalvehicles: 15 sq. m. for a total of seven vehicles. ompetition Organization and dministration Tower of the administration building: d floor room for direction of sports cilities and competition d floor room, International 15 sq. m. deration h floor tic 35 sq. m. room, data processing 50 sq. m. room, data evaluation 17 sq. m. . . room, check-up calculation 17 sq. m. room, sports direction room, technical direction 17 sq. m. 17 sq. m. room, printing 46 sq. m. lounge for hostesses 35 sq. m. room, security guards 17 sq. m. room, police and fire departent 17 sq. m.

rooms, health service, ter rescue squads, each 17 sq. m.

estaurant

ervice for athletes, guests of honor, ficials and personnel in separate areas the restaurant (total 200 places). torage rooms and personnel rooms in the sement. iosks and tents along the course were

ovided for spectators.

Type of Sport: Yachting

Location. 2300 Kiel Schilksee Section

OverallPlanning: Dipl.-Ing.Hinrich Storch, Walter Ehlers, architects, Hannover

Landscaping

Rolf Ehlgötz, garden and landscape architect. Bad Gandersheim

Dipl.-Ing. Gerhard Demuss, architectural consulting engineer, Hannover

Surveying: Dr. Klaus David, consulting engineer. Kiel

Heating (district heating), sanitation, swimming pool technology, ventilation: Hans Fey Senior and Junior, consulting engineers, Wuppertal

Electrical Work: Behrend and Ohlendorf, Engineering Group, Hannover

Acoustics Heinrich Keilholz, Hannover

General coordinating and scheduling: Business Consultants, Gelsenkirchen/Kiel

The Building Program and its

Characteristics The building program included the following projects:

1. The Yachting Center Structures with massage facilities, sauna, swimming pools, showers, changing rooms, a recreation center (lounges with dining facilities), boat houses (multi-purpose

2. Organization and press buildings Regatta management, jury, press center, administration, information.

3. Spectators'facilities Promenades, the ceremonial area, a bus station

4. Olympic living quarters Apartments with shopping center and res-taurants, dwellings as either flats or onefamily houses, an apartment hotel with cafe and bar.

5. Special facilities The Olympic flame, decorative flags, etc.

Additional projects including improving and widening of the surrounding yachting basins, the construction of a youth village and promenades for visitors.

Design

halls).

The situation at hand: The situation at nand: The construction site is located 13 kilo-meters from the center of Kiel on the northern edge of the Kiel-Schilksee sec-tion on the Kiel Förde. Knolls from the hilly landscape to the south of the cliffs jut like tongues into the competition area. The elevation descends from about twelve

meters above mean sea level to practically sea level in the marshy area around Fohlensee. This low lying area is sepa-rated from the sea by a dike. The construction site is situated on a beach promenade extending from the Schilksee resort area (about 500 meters away) to Strande (about 1,500 meters away).

Design tasks:

The new components of the entire building complex had to fit into the situation described above creating a sports center of architectural prominence

The architectural arrangement: A foundational structure houses the jury, the administration, the press center, a swimming pool, garages for the apartments and boat houses. It supports a promenade at the second level which runs directly along the harbor. It takes in the knolls and the cliffs to the south and continues their outling nethwards as far as the neth their outline northwards as far as the path on the dike to Strande. The apartments are terraced and are set in progressively receding structures which follow the lines of the foundation. While one of these superstructures forms a roof over the promenade, another extends into the landscape to the west. The very height of the apartment towers of the Olympic living quarters emphasizes the topographical features of the terrain. They are joined to the main building in the south. The one-family houses are located in the southern part of the site and are arranged either as row houses or houses with enclosed yards. This entire area is screened with dense hedges.

At the same time, the promenade with its shops, restaurants, refreshment stands and swimming pool had to be a center of attraction for visitors in its post-Olympic use. It was also to make Schilksee an interesting place to visit even when there are no yachting events, and offer visitors better views of boating events at other times. Since the regatta courses are so distant there could not be any organized viewing stands as in other sports. Here spectators would watch the events while strolling or lounging on the elevated promenade with its panoramic view of the harbor. The promenade was also the spectators' gallery at the opening, closing and victors' ceremonies. It separated the visitors' area from the harbor activity without isolating either.

The Olympic flame marked the center of the harbor area and was an integral part of the events occuring both on land and at sea.

The Building Program and Survey of its Use

The Indoor Swimming Pool

The indoor sea water swimming pool is equipped with an adjustable bottom and measures 12.5 m. x 25.0 m. Diving equip-ment includes a 1 m. board, a 3 m. board and a 3 m. diving platform. There are 60 changing booths, 180 lockers, a sauna and health baths. Olympic use:

It served as a relaxing sport for the yachters. The lobby was temporarily ex-panded for use as a reception area for the organizing committee. Post-Olympic use:

It will be open to the public and at the same time be a training center for vachters.

The Recreation Center

This multi-purpose hall for sports and other events measures 18 m. x 36 m. It also has changing and shower rooms, a 250-seat self-service restaurant, which can be subdivided into four smaller independent rooms, a kitchen, various storerooms and personnel rooms. There are also seven groups of rooms which serve as club rooms with coat rooms and toilets, washrooms and toilets for yachters, etc. There is also an apartment for the caretaker.

Olympic use:

It served as waiting rooms, dining rooms and lounges for the participants in the yachting events. Post-Olympic use:

It will be used simultaneously as a multipurpose hall for school and social events, a public restaurant and dining facilities for the performing center. The club rooms will be used by various yachting associations. The toilets and washrooms are open both to visitors and yachters.

South Boat House

Its entire area measures approximately 4,200 sq. m., has 5.5 m. overhead clear-ance, is located on the ground floor and is built of concrete and steel.

Olympic use: It housed the special temporary facilities

(see below). Post-Olympic use: It will provide winter storage space for boats and additional garage space for the apartments in summer.

North Boat House

This hall has approximately 2,400 sq. m. of floor space with the adjoining work-shops (paint shop, sailmaking, boat build-ing, spare parts, etc.). Its foundation is built on steel piles; the walls and pillars are built of reinforced concrete; and the roof joists are steel.

Olympic use:

The regatta boats were measured and repaired here.

Post-Olympic use: Larger boats will be stored here during the winter. Boats will also be measured and repaired here during regattas.

Regatta Administration, Jury and Press Buildings There are about 2,376 sq. m. of floor space

for offices, conference rooms and equipment storage available to the organization and the press.

Olympic use:

Offices, conference rooms and storerooms were located here for the organization and some of the press personnel. There was also a temporary press bar.

Post-Olympic use:

Organization and press rooms will be located here for yachting events. There will also be accommodation and teaching rooms for the performing center.

Information Center

There are about 325 sq. m. available for found department, police and small res-taurants (with rural decor).

Olympic use: Tourist information, a bank and dining

facilities for visitors were located here. Post-Olympic use: It will be an information center for resort

and vacation opportunities, and sports.

East Apartment Building There are 240 apartments, of which one third measures 53 sq. m., one third 46 sq. m., and the others 39 sq. m. The apartments are built in a terraced structure with partially roofed balconies. One half of them face the sea and have a view; the other half face inland and enjoy the sun. There are about 2,000 sq. m. of space available for shops and their supply rooms on the promenade. It also has approxi-mately 400 sq. m. of restaurant space (A bowling alley and clubrooms are planned.) with kitchens, pantries and personnel areas. There are also terraces on the promenade.

There is a garage on two levels with 73 parking spaces in the basement. Olympic use:

The apartments of sport functionaries and press representatives were located here. There were also shops and restaurants to

servevisitors. Special temporary facilities were situated in the garages (see below).

Post-Olympic use:

Apartments, vacation dwellings, shops to serve yachters, guests and residents will be located here. The garages will be used by apartment dwellers.

Apartment Tower 1

There are 78 apartments on 13 stories, of which

13 are	1 room apartments
13 are	2 room apartments
39 are	3 room apartments
13 are	4 room apartments
There is approximately	5,525 sq. m. of living
space.	, i c

Olympic use:

It was used as living quarters for parti-cipants and their trainers and for medical attention.

Post-Olympic use: The apartments will be sold or rented.

Apartment Tower 2

There are 90 apartments on 15 stories of which 15 are 1 room apartments

15 ale	
45 are	3 room apartments
14 are	4 room apartments
1 is a	5 room apartment
There is a total of abou	t 6,375 sq. m. of
living area. The central	I heating plant for
the Olympic Center is I	located in the
basement.	

Olympic use: It was used as living quarters for participants and trainers.

Post-Olympic use:

The apartments will be rented or sold.

The one-Family Houses

There are 32 dwellings in corner houses or houses with yards and gardens. The individual dimensions are 24 houses with 124 sq. m. and eight with 148 sq. m. of floor space. There is a total of about 4,165 sq. m. of living space and 32 garages.

Olympic use: They served as living quarters for parti-

cipants and trainers. Post-Olympic use: They will be private homes.

The Apartment Hotel

There are 506 beds in 161 suites distributed as follows: 69 single rooms with two beds each and

92 two-room suites with four beds each.

In addition there is a lobby, a breakfast room with a small kitchen, personnel and other rooms and a garage for twenty automobiles.

Olympic use:

It was used as living quarters for guests of the OC and the City of Kiel. Short-term personnel also had accommodations here. Post-Olympic use:

It will be the apartment hotel "Hotel Olympia".

The Harbormaster's Area and the **Olympic Flame**

There are three accessible platforms built on a single foundation. The harbormaster's office and the customs house are located under two of the platforms. The third platform holds the Olympic flame and has nothing built under it.

Olympic use: The Olympic flame burned here. There was an observation platform and the technical equipment for operating the harbor were controlled from here.

Post-Olympic use:

The brazier and a winners' plaque will be a monument to the 1972 Olympic Games. The harbormaster's and customs house will continue to operate and there will be an observation platform for visitors.

The Harbor

A second yacht basin was constructed and equipped with docks, a boat platform mea-suring some 70 m., a 20 ton capacity winch launching facility, etc. An additional wharf was constructed with a stationary crane and provision for several additional mobile cranes for moving boats. There were also berths for boats and trailers and a breakwater to protect the new yacht basin from heavy seas. Utilities:

Water, electricity and telephones were installed for the docks and the berths. There is a ceremonial area with 800 terraced seats and a signal mast. Refreshment islands with shelters, wind screens and kiosks were provided. Scoreboards for regatta results were also installed.

Olympic and post-Olympic use: There are berths for boats with opportunities for yachtsmen and aides to repair their boats. They can also take advantage of the dining facilities and overnight accommodations.

Special Temporary Facilities

The Special Post Office

Function:

visitors. Location:

It was situated in the southern section of the south boathouse.

Construction: Ventilation, wall coverings, ceilings, partitions and a floor were built-in.

It served as a general post office for

Reception Centralized Services Function:

It served as a reception hall: as an information center, dining area, bank, post office and lounge for visitors. It also included the administrative offices for the Olympic Village.

Location:

It was situated in the south boat house. Construction:

See "special post office" above.

llse Work Area for Journalists

Ries Strasse

Team director for the Olympic Construction Company, Ltd.: Construction Engineer Horst Chmielorz, Munich

Project director for the Olympic Construction Company, Ltd.: Construction Engineer Horst Chmielorz, Munich

Design and Planning: Planning Company for Regional, Architectural and Engineering Planning, Ltd., Munich

Project director: Werner Wirsing, Uwe Breukel, Munich

The Journalists' Village with the Press Center and Olympic Shopping Center is situated in the northwest of the Olympic Park west of the Landshuter Allee and north of the Middle Ring, only a few hundred meters from the main Olympic sports facilities and from the Olympic Village. The entire complex was divided into three functional areas. 1. The Press Center, i.e. the working area

for journalists. 2. The Journalists' Village, the living quarters for journalists, with 4,238 single rooms and apartments.

rooms and apartments. 3. The Olympic Shopping Center, which had all the businesses necessary to cater for the personal needs of those living in the Journalists' Village. (The following text will handle only the Press Center, which was adapted for

Olympic needs and is supposed to become a school after the Olympics.)

Characteristics of Design and Construction

The Press Center was planned as a fourstory square building (length of sides, approximately 70 m.). The restaurant for the journalists (the neighboring building), a square, one-story building with sides approximately 50 m. long, adjoins the Press Center on its western side. The Press Center with the restaurant was constructed in the short time of sixteen months by using prefabricated construction methods. Both buildings were erected of a steel and reinforced concrete laminated construction, on a square grid foundation. A steel skele-ton system of primary and secondary sup-ports is combined with the reinforced con-crete finishing panels. The main building is supported by four main construction elements, which are in the corners of the building (or, on the third and fourth floors, in the corners of the inner court) and contain stairwells, elevators as well as necessary auxiliary rooms. All exterior walls of the building consist

of one-story high aluminum elements, which are covered with multi-layer, heat conserving panels in the areas around the windowsills and in the areas between the floors. With the exception of the walls of the four main construction elements which serve a support function, all interior walls are constructed of multi-layer mobile wall

Radio and Television Center (DOZ) Function

It served as a DOZ radio and television subcenter and had two recording studios with control rooms and other equipment. There were also an "off-tube-room", tech-nical equipment and offices. Location:

It was situated in the south boathouse. Construction:

It was equipped with suspended ceilings, sound conditioning walls, and floating floor construction.

Press Center:

Function:

Press representatives were received and accredited here. Mail was distributed to the press. A conference room, a data transmitter and read-out station, long distance telephone call booths and teletype machines were located here. Also provided were a photo service with 10 small laboratories, a large laboratory which also sold accessories, and work areas in the Carrel System.

Agencies for pictures and texts with their own photo laboratories were located here.

Location: It was situated in the south boat house and in the lower garage level and was connected to the adjacent permanent press center and DOZ.

Construction: See "special post office" above.

Personnel Area

Function: Hiring and outfitting of short-term personnel was taken care of here. The area also served as their lounge. Location:

It was situated in the garage under the changing rooms of the swimming pool. Construction:

It was equipped with lighting, ventilation and partitions.

Measuring Area

Function: The participants' boats were measured here. The participants could also keep their tool boxes and make repairs in this area.

Location The area was situated in the north boat

house. Construction:

Platforms were provided for the measurers. The measuring area was partitioned off and wooden boxes were provided.

Access

By car: The complex had access to the city street network by the construction of Förde Strasse

Parking lots, some of which will also be boat storage areas, are located immediately at the entrances. Additional temporary parking areas are located west of Forde Strasse outside the building site. Public transit:

Visitors could use either buses or steamers. Pedestrians:

Pedestrians reach the promenade and harbor area from the parking lots, the bus stop or Schilksee through a wide entrance area which gives the center a certain charm. This pedestrian area meets the promenade at a point enlivened by the resort and beach activity. It is arranged on terraces and descends gradually. There is an unobstructed view of the Baltic Sea, the harbor and the Olympic flame. The promenade itself forms part of the pedestrian path network

Dimensions of the Yachting CenterTotal area285,000 sq. m.Built-up area77,000 sq. m.Usable floor space70,000 sq. m.Total volume300,000 sq. m.Harbor surface96,500 sq. m.

Olympic Use

read-out station.

The Restaurant

chairs

as many as 4,000 persons.

August 29, until September 1, 1972 and September 4, 5, and 8, 1972.

Spectators' Area There are no special spectator facilities at the Olympic Yachting Center in Kiel-Schilksee. The viewers may stroll freely on

the promenade. Information booths were set up along the promenade where fans could keep themselves informed about

Olympic yachting events with models and plans. Visitors could also keep up on

Olympic events happening in Munich by enlarged television pictures and a data

For fans who wished to witness the vacht-

ing events at close range, there were fourteen bay steamers sailing every day to the regatta course. They could carry

Visitors were provided with food service

in temporary stands with roofs, kiosks and

Cost

The entire cost of buildings and furnishings required for the Olympics totaled 82.2 million DM.

Utilities

The entire project was heated by a central heating plant located in the basement of the Apartment Tower II. It was fired with light heating oil and furnished ap-proximately 3.0 Gcal/h. The bungalows had their own individual

gas heat.

The swimming pool, the sauna, the restau-rants, the multi-purpose hall and the recreation center were ventilated. Temporary ventilators were installed in the south boat house and in the garages where the special facilities were temporarily accommodated.

Low voltage installations: 100 main telephone connections were installed. These had 600 extensions and additional extensions were installed for the Olympic Games.

All buildings had common antennas for radio and television reception. Temporary antennas were installed for radio com-munications with the regatta course, etc. Clock systems were installed in the harbor area and swimming pool and recreation

A public address system was installed in the harbor area and swimming pool. Tem-porary intercoms were installed in all functional areas. In addition there is a fire alarm system.

Data processing centers:

Electronic data processing machines were temporarily located in the regatta adminis-tration offices. Temporary data transmitters and data read-out centers were situated in the spectator, press and sport areas.

Technical Sport Aids

Scoreboards: 5 manually operated scoreboards were installed in the harbor area to display regatta results in each of six Olympic yachting categories.

Timing: The events were timed electronically with multi-counters.

The Yachting Competition Courses

The competition areas for the vachting events are located on the Kiel Outer Forde. The approximate center points of the regatta areas are as follows: Regatta area A (Soling and Dragon) 54°29'50" N., 10°22'00" E. Regatta area B (Flying Dutchman, Tempest, Star) 54°30'30" N., 10°13'00" E. Regatta area C (Finn) 54°27'30" N., 10°17'45" E.

The regatta courses have the shape of right angle isosceles triangles. The triangle base of courses A and B measures 2 nautical miles; that of course C, 1.5 nautical miles. The total length of regatta courses A and B is 11 nautical miles; that of course C, 8.4 nautical miles. Location: 8000 Munich 40

sections. All rooms, except for bathrooms, etc., are covered with a sound absorbing synthetic textile floor covering.

Dimensions of the Facility 7,050 sq. m. Area under roof 90.000 cu m. Interior space Total usable floor space...... 17,400 sq. m.

Access

For cars and pedestrians: From the Journalists' Village on Ries Strasse there was a direct connection to the Olympic Village via Lerchenauer Strasse, Moosacher Strasse and Hanauer Strasse, or via the Middle Ring to Olympic Park. These were the shortest ways for service vehicles from all parts of Olympic Park and also provided good connections to all other sports facilities The pedestrian paths led about 1,000 m. The pedestrian paths led about 1,000 m., without crossing a street, from the central plateau next to the main sports facilities, via the dam paths to the German Olympia Center (DOZ), the volleyball hall, the hockey field, to the Journalists' Village and the Press Center. There was also a pedestrian path of less than 1,000 m. leading to Olympic Village. Public transport

Public transport:

Bus shuttle service during the Olympic Games. Pedestrian and road connection to the rapid transit station 500 m. away. Shuttle-buses for athletes, journalists and officials connected all the sports facilities with the Journalists' Village and the Press Center. The central bus stop was right at the entrance to the Press Center. Parking places: Near the Press Center, 52 parking places were available for cars with special permits.

Total Cost excluding Incidentals 23.7 million DM

Utilities Heating:

The site was supplied by district heating. The capacity of the connection was 2 mil-lion kcal/h. Rooms were heated with hot water radiators. Some individual rooms received supplementary warm-air heating. The hot water was heated by a heat exchanger.

Plumbing:

Water and sewage lines were led from and to the main construction elements (stairwell and elevator shaft). The regulating devices are in the space between the floors and are accessible at regular intervals in accordance with the layout of the building.

Ventilation:

The central ventilation installations are in the main construction elements. The floors are supplied by vertical shafts; the horizontal distribution of the intake and exhaust air is channeled in the space above the ceiling.

High voltage installations: Installed transformer output 6 x 630 kVA. Lighting:

All rooms were illuminated by fluorescent tubes. In the forum, extra spotlights were put in for special lighting. The wiring of the laboratory and of the darkroom was determined by their special requirements; the other rooms were wired according to general building codes.

Low voltage installations: One telephone extension switchboard with 550 phones, 170 teletype machines, 8 data viewing stations, 1 antenna system for approximately 200 television sets, 1 ELA installation for the foyer, OC press, and the kitchens, as well as six picture trans-mission machines, and a fire alarm system.

Space Allocation and Functions

Space Allocation and Functions Ground floor: On the ground floor were located the cen-tral hall, the communications and informa-tion center with 120 seats for the journa-lists, television sets, data viewing stations and teletype machines. These installa-tions gave the journalists the possibility of complete information. All the happenings of the Olympic Games in all their phases could be followed from here without any gape. A here edicined the central heal. The gaps. A bar adjoined the central hall. The following services and institutions were grouped around the hall: thirty accredita-tion windows, the issuance of meal tickets, general information, the chauffeurs, the issue of press cards, two rooms for the doctor on call, two rooms for the chauffeurs and couriers, the freight and travel office, the bank counter, the newspaper kiosk, the letter and package post office, the post office boxes for every accredited journalist; in addition the printing plant with forty printing and sixteen collating machines with the required reproduction and copying equip-ment. In addition, the following offices were accommodated:

Office of the Association of the German Sports Press

Office of the International Press Associ-ation (AJPS) Office of the Chief of Service

Office for Documentation Office of the Olympic Press Chief.

Second floor:

Two journalists' work rooms with a total of 961 sq. m. and 350 places each equipped of 961 sq. m. and 350 places each equipped with desk, chair and typewriter, the central photographic laboratory, the counter for receiving and returning films, the sales room and information, the filmdeveloping lab and the rooms for do-it-yourself developing (34 developing places and 35 printing cubicles), as well as the office of the national Fotopool, the camera repair workshop, the wire photo facility of the German Federal Post Office with six facsimile transmission machines and two facsimile transmission machines and two rooms of the sports information service, the telephone room with 70 telephone booths and 20 telephone shells with 20 coin-operated telephones, the teletype room with 48 teletype machines and the telex counter. In addition, a milk bar was situated in the area of the German Federal Post Office.

Third floor:

Deutsche Presseagentur (dpa), European Press Photo Agencies Union (EPU).

International Fotopool, Polska Agencja Prasowa (PAP), Politikens Pressfoto, Denmark,

Sport-Illustrierte, Federal Republic of

Germany, Ekstra Bladet, Denmark,

two rooms for the United Press International (UPI), one interview room and the offices for the Associated Press (AP).

Fourth floor: Agenzia Nationale Stampa Associata,

(ĂNSA).

Algemeen Nederlands Presbureau, (ANP) conference room for 150 people and two interview rooms as well as a bar. Adjoining was the following row of additional agencies:

Agence France Press (AFP) Jiji Japan Austria Presse Agentur (APA) Springer Verlag, Federal Republic of Germany Dagens Nyheter, Sweden Expressen, Sweden Süddeutscher Verlag Münchner Zeitungsverlag Tidningarnas Telegrambyra, Scandinavia Reuters, Great Britain Kyodo, Japan ADN Allgemeiner Deutscher Nachrichtendienst, German Democratic Republic CTK Československa Tiskova Kanelar Administration, press subcenter Administration, Press Center L'Equipe, France Sports Illustrated, USA Sport Zürich, Switzerland Tanjug, Yugoslavia Tass, USSR Press committee MTI, Hungary EFE, Spain Press and Information Service of the German Federal Government City of Munich, Free State of Bavaria.

Restaurant

The restaurant of the Press Center has at its disposal 1,000 seats inside and an additional 400 places on the terrace. The capacity was estimated to serve 6,500 persons (in several shifts). The total area of 3,500 sq. m. was divided into the dining room, the room with the self-service bai (only accessible by going past a control point), as well as the kitchens and preparation rooms.

Type of Sport: Water Polo

Location: 8000 Munich 19 Homer Strasse

Team Director for the Olympic Construc-tion Company, Ltd.: **Dipl.-Ing. Herbert Weidenschlager,** Munich

Project Director for the Olympic Construction Company, Ltd. Architect Franz Grammling, Munich

Design, planning, engineering, and supervision of Construction: Dipl.-Ing. Kurt Becker, Engineering Office, Munich

Characteristics of Design and Construction

The two-story buildings at the eastern (office building with restaurant) and the western (locker rooms, concession stand and wing for the toilets) ends along with the grandstands on the northern side together close off the rectangular swimming area. This area consists of a swimming pool (used for the water polo competitions), a diving pool and a 10-meter diving tower. diving pool and a 10-meter diving tower. The temporary grandstands on the southern side form the boundary between the swimming stadium and the adjoining sunbathing area. The two larger buildings are constructed of a reinforced concrete framework (concrete poured on the site) with wall panels of limestone. The exterior walls are finished with concrete construc-tion panels which have a white gravel surface surface

Surface. Decorative design elements include facade panels and dark anodized aluminum windows on the exterior, with ceramics, natural stone, wood or plastic ceiling panels on the inside. The swimming and diving people consist of watertight resilient resilient pools consist of watertight, resilient rein-forced concrete with rough ceramic cover-ing. The pools are equipped with "Pyrmont type" overflow gutters.

Dimensions of the Facility

Area of the swimming stadium site:	
approximately 15, 000 sq.	m.
Volume of buildings:	
Total 16,860 cu.	m.
Eastern building 9,017 cu.	m.
Heated corridor 515 cu.	m.
Concession stand and	
toilet wing 1,290 cu.	m.
Warm-up room 864 cu.	m.
Western building 5,173 cu.	m.
Volume of the swimming pools:	
Total 4,544 cu.	m.
Competition pool 2,215 cu.	m.
Diving pool 2,330 cu.	m.
Built-over area:	
Swimming stadium, approx 12,500 sq.	m.
Surface area of the	
swimming pool 1,075 sq.	m.
Usable surface of the water	
polo playing area:	
20 m. x 30 m. 600 sq.	m.

Access

By car: From the Olympic Village via the Middle Ring, Dachauer Strasse and Homer Strasse to the Dante Pool. Public transit: Streetcar stops on Dachauer Strasse and Dante Strasse.

Parkinglots:

Five hundred parking places on Homer Strasse were reserved primarily for vehicles with special parking permits.

Total Cost excluding Incidentals 13.5 million DM

Utilities

Heating: Heating from the separate district heating system is provided in the form of steam, or optionally of warm water (for direct heating of the pools). Heat transfer takes place in a counter-current device. The water in the pools can also be heated by the direct addition of warm water, if de-sired. The heating system is controlled automatically. The entire Dante Pool complex has the following facilities: the large Olympic swimming pool (water polo and competition area), the diving pool (preparation for competition), as well as five other swimming pools, of which two (each measuring 14.5 m. x 50.0 m.) were fixed up to serve as Olympic training pools. The total capacity for the heating of all the pools listed above amounts to 4.2 Gkcal/h. The heating capacity for the buildings (including the basement level corridors around the pools) is 300,000 kcal/h. the direct addition of warm water, if de kcal/h.

Ventilation:

Athletes' locker rooms (western building) 105,000 kcal/h 11,000 cu. m./h. Offices restaurant and sauna (eastern building) 400,000 kcal/h 30,500 cu. m./h. Filter system:

Twelve gravel pressure filters with a capacity of 2,400 cu. m./h. Total volume, including training pools =

9,500 cu. m. Filter cellar 250 sg. m.

Disinfection of the swimming pool water:

Chlorinator, chlorination room with chlorine storage room on the ground floor of the western building, total 12 sq. m. The aluminum-sulfate equipment is installed in the basement of the western building, in the passageway 10 sq. m. The water in the swimming pools is being experimentally monitored by a redox voltage measuring device. Water circulation:

In the competition pool and the diving pool, the water is brought in and circulated horizontally by jets which are set in the walls of the pools on their longer sides ("radiation turbulence"). Two-thirds of the water flows out via the overflow gutters, one-third through the drains in the bottom of the pools. High voltage installations: The output of the transformers

750 watt) installed in the competition swimming pool and the diving pool. Low voltage equipment: The following installations are provided: a telephone system with 57 extensions, a

clock system intercoms, a PA system, a portable underwater speaker system, an antenna system, and three teletype machines

Technical Equipment for Sports Electronic Scoreboard: This part of the scoreboard, executed

in the light chamber technique, is per-manently built in. It is 2 m. high and 3.5 m. long. There are five lines with a maximum height of 27 cm. each. It is technically set up for both water polo and swimming competitions. The data is fed to it by the control console at the referees' table. Manual Scoreboard:

The electronic Scoreboard is flanked by two magnetic boards. Each is 2 m. high and 1 m. wide. On the magnetic boards, the following data are displayed: the names of the athletes, the starting numbers, team colors, and countries. The manual part is manipulated from the service room on the upper floor of the western build-

Timing system for the 45-second rule: This installation consisted of a control console on the referees' table and two light number displays on the northern and southern edges of the playing area. At the end of the 45 seconds, an acoustical signal was sounded.

Intercom system: This installation provided speech contact between the direction booth, the FINA-room and the referees' table. Water polo playing area: Slack lines and marking lines indicated the boundaries of the playing area. The float-ing water polo goals were secured with rooms to the long sides of the pool. A floatropes to the long sides of the pool. A float-ing water polo basket in the middle of the playing area served as the fixed point for the ball at the beginning of the play.

Competition Area

Water polo, competition and training. Water polo playing area 20 m. x 30 m. in the competition swimming pool of size 21.5 m. x 50.0 m., 2.0 m-2.2 m. deep. Temperature = 27.5° C. Preparation pool: Diving pool 21.56 m. x 22.15 m., 5.00 m.

deep. Upper floor, eastern wing: Direction booth, direction

of competition 22 sq. n After the Olympics the installation will be . 22 sq. m. used as a public open-air swimming pool.

Olympic Usage August 28 - September 4, 1972

Athletes' Area

PoolGallery:
The benches for the reserve players of
both teams were set up on the long sides
of the pool, parallel to the playing area,
and on the pool's northern side.
Ground floor and second story,
western wing:
Each floor has six locker rooms. In each
locker room, there are benches along the
walls, sixteen lockers, one wash basin and
one massage table.
6 locker rooms, each 25 sq. m.
Doping checkpoint with
lollet on the second hoor 20 sq. m.
Hygiene.
walling room, doclors
Dre ewim ebewere each fleer
Pre-Swilli Silowers, edcli iloor
$\angle x \circ showers with 4 tollets 47 sq. m.$

Ground floor fover, athletes' passageway with bar for the participants 40 sg. m. Access: The bus stops for the water polo teams were on the grounds of the Dante Pool complex, west of the athletes' bathhouse. The participants reached the locker rooms, toilets, showers, doping checkpoint and doctor's area via their own special entrance. The pool was reached via the fover on the ground floor.

Spectator Area

Permanent northern grandstand:
Total spectator places 3,200
Seats 1,220
Standing room 980
VIP seats 112
Press seats with desks 24
Press seats without desks 28
Temporary southern grandstand:
Seats
Participants' seats 1 30
Spectators 870
Ten places (with desks) for commentators
were set up on a special camera tower be-
hind the southern grandstand.
Serving of VIPs:
The quests of honor were served in the

restaurant upstairs in the eastern wing Serving of spectators: For the spectators the concession area

was available in the western building, as well as a kiosk under the northern grandstand.

Sanitation facilities:

For those in the northern grandstands, there were toilet facilities installed under the grandstands. The toilets in the western building were convenient for spectators in the southern grandstand.

First aid:

The first aid room was on the ground floor of the eastern building. Access:

Spectators came via the approaches on Homer Strasse to the ticket windows and ticket takers on each side of the eastern building. From there they were directed to the spectator areas of the northern and southern grandstands, which were separated from the rest of the complex.

Communications Area

Ground floor, eastern wing:
Press subcenter total 190 sq. m.
Teletype room 15 sq. m.
Press office area 63 sq. m.
Press telephone room 20 sq. m.
Press mail 28 sq. m.
Ground floor, western wing:
Interview room (warm-up area) 45 sq. m.
_ Transmission installations:
Four television cameras on the camera
tower and the pool gallery, an underwater
camera (underground corridor around the

pools), one black-and-white camera, a mobile DOZ subcenter, a mobile postal unit, a mobile transmission unit, a equip-ment truck. Parking places for tech-90 sq. m. nical vehicles

General and Competition

Organization

At poolside: Referees' table (with roof) 6.00 m. x 0.80 m., timekeepers, announcers, control console for the scoreboard, referees' cat-walk 30 m. x 1.50 m., by 0.35 m., high chairs for the line referees.

Basement:	in wing	•
Data processing Telephone switchboard	. 45 sq. 13 sq.	m. m.
Ticket takers Printing and display technique	13 sq. 32 sq.	m. m.
General services - nolice	13 SY.	
fire department.	.26 sq.	m.
Office for the Fédération Inter-		
nationale de Natation Amateur		
(FINA) — International Amateur		
Swimming Federation,		
two rooms each	. 24 sq	. m.
Uffice of the German Swim-	04.00	
Technical supervision	24 SQ. 25 SO	m.
Competition auxiliary personnel.	20 09.	
equipment and superintendent		
of the training pools	35 sq.	m.
First aid	. 35 sq	. m.
Ticket window and inspection,		
security guards	13 sq.	m.
Chauffours	18 cd	m.
Hostesses' room	55 sq	 m
In each case, the closed-off area	is have	
their own toilets and locker room	IS.	
Upstairs:		
Superintendent of the sports		
facilities: office with ante-	45	
Double sound for the compo	45 sq.	m.
titors locker room toilet		
massage, lounge, sauna room.		
cold water room, total	160 sq.	m.

Organization building eastern wing:

Restaurant

There was a sit-down restaurant for 250 persons upstairs in the eastern building. A partitioned area was reserved for the guests of honor, the officials, and the press. The rest served the personnel of the 320 sq. m. See

"Spectator Area". Kiosk under the northern grandstands: See "Spectator Area".

Selected Literature on the Buildings Erected for the 1972 Olympic Games in Munich

Period of Survey: 1965-1972 No. 725.826/.89 (430.1 M) Buildings erected for the Olympic Games (Munich)

Documentation center for building technology of the Frauenhofer Society, 7000 Stuttgart W. Silberburgstr. 119A

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The greater part of the structures and installations listed separately under 7 to 18 are also covered by general reviews under items 1 and 2.

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The volume's spine is of green cloth. The number "2" appears in white on the spine.

The book has 217 pages.

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