The Aga Khan Award for Architecture

Hajj Terminal, King Abdul Aziz International Airport

Jeddah, Saudi Arabia

Architects:

Skidmore, Owings and Merrill

(Fazlur Rahman Khan, Engineer)

New York and Chicago, U.S.A.

Client:

Ministry of Defence and Aviation

Riyadh, Saudi Arabia

Completed:

1982

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HAJ TERMINAL, KING ABDUL AZIZ INTERNATIONAL AIRPORT

Jeddah, Kingdom of Saudi Arabia

I. OBJECTIVES

To provide a gateway to Mecca for the increasing number of pilgrims. The Haj terminal is to accommodate for the drastic increase in the number of Haj (pilgrims), estimated at about 500,000 in 1975 and projected to about 900,000 by 1990.

To develop the terminal in such a way as to provide symbolic power pertinent to the Haj as emobdying the most important and sacred event in the life of a muslim.

To provide for the unique requirements of the Haj which makes the Haj terminal more of a village than a regular terminal.

II. DESCRIPTION OF THE SITE

A. Location and Context

The Haj terminal is one of three domestic terminals in King Abdul Aziz International Airport in Jeddah, Saudi Arabia. Located approximately 70 kilometres west of the Holy City of Mecca, King Abdul Aziz International Airport occupies a huge site of about 105 sq. kilometres of desert planes to the north west of the City of Jeddah.

The Haj terminal is designed to shelter the pilgrims from the intense heat and it covers 105 acres (40.5 hectares). The climate is hot and humid with a mean maximum temperature of 97°f. (36°c.) and a mean humidity of 64%. Sea breezes produce high humidity and hence affect the comfort level. Total annual precipitation is low and concentrated from November to January. (See sheet No)

B. Background

King Abdul Aziz International Airport (KAIA) is a fairly new complex constructed to provide for the immense growth which engulfed the City of Jeddah. The old airport was located to the north east of the old city and became obselete because of the rapid urban growth and the phenomenal increase in air travel since 1975.

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C. Local Architectural Character

KAIA is a showcase for international architects attempting to provide an architecture with a cultural and symbolic "flava". Both the international terminal and the Saudia are designed by Edward Stone with a shell structured roof inspired by a "one way tent" like fold. The Royal pavilion is designed by Yamasaki and is a huge room for the King, covered with a concrete shell, in turn covered by green copper - immense luxury, with very little symbolic or formal power.

The complex of the domestic terminals has a measure of coherence attained through its layout, as well as the compatibility of forms. A visual axis organizes the locations of the two domestic terminals with the centreline of the Haj terminal.

D. Access

As a whole KAIA is connected to all regional centres, Mecca, Medina and, of course, Jeddah, through a network of roads operating on all levels from internal service roads to major road and freeway networks. The Haj terminal has direct access to the Medina and Mecca freeways. The gateway to the Medina freeway also includes facilities for the International Terminal Interchange where buses and other vehicles operating for transporting the Haj from the terminal to their Holy destinations can park and be served.

(See sheet no — Attached)

III. DESIGN AND CONSTRUCTION

A. Architect's Brief

The Haj Terminal was designed to process approximately 950,000 pilgrims during the Haj by the year 1985. The capacity of the terminal at any one time is estimated at 50,000 pilgrims for a period of up to 18 hours during arrival and 80,000 pilgrims for periods of up to 36 hours during departure. The time lag is due waiting for the arrival of buses.

In plan the Haj Terminal consists of two identical halves, 320 x 686 mt and separated by a landscaped mall. Each half of the terminal is divided into five equal modules. Each module in turn is made of 21 lightweight tent structures arranged on 3 x 7 tents for each module and covers 10.5 acres (4 hectares). Each unit is 45 x 45 mt.

As developed, the Haj Terminal has 20 gate processing areas, 10 on each side of the terminal. Each gate has equal areas within the terminal for passenger processing. The aircraft aprons are designed to accommodate a wide range of aircrafts: B 747, DC10, DC1011, B707, DC8, B727, B737, DC9.

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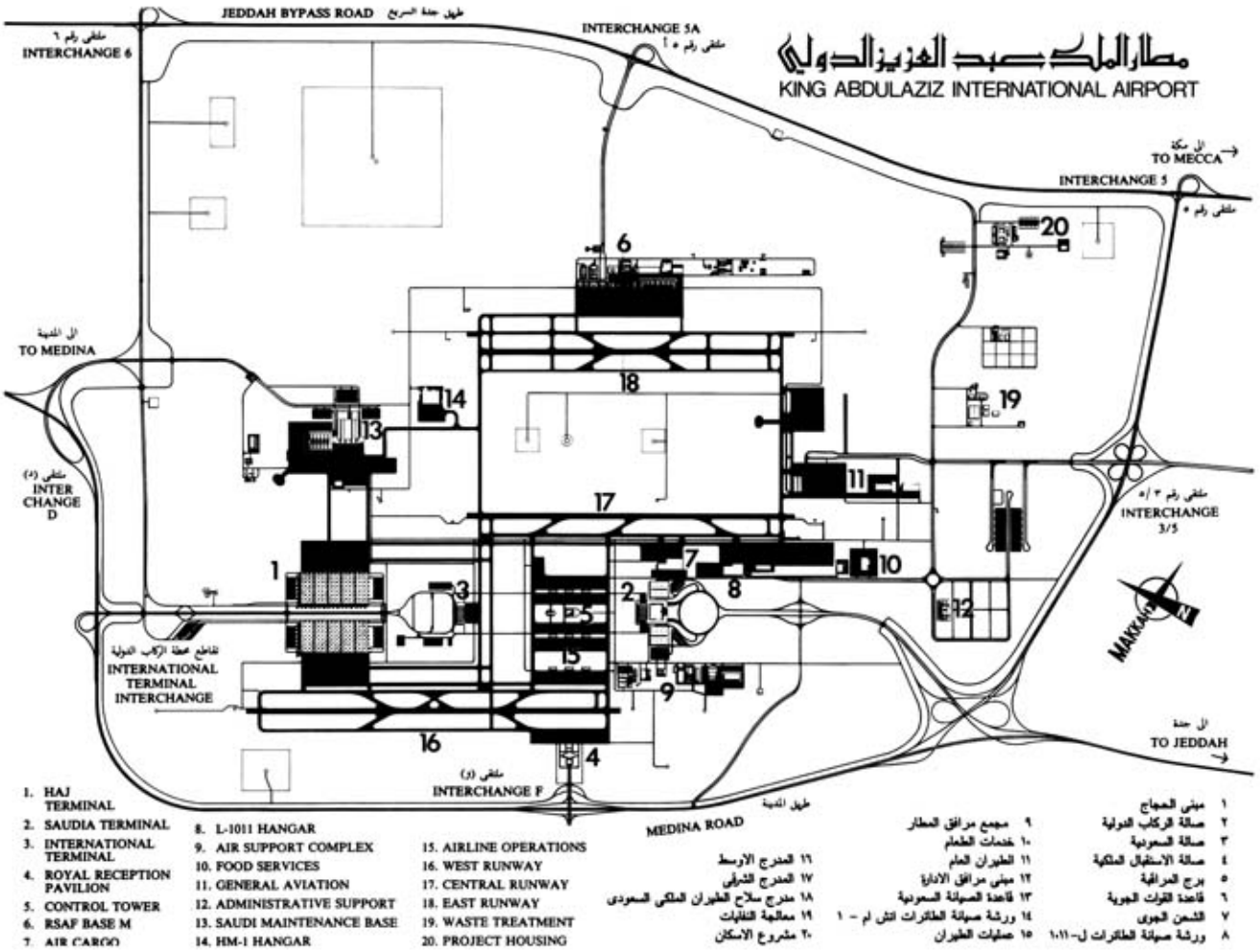
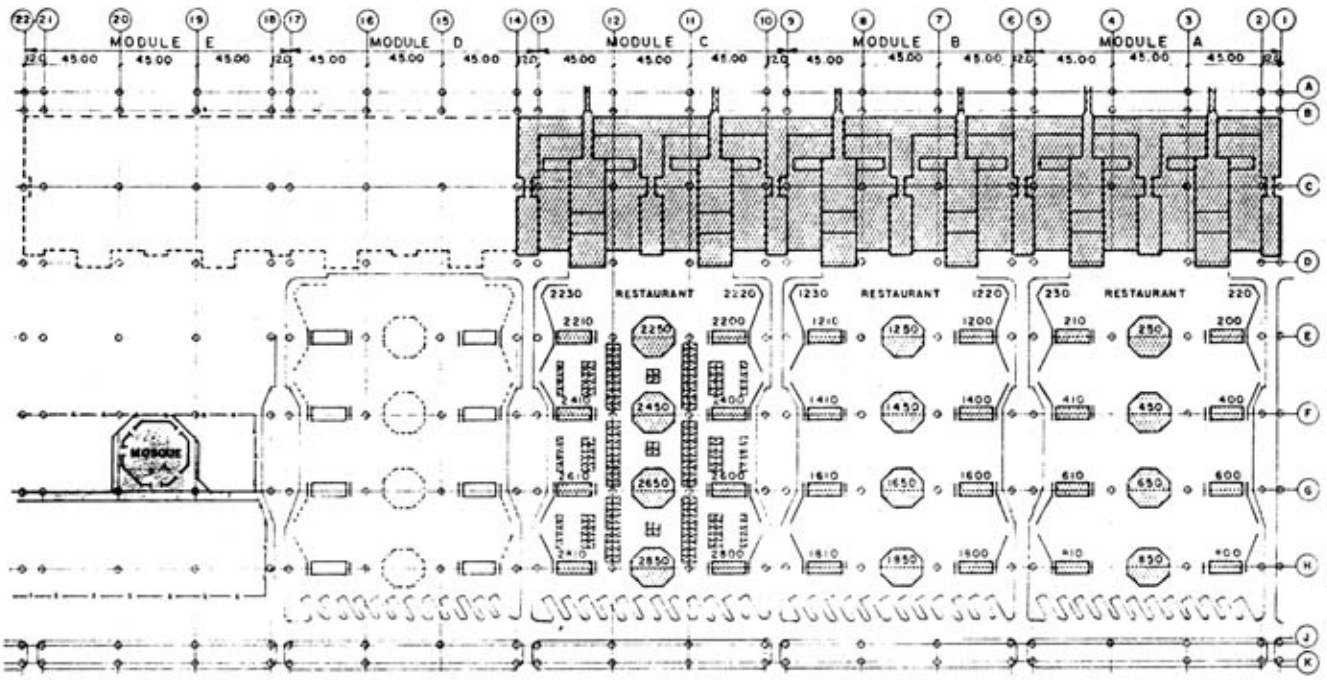




HAJ - EAST TERMINAL BUILDING
AND SUPPORT AREA

NO.	DATE	DESCRIPTION	APPR.
		ISSUED FOR LEASE	
		REVISIONS	

NEW JEDDAH INTERNATIONAL AIRPORT

TITLE HAJ-EAST TERMINAL BUILDING AND SUPPORT AREA LEASE PLAT

PLAT NO. ____
NO __ OF ____
EXHIBIT NO. __ .

DRAWING NUMBER	IAP/LP/162-0-000		
DRAWN G.B.C.	CHECKED H.OLIPHANT	SCALE 1:3,000	DATE 30-08-81

Haj Terminal, King Abdul Aziz International Airport, Jeddah, Kingdom of Saudi Arabia

On leaving the plane the pilgrims enter the second level of the air-conditioned terminal building for health and immigration processing. Baggage claims and Customs are on the lower level. Upon leaving the terminal the pilgrim enters the shaded area called "Terminal Support Area"; or the Tent structure.

B. Evolution of the Design Concept

(i) Response to constraints: No site of financial constraints were established. The original organization of the plan came directly from the analysis of the requirements of the programme.

Early on in the development of the scheme, the client and the architect acknowledged that the Haj Terminal must be understood as a city, or a village, and not merely as an air terminal.

The idea of the tent structure passed through at least 2 attempts before it was fully conceived. First a concrete structure was proposed to cover the Haj waiting area. This was developed to a lightweight steel structure. Then the idea of the tent forced itself as the most appealing and practical solution.

In the words of the architect: "Due to the large volume of space required to properly house the support area functions, it was decided to air condition only certain spaces and to develop a shaded "village" for the remainder of the area. A number of alternative roof systems were investigated. This resulted in a long span, lightweight structure with translucent materials that could adequately respond to the overall environmental needs of such a space.

A heavyweight, Teflon-coated fibreglass fabric was selected as the optimum membrane material which derived its basic structural strength from the fibreglass and utilized the Teflon-coated fibreglass for posterior and durability" (from the Architect's Record, Award File).

(ii) Response to User's Requirements: The layout of the terminal as a whole provides for the expected volume of pilgrims up to the year 2,000. The organization of the terminal in two halves each divided in turn into 5 modules, and each module into a terminal for processing purposes and support shelter gives a measure of flexibility which responds to the nature of the Haj and its activities.

A two-storey, air-conditioned terminal building under the tented shelter houses the health and immigration processing, provides the least successful element of this terminal. Forced, mechanical and out of character.

Under each module, areas and facilities are located to accommodate for sleeping, rest and food services and preparation. Washing and toilet facilities are provided. A souk, or an open market, is also provided. Air vents are provided to increase the air movement to overcome the hot and humid atmosphere.

While a formal arrangement is made to provide for all of these facilities, the volume of the Haj produces its own pattern. The shaded area becomes truly a support facility. Activities form their own pattern in the space.

(iii) Formal Aspects: The basic unit of spatial organization is the tent structure, a 45 x 45 mt. unit supported on four steel pylons and stretched with steel cables. Steel pylons are 45 mt. high. The sheer size and elegance of the double carved fibreglass tent creates an extremely graceful shelter for the variety of activities under the tents.

The extremely regular geometry of the plan made by the repitition of the tent unit in 3 x 7 units for each module which in turn is repeated five times for each half of the terminal is not experienced as monotonous. On the contrary, the shapes and the visual experiences created by the forms of the tent, the cables, produces a rich and stimulating feeling throughout the facility. Interplay of solid and voids, dark and light, creates a vivid and a continuous sense of drama and excitement.

The ressemblance of the fibreglas$ tent to the desert tent in form is apparent. Yet the excitement and power of this structure is an independent phenomonen.

Seen from a distance and from many different directions, the power of the form of the terminal is experperienced in many different ways.

Most powerful of all is the experience of the incompleted modules, where the beauty of the tent structure is not compromised by the elements and configurations underneath. This feeling invited the airport authorities to consider some other functions for the incompleted modules, such as exhibits and fair grounds.

.../..

(iv) Landscaping: An ambitious scheme is developed for landscaping the mall between the two halves of the terminal as well as the surroundings. This has not yet been done. However, an elaborate strom treatment landscape has been done to divert the paths of heavy storms.

During our review, El-Kamassen sand storms were taking place. This is a yearly sand storm which engulfs the whole Middle East and made it apparent that additional and more sensitive landscaping must be developed to offset this yearly sand storm.

C. Structure, Materials and Technology

"The fabric roof which covers the entire area of the Haj Terminal and the support complex consists of 10 identical modules. Each roof module has 3 x 7 bays forming 21 typical 45 x 45 metres square roof units. The roof unit is a tensile membrance structure spanning between 4 corner pylons which are 45 metres in height. The double curved skin of each unit is made up of heavy weight Teflon-coated fibreglass fabric, supported on 32 steel radial cables, which in turn span between an upper tension ring and a lower tie-down or catenary cable." (P. 74 Final Design Development Report S.O.M.)

Of all aspects of this facility, it is the structural system that stands out as the most significant achievement. Not only for its formal characteristics. The decision and design process by which this monumental work was done is by itself a work worthy of recognition. An intense interaction between the client, the architect and the builders, and the top craftsmen and technologists all over the world produced this landmark.

D. Materials

Structural materials:

(i) Concrete - cast in place and precast pre-stressed concrete used for the terminal facilities

(ii) Steel - rolled shaped steel for the tent pylons

(iii) Cables - plastic jacketed bridge strand (for stretching of the tent)

(iv) Teflon-coated fibreglass - high strength Teflon-coated fibreglass with an average weight of 45 oz. per sq. yard.

(v) Infill: precast concrete elements are used

finishing: a concrete floor for the support area is treated with apexy for fire resistance and as a heavy duty treatment.

.../..

E. Construction and Technology

A two-way grid of pylons forms the low point of each membrane unit while an open tension ring suspended by cables from the top of the pylons establishes its high point at the centre of each bay. A row of double pylon portal frames provides a stiff edge for the modules. Using electronically synchronized equipment, modules, 21 pre-assembled tent units were simultaneously raised into place. At the same time, each membrane was stretched and pretensioned as the inner tension ring element was lifted and joined to the suspended outer ring. (Architect's Record, Award file)

F. Labour Employed

General Contractor : Hochtief AG Essen, W. Germany
Skilled labour - Germans
Philipinos
Unskilled labour - Pakistani

Fabric roof system : Owens-Corning - Saudi Company
Skilled labour - U.S.A.

Construction Management : Parson Ltd.Danial Int.
Skilled labour - U.S.A.

A list of consultant and master craftsmen is included in the Award file, attached.

G. Origin of Technology, Materials, Labour Force and Professionals

The origin of the technology, materials, labour force and professionals is included in the Architect's record, the Award file (attached).

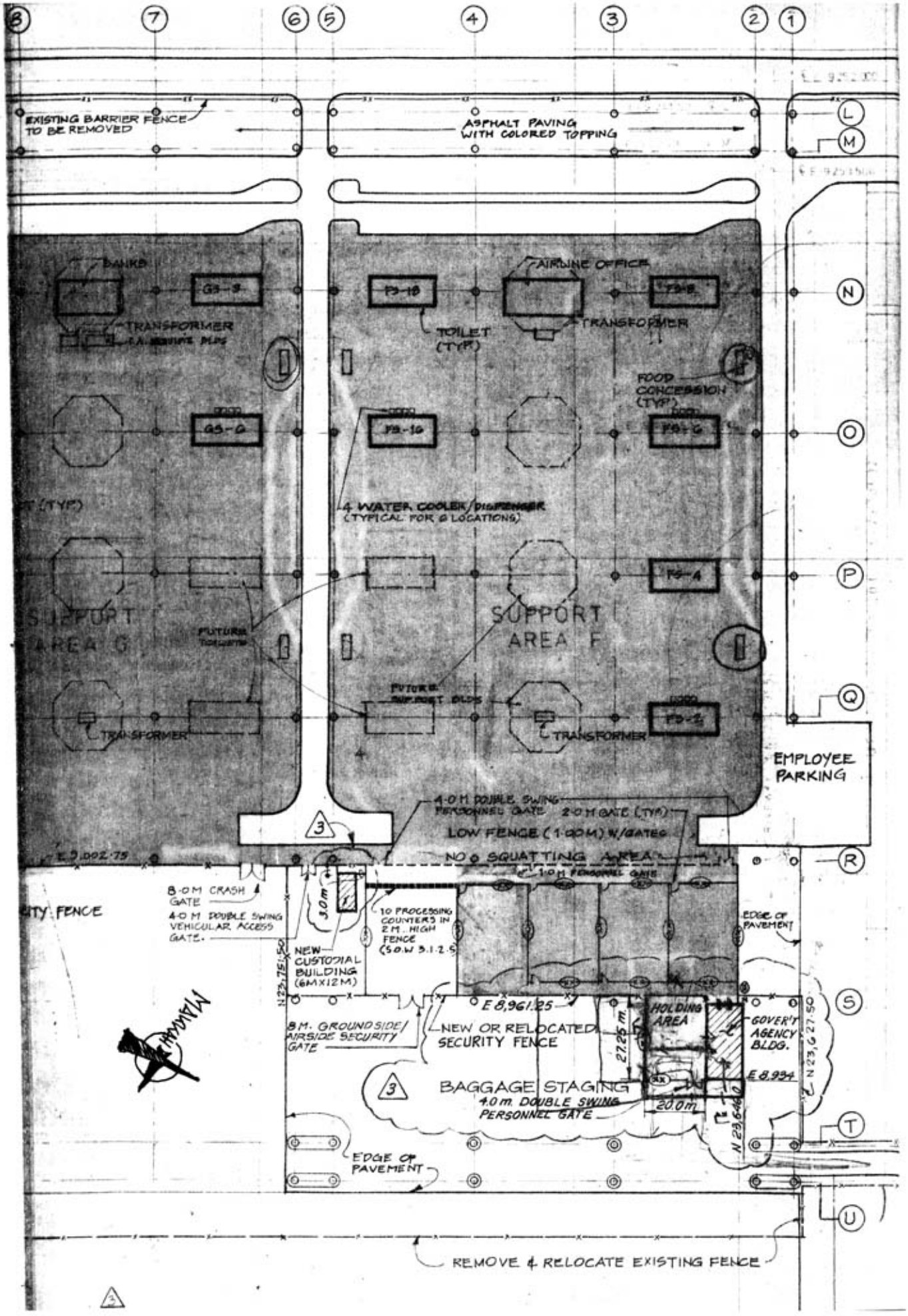
IV. CONSTRUCTION SCHEDULE

A. History of the Project

Master planning	July 1975 - April 1976
Preliminary Design	September 1977
Final design document	January 1981

Design data applying to the entire terminal, which construction data apply to the five completed modules which are actually in use by Haj. The remaining modules are in different stages of construction. Three of the remaining five are now being prepared for the next Haj season. The remaining two are left only as tent structures - for all module tent structures were completed by January 1981.

See sheet - attached, east terminal building
See sheet - attached, west terminal work.



Haj Terminal, King Abdul Aziz International Airport, Jeddah, Kingdom of Saudi Arabia

B. Cost of Construction

A great deal of security surrounds the issue of cost and financing. Saudi' are probably embarrassed by the immense cost of construction in the whole kingdom. The following estimates are taken from the official record of the General Contractor (Hochtief) and were prepared by his General Manager.

The Haj Terminal is financed in full by the Ministry of Defence and Aviation: The Presidencey of the International Airport projects.

Total cost: Ref. (Hochtief, Jeddah)

1. First offer by Hochtief for the entire package designed by S.O.M.:

   4,000,000,000 S.R. 1978

   or 1,200,000,000$ (3.5 S.R./US$)

2. Actual total cost for the completed works is

   2,2000,000,000 S.R.

   or 650,000,000$

Present state of completion is:

Complete tent structure : 10 modules
Complete support area: 5 modules
Complete Terminal buildings: 3 modules
Complete roads, parking area, bus holding station
Complete underground services (water lines survey, strom water)

The total actual cost includes the cost of 2 years maintenance of the whole tent structure and 8 years inspection once every six months.

3. Unit cost:

   Calculation for a module - unit cost per one sq. mt.for the following:

   a) Tent structure : one module: 21 tents. 2150 S.R./sq.mt

      area : 42.525 sq.mt.
      cost : 90.700.000.S.R.

.../..

b) Support area: toilets, airline operations, kitchens 35000/sq.mt.

area : 30,375 sq. mt.
cost: 106,600,000,000 S.R.

c) Terminals : for one module 8500 sq.mt.

g.f. area : 12.900 x 2 (floors)
total cost : 219,300,000

Total cost per completed module : 416,600,000 S.R.

Total cost per one sq. mt., including tent structure, terminal and support area 13,650 S.R. or 3900 US $

4. Breakdown of total cost according to different stages of construction:

a) -	3 completed modules	3 x 416,600	1,249,800.000
b) -	2 tent and supports	2 x 197,000,000	394,600,000
c) -	tent	5 x 90,700,000	453,500,000
			2,097,900,000
Roads, access roads, bus station			103,000,000
		S.R.	2,200,000,000

C. Comparative Cost

	S.R.	$
Cost per sq. mt. for the south terminal	15,000	4,200
Cost per sq. mt. for the north terminal	9,000	2,500
Cost per sq. mt. for the Royal terminal	21,000	6,000
Cost per sq. mt. for comparable German airports		1,400
Cost per sq. mt. for comparable U.S. airports		1,100

Haj Terminal, King Abdul Aziz International Airport, Jeddah, Kingdom of Saudi Arabia

HAJJ TERMINAL

HAJJ TERMINAL

King Abdul Aziz International Airport, Jidda, Saudi Arabia, completed 1981–1982. Client: Ministry of Defence and Aviation, Jidda, Saudi Arabia. Architect: Skidmore, Owings and Merrill, New York and Chicago.

Master Jury's Citation: For the brilliant and imaginative design of the roofing system, which met the awesome challenge of covering this vast space with incomparable elegance and beauty. The Hajj Terminal structure has pushed known building technology beyond its established limits while demonstrating that such a massive structure can still be light and airy, a twentieth-century echo of the traditional tent structures that have worked so well in desert climates.

The size of the structure and the uniqueness of the hajj *phenomenon itself that prompted its erection place it beyond the pale of direct replicability, but the design will undoubtedly serve as a source of inspiration to designers throughout the Muslim world for generations to come.*

Hajj, the yearly pilgrimage to the holy city of Mecca, Saudi Arabia, is required of all Muslims who have the means and ability to undertake the journey. With the number of Muslims growing, economic development in the Islamic world, and the increasing reliance on air transportation, the *hajj* has indeed become a unique phenomenon of religious practice, facilitated by modern means of transportation. Estimated at about 500,000 in 1979, the number of pilgrims is expected to double by the early 1990s.

The *hajj* season takes place within a period of about six weeks, resulting in unusually heavy air traffic during this rather short time span. To cope with this the Saudi government began planning for a *hajj* terminal in the early 1960s. Construction was started in 1974 with the American firm of Skidmore, Owings, and Merrill as architects and engineers. Given the large number of pilgrims that had to be accommodated, as well as the diverse requirements of the *hajj,* the terminal was designed and built not merely as another air terminal but in many respects as a large village.

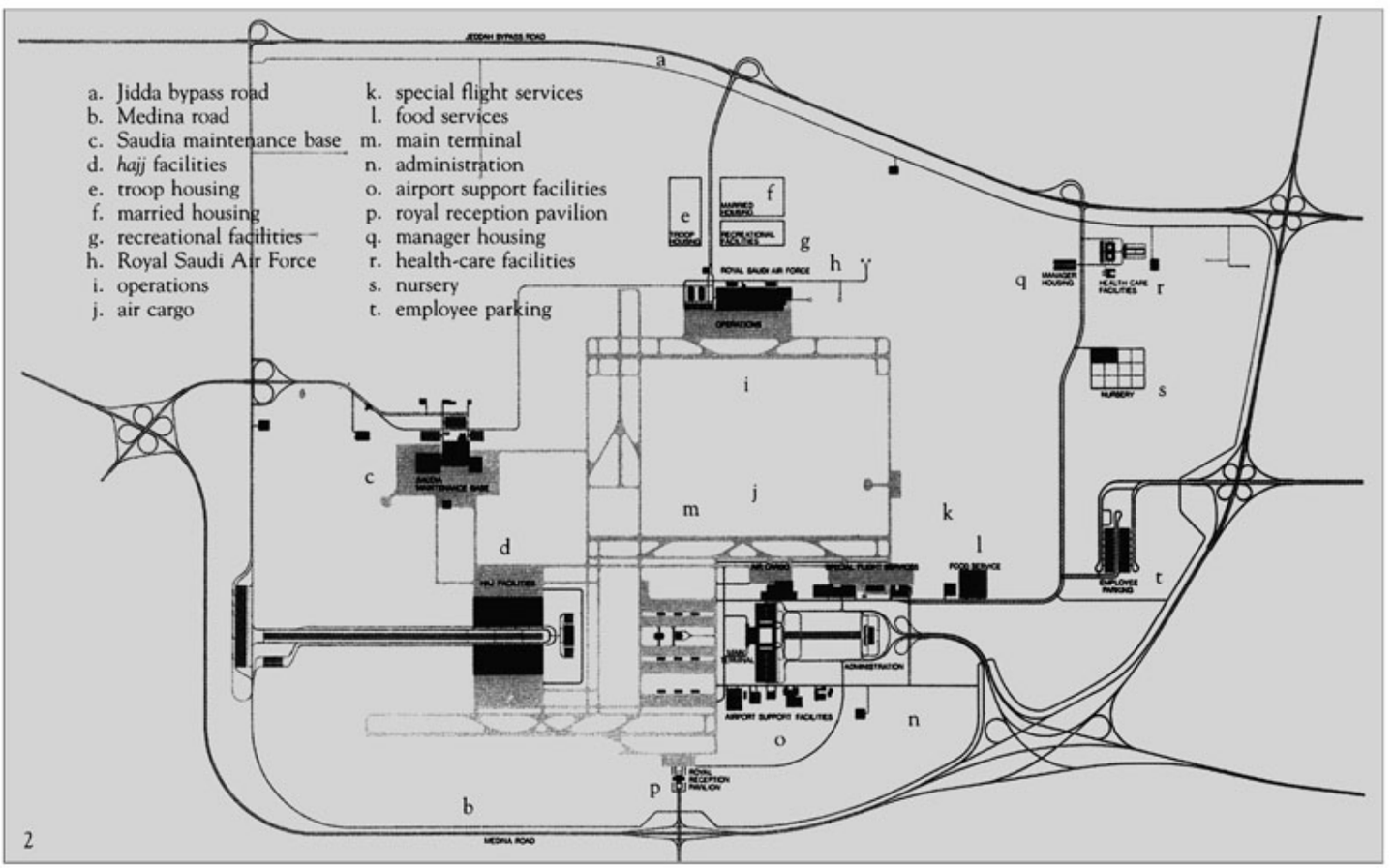
Pages 118–123: The light, airy structure of the Hajj Terminal echoes in gigantic form the traditional tent encampments of nomadic tribes. The elegant open structure allows the air to circulate, while the translucent fiberglass roof fabric maintains a tolerable temperature inside the terminal for the tens of thousands of pilgrims that may find themselves there at any one time.

Location. The Hajj Terminal is one of three terminals in the recently constructed King Abdul Aziz International Airport (KAIA), Jidda. The others include the New Jidda International Airport and the Saudia Terminal. KAIA was built when the old airport, located to the northeast of the old city of Jidda, became obsolete as a result both of urban growth and a phenomenal increase in air travel since 1975. Located approximately 70 kilometers west of Mecca and 64 kilometers northwest of Jidda, KAIA occupies an enormous site of about 105 square kilometers of desert plain, with the Hajj Terminal covering 40.5 hectares. To give some indication of its vastness by means of comparison, the Hajj Terminal covers an area larger than the combined areas of the international airports of New York, Chicago, and Paris. A network of roads connect KAIA to Mecca, Medina, and Jidda.

Plan. The plan of this terminal is extremely regular geometrically, consisting of two separate but identical tent-roof pavilions 320 by 686 meters, separated by a landscaped mall. (An elaborate landscape has been planned for this mall to resist the yearly El-Kamassen sand storm that engulfs the region). Each pavilion is divided into five equal modules. Each module in turn consists of twenty-one identical lightweight tent units, arranged seven units long by three wide and covering 4 hectares.

The *hajj* aircraft land at one of twenty gate processing areas—ten on each side of the terminal. Each gate has equal areas within the terminal for passenger processing. The enormous problem of the numbers of people to be catered for, as well as the time lag while pilgrims wait for road transport to take them to Mecca, decided the designers to form two zones under each module. The first zone consists of a number of air-conditioned buildings and the second of the vast waiting and support areas, which are not air-conditioned.

Passengers disembark onto a second-level air-conditioned building to go through immigration and health formalities. Baggage collection and customs are on the ground-floor level, after which the pilgrim enters the terminal support area, which is not air-conditioned but covered with a fabric roof, providing shelter from the intense desert heat. Designed to shelter the pilgrims before they depart for Mecca, this area consists of restaurants, shops, toilets, and mosques, with facilities for food preparation, washing, resting, and sleeping.



One of the essential factors in the concept of the support area is that it does not impose the conventional "airport discipline," which would be both alien and uncomfortable to most pilgrims. Most have saved all their lives to make the journey, and this is probably the first and last time they will be traveling by air. The informal and flexible design of the support area, therefore, conforms with the spirit of *hajj*. The thousands of pilgrims arriving at the terminal during this period often have to wait, sometimes for up to thirty hours, for certain formalities to be completed. Large rest areas have therefore been provided with benches that allow pilgrims ample room to lie down comfortably. At the same time the enormous floor space allows them to roll out rugs and offer prayers without obstructing anyone.

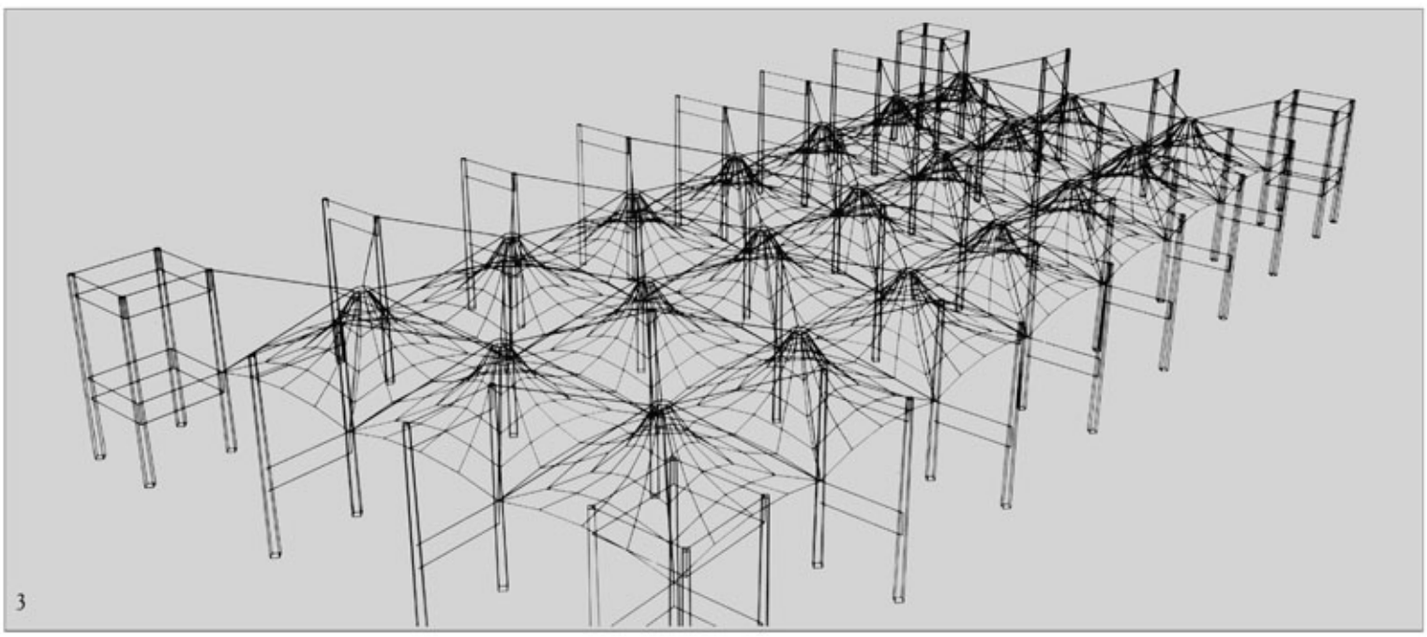
1: The Hajj Terminal has the capacity to handle the 950,000 pilgrims expected in 1985. 2: The master plan shows the terminal in the context of the new King Abdul Aziz International Airport, 64 kilometers northwest of Jidda. 3, 4: The terminal is in two halves, each consisting of five equal modules, one of which is shown in the computer drawing; each module comprises twenty-one tent units suspended from tapering steel pylons.

From the support area the pilgrims have direct road access to the Mecca and Medina freeways.

In 1979 approximately 500,000 pilgrims flew to Saudi Arabia for the *hajj* season. By 1982 this figure was expected to increase to 600,000, which would average out to roughly 30,000 passengers a day. The capacity of the terminal at any one time is estimated at 50,000 pilgrims for a period of up to 18 hours during arrival, and 80,000 pilgrims for periods of up to 36 hours during departure. The time lag is due to waiting for the arrival of buses. In its present form the terminal has the potential of catering for the needs of the 950,000 pilgrims expected by the year 1985.

Structure. The roof of the Hajj Terminal, consisting of a number of tent units, is the world's largest fabric structure enclosing the world's largest covered space. The idea of the tent structure was the third solution proposed by the architects. First a concrete structure was proposed. This plan gave way to a lightweight steel structure. Finally, a tent structure was accepted as the most appealing and practical solution.

Each tent unit is 45 by 45 meters at its base, rising conically to a 5-meter-diameter center support ring at the top. The con-



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struction of the tent unit is unusual. Unlike most tents its lowest edge does not touch the ground but is some six stories, or 20 meters, above it, with the fabric rising to 33 meters. The fabric surface is supported by thirty-two steel radial cables, which span from the upper tension ring to a lower tie-down or catenary. The twenty-one tent units of each module were raised simultaneously into place by means of electronically synchronized equipment.

The overall stability and structural integrity of the system is achieved by a special arrangement of perimeter pylons. Extending around each three-by-seven-unit module, including the common row of pylons between adjacent modules, are very stiff double-pylon portal frames. In all there are 440 pylons, for which 30,000 tons of steel was used. Each pylon is 45 meters high, weighs 68 tons, and tapers from a diameter of 2 meters at the base to 1 meter at the top.

Materials. The double-curved skin of each unit is made of heavy-weight Teflon-coated fiberglass fabric, manufactured by Owens-Corning. This specially designed fabric has a number of uses. The whiteness of the fabric reflects 75 per cent solar radiation and, together with the design of the terminal structure, which allows for air circulation, it helps keep temperatures down. Thus when temperatures outside reach a scorching 130° F., those within the shaded area of the terminal that is not air-conditioned can be kept in the mid-80° range. At the same time the thin, translucent quality of the fabric allows it to transmit some 7 per cent of sunlight into the structure, eliminating the need for artificial day-time lighting. In addition the acoustical problems under the tents, caused by the presence of large numbers of pilgrims, are diminished by both the height of the roof and the material. The fabric is able to withstand temperatures up to 1,500° F. and will not change color as a result of the sun's ultraviolet rays. Its strength gives it a life expectancy of thirty to fifty years.

Other materials used were rolled shaped steel for the tent pylons, plastic-jacketed bridge strand cables for stretching the tents; and concrete, both cast in place and precast, prestressed for the terminal facilities.

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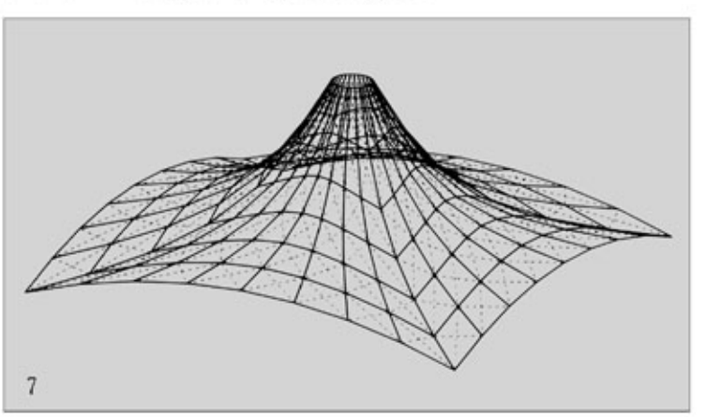
Conclusion. The tent structure of the Hajj Terminal is an important contribution to the development of an architecture relevant to the Islamic world. As a concept and in its execution it is a work of exceptional originality. Because of its size the terminal's support area is ideally suited for large public events. Outside the *hajj* season, therefore, it is used for such purposes as the city of Jidda's reception for King Fahd, held there after he became king.

The late Fazlur R. Khan, a Bangladeshi architect who played the major role in designing the Hajj Terminal's tent-roof structure, considered it "a very Saudi place." However, while the tent is typical of Saudi architecture, the form it takes at the Hajj Terminal makes it different. "This tent," said Khan, "does not copy tents of the past—it is a form for the future, and here it caters for today's needs—air travel."

The regular geometry of the plan, made by repeating the tent unit, does not produce a monotonous effect. On the contrary, the composition of fabric, cables, and steel columns results in a visually stimulating environment. The interplay of solid and void, dark and light, creates a continuous sense of drama, while the repetition of the tent unit provides rhythm and a strong sense of order.

5, 6: Each tent unit consists of a double-curvature tensile surface that rises conically to a tension ring. 7: The fabric surface is supported by steel radial cables (seen in the computer drawing) that span between the upper ring and lower catenary. 8: Tent units are suspended some six stories above ground with each module of twenty-one tent units separated by double pylons.



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1983 PROJECT SUMMARY

Haj Terminal , King Abdul Aziz International Airport 274.
Jeddah , Kingdom of Saudi Arabia SAU.

An airport and support facility for passengers bound for the Holy City of Mekkah .

Date of Completion : 1981 (partial) ; 1982 (full) .

I. Objectives

Pilgrimage to Mekkah is considered the most important act of Islamic faith Every Muslim is required , if able , to perform Haj at least once in his life .

The increase in purchasing power and the development of modern modes of transportation have resulted in the annual growth , now massive , of arriving pilgrims to Jeddah airport . A separate and special facility was required to handle these Mekkah-bound travellers .

A large volume of pilgrims with highly diversified needs are obliged , for administrative reasons , to remain in the facility for some time . The area symbolises the " gateway to Mekkeh " ; a peaceful environment is required to make as tranquil as possible this transition to the realm of spirituality . Practical requirements must be met to provide shelter from the intense heat and to accommodate the many and diverse needs of this large group .

II. Description and History

The only commercial centre in close (70 km) proximity to Mekkah , Jeddah airport receives all air traffic bound to the Holy City . The site for King Abdul Aziz Airport extends along the shore of the Red Sea north of Jeddah . The Haj Terminal covers a site area of 105 acres .

Arriving pilgrims in 1965 numbered 50,000 ; a decade later in 1975 that amount increased tenfold to 500,000 ; the projection for 1985 is one million .

Many pilgrims are travelling for the first time to accomplish this most significant journey ; the incidence of cultural shock is manifold . Most are elderly with specific needs . The sudden passage from highly varied individual behaviours to a collective spiritual experience is symbolised by the ritual donning of white garments on a cleansed body for the first step onto sacred ground .

The very uncomfortable climate is characterised either by very dry desert winds or by sea breezes bringing high humidity . The average maximum temperature is 97° F (36° C) and the mean relative humidity is 64% .

Haj Terminal, King Abdul Aziz International Airport, Jeddah, Kingdom of Saudi Arabia

Description of Project

The master plan is composed of two identical halves , each comprising five modules , separated by a central landscaped mall . Each module consists of 21 square units joined in a 3 x 7 rectangle fortified on the perimeter by stiff double pylons .

Each unit measures 150 x 150 ft. (47.5 x 47.5 m) and is defined by four pylons at each corner from which are suspended 16 ft. diameter steel rings supporting the tent-like fabric roofs .

Together , the complete fabric roof is made up of 210 white tent units and is on the scale of a small city . All utility , power , and communications systems run through large underground corridors beneath the mall . A total of 20 wide-body aircraft aprons surround the modules .

Upon deplaning , passengers enter an air-conditioned upper level administrative facility that is an independent structure within each module . Leaving the immigration facilities , they descend a ramp into the lower , main area , where are located facilities for accommodation , sleeping , food preparation , etc . Administrative , information , banking , and postal facilities are housed in shop-like shelters ; long arrays of shops lend an atmosphere not dissimilar to Arabian souks .

III. Design , Construction , and Use

The roof shape is the consequent inspiration of the visual impact of large-scale nomad settlements and the response to the severe climate . A precise study of air-movement patterns led to the double-curved tent shape whose peak is the open supporting ring . The shape creates a movement of cool air under its surface , carried mechanically from above to the lower , ground areas . The fiberglass roof fabric is a Teflon-coated double membrane , strong , lightweight , and translucent .

Pre-assembled on the ground , all 21 tent units of each module were raised simultaneously by electronically synchronised equipment . Stabilising cables , paired for safety , join together the tension rings and secure the fabric to the pylons .

The ground plane is paved with coral and coral sand . All structural members were imported ; infill materials were obtained on-site or nearby . Most of the labour force was of Philippine origin ; handworkers were trained on-site to work with the technology of the fabric roof structures .

The process to erect one tent unit spans a 45-day period ; the structure was completed over 29 months . A full scale prototype of two tent units was erected to verify the performance of the membrane and all connection details . The data relating to shape and materials resistance was analysed by computer for comparison with the theoretical model .

IV. Construction Schedule and Costs

An Americal group of general planners was contracted to develop the Haj Terminal project in association with the Saudian Airways Engineering Corporation . An early solution was submitted in 1965 by other planners ; these proposals were not elaborated . In 1977 , the current architects designed the project along the lines of the former plan . The construction process began in 1978 ; three of the ten previsioned modules were in use for the 1981 pilgrimage . A future expansion of five additional modules on each side is previsioned .

Haj Terminal, King Abdul Aziz International Airport, Jeddah, Kingdom of Saudi Arabia

Information on the cost of this project is not available .

V. Project Significance

Considering the recent emergence of the Saudian economic situation , the evocation of a typical , local architecture may be understood in terms of refernence , imagery , symbolism . There existed no cultural reference to sedentary buildings ; there were no constraining site features ; the client's financial assets were not limited . Thus , if respective of the climatic conditions , this , as any , new construction has the potential of defining what is or will become (modern) Saudian architecture .

The rapport developed between the Haj itself and the highly-dimensioned means of execution of the megastructure re-define and may surpass the (original) concept of pilgrimage .

PROJECT BASIC FACT SHEET

1. 1.1 Country : Kingdome of Saudi Arabia

1.2. Project : Haj Terminal, King Abdul Aziz International Airport. Jeddah.

1.3. Architect : Skidmore Owings and Merrill and Partners. New York. Chicago.

1.4. Dates of i) design : Completed Jan. 1978

ii) construction : Construction for 3 modules June 1981

2. 2.1. Project Description : An international terminal for the Haj (Pilgrims) within King Abdul Aziz Airport. The Terminal occupy 105 acres of built area. Organized in 10 modules each is 42 000 sq mt.

2.2. Project Objectives : To provide a gateway to Mecca for the increasing number of pilgrims - 50.000 - 1965 to 500.000 by 1975. and estimated to reach 900.000 by 1985

2.3. Description of site and surroundings : King Abdel Aziz Int. Airport is 70 km west of Mecca & to the north of Jeddah. The site occupies 105 ~~km~~ sq. km. Includes 3 other terminals and Airforce facilities.

3. 3.1. Site Area : 450.000 (for 10 modules) sq.m. (4 ha.)

3.2. Building Area : 126.000 sq.m.

3.3. Building Materials & Techniques (identifying whether self-help or not)

i) Foundations : Concrete foundations on a Coral soil

ii) Walls : Precast Concrete, Prestressed Elements

iii) Roofing : Teflon Coated Fiberglas, supported on steel Pylons.

iv) Other special features (if any) :

3.4. Beneficiaries : Number of persons 500.000 (1975) - 900.000 (1985)

Type of persons (socio/econ. level , etc.)

Pilgrims of all ages, nationalities from 104 Countries.

Haj Terminal, King Abdul Aziz International Airport, Jeddah, Kingdom of Saudi Arabia

4. Costs (in US$)

4.1. Budget : $ N.A (19) = $ _____ (1983)

4.2. Actual (tot.) : $ 650.000.000 (1981) = $ _____ (1983)

4.3. Breakdown of Actual Costs :

Land : $ _____ (19) = $ _____ (1983)

Infrastructure : $ 29.400.000 (1981) = $ _____ (1983)

Building : $ 620.600.000 (1981) = $ _____ (1983)

Total : $ 650.000.000 (1981) = $ _____ (1983)

4.4. Unit Costs :

(i) Unit Cost of Building : $ 3900 /sq.m. (1981) = $ _____ /sq.m. (198

[Compares with present range in country of :

High : $ 6000 /sq.m. (1983)

Med : $ 4200 /sq.m. (1983)

Low : $ 2500 /sq.m. (1983)]

(ii) Actual Total Cost of Housing Unit in US$ 1983

(Actual Cost ÷ Number of Units)

Land : $ _____ (1983)

Infrastructure : $ _____ (1983)

Building : $ _____ (1983)

Total : $ _____ (1983)

5. Country Economic data

5.1. Per capita income : $ 13.000 (1983) (p.a.)

5.2. Average Household income : $ _____ (1983) (p.a.)

$ _____ (1983) (p.mo.)

5.3. Poverty threshols : $ _____ (1983) per household per month

5.4. Project beneficiaries :
Average household income level
: $ varies (1983) per household per month

Haj Terminal, King Abdul Aziz International Airport, Jeddah, Kingdom of Saudi Arabia

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1983 ARCHITECTS' RECORD **CONFIDENTIAL**

I. IDENTIFICATION

A. Projet Title: King Abdul Aziz International Airport/Haj Terminal Complex

B. Postal Address: Jeddah, Kingdom of Saudi Arabia

II. PERSONS RESPONSIBLE

(Please give name and address for each. If more than one, please state precise roles and relationships.)

A. Client/Owner

International Airport Projects, Ministry of Defense and Aviation, The Kingdom of Saudi Arabia. Brigadier General Said Y. Amin, Director.

B. Architect/Planner

Skidmore, Owings & Merrill - New York and Chicago
Partners in Charge:

Gordon Wildermuth	Roy O. Allen	Raul de Armas
Gordon Bunshaft	Parambir Gujral	Fazlur Khan
John Winkler		

C. Consultants (e.g. Economist, Sociologist, Demographer, Engineer)

(Please see attached sheet for consultants list.)

D. Contractor

1. Owens-Corning Saudi Company (Fabric Roof System Contractor)
2. Hochtief AG, Essen, West Germany (General Contractor)
3. Saudi Arabian Parsons Ltd./Daniel International Ltd. (Construction Manager)

E. Master Craftsman

(Please see attached sheet for master craftsman list.)

(Please continue overleaf if necessary)

Haj Terminal, King Abdul Aziz International Airport, Jeddah, Kingdom of Saudi Arabia

II.C. Consultants (e.g., Economist, Sociologist, Demographer, Engineer)

1. Air-ride planners, navigation aids, fuel systems: Trans Plan, Inc.
2. Traffic planners: Wilbur Smith & Associates
3. Graphics: Lance Wyman and William Cannan
4. Security: The Wackenhut Corp.
5. Public address system: Wilke, Inc.
6. Processing analysis: R. Shriver Associates.
7. Special lighting: Edison Price, Inc.

II.E. Master Craftsman (Following were subcontractors to Owens-Corning Saudi Company)

1. Structural Steel Subcontractors: Nippon Kokan K.K. and Mitsubishi
2. Structural Cable Manufacturer: Chiers-Chatillon-Gorcy
3. Structural Cable Coater: Owens-Corning Saudi Company
4. Fabric Roof Fabricators: Owens-Corning Fiberglas Corporation and Birdair Structures, a division of Chemfab
5. Fabric Manufacturers: Owens-Corning Fiberglas Corporation and Chemical Fabrics Corporation
6. Fabric Weaver: Chemical Fabrics Corporation
7. "Beta" yarn Manufacturer: Owens-Corning Fiberglas Corporation
8. Teflon Manufacturer: E.I. du Pont de Nemours & Company
9. Special Erection Equipment Designer and Manufacturer: SIARGA International
10. Special Tooling Designer and Manufacturer: Schueler-Leukart
11. Engineering: URS Corp.
12. Engineering: Geiger-Berger Associates

III. USE

A. Type(s) of Use: Airport Terminal for Muslim pilgrims arriving in Jeddah by air and continuing on their pilgrimage to Makkah.

B. User/Occupant

1. Occupation: Varies.

2. Income Level: Varies.

C. Specify any change(s) between planned and actual use.

None

IV. PROJECT HISTORY

A. Programme Development: 1975 (under Airport Master Plan prepared by Skidmore, Owings & Merrill/Airways Engineering Corporation, a joint venture.)

1. Date of Commencement

2. Date of Completion: 1977

B. Design

1. Date of Commencement: 1977

2. Date of Completion: 1978

C. Construction

1. Date of Commencement: 1978

2. Date of Completion: All tent units presently erected; the remainder of the construction not yet complete.

D. Date of Project Occupancy: 3 of 10 modules were occupied for the 1981 Haj.

V. PROJECT ECONOMICS

(For Costs, please give amounts and currencies. Specify their date(s) of validity)

A. Total Initial Budget: Not available at this time.

B. Total Actual Costs: Not available at this time.

C. Analysis of Costs

1. Land: Not available at this time.

2. Materials: Not available at this time.

3. Labour: Not available at this time.

4. Professional Fees: Not available at this time.

D. Source(s) of Funds (indicate percentage)

1. Private: Not available at this time.

2. Public

a. Local: Not available at this time.

b. National: Not available at this time.

c. International: Not available at this time.

(Please continue overleaf if necessary)

Haj Terminal, King Abdul Aziz International Airport, Jeddah, Kingdom of Saudi Arabia

VI. CONSTRUCTION DETAILS

A. Site Area and Characteristics

Designed to shelter the pilgrims from the intense heat, the Haj Terminal covers a site of 105 acres (40.5 hectares) at the King Abdul Aziz International Airport on the shore of the Red Sea just north of Jeddah, Saudi Arabia. The climate is hot and

(continued)

B. Total Floor Area of Individual Building(s)

The lightweight units (45 meters square) are grouped in modules of 21 units. Each module is three by seven units and covers 10.5 acres (4 hectares). There are 10 such modules, five on each side of a landscaped central roadway.

C. Structural System (describe)

The 4.6 million sq. ft. (427,509 sm) roof consists of 210 double curvature Teflon-Coated Fiberglas membrane units, each 150 x 150 feet (45.7 x 45.7 m) in plan, used as interactive structural elements with radiating cables, and supported by steel pylon frames.

D. Materials (describe and indicate whether locally produced or imported)

1. Infill

The material below the surface is basically coral and coral sand. Suitable fill was obtained on the airport site in several other locations.

2. Rendering of Facades

Teflon-Coated Fiberglas fabric roof produced by

(continued)

3. Floors

Concrete imported.

4. Ceilings

See item 2 above.

5. Others (interior and exterior)

None.

E. Site Utilities and Building Services (describe)

Due to the enormous scale of the project, the utility systems are on the scale of a small city. Basically, the major utilities are heated under the landscaped central mall and service each module through three large underground corridors, containing power, communications, chilled water, potable water, and

(continued)

F. Construction Technology

1. Describe the Basic Method of Construction

A two-way grid of pylons forms the low point of each membrane unit while an open tension ring, suspended by cables from the top of the pylons establishes its high point at the center of each bay. A row of double pylon portal frames provides a

(continued)

2. Indicate which major building parts were fabricated on-site and which were fabricated elsewhere.

Structural parts were imported from foreign countries and the structure was erected over a period of 29 months. The pylons came from Japan, the cables from France and the fabric from the U.S.A.

G. Type of Labour Force (indicate percentage)

1. Skilled — Not available at this time.

2. Unskilled — Not available at this time.

H. Origin of Labour Force (indicate percentage)

1. Domestic — Not available at this time.

2. Imported — Not available at this time.

(Please continue overleaf if necessary)

Haj Terminal, King Abdul Aziz International Airport, Jeddah, Kingdom of Saudi Arabia

VI.A. (cont'd)

humid, with a mean maximum temperature of 97°F (36°C) and a mean relative humidity of 64%. Sea breezes which produce high humidity and lower dry bulb temperatures and hot, dry desert winds greatly affect temperature and comfort levels. The mean total annual precipitation is usually quite low, with 98% of the precipitation occurring from November through January.

VI.D.2. (cont'd)

Owens-Corning Fiberglas of the USA; steel pylons produced by Nippon Kokan K.K. and Mitsubishi of Japan; and steel cables produced by Chiers-Chatillon-Gorcy of France.

VI.E. (cont'd)

sanitary sewers. Also located in the central mall are two large exhaust fans for each module which draw off the exhaust fumes of Haji buses.

VI.F.1. (cont'd)

stiff edge for the modules. Using electronically synchronized equipment, modules, or 21 pre-assembled tent units, were simultaneously raised into place. At the same time, each membrane was stretched and pretensioned as the inner tension ring element was lifted and joined to the suspended outer ring.

VII. EVOLUTION OF DESIGN CONCEPTS

Please describe the genesis of the project, through programme, design and construction to final and present occupancy.

The Haj Terminal, situated within the King Abdul Aziz International Airport in Jeddah, Saudi Arabia, is located approximately 70 kilometers west of the Holy City of Makkah. Since Jeddah is the only large commercial city in close proximity to Makkah, all air traffic bound for Makkah arrives in Jeddah and proceeds by land transportation from Jeddah to Makkah. Normal airport facilities are capable of handling this traffic during most of the year; however, approximately once a year, vast numbers of Moslem pilgrims from all over the world travel to Makkah to participate in the Haj pilgrimage. The Haj activity takes place within about six weeks, resulting in unusually high air traffic for this rather short period of time. Since the public facilities at the new airport were designed to handle only the normal flow of domestic and international air traffic, a separate terminal facility was required to process the Haj pilgrims.

The Haj Terminal design requirements were such that the facility had to be capable of handling a large volume of people with highly diversified needs over a short period of time. It is projected that this facility will process approximately 950,000 pilgrims during the Haj period by the year 1985. It is estimated that the Haj terminal complex will need to accommodate 50,000 pilgrims at one time for periods up to 18 hours during arrival and 80,000 pilgrims for periods up to 36 hours during departure. This time is required in order to transfer between air and land transportation. Therefore, appropriate space had to be created which was adaptable and flexible to the Hajis' needs. It was determined that approximately 500,000 sm of space was required to accommodate these needs.

The Haj Terminal and Support Complex has been designed to accommodate 5,000 pilgrims per peak hour. In plan, the Haj Terminal consists of two identical halves, 1,050 by 2,250 feet (320 by 686 meters), separated by a landscaped central mall, with the adjacent aircraft aprons for docking airplanes. The pilgrims' aircraft land at the King Abdul Aziz International Airport and taxi to one of a possible 20 wide-body aircraft gate positions, two per module, located on the airside of the Haj Terminal Building. Extensive computer analysis was conducted to provide solutions for relieving aircraft congestion on the ground. All 20 terminal gates can accommodate Boeing 747 aircraft. If the Terminal gate positions are filled, the aircraft wait in one of the two holding aprons which can accommodate 26 aircraft of varying sizes. On leaving the plane, the pilgrims enter the second level of the air-conditioned Terminal building where they pass through all the necessary health and immigration formalities before going down a ramp to a lower level baggage claiming and customs area. This process lasts sixty to seventy-five minutes. Upon exiting the Terminal building, the pilgrim arrives in a shaded environment created by the Terminal Support Area roof.

Under each module, areas and facilities are located for the pilgrim to rest, sleep and to acquire both prepared foods or food which the pilgrim himself may prepare. In addition, many washing and toilet facilities have been provided in each module as well as offices providing banking, postal, airline, bus and taxi, and general information support services.

Due to the large volume of space required to properly house the support area functions, it was decided to air condition only certain spaces and to develop a shaded "village" for the remainder of the area. To create such a large, covered, naturally ventilated, highly flexible space within a very short construction schedule, a number of alternative roof systems were investigated. This resulted in a long span, lightweight structure with

(continued)

(Please continue overleaf if necessary)

Haj Terminal, King Abdul Aziz International Airport, Jeddah, Kingdom of Saudi Arabia

VII. (cont'd)

translucent material that could adequately respond to the overall environmental needs of such a space. It was determined that a fabric membrane should be used as a structural element, together with a one-way cable system, thus resulting in a two-way interactive system of cables and membrane.

To utilize the membrane material as part of the structure, it had to satisfy numerous performance criteria. It was required that the fabric membrane for the Terminal provide for a life of at least 30 to 40 years with minimum maintenance. This requirement was an extremely difficult one for the Jeddah environment due to the continuous exposure to ultra-violet degradation and a highly corrosive marine atmosphere. In addition, the fabric membrane had to satisfy the following requirements:

1. Self-cleaning to insure a lasting good visual appearance.

2. Lightweight yet capable of carrying high tensile loads with little or no long term creep.

3. Good thermal insulation qualities to insure the comfort of the pilgrims while at the same time providing sufficient translucency to naturally illuminate the vast covered area during daylight hours.

4. Non-combustible and also non-toxic when subjected to fire.

5. Easy to fabricate and ship.

6. Easy to repair on site if required.

As a result of these requirements, a heavyweight, Teflon-Coated Fiberglas fabric was selected as the optimum membrane material which derived its basic structural strength from the fiberglas and utilized the teflon coating for protection and durability.

With the selection of the basic materials for the tension membrane structure (cables and Teflon-Coated Fiberglas), a comprehensive study of shapes and forms was undertaken to develop a structure that is both aesthetically pleasing and structurally feasible.

From a structural design point of view, it was important that the membrane surface should result in a double curvature shape to insure stability for both upward and downward acting wind loads. Such a shape guarantees tension in the fabric under any loading condition.

After studying various possible shapes and proportions, the final configuration selected resulted from a two-way grid of pylons and an open

tension ring at the center of this grid, suspended by cables from the top of pylons. The double curvature tensile membrane surface is created by holding the membrane at the pylon locations and raising the tension ring, thus stretching and pretensioning the membrane. This shape provided for rain drainage at the pylons and also induced a natural flow of air out from under the tent roof through the opening at the high point at the center tension ring.

Further refinement of the structural system was based on the ease of fabrication and construction. The overall plan of 10 modules with 5 on each side of the central roadway provided for future expansion of 5 additional modules on each side. Steel pylons are located at the corners of each unit and are 45 meters high. The roof membrane forms the tent shape springing upward from a 20 meter height at the pylons to a 35 meter height at the center tension ring. The center tension ring is 5 meters in diameter. A total of 32 radial cables extend from the center tension ring to edge, or ridge, cables connecting the pylons at the edge, or intersection, of adjacent roof units. The suspension cables are arranged in 4 pairs (8 total) and extend down from the top of the pylons to hold the center tension ring in place.

Pairs of suspension cables rather than single cables were used to provide a degree of safety in the structure in case of accidental failure of one cable. Further, to protect against collapse due to membrane damage, 4 stabilizing cables are provided for each unit. These stabilizing cables extend downward from the center tension ring to the lower tension ring at the pylon. The purpose of these cables is to maintain stability within a unit and its adjacent units if a particular unit's membrane loses tension. These cables maintain the stability of each tent unit by keeping the center ring in position, thus retaining the forces in the suspension cables and pylons.

The overall stability and structural integrity of the entire system is achieved by a special arrangement of the pylons around the perimeter of each module. Extending around the perimeter of each 3 x 7 module, including the common row of pylons between adjacent modules, is a row of very stiff double pylon, portal frames. By providing this stiff edge and separation between modules, they become independent of each other and can be added or removed in truly a modular fashion. Also, this system insures that a failure in one module will be isolated within that module and not transmitted to an adjacent module.

An aero-elastic model consisting of 3 x 3 units and closely simulating the dynamic properties of the full-scale structure was constructed and tested in a wind tunnel. It was found that the structure was stabile and did not experience excessive vibrations during a simulated 95 mile per hour wind storm.

As part of the final verification for this unique structure, a full scale prototype of two of the tent roof units was built. The purpose of the prototype was to verify the results of the structural analysis and to demonstrate that the roof system, which includes many connection details, could be constructed. A simulation apparatus was provided along the "interior" edges to simulate the continuity provided by the adjacent units in the actual structure. All roof membrane patterning, construction, fabrication and shipping techniques were carried out exactly as anticipated for Jeddah. Cables were fabricated and shipped to the prototype site from France. As part of the prototype testing program, instrument testing verified the performance of all elements of the roof membrane including cables, fabric and tension rings.

Following the erection and final tensioning of the two roof units, a ground survey and air survey (photogrammetry) were conducted to verify the final shape of the membrane. Confirmation of the shape was not only visually important, but was required to analyze the cable and fabric stress data. By analyzing the stress data together with the shape data, it was possible to evaluate the overall behavior and performance of the structure with reference to the theoretical model. Minor adjustments were then made for the actual construction in Jeddah.

Construction of the Haj Terminal support complex is now complete. Dedicated in April 1981, three of the Terminal's 10 modules were in operation for the October 1981 pilgrimage. For many, the entry to this Haj facility becomes not only an entry to the Kingdom of Saudi Arabia, but the gateway to the Holy Land - the gateway to Makkah. By applying high technology to the environmental conditions of the site and the socioeconomic and cultural needs of the people who use this facility, the Haj Terminal and Support Complex has become a modern version of the traditional desert tent village. The Haj Terminal recalls the traditions of an Islamic heritage in today's world. We are hopeful that it will inspire pilgrims representing 800 million Muslims who turn to Mecca five times daily for prayer and devotion to Allah. The Haj Terminal welcomes believers from around the world as they make this profound journey, their duty to Allah, to the Kingdom of Saudi Arabia and the Holy cities of Islam.

Haj Terminal, King Abdul Aziz International Airport, Jeddah, Kingdom of Saudi Arabia

VIII. SIGNIFICANCE OF PROJECT

In what way is this project important?
Please describe the aspect(s) of the project which you feel represent a particular achievement, for example, the technical, economic, or social achievement, or its response to culture or climate, etc.

Islam requires everyone who is physically able to perform Haj at least once in his or her lifetime; it is therefore a most significant journey. Many pilgrims are inexperienced travellers, separated from their culture and familiar surroundings for the first time. The Haj Terminal design responds to the Hajis' physical needs and comfort in a form that is technologically appropriate for its use and architecturally responsive to the surrounding environment. The translucent fabric roof helps create a naturally ventilated and lighted open space which prevents distraction from the Hajis' spiritual objectives, yet affords the pilgrim needed shelter and minimizes walking distance. The Terminal prepares him for his next journey which will take place in a similar open air setting. The Terminal is a transitional shelter, yet it is a visually powerful and well-organized transportation facility which attempts to avoid confusion or cultural shock for the Haji. Because the Terminal is only minimally mechanized, the need for extensive maintenance for a building that is active only a few weeks of the year is eliminated.

The research and time devoted to the Haj Terminal structural design has no doubt advanced our state-of-the-art knowledge of large scale, long life, fabric membrane structures. The very size of the Haj Terminal required a more sophisticated design process than is usually applied to fabric roofs. This project has stimulated tremendous interest in the development and use of fabric roof structures not only in the Mideast, but throughout the world.

(Please continue overleaf if necessary)

IX. DOCUMENTATION

Please indicate the materials you enclose for project documentation:

- X — 10 Photographs; Color, and Black & White; 8″ × 10″ (18 × 24 cm).
- X — 20 Slides; Color, and Black & White; 35 mm.
- X — Drawings: Community plan, Site plan, Floor plans, Sections, Elevations.
- X — Project Brief/Programme
- ___ — Biographical Data
- X — Other (Please specify: Firm History).

Please note: The submission of this Record is a prerequisite to candidacy for the Award. All information contained and submitted with the Form will be kept strictly confidential until the announcement of the 1983 Award recipients. Subsequently, such information may be made available by the Aga Khan Award Foundation for scholarly purposes only. Nevertheless, persons wishing to publish, reproduce or reprint such information shall be required to secure prior permission in each instance.

Authorized Signature Wilderrutt Date 6/11/82

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SAU.

The Aga Khan Award for Architecture

32, chemin des Crêts, 1218 Grand-Saconnex, Genève, Suisse, Téléphone (22) 98 90 70, Télex 28842 AKAA CH

1983 NOMINATION FORM **CONFIDENTIAL**

I. AWARD CRITERIA

The Aga Khan Award for Architecture seeks to recognize projects which demonstrate architectural excellence at all levels. Since architecture cannot be isolated from the society in which it is created, the Award will consider the context in which architecture is practiced and the processes of design, research and evaluation through which it is achieved. The social, economic, technical, physical and environmental challenges to which the projects respond must be important factors in any assessment of their success.

Projects will be chosen as much for their catalytic value in the evolution of a new cultural and environmental sensibility, as for their individual design merits. Consideration will be given particularly to those projects which use local initiatives and resources creatively, which meet both the functional and cultural needs of their users and have the potential to stimulate related developments elsewhere in the Muslim world.

Projects completed or in use between 1956 and 1980 will be eligible for the 1983 Award. Because positive user response and beneficial environmental impact are essential Award criteria, only projects completed or in use for at least two years will be considered. All projects are eligible except those associated with His Highness the Aga Khan or other members of the Award.

II. PROJECT IDENTIFICATION

1. Title: HAJ TERMINAL, KING ABDUL AZIZ INTERNATIONAL AIRPORT

   Postal Address: JEDDAH
   SAUDI ARABIA

   Telephone _____ Telex _____

2. Date of Completion: 1981

3. Architect(s): SKIDMORE OWINGS AND MERRILL
   DR. FAZLUR KHAN

   Postal Address: 30 W. Monroe Street
   CHICAGO, ILLINOIS, USA 60603

   Telephone (312) 641-5959 Telex 25 43 37

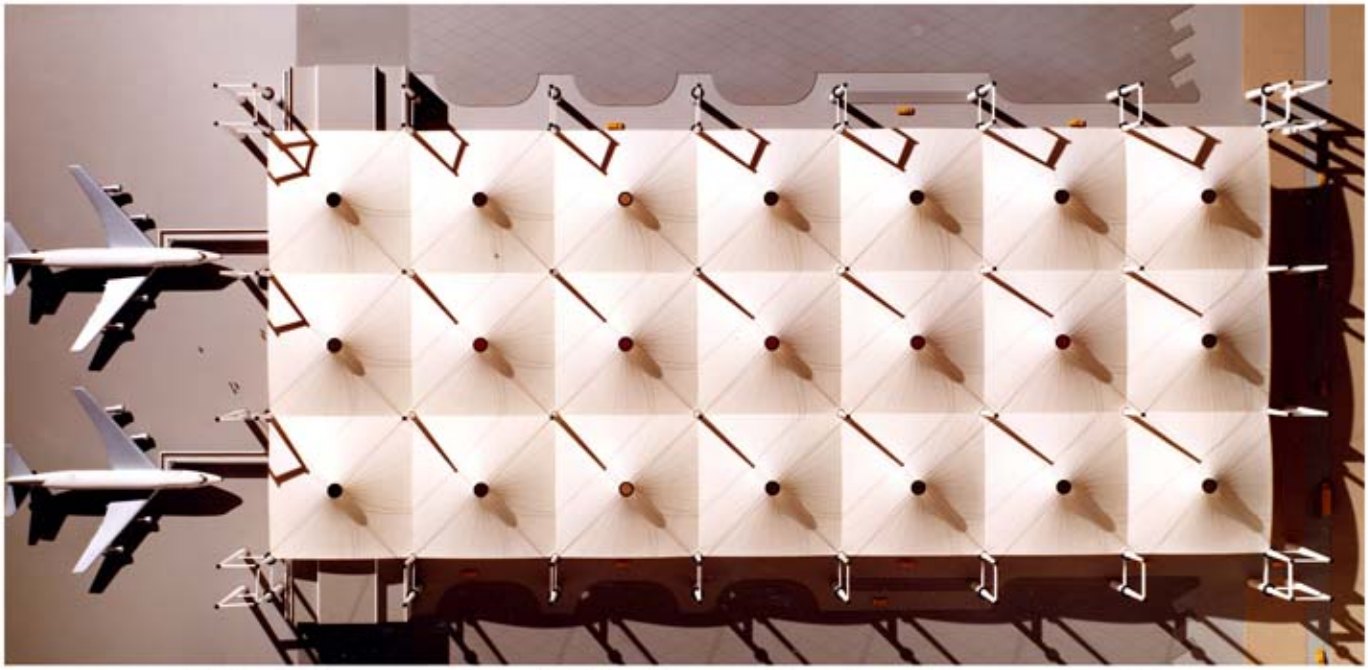
4. Client(s): MINISTRY OF DEFENSE & AVIATION
   KINGDOM OF SAUDI ARABIA
   BRIG-GEN. SAID Y. AMIN, DIRECTOR

   Postal Address

   Telephone _____ Telex _____

UNOFFHUK

Haj Terminal, King Abdul Aziz International Airport, Jeddah, Kingdom of Saudi Arabia



Each of the ten modules is 3 by 7 tent units, planned to accommodate two Boeing 747 airplanes

The Haj Terminal in two separate, identical fabric structures lining a central landscaped mail

Haj Terminal, King Abdul Aziz International Airport, Jeddah, Kingdom of Saudi Arabia

During construction: steel pylons and open tension rings

Using electronically synchronized equipment,
the pre-assembled tent units were raised simultaneously

Haj Terminal, King Abdul Aziz International Airport, Jeddah, Kingdom of Saudi Arabia

Haj Terminal, King Abdul Aziz International Airport, Jeddah, Kingdom of Saudi Arabia

Haj Terminal, King Abdul Aziz International Airport, Jeddah, Kingdom of Saudi Arabia

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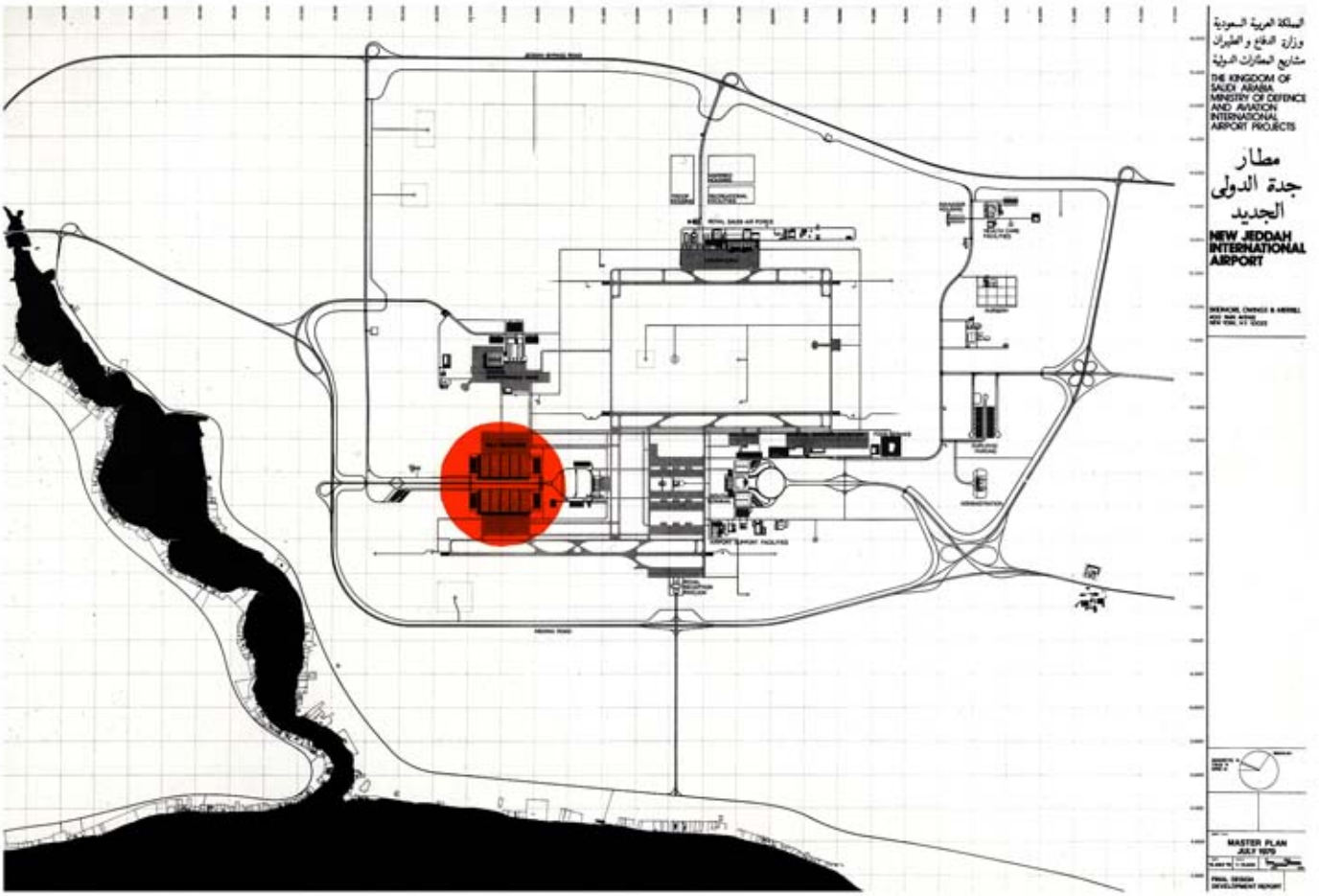
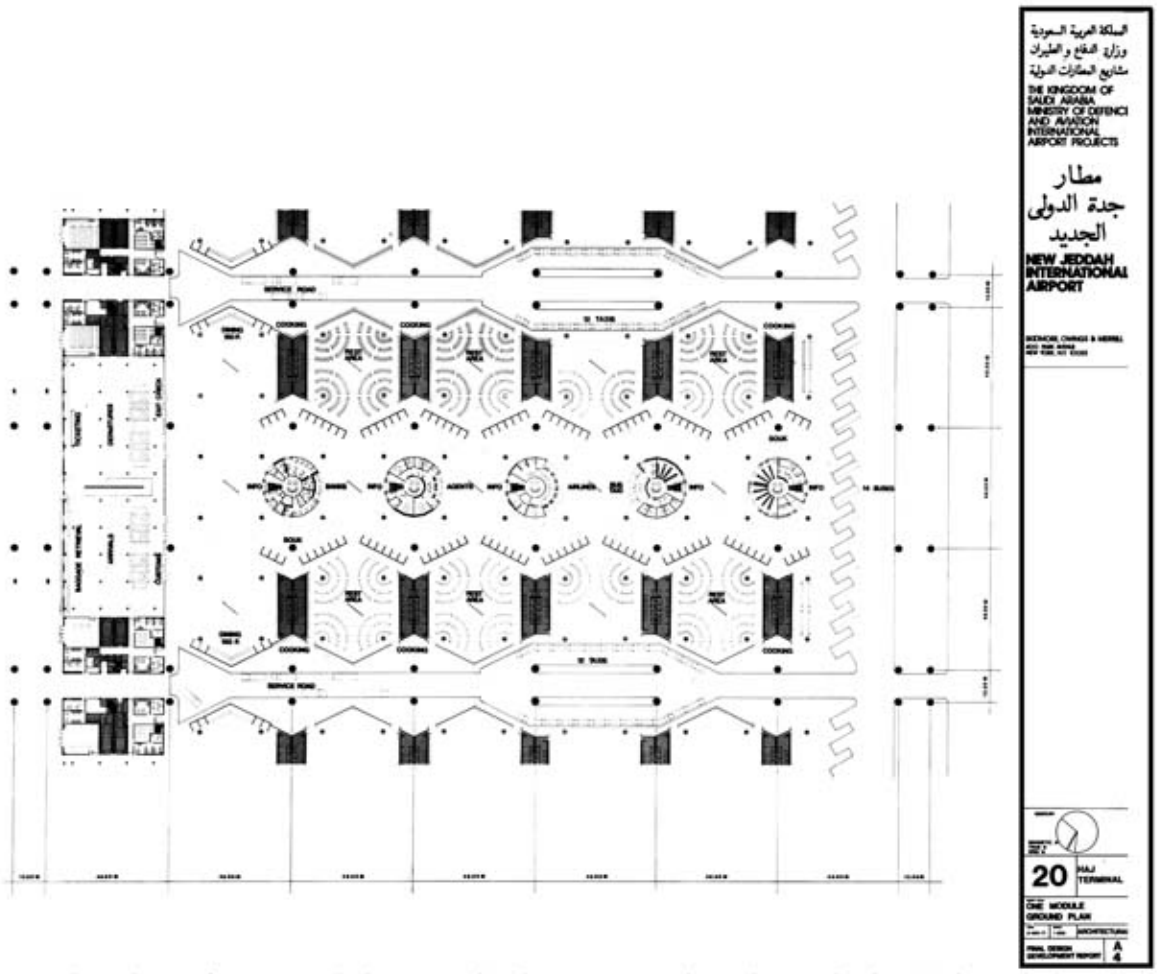
Haj Terminal, King Abdul Aziz International Airport, Jeddah, Kingdom of Saudi Arabia

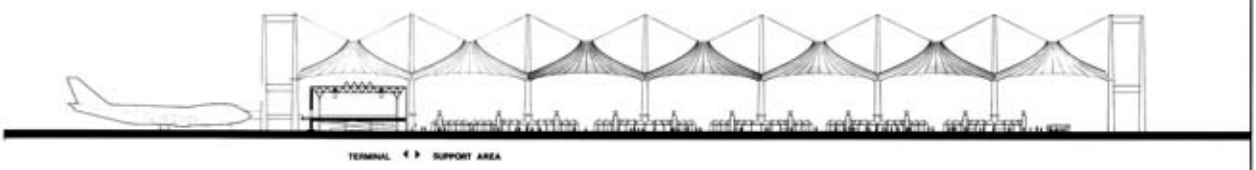


Master Plan: Haj Terminal within the orange circle



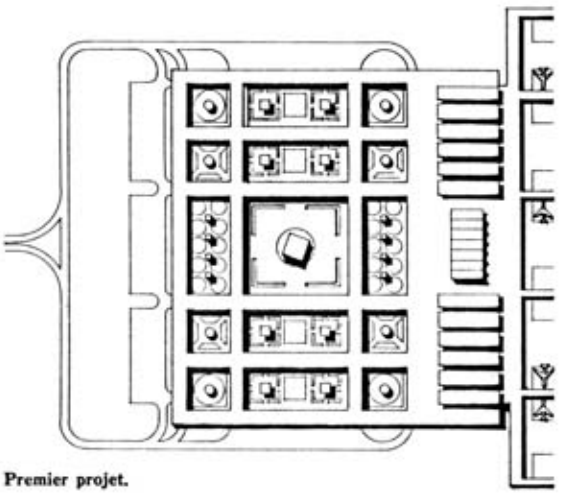
The plan of one module reveals the progression through the Haj complex

Haj Terminal, King Abdul Aziz International Airport, Jeddah, Kingdom of Saudi Arabia

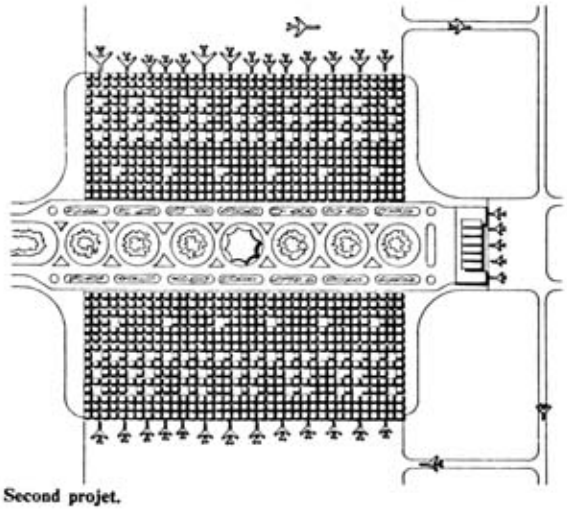


Pilgrims file into a two-storey air-conditioned building for processing, then proceed to support area

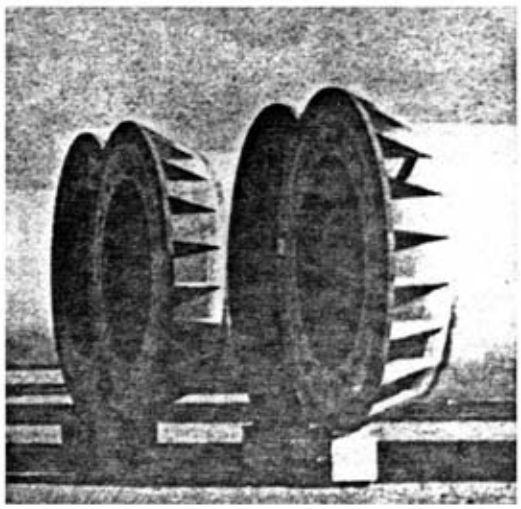
Haj Terminal, King Abdul Aziz International Airport, Jeddah, Kingdom of Saudi Arabia

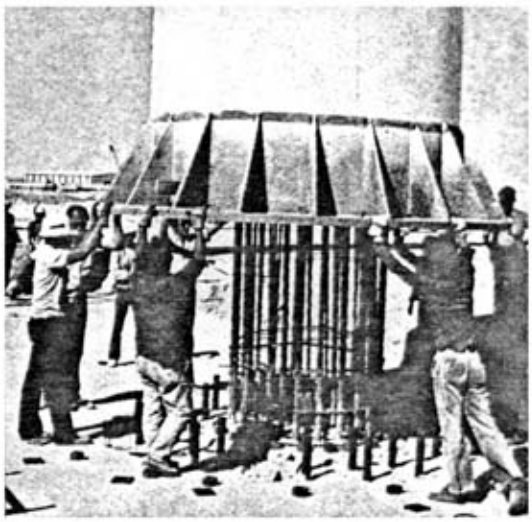


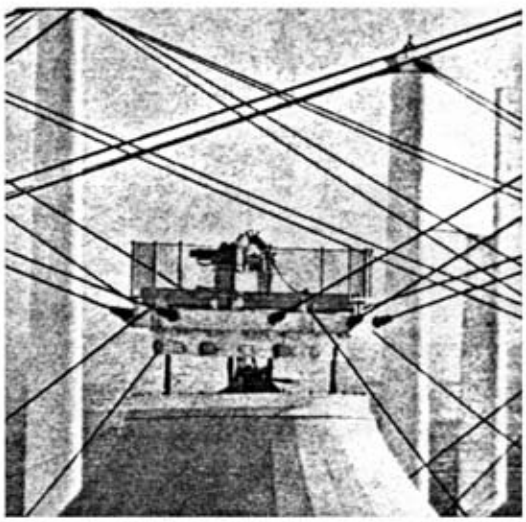
Premier projet.

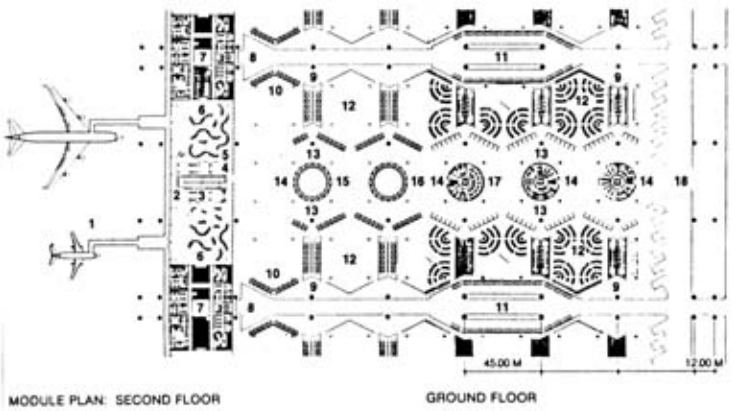


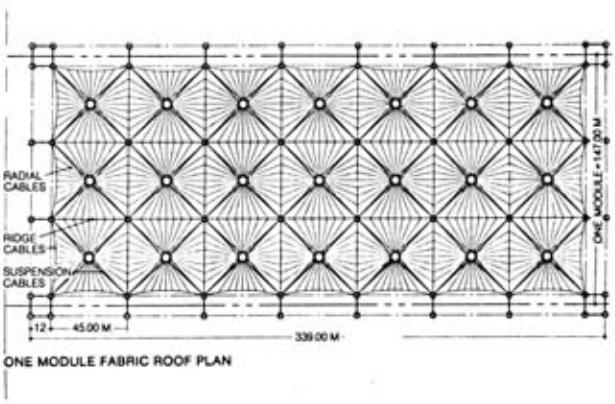
Second projet.



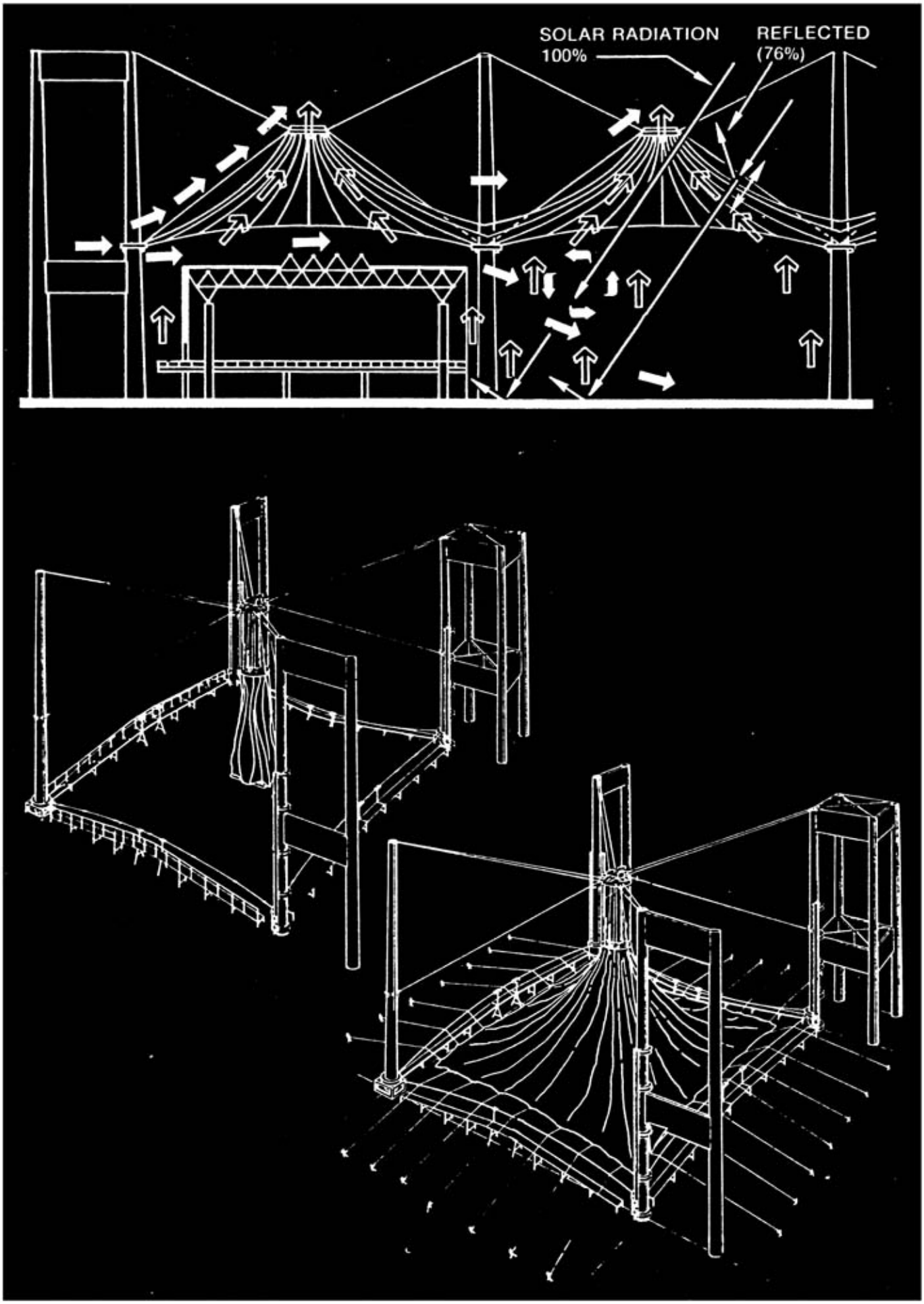








Haj Terminal, King Abdul Aziz International Airport, Jeddah, Kingdom of Saudi Arabia



Haj Terminal, King Abdul Aziz International Airport, Jeddah, Kingdom of Saudi Arabia

Hajj Terminal
Jeddah, Saudi Arabia

List of Visual Materials

No	VM Num	CD Id	IMG Ord	VM Title	Date	Photographer	Format	Copyright
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Hajj Terminal
Jeddah, Saudi Arabia

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Photographer: GUNAY Reha
Copyright: Y
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VM Link: 0274 Hajj Terminal

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Date: 15.05.1983
Photographer: GUNAY Reha
Copyright: Y
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Photographer: GUNAY Reha
Copyright: Y
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Hajj Terminal
Jeddah, Saudi Arabia

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Photographer: GUNAY Reha
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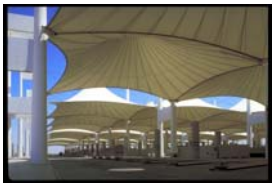

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Date: 15.05.1983
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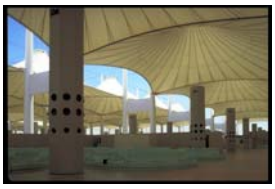
Hajj Terminal
Jeddah, Saudi Arabia



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Copyright: Y
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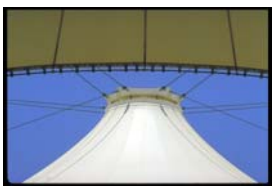

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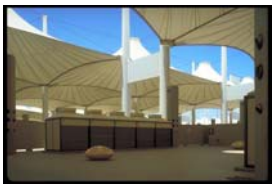
Hajj Terminal
Jeddah, Saudi Arabia



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Copyright: Y
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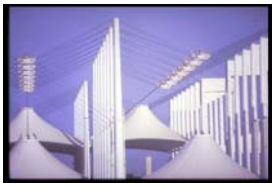

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Copyright: Y
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Photographer: SKIDMORE OWINGS & MERRILL
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Hajj Terminal
Jeddah, Saudi Arabia

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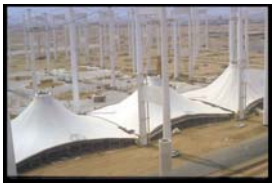

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Hajj Terminal
Jeddah, Saudi Arabia

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Hajj Terminal
Jeddah, Saudi Arabia

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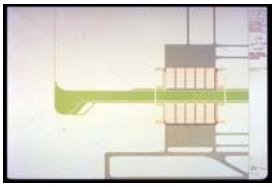

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Jeddah, Saudi Arabia

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Hajj Terminal
Jeddah, Saudi Arabia

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Photographer: GUNAY Reha
Copyright: Y
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Hajj Terminal
Jeddah, Saudi Arabia

List of Visual Materials

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98	S033307	CD00044	IMG0063		15.05.1983	GUNAY Reha	24x36	Y
99	S033308				15.05.1983	GUNAY Reha	24x36	Y
100	S033309				15.05.1983	GUNAY Reha	24x36	Y

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No	VM Num	CD Id	IMG Ord	VM Title	Date	Photographer	Format	Copyright
101	S033310				15.05.1983	GUNAY Reha	24x36	Y
102	S033311				15.05.1983	GUNAY Reha	24x36	Y
103	S033312				15.05.1983	GUNAY Reha	24x36	Y
104	S033313				15.05.1983	GUNAY Reha	24x36	Y
105	S033314				15.05.1983	GUNAY Reha	24x36	Y
106	S033315				15.05.1983	GUNAY Reha	24x36	Y
107	S033316				15.05.1983	GUNAY Reha	24x36	Y
108	S033317				15.05.1983	GUNAY Reha	24x36	Y
109	S033318				15.05.1983	GUNAY Reha	24x36	Y
110	S033319				15.05.1983	GUNAY Reha	24x36	Y
111	S033320				15.05.1983	GUNAY Reha	24x36	Y
112	S033321				15.05.1983	GUNAY Reha	24x36	Y
113	S033322				15.05.1983	GUNAY Reha	24x36	Y
114	S033323	CD00044	IMG0072		15.05.1983	GUNAY Reha	24x36	Y
115	S033324				15.05.1983	GUNAY Reha	24x36	Y
116	S033325	CD00044	IMG0070		15.05.1983	GUNAY Reha	24x36	Y
117	S033326				15.05.1983	GUNAY Reha	24x36	Y
118	S033327				15.05.1983	GUNAY Reha	24x36	Y
119	S033328				15.05.1983	GUNAY Reha	24x36	Y
120	S033329				15.05.1983	GUNAY Reha	24x36	Y
121	S033330				15.05.1983	GUNAY Reha	24x36	Y
122	S033331				15.05.1983	GUNAY Reha	24x36	Y
123	S033332				15.05.1983	GUNAY Reha	24x36	Y
124	S033333				15.05.1983	GUNAY Reha	24x36	Y
125	S033334				15.05.1983	GUNAY Reha	24x36	Y
126	S033335				15.05.1983	GUNAY Reha	24x36	Y
127	S033336				15.05.1983	GUNAY Reha	24x36	Y
128	S033337	CD00044	IMG0076		15.05.1983	GUNAY Reha	24x36	Y
129	S033338				15.05.1983	GUNAY Reha	24x36	Y
130	S033339				15.05.1983	GUNAY Reha	24x36	Y
131	S033340				15.05.1983	GUNAY Reha	24x36	Y
132	S033341				15.05.1983	GUNAY Reha	24x36	Y
133	S033342				15.05.1983	GUNAY Reha	24x36	Y
134	S033343	CD00044	IMG0077		15.05.1983	GUNAY Reha	24x36	Y
135	S033344				15.05.1983	GUNAY Reha	24x36	Y
136	S033345				15.05.1983	GUNAY Reha	24x36	Y
137	S033346				15.05.1983	GUNAY Reha	24x36	Y
138	S033347				15.05.1983	GUNAY Reha	24x36	Y
139	S033348				15.05.1983	GUNAY Reha	24x36	Y
140	S033349				15.05.1983	GUNAY Reha	24x36	Y
141	S033350				15.05.1983	GUNAY Reha	24x36	Y
142	S033351				15.05.1983	GUNAY Reha	24x36	Y
143	S033352				15.05.1983	GUNAY Reha	24x36	Y
144	S033353				15.05.1983	GUNAY Reha	24x36	Y
145	S033354				15.05.1983	GUNAY Reha	24x36	Y
146	S033355				15.05.1983	GUNAY Reha	24x36	Y
147	S033356				15.05.1983	GUNAY Reha	24x36	Y
148	S033357				15.05.1983	GUNAY Reha	24x36	Y
149	S033358				15.05.1983	GUNAY Reha	24x36	Y
150	S033359				15.05.1983	GUNAY Reha	24x36	Y

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No	VM Num	CD Id	IMG Ord	VM Title	Date	Photographer	Format	Copyright
151	S033360				15.05.1983	GUNAY Reha	24x36	Y
152	S033361				15.05.1983	GUNAY Reha	24x36	Y
153	S033362				15.05.1983	GUNAY Reha	24x36	Y
154	S033363	CD00044	IMG0067		15.05.1983	GUNAY Reha	24x36	Y
155	S033364				15.05.1983	GUNAY Reha	24x36	Y
156	S033365				15.05.1983	GUNAY Reha	24x36	Y
157	S033366				15.05.1983	GUNAY Reha	24x36	Y
158	S033367				15.05.1983	GUNAY Reha	24x36	Y
159	S033368				15.05.1983	GUNAY Reha	24x36	Y
160	S033369				15.05.1983	GUNAY Reha	24x36	Y
161	S033370				15.05.1983	GUNAY Reha	24x36	Y
162	S033371				15.05.1983	GUNAY Reha	24x36	Y
163	S033372				15.05.1983	GUNAY Reha	24x36	Y
164	S033373				15.05.1983	GUNAY Reha	24x36	Y
165	S033374				15.05.1983	GUNAY Reha	24x36	Y
166	S033375				15.05.1983	GUNAY Reha	24x36	Y
167	S033376				15.05.1983	GUNAY Reha	24x36	Y
168	S033377				15.05.1983	GUNAY Reha	24x36	Y
169	S033378				15.05.1983	GUNAY Reha	24x36	Y
170	S033379				15.05.1983	GUNAY Reha	24x36	Y
171	S033380				15.05.1983	GUNAY Reha	24x36	Y
172	S033381				15.05.1983	GUNAY Reha	24x36	Y
173	S033382				15.05.1983	GUNAY Reha	24x36	Y
174	S033383				15.05.1983	GUNAY Reha	24x36	Y
175	S033384				15.05.1983	GUNAY Reha	24x36	Y
176	S033385	CD00044	IMG0060		15.05.1983	GUNAY Reha	24x36	Y
177	S033386				15.05.1983	GUNAY Reha	24x36	Y
178	S033387				15.05.1983	GUNAY Reha	24x36	Y
179	S033388				15.05.1983	GUNAY Reha	24x36	Y
180	S033389				15.05.1983	GUNAY Reha	24x36	Y
181	S033390				15.05.1983	GUNAY Reha	24x36	Y
182	S033391				15.05.1983	GUNAY Reha	24x36	Y
183	S033392				15.05.1983	GUNAY Reha	24x36	Y
184	S033393				15.05.1983	GUNAY Reha	24x36	Y
185	S033394				15.05.1983	GUNAY Reha	24x36	Y
186	S033395				15.05.1983	GUNAY Reha	24x36	Y
187	S033396				15.05.1983	GUNAY Reha	24x36	Y
188	S033397				15.05.1983	GUNAY Reha	24x36	Y
189	S033398				15.05.1983	GUNAY Reha	24x36	Y
190	S033399				15.05.1983	GUNAY Reha	24x36	Y
191	S033400				15.05.1983	GUNAY Reha	24x36	Y
192	S033401				15.05.1983	GUNAY Reha	24x36	Y
193	S033402				15.05.1983	GUNAY Reha	24x36	Y
194	S033403				15.05.1983	GUNAY Reha	24x36	Y
195	S033404				15.05.1983	GUNAY Reha	24x36	Y
196	S033405				15.05.1983	GUNAY Reha	24x36	Y
197	S033406				15.05.1983	GUNAY Reha	24x36	Y
198	S033407				15.05.1983	GUNAY Reha	24x36	Y
199	S033408				15.05.1983	GUNAY Reha	24x36	Y
200	S033409				15.05.1983	GUNAY Reha	24x36	Y

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No	VM Num	CD Id	IMG Ord	VM Title	Date	Photographer	Format	Copyright
201	S033410				15.05.1983	GUNAY Reha	24x36	Y
202	S033411				15.05.1983	GUNAY Reha	24x36	Y
203	S033412				15.05.1983	GUNAY Reha	24x36	Y
204	S033413				15.05.1983	GUNAY Reha	24x36	Y
205	S033414				15.05.1983	GUNAY Reha	24x36	Y
206	S033415				15.05.1983	GUNAY Reha	24x36	Y
207	S033416				15.05.1983	GUNAY Reha	24x36	Y
208	S033417				15.05.1983	GUNAY Reha	24x36	Y
209	S033418				15.05.1983	GUNAY Reha	24x36	Y
210	S033419				15.05.1983	GUNAY Reha	24x36	Y
211	S033420				15.05.1983	GUNAY Reha	24x36	Y
212	S033421				15.05.1983	GUNAY Reha	24x36	Y
213	S033422				15.05.1983	GUNAY Reha	24x36	Y
214	S033423				15.05.1983	GUNAY Reha	24x36	Y
215	S033424				15.05.1983	GUNAY Reha	24x36	Y
216	S033425				15.05.1983	GUNAY Reha	24x36	Y
217	S033426				15.05.1983	GUNAY Reha	24x36	Y
218	S033427				15.05.1983	GUNAY Reha	24x36	Y
219	S033428				15.05.1983	GUNAY Reha	24x36	Y
220	S033429				15.05.1983	GUNAY Reha	24x36	Y
221	S033430	CD00044	IMG0068		15.05.1983	GUNAY Reha	24x36	Y
222	S033431				15.05.1983	GUNAY Reha	24x36	Y
223	S033432				15.05.1983	GUNAY Reha	24x36	Y
224	S033433				15.05.1983	GUNAY Reha	24x36	Y
225	S033434				15.05.1983	GUNAY Reha	24x36	Y
226	S033435				15.05.1983	GUNAY Reha	24x36	Y
227	S033436				15.05.1983	GUNAY Reha	24x36	Y
228	S033437				15.05.1983	GUNAY Reha	24x36	Y
229	S033438				15.05.1983	GUNAY Reha	24x36	Y
230	S033439				15.05.1983	GUNAY Reha	24x36	Y
231	S033440				15.05.1983	GUNAY Reha	24x36	Y
232	S033441				15.05.1983	GUNAY Reha	24x36	Y
233	S033442				15.05.1983	GUNAY Reha	24x36	Y
234	S033443				15.05.1983	GUNAY Reha	24x36	Y
235	S033444				15.05.1983	GUNAY Reha	24x36	Y
236	S033445				15.05.1983	GUNAY Reha	24x36	Y
237	S033446				15.05.1983	GUNAY Reha	24x36	Y
238	S033447				15.05.1983	GUNAY Reha	24x36	Y
239	S033448				15.05.1983	GUNAY Reha	24x36	Y
240	S033449				15.05.1983	GUNAY Reha	24x36	Y
241	S033450				15.05.1983	GUNAY Reha	24x36	Y
242	S033451				15.05.1983	GUNAY Reha	24x36	Y
243	S033452	CD00044	IMG0071		15.05.1983	GUNAY Reha	24x36	Y
244	S033453				15.05.1983	GUNAY Reha	24x36	Y
245	S033454				15.05.1983	GUNAY Reha	24x36	Y
246	S033455				15.05.1983	GUNAY Reha	24x36	Y
247	S033456				15.05.1983	GUNAY Reha	24x36	Y
248	S033457				15.05.1983	GUNAY Reha	24x36	Y
249	S033458				15.05.1983	GUNAY Reha	24x36	Y
250	S033459				15.05.1983	GUNAY Reha	24x36	Y

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No	VM Num	CD Id	IMG Ord	VM Title	Date	Photographer	Format	Copyright
251	S033460				15.05.1983	GUNAY Reha	24x36	Y
252	S033461				15.05.1983	GUNAY Reha	24x36	Y
253	S033462				15.05.1983	GUNAY Reha	24x36	Y
254	S033463	CD00044	IMG0066		15.05.1983	GUNAY Reha	24x36	Y
255	S033464				15.05.1983	GUNAY Reha	24x36	Y
256	S033465				15.05.1983	GUNAY Reha	24x36	Y
257	S033466				15.05.1983	GUNAY Reha	24x36	Y
258	S033467				15.05.1983	GUNAY Reha	24x36	Y
259	S033468				15.05.1983	GUNAY Reha	24x36	Y
260	S033469				15.05.1983	GUNAY Reha	24x36	Y
261	S033470				15.05.1983	GUNAY Reha	24x36	Y
262	S033471				15.05.1983	GUNAY Reha	24x36	Y
263	S033472	CD00044	IMG0074		15.05.1983	GUNAY Reha	24x36	Y
264	S033473				15.05.1983	SKIDMORE OWINGS _	24x36	Y
265	S033474				15.05.1983	GUNAY Reha	24x36	Y
266	S033475				15.05.1983	GUNAY Reha	24x36	Y
267	S033476				15.05.1983	GUNAY Reha	24x36	Y
268	S033477				15.05.1983	GUNAY Reha	24x36	Y
269	S033478	CD00044	IMG0051		15.05.1983	SKIDMORE OWINGS _	24x36	Y
270	S033479				15.05.1983	GUNAY Reha	24x36	Y
271	S033480				15.05.1983	GUNAY Reha	24x36	Y
272	S033481				15.05.1983	GUNAY Reha	24x36	Y
273	S033482				15.05.1983	GUNAY Reha	24x36	Y
274	S033483				15.05.1983	GUNAY Reha	24x36	Y
275	S033484				15.05.1983	GUNAY Reha	24x36	Y
276	S033485				15.05.1983	GUNAY Reha	24x36	Y
277	S033486				15.05.1983	GUNAY Reha	24x36	Y
278	S033487				15.05.1983	GUNAY Reha	24x36	Y
279	S033488				15.05.1983	GUNAY Reha	24x36	Y
280	S033489				15.05.1983	GUNAY Reha	24x36	Y
281	S033490				15.05.1983	GUNAY Reha	24x36	Y
282	S033491				15.05.1983	GUNAY Reha	24x36	Y
283	S033492				15.05.1983	GUNAY Reha	24x36	Y
284	S033493				15.05.1983	GUNAY Reha	24x36	Y
285	S033494				15.05.1983	GUNAY Reha	24x36	Y
286	S033495				15.05.1983	GUNAY Reha	24x36	Y
287	S033496				15.05.1983	GUNAY Reha	24x36	Y
288	S033497				15.05.1983	GUNAY Reha	24x36	Y
289	S033498				15.05.1983	GUNAY Reha	24x36	Y
290	S033499				15.05.1983	GUNAY Reha	24x36	Y
291	S033500				15.05.1983	GUNAY Reha	24x36	Y
292	S033501				15.05.1983	GUNAY Reha	24x36	Y
293	S033502				15.05.1983	GUNAY Reha	24x36	Y
294	S033503				15.05.1983	GUNAY Reha	24x36	Y
295	S033504				15.05.1983	GUNAY Reha	24x36	Y
296	S033505				15.05.1983	GUNAY Reha	24x36	Y
297	S033506				15.05.1983	GUNAY Reha	24x36	Y
298	S033507				15.05.1983	GUNAY Reha	24x36	Y
299	S033508				15.05.1983	GUNAY Reha	24x36	Y
300	S033509				15.05.1983	GUNAY Reha	24x36	Y

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No	VM Num	CD Id	IMG Ord	VM Title	Date	Photographer	Format	Copyright
301	S033510				15.05.1983	GUNAY Reha	24x36	Y
302	S033511				15.05.1983	GUNAY Reha	24x36	Y
303	S033512				15.05.1983	GUNAY Reha	24x36	Y
304	S033513				15.05.1983	GUNAY Reha	24x36	Y
305	S033514				15.05.1983	GUNAY Reha	24x36	Y
306	S033515				15.05.1983	GUNAY Reha	24x36	Y
307	S033516				15.05.1983	GUNAY Reha	24x36	Y
308	S033517				15.05.1983	GUNAY Reha	24x36	Y
309	S033518				15.05.1983	GUNAY Reha	24x36	Y
310	S033519				15.05.1983	GUNAY Reha	24x36	Y
311	S033520				15.05.1983	GUNAY Reha	24x36	Y
312	S033614				15.05.1983	GUNAY Reha	6x9	Y
313	S033615				15.05.1983	GUNAY Reha	6x9	Y
314	S033616				15.05.1983	GUNAY Reha	6x9	Y
315	S033617				15.05.1983	GUNAY Reha	6x9	Y
316	S033618				15.05.1983	GUNAY Reha	6x9	Y
317	S033619				15.05.1983	GUNAY Reha	6x9	Y
318	S033620				15.05.1983	GUNAY Reha	6x9	Y
319	S033621				15.05.1983	GUNAY Reha	6x9	Y
320	S033622				15.05.1983	GUNAY Reha	6x9	Y
321	S033623				15.05.1983	GUNAY Reha	6x9	Y
322	S033624				15.05.1983	GUNAY Reha	6x9	Y
323	S033625				15.05.1983	GUNAY Reha	6x9	Y
324	S033626				15.05.1983	GUNAY Reha	6x9	Y
325	S033627				15.05.1983	GUNAY Reha	6x9	Y
326	S033628				15.05.1983	GUNAY Reha	6x9	Y
327	S033629				15.05.1983	GUNAY Reha	6x9	Y
328	S033630				15.05.1983	GUNAY Reha	6x9	Y
329	S033631				15.05.1983	GUNAY Reha	6x9	Y
330	S033632				15.05.1983	GUNAY Reha	6x9	Y
331	S033633				15.05.1983	GUNAY Reha	6x9	Y
332	S033634				15.05.1983	GUNAY Reha	6x9	Y
333	S033635				15.05.1983	GUNAY Reha	6x9	Y
334	S033636				15.05.1983	GUNAY Reha	6x9	Y
335	S033637				15.05.1983	GUNAY Reha	6x9	Y
336	S033638				15.05.1983	GUNAY Reha	6x9	Y
337	S033639				15.05.1983	GUNAY Reha	6x9	Y
338	S033640				15.05.1983	GUNAY Reha	6x9	Y
339	S033641				15.05.1983	GUNAY Reha	6x9	Y
340	S033642				15.05.1983	GUNAY Reha	6x9	Y
341	S033643				15.05.1983	GUNAY Reha	6x9	Y
342	S033644				15.05.1983	GUNAY Reha	6x9	Y
343	S033645				15.05.1983	GUNAY Reha	6x9	Y
344	S033646				15.05.1983	GUNAY Reha	6x9	Y
345	S033647				15.05.1983	GUNAY Reha	6x9	Y
346	S033648				15.05.1983	GUNAY Reha	6x9	Y
347	S033649				15.05.1983	GUNAY Reha	6x9	Y
348	S033650				15.05.1983	GUNAY Reha	6x9	Y
349	S033651				15.05.1983	GUNAY Reha	6x9	Y
350	S033652				15.05.1983	GUNAY Reha	6x9	Y

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No	VM Num	CD Id	IMG Ord	VM Title	Date	Photographer	Format	Copyright
351	S033653				15.05.1983	GUNAY Reha	6x9	Y
352	S033654				15.05.1983	GUNAY Reha	6x9	Y
353	S033655				15.05.1983	GUNAY Reha	6x9	Y
354	S033656				15.05.1983	GUNAY Reha	6x9	Y
355	S033657				15.05.1983	GUNAY Reha	6x9	Y
356	S033658				15.05.1983	GUNAY Reha	6x9	Y
357	S033659				15.05.1983	GUNAY Reha	6x9	Y
358	S033660				15.05.1983	GUNAY Reha	6x9	Y
359	S033661				15.05.1983	GUNAY Reha	6x9	Y
360	S033662				15.05.1983	GUNAY Reha	6x9	Y
361	S033663				15.05.1983	GUNAY Reha	6x9	Y
362	S033664				15.05.1983	GUNAY Reha	6x9	Y
363	S033665				15.05.1983	GUNAY Reha	6x9	Y
364	S033666				15.05.1983	GUNAY Reha	6x9	Y
365	S033667				15.05.1983	GUNAY Reha	6x9	Y
366	S033668				15.05.1983	GUNAY Reha	6x9	Y
367	S033669				15.05.1983	GUNAY Reha	6x9	Y
368	S033670				15.05.1983	GUNAY Reha	6x9	Y
369	S033671				15.05.1983	GUNAY Reha	6x9	Y
370	S033672				15.05.1983	GUNAY Reha	6x9	Y
371	S033673				15.05.1983	GUNAY Reha	6x9	Y
372	S033674				15.05.1983	GUNAY Reha	6x9	Y
373	S033675				15.05.1983	GUNAY Reha	6x9	Y
374	S033676				15.05.1983	GUNAY Reha	6x9	Y
375	S033677				15.05.1983	GUNAY Reha	6x9	Y
376	S033678				15.05.1983	GUNAY Reha	6x9	Y
377	S033679				15.05.1983	GUNAY Reha	6x9	Y
378	S033680				15.05.1983	GUNAY Reha	6x9	Y
379	S033681				15.05.1983	GUNAY Reha	6x9	Y
380	S033682				15.05.1983	GUNAY Reha	6x9	Y
381	S033683				15.05.1983	GUNAY Reha	6x9	Y
382	S033684				15.05.1983	GUNAY Reha	6x9	Y
383	S033685				15.05.1983	GUNAY Reha	6x9	Y
384	S033686				15.05.1983	GUNAY Reha	6x9	Y
385	S033687				15.05.1983	GUNAY Reha	6x9	Y
386	S033688				15.05.1983	GUNAY Reha	6x9	Y
387	S033689				15.05.1983	GUNAY Reha	6x9	Y
388	S033690				15.05.1983	GUNAY Reha	6x9	Y
389	S033691				15.05.1983	GUNAY Reha	6x9	Y
390	S033692				15.05.1983	GUNAY Reha	6x9	Y
391	S033693				15.05.1983	GUNAY Reha	6x9	Y
392	S033694				15.05.1983	GUNAY Reha	6x9	Y
393	S033695				15.05.1983	GUNAY Reha	6x9	Y
394	S033696				15.05.1983	GUNAY Reha	6x9	Y
395	S033697				15.05.1983	GUNAY Reha	6x9	Y
396	S033698				15.05.1983	GUNAY Reha	6x9	Y
397	S033699				15.05.1983	GUNAY Reha	6x9	Y
398	S033700				15.05.1983	GUNAY Reha	6x9	Y
399	S033701				15.05.1983	GUNAY Reha	6x9	Y
400	S033702				15.05.1983	GUNAY Reha	6x9	Y

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No	VM Num	CD Id	IMG Ord	VM Title	Date	Photographer	Format	Copyright
401	S033703	CD00044	IMG0048		15.05.1983	SKIDMORE OWINGS _	24x36	Y
402	S033704				15.05.1983	SKIDMORE OWINGS _	24x36	Y
403	S033705				15.05.1983	SKIDMORE OWINGS _	24x36	Y
404	S033706				15.05.1983	SKIDMORE OWINGS _	24x36	Y
405	S033707				15.05.1983	SKIDMORE OWINGS _	24x36	Y
406	S033708				15.05.1983	SKIDMORE OWINGS _	24x36	Y
407	S033709				15.05.1983	SKIDMORE OWINGS _	24x36	Y
408	S033710				15.05.1983	SKIDMORE OWINGS _	24x36	Y
409	S033711				15.05.1983	SKIDMORE OWINGS _	24x36	Y
410	S033712	CD00044	IMG0086		15.05.1983	SKIDMORE OWINGS _	24x36	Y
411	S033713				15.05.1983	SKIDMORE OWINGS _	24x36	Y
412	S033714				15.05.1983	SKIDMORE OWINGS _	24x36	Y
413	S033715				15.05.1983	SKIDMORE OWINGS _	24x36	Y
414	S033716				15.05.1983	SKIDMORE OWINGS _	24x36	Y
415	S033717				15.05.1983	SKIDMORE OWINGS _	24x36	Y
416	S033718				15.05.1983	SKIDMORE OWINGS _	24x36	Y
417	S033719				15.05.1983	SKIDMORE OWINGS _	24x36	Y
418	S033720	CD00044	IMG0064		15.05.1983	SKIDMORE OWINGS _	24x36	Y
419	S033721				15.05.1983	GUNAY Reha	24x36	Y
420	S033722				15.05.1983	GUNAY Reha	24x36	Y
421	S033723				15.05.1983	GUNAY Reha	24x36	Y
422	S033724				15.05.1983	GUNAY Reha	24x36	Y
423	S033725				15.05.1983	GUNAY Reha	24x36	Y
424	S033726				15.05.1983	GUNAY Reha	24x36	Y
425	S033727				15.05.1983	GUNAY Reha	24x36	Y
426	S033728				15.05.1983	GUNAY Reha	24x36	Y
427	S033729				15.05.1983	GUNAY Reha	24x36	Y
428	S033730				15.05.1983	GUNAY Reha	24x36	Y
429	S033731				15.05.1983	GUNAY Reha	24x36	Y
430	S033732				15.05.1983	GUNAY Reha	24x36	Y
431	S033733				15.05.1983	GUNAY Reha	24x36	Y
432	S033734				15.05.1983	GUNAY Reha	24x36	Y
433	S033735				15.05.1983	GUNAY Reha	24x36	Y
434	S033736				15.05.1983	GUNAY Reha	24x36	Y
435	S033737				15.05.1983	GUNAY Reha	24x36	Y
436	S033738				15.05.1983	GUNAY Reha	24x36	Y
437	S033739				15.05.1983	GUNAY Reha	24x36	Y
438	S033740				15.05.1983	GUNAY Reha	24x36	Y
439	S033741	CD00044	IMG0088		15.05.1983	GUNAY Reha	24x36	Y
440	S033742	CD00044	IMG0091		15.05.1983	GUNAY Reha	24x36	Y
441	S033743				15.05.1983	SKIDMORE OWINGS _	24x36	Y
442	S033744				15.05.1983	SKIDMORE OWINGS _	24x36	Y
443	S033745				15.05.1983	SKIDMORE OWINGS _	24x36	Y
444	S033746				15.05.1983	SKIDMORE OWINGS _	24x36	Y
445	S033747				15.05.1983	SKIDMORE OWINGS _	24x36	Y
446	S033748				15.05.1983	SKIDMORE OWINGS _	24x36	Y
447	S033749				15.05.1983	GUNAY Reha	24x36	Y
448	S033750	CD00044	IMG0069		15.05.1983	GUNAY Reha	24x36	Y
449	S033751				15.05.1983	SKIDMORE OWINGS _	24x36	Y
450	S033752				15.05.1983	SKIDMORE OWINGS _	24x36	Y

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No	VM Num	CD Id	IMG Ord	VM Title	Date	Photographer	Format	Copyright
451	S033753				15.05.1983	GUNAY Reha	24x36	Y
452	S033754				15.05.1983	SKIDMORE OWINGS _	24x36	Y
453	S033755				15.05.1983	SKIDMORE OWINGS _	24x36	Y
454	S033756	CD00044	IMG0087		15.05.1983	SKIDMORE OWINGS _	24x36	Y
455	S033757				15.05.1983	GUNAY Reha	24x36	Y
456	S033758				15.05.1983	SKIDMORE OWINGS _	24x36	Y
457	S033759				15.05.1983	SKIDMORE OWINGS _	24x36	Y
458	S033760				15.05.1983	SKIDMORE OWINGS _	24x36	Y
459	S033761	CD00044	IMG0049		15.05.1983	SKIDMORE OWINGS _	24x36	Y
460	S033762				15.05.1983	SKIDMORE OWINGS _	24x36	Y
461	S033763				15.05.1983	SKIDMORE OWINGS _	24x36	Y
462	S033764				15.05.1983	SKIDMORE OWINGS _	24x36	Y
463	S033765				15.05.1983	SKIDMORE OWINGS _	24x36	Y
464	S033766	CD00044	IMG0089		15.05.1983	SKIDMORE OWINGS _	24x36	Y
465	S033767	CD00044	IMG0084		15.05.1983	SKIDMORE OWINGS _	24x36	Y
466	S033768				15.05.1983	GUNAY Reha	24x36	Y
467	S033769				15.05.1983	SKIDMORE OWINGS _	24x36	Y
468	S033770				15.05.1983	SKIDMORE OWINGS _	24x36	Y
469	S033771	CD00044	IMG0052		15.05.1983	SKIDMORE OWINGS _	24x36	Y
470	S033772				15.05.1983	SKIDMORE OWINGS _	24x36	Y
471	S033773				15.05.1983	SKIDMORE OWINGS _	24x36	Y
472	S033774	CD00044	IMG0093		15.05.1983	SKIDMORE OWINGS _	24x36	Y
473	S033775				15.05.1983	SKIDMORE OWINGS _	24x36	Y
474	S033776				15.05.1983	SKIDMORE OWINGS _	24x36	Y
475	S033777				15.05.1983	SKIDMORE OWINGS _	24x36	Y
476	S033778				15.05.1983	SKIDMORE OWINGS _	24x36	Y
477	S033779				15.05.1983	SKIDMORE OWINGS _	24x36	Y
478	S033780				15.05.1983	SKIDMORE OWINGS _	24x36	Y
479	S033781				15.05.1983	SKIDMORE OWINGS _	24x36	Y
480	S033782				15.05.1983	SKIDMORE OWINGS _	24x36	Y
481	S033783				15.05.1983	SKIDMORE OWINGS _	24x36	Y
482	S033784				15.05.1983	SKIDMORE OWINGS _	24x36	Y
483	S033785				15.05.1983	SKIDMORE OWINGS _	24x36	Y
484	S033786				15.05.1983	SKIDMORE OWINGS _	24x36	Y
485	S033787				15.05.1983	SKIDMORE OWINGS _	24x36	Y
486	S033788				15.05.1983	SKIDMORE OWINGS _	24x36	Y
487	S033789				15.05.1983	SKIDMORE OWINGS _	24x36	Y
488	S033790				15.05.1983	SKIDMORE OWINGS _	24x36	Y
489	S033791				15.05.1983	SKIDMORE OWINGS _	24x36	Y
490	S033792				15.05.1983	SKIDMORE OWINGS _	24x36	Y
491	S033793				15.05.1983	SKIDMORE OWINGS _	24x36	Y
492	S033794				15.05.1983	SKIDMORE OWINGS _	24x36	Y
493	S033795				15.05.1983	SKIDMORE OWINGS _	24x36	Y
494	S033796				15.05.1983	SKIDMORE OWINGS _	24x36	Y
495	S033797				15.05.1983	SKIDMORE OWINGS _	24x36	Y
496	S033798				15.05.1983	SKIDMORE OWINGS _	24x36	Y
497	S033799	CD00044	IMG0085		15.05.1983	SKIDMORE OWINGS _	24x36	Y
498	S033799	CD00044	IMG0095		15.05.1983	SKIDMORE OWINGS _	24x36	Y
499	S033800				15.05.1983	SKIDMORE OWINGS _	24x36	Y
500	S033801				15.05.1983	SKIDMORE OWINGS _	24x36	Y

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No	VM Num	CD Id	IMG Ord	VM Title	Date	Photographer	Format	Copyright
501	S033802				15.05.1983	SKIDMORE OWINGS _	24x36	Y
502	S033803				15.05.1983	SKIDMORE OWINGS _	24x36	Y
503	S033804				15.05.1983	SKIDMORE OWINGS _	24x36	Y
504	S033805				15.05.1983	SKIDMORE OWINGS _	24x36	Y
505	S033806	CD00044	IMG0050		15.05.1983	SKIDMORE OWINGS _	24x36	Y
506	S033807				15.05.1983	SKIDMORE OWINGS _	24x36	Y
507	S033808				15.05.1983	SKIDMORE OWINGS _	24x36	Y
508	S033809	CD00044	IMG0094		15.05.1983	SKIDMORE OWINGS _	24x36	Y
509	S033810				15.05.1983	SKIDMORE OWINGS _	24x36	Y
510	S033811				15.05.1983	SKIDMORE OWINGS _	24x36	Y
511	S033812				15.05.1983	SKIDMORE OWINGS _	24x36	Y
512	S033813				15.05.1983	SKIDMORE OWINGS _	24x36	Y
513	S033814				15.05.1983	GUNAY Reha	6x9	Y
514	S033815				15.05.1983	GUNAY Reha	6x9	Y
515	S033816				15.05.1983	SKIDMORE OWINGS _	24x36	Y
516	S033817				15.05.1983	SKIDMORE OWINGS _	24x36	Y
517	S033818				15.05.1983	SKIDMORE OWINGS _	24x36	Y
518	S033819				15.05.1983	SKIDMORE OWINGS _	24x36	Y
519	S033820				15.05.1983	SKIDMORE OWINGS _	24x36	Y
520	S033821				15.05.1983	SKIDMORE OWINGS _	24x36	Y
521	S033822				15.05.1983	SKIDMORE OWINGS _	24x36	Y
522	S033823	CD00044	IMG0098		15.05.1983	SKIDMORE OWINGS _	24x36	Y
523	S033824				15.05.1983	SKIDMORE OWINGS _	24x36	Y
524	S033825				15.05.1983	SKIDMORE OWINGS _	24x36	Y
525	S033826				15.05.1983	SKIDMORE OWINGS _	24x36	Y
526	S033827				15.05.1983	SKIDMORE OWINGS _	24x36	Y
527	S033828				15.05.1983	SKIDMORE OWINGS _	24x36	Y
528	S033829				15.05.1983	SKIDMORE OWINGS _	24x36	Y
529	S033830	CD00044	IMG0082		15.05.1983	SKIDMORE OWINGS _	24x36	Y
530	S033831				15.05.1983	SKIDMORE OWINGS _	24x36	Y
531	S033832				15.05.1983	SKIDMORE OWINGS _	24x36	Y
532	S033833				15.05.1983	SKIDMORE OWINGS _	24x36	Y
533	S033834				15.05.1983	SKIDMORE OWINGS _	24x36	Y
534	S033835				15.05.1983	SKIDMORE OWINGS _	24x36	Y
535	S033836				15.05.1983	SKIDMORE OWINGS _	24x36	Y
536	S033837				15.05.1983	SKIDMORE OWINGS _	24x36	Y
537	S033838				15.05.1983	SKIDMORE OWINGS _	24x36	Y
538	S033839				15.05.1983	SKIDMORE OWINGS _	24x36	Y
539	S033840				15.05.1983	SKIDMORE OWINGS _	24x36	Y
540	S033841				15.05.1983	SKIDMORE OWINGS _	24x36	Y
541	S033842				15.05.1983	SKIDMORE OWINGS _	24x36	Y
542	S033843				15.05.1983	SKIDMORE OWINGS _	24x36	Y
543	S033844				15.05.1983	SKIDMORE OWINGS _	24x36	Y
544	S033845	CD00044	IMG0046		15.05.1983	SKIDMORE OWINGS _	24x36	Y
545	S033846				15.05.1983	SKIDMORE OWINGS _	24x36	Y
546	S033847	CD00044	IMG0047		15.05.1983	SKIDMORE OWINGS _	24x36	Y
547	S033848				15.05.1983	SKIDMORE OWINGS _	24x36	Y
548	S033849				15.05.1983	SKIDMORE OWINGS _	24x36	Y
549	S033850				15.05.1983	SKIDMORE OWINGS _	24x36	Y
550	S033851				15.05.1983	SKIDMORE OWINGS _	24x36	Y

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No	VM Num	CD Id	IMG Ord	VM Title	Date	Photographer	Format	Copyright
551	S033852				15.05.1983	SKIDMORE OWINGS _	24x36	Y
552	S033853				15.05.1983	SKIDMORE OWINGS _	24x36	Y
553	S033854				15.05.1983	SKIDMORE OWINGS _	24x36	Y
554	S033855				15.05.1983	SKIDMORE OWINGS _	24x36	Y
555	S033856				15.05.1983	SKIDMORE OWINGS _	24x36	Y
556	S033857	CD00044	IMG0092		15.05.1983	SKIDMORE OWINGS _	24x36	Y
557	S033858	CD00044	IMG0096		15.05.1983	SKIDMORE OWINGS _	24x36	Y
558	S033859				15.05.1983	SKIDMORE OWINGS _	24x36	Y
559	S033860				15.05.1983	SKIDMORE OWINGS _	24x36	Y
560	S033861				15.05.1983	SKIDMORE OWINGS _	24x36	Y
561	S033862				15.05.1983	SKIDMORE OWINGS _	24x36	Y
562	S033863	CD00044	IMG0097		15.05.1983	SKIDMORE OWINGS _	24x36	Y
563	S033864				15.05.1983	SKIDMORE OWINGS _	24x36	Y
564	S033865				15.05.1983	SKIDMORE OWINGS _	24x36	Y
565	S033866				15.05.1983	SKIDMORE OWINGS _	24x36	Y
566	S033867				15.05.1983	SKIDMORE OWINGS _	24x36	Y
567	S033868				15.05.1983	SKIDMORE OWINGS _	24x36	Y
568	S033869				15.05.1983	SKIDMORE OWINGS _	24x36	Y
569	S033870				15.05.1983	SKIDMORE OWINGS _	24x36	Y
570	S033871				15.05.1983	SKIDMORE OWINGS _	24x36	Y
571	S033872				15.05.1983	SKIDMORE OWINGS _	24x36	Y
572	S033873				15.05.1983	SKIDMORE OWINGS _	24x36	Y
573	S033874				15.05.1983	SKIDMORE OWINGS _	24x36	Y
574	S033875				15.05.1983	SKIDMORE OWINGS _	24x36	Y
575	S033876				15.05.1983	SKIDMORE OWINGS _	24x36	Y
576	S033877				15.05.1983	SKIDMORE OWINGS _	24x36	Y
577	S033878	CD00044	IMG0083		15.05.1983	SKIDMORE OWINGS _	24x36	Y
578	S033878	CD00044	IMG0090		15.05.1983	SKIDMORE OWINGS _	24x36	Y
579	S033879				15.05.1983	SKIDMORE OWINGS _	24x36	Y
580	S033880				15.05.1983	SKIDMORE OWINGS _	24x36	Y
581	S033881				15.05.1983	SKIDMORE OWINGS _	24x36	Y
582	S033882				15.05.1983	SKIDMORE OWINGS _	24x36	Y
583	S033883				15.05.1983	SKIDMORE OWINGS _	24x36	Y
584	S033884	CD00044	IMG0075		15.05.1983	SKIDMORE OWINGS _	24x36	Y
585	S033885				15.05.1983	SKIDMORE OWINGS _	24x36	Y
586	S033886				15.05.1983	SKIDMORE OWINGS _	24x36	Y
587	S033887				15.05.1983	SKIDMORE OWINGS _	24x36	Y
588	S033888				15.05.1983	SKIDMORE OWINGS _	24x36	Y
589	S033889				15.05.1983	SKIDMORE OWINGS _	24x36	Y
590	S033890				15.05.1983	SKIDMORE OWINGS _	24x36	Y
591	S033891				15.05.1983	SKIDMORE OWINGS _	24x36	Y
592	S033892				15.05.1983	SKIDMORE OWINGS _	24x36	Y
593	S033893				15.05.1983	SKIDMORE OWINGS _	24x36	Y
594	S033894				15.05.1983	SKIDMORE OWINGS _	24x36	Y
595	S033895				15.05.1983	SKIDMORE OWINGS _	24x36	Y
596	S033896				15.05.1983	SKIDMORE OWINGS _	24x36	Y
597	S033897				15.05.1983	SKIDMORE OWINGS _	24x36	Y
598	S033898				15.05.1983	SKIDMORE OWINGS _	24x36	Y
599	S033899				15.05.1983	SKIDMORE OWINGS _	24x36	Y
600	S033900				15.05.1983	SKIDMORE OWINGS _	24x36	Y

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No	VM Num	CD Id	IMG Ord	VM Title	Date	Photographer	Format	Copyright
601	S033901				15.05.1983	SKIDMORE OWINGS _	24x36	Y
602	S033902				15.05.1983	SKIDMORE OWINGS _	24x36	Y
603	S033903				15.05.1983	SKIDMORE OWINGS _	24x36	Y
604	S033904				15.05.1983	SKIDMORE OWINGS _	24x36	Y
605	S033905				15.05.1983	SKIDMORE OWINGS _	24x36	Y
606	S033906				15.05.1983	SKIDMORE OWINGS _	24x36	Y
607	S033907				15.05.1983	SKIDMORE OWINGS _	24x36	Y
608	S033908				15.05.1983	SKIDMORE OWINGS _	24x36	Y
609	S033909				15.05.1983	SKIDMORE OWINGS _	24x36	Y
610	S033910				15.05.1983	SKIDMORE OWINGS _	24x36	Y
611	S033911	CD00044	IMG0056		15.05.1983	SKIDMORE OWINGS _	24x36	Y
612	S033912				15.05.1983	SKIDMORE OWINGS _	24x36	Y
613	S033913				15.05.1983	SKIDMORE OWINGS _	24x36	Y
614	S033914				15.05.1983	SKIDMORE OWINGS _	24x36	Y
615	S033915				15.05.1983	SKIDMORE OWINGS _	24x36	Y
616	S111680	CD00044	IMG0078			SKIDMORE OWINGS _	24x36	Y
617	S132689	CD00044	IMG0053		01.05.1983	SKIDMORE OWINGS _	24x36	Y
618	S132690	CD00044	IMG0079		01.05.1983	SKIDMORE OWINGS _	24x36	Y
619	S132691	CD00044	IMG0080		01.05.1983	SKIDMORE OWINGS _	24x36	Y
620	S132692	CD00044	IMG0081		01.05.1983	GUNAY Reha	24x36	Y
621	S135861					GUNAY Reha	6x9	Y
622	S135862					GUNAY Reha	6x9	Y
623	S135863					GUNAY Reha	6x9	Y
624	S135864					GUNAY Reha	6x9	Y

List of Additional Materials

- Photographs
- Slides
- Article in Progressive Architecture , February 1982
- Article in Mimar 4 , April-June 1982