



Transportation News

A Resource for Military Transportation Engineers



Volume 22, September 2001

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Failures at Fairchild AFB Lead to Success

In June 2001 seven test strips were laid for the FY01 Runway Construction project at Fairchild AFB, Washington. The test strips failed to meet contract requirements for density and voids. In general, the asphalt mix used for the test strips were low on voids, high on stability, low on densities (mat and joint), fell on the fine side of the gradation band, and the mat was shoving and check cracking. In other words, the mix was a tender mix. The test strips were removed.

The Transportation Systems Center, providing on-site technical support to U.S. Army Corps of Engineers, Seattle District, attended the preparatory inspection meeting and observed the placement of the hot mix asphalt (HMA) test strips. The Transportation Systems Center helped the field come up with a mix design and suggested changes to the construction procedures to help establish an asphalt mix that would meet specifications.

Recommendations regarding changes to the HMA mix design included using a coarser gradation, less natural sand and less minus 200 material. Recommendations for and improved construction techniques included using heavier rollers, ballasting the rollers, breakdown with a rubber tire roller, cut back joints, changing the rolling pattern, increasing the mat thickness from 2 lifts of 1-1/2 inches to 1 lift of 3 inches, and removing the wedge joint maker. Taking into consideration



Test section at Fairchild AFB. The asphalt pavement is lifting off of the surface. USACE recommended additional rollers to keep up with the paving operation so the mix did not have time to cool.



Most likely roller stopped during laydown on the test section. USACE recommended that contractor keep the rollers moving on the pavement.

these recommendations the contractor successfully laid down a test strip and from then on it was smooth paving. The project also included extensive lighting (see next page for details). The project was successfully completed and Fairchild AFB was able to welcome home the 92nd Air Refueling Wing on 28 July 2001.

(Continued on Page 2)



Construction of the Runway at Fairchild AFB after successfully laying pavement in a test section.

Shoulder Strength for Assault Strips

The shoulders for unsurfaced assault strips should be designed to the same strength as the runway. The reason - on unsurfaced air strips the shoulder can not be accurately delineated from the runway. Therefore use the same thickness to provide equal strength for safety. This is not true for flexible or rigid surfaced assault strips. The edge of the paved strips can be distinguished and easily marked to keep aircraft on the load-bearing surface of the runway.

The following Engineering Technical Letters (ETL) contain criteria on assault strips and are available at www.afcesa.af.mil/Publications/ETLs.

- ✂ ETL 98-5, *C-130 and C-17 Contingency and Training Airfield Dimensional Criteria*
- ✂ ETL 97-9, *Criteria and Guidance for C-17 Contingency and Training Operations on Semi-Prepared Airfields*

For more information contact B.J. Skar, Transportation Systems Center, (402) 221-7262. ✂

Lighting the Way for Head of State

Egyptian President Hosny Mubarak uses the Al Maza Airfield Systems (AAS) when flying into Cairo, Egypt. The U.S. Army Corps of Engineers, Trans Atlantic Center with support from the Transportation Systems Center is upgrading the lighting at Al Maza AAS to better light the way. The \$2.2M project provides airfield lighting to support Category I approach on Runway 36, approach lighting and taxiway lighting. All airfield work will meet ICAO (International Civil Aviation Organization) requirements. The 90% Design Build RFP review conference is scheduled for the week of August 6th at Al Maza.

For more information contact John Gregory, Transportation Systems Center, (402) 221-7267. ✂

Failures at Fairchild AFB Lead to Success (Cont'd)

FY2001 Runway Construction Project included:

- ✂ Removal of 220,000 SY (1,980,000 SF) of existing asphalt (approx. 70,000 tons)
- ✂ Grading and compaction of 220,000 SY of existing subbase
- ✂ Placing, grading and 100% compaction of 37,000 tons of new crushed aggregate base course
- ✂ Placing and compaction of 220,000 SY of new runway and shoulder asphalt which totaled over 40,000 tons
- ✂ Core Drilling 557 (13" diameter by 6" deep holes) in the existing concrete keel for the new centerline and touchdown zone lights
- ✂ Installing 80 new concrete anchors for 80 touchdown zone lights at one end of the runway
- ✂ Sawcutting and sealing 19,000 LF of grooves for wireways in the existing concrete keel for the new conductors
- ✂ 80,000 LF of sawcutting asphalt full depth
- ✂ Installing a total of 637 light cans for the centerline & touchdown zone lights
- ✂ Installing 277 centerline lights and 360 touchdown zone lights
- ✂ Pulling and terminating over 400,000 LF of wire
- ✂ Installing over 300 isolation transformers
- ✂ Installing 6 constant current regulators and 3 new high voltage transformers
- ✂ Applying over 100,000 SF of new paint striping



Completed runway and lighting project at Fairchild AFB

For more information contact the Project Engineer, Paul Wiersma, USACE, Seattle District, (509) 244-5571 ext 223. ✂

Use Your Brain To Cut Stress

Relieve stress by understanding which brain hemisphere is stressed.

If you feel depressed or emotionally overwrought, your stress is in the right hemisphere – the creative, emotional, holistic side

What to do: Switch to your matter-of-fact left hemisphere by doing math, writing factual prose or organizing. The emotional right brain will calm down.

If you feel time-stressed and overburdened, the left hemisphere is involved. Switch to your right brain by singing or playing a sport.

Source: Wellspring Seminars, 355 Park Ave., Newmarket, ON L3Y 1V4 printed in *Communications Briefings*, Volume XX, No. I, 1101 King Street, Suite 110, Alexandria, VA 22314 ✂

Pavement UFCs Hit It Big on TECHINFO

The following pavement-related documents have made the change to Unified Facilities Criteria (UFC) and are available in their new format on the TECHINFO website. To find the documents go to www.hnd.usace.army.mil - Engineering Publications - Tri-Service Unified Facilities Criteria (UFC).

UFC 3-260-02, *Pavement Design for Airfields*

UFC 3-260-03, *Airfield Pavement Evaluation*

UFC 3-270-01, *O&M Asphalt Maintenance and Repair*

UFC 3-270-04, *O&M Concrete Repair*

UFC 3-270-05, *O&M Paver Concrete Surfaced Airfields Pavement Condition Index (PCI)*

Stay posted for more UFC documents to come your way. ✂

FAA Construction Manual Available

Construction Manual for Airfield Pavements by Jack A. Scott, Federal Aviation Administration Northwest Mountain Region, is available on the Internet at www.nw.faa.gov/airports/Standards/PAVEMAN.PDF. The manual is to alert the inspector to important construction details, identify deficiencies that do occur, and to provide information necessary to insure that pavement quality is satisfactory. The manual provides guidance on most aspects of pavement construction from subgrade through asphalt concrete or Portland cement concrete. The intent is not to replace technical publications or contract specifications, but to provide additional information to insure quality-paving projects.

For more information contact Jack Scott, FAA, (425) 227-2622. ✂

MAJCOM Preferences No Longer a Secret

Pssst! We have inside information on the Air Force MAJCOMs, their design preferences that is. Before you get started on a MAJCOM design project contact us at the Transportation Systems Center and we'll share the scoop.

Some of the secrets we're willing to share:

- ✂ Preferred pavement type for hangar access aprons
- ✂ Type of rigid airfield pavement preferred (plain, reinforced, prestressed, fiberous, etc)
- ✂ Key or doweled longitudinal constructions joints preference
- ✂ Type of rigid-flexible pavement interface joint detail preferred
- ✂ When to use drainage layers
- ✂ Preferred drainage layer stabilization
- ✂ Preferred Joint sealant type
- ✂ Whether resin modified pavements are allowed
- ✂ Preferred type of airfield pavement surface texture finish

Call Betty Carmody, Transportation Systems Center, (402) 221-7264 for all the good dirt (cement, sand, etc., too) on the MAJCOMs pavement preferences. Be sure to specify which MAJCOM you are designing for, there is a separate list for each MAJCOM. ✂

Team Work to Solve HMA Pavement Problem

Hot Mix Asphalt (HMA) pavement at Homestead Air Reserve Station, Florida had problems from the start. The pavement constructed in 1996 for the Aircraft Hydrant Fueling System included placing approximately 4 inches of HMA on 3 inches of existing HMA on 4 inches of base over a subgrade with a CBR of 25. The pavement was designed to support Air Force medium-load. Test results reviewed by paving experts indicated that the in-place densities were low (92.15% to 97.65%) and in-place air voids were high (average between 10% and 11%). Project files also indicated that the HMA consisted of 35% of recycled material, which is not acceptable for a surface course. The contractor used much softer Asphalt Cement than specified and density requirements were inadvertently removed from the contract during a contract modification.

Recently a team from HQ AFCESA, National Center for Asphalt Technology (NCAT) and the TSMCX inspected the pavement and met personnel from the Corps' Mobile District (CESAM), Homestead ARS and HQ AFRC. The purpose of the site visit was to develop acceptable repair alternatives. The team recommended three repair options: 1) remove and replace 4 inches of asphalt surface and place a new fuel resistant sealer; 2) remove and replace 2-½ inches of asphalt surface and place a new fuel resistant sealer; or 3) remove 2-½ inches of asphalt surface and replace with Resin Modified Pavement (RMP).

CESAM will prepare cost estimates for each option and forward to HQ AFRC for their consideration. CESAM will also negotiate with the contractor to obtain some money back for repair of the unacceptable HMA pavement. Any additional funding required will have to come from HQ AFRC or Homestead ARS. For more information contact Terry Sherman, Transportation Systems Center, (402) 221-7260. ✂

Tri-Service Team Working Together to Address ASR Problems

The Tri-Services met recently to develop a plan to address requirements of Public Law 106-398: Damage to Aviation Facilities caused by Alkali Silica Reaction (ASR). The law requires military departments to assess the damage caused by ASR and the availability of technologies of preventing, treating or mitigating ASR. The three services cannot spend over \$5M and work must be complete work by 30 Sep 2006. The tri-service team (TSMCX, ERDC, HQUSACE, HQ AFCEA, NAVFAC LANTDIV and NFESC) discussed and revised a proposed plan to evaluate several technologies to mitigate ASR to include demonstration projects, laboratory studies and monitoring of several airfield projects. The technologies/products to be evaluated include low alkali cement, Class F fly ash, ground granulated blast furnace slag (GGBFS), lithium admixture, lithium admixture with Class F fly ash and topical application of lithium solution to treat ASR. The revised plan required about \$2.5M for the next five years with the final report by 30 Sep 2006. The three services are now seeking funds to support this plan.

For more information contact Ray Rollings, ERDC, (603) 646-4821. ✉

Web Site Available for Boeing Aircraft

Boeing has a web page at www.boeing.com/assocproducts/aircompat/#3 that gives aircraft Characteristics for Airport Planning. Information that can be obtained from the site includes airplane descriptions, ground maneuvering, operating conditions, scale drawings, and more. ✉

Airfield Paving Workshops Improves Construction Results

Want to improve construction on your next airfield-paving job? The Transportation Systems Center provides on-site Airfield Paving Workshops on how to construct quality hot-mix asphalt (HMA) and portland cement concrete (PCC) airfield pavements. Workshops are provided for Corps Quality Assurance (QA) staff, contractor and subcontractor Quality Control (QC) and construction staff, materials suppliers, and testing personnel. Corps designers, local Air Force Base Civil Engineers (BCE) and any Director of Public Works staff are also invited to attend.

The workshops are tailored to specific project requirements and are usually one day for HMA paving and two days for PCC slipform paving. HMA workshops include overview of HMA, mixing plant operations, placement, compaction, materials testing, QC/QA testing and inspection, control chas, trouble shooting and a review of contract specification 02749. PCC Workshops include mixing plant operations, materials testing, QC/QA testing and inspection, slipform paving, finishing, texturing, curing, grooving, joints, joint sealing, demolition, and review of contract specification 02753.

Recent workshops were held for:

- ✉ Repair Runway 6-24 Project (North Auxiliary Field), Charleston AFB, South Carolina
- ✉ Repair Primary Runway, Tinker AFB, Oklahoma & Upgrade Center Runway, Vance AFB, Oklahoma
- ✉ Personnel at U.S. Army Corps of Engineers, Far East District, Seoul, Korea
- ✉ Keel Replacement, Cannon AFB, New Mexico
- ✉ Ramp Replacement, Kirtland AFB, New Mexico

As explained in the article "Military Construction Management Policy for Airfield Pavement Projects", Volume 21 of *Transportation News*, the workshops are required for all airfield pavement projects with a current working estimate (CWE) over \$5,000,000. Workshops for projects with a CWE less than \$5,000,000 will be provided only when requested by the customer or construction district.

Upcoming workshops will be held at:

- ✉ Fort Campbell, Kentucky (27 – 28 August 2001)
- ✉ Wright-Patterson AFB, Ohio (30 – 31 August 2001)
- ✉ Altus AFB, Oklahoma (5 – 6 September 2001)
- ✉ Pope AFB, North Carolina (January or February 2002)

For more information on the workshops or construction support contact Terry Sherman, Transportation Systems Center, (402) 221-7260. ✉

Ground Vehicle Characteristics Available on the Web

Looking for ground vehicle information to support road design? Go to the web site www.tea.army.mil/si/tb55. The site provides basic characteristics on almost every tactical military vehicle such as width, length, height, wheelbase dimensions and gross-weight. The information is from Technical Bulletin No. 55-46-1/Navy Publication No. P-1055, Standard Characteristics for Transportability of Military Vehicles and Other Outsize/Overweight Equipment. Check the site out. Some vehicles even have photos. ✉

Michael AAF in Need of a New Runway

Critical to the mission of Dugway Proving Ground, Utah, is the runway at Michael Army Airfield (AAF). Dugway is the primary chemical-biological weapon test and evaluation center for the Army. Unique to the installation is the 860,000+ acres of Utah high desert within the fence line. This makes it one of the only installations capable of doing unencumbered training exercises, often involving joint land and air training.

During a visit to Dugway Proving Ground Senator Bennett saw the poor condition of the runway at Michael AAF and recognized the need for rehabilitation. The Senator directed a project be developed to either rehabilitate the existing runway or construct a new one. Cost-benefit analysis determined that construction of a new runway would be more beneficial. A planning charette was conducted (without the aid of the Corps) and a sticker price of \$18 million was determined and forwarded to congress.



Runway at Michael AAF, Dugway Proving Ground, Utah

As Dugway is within the geographic military boundary for the U.S. Army Corps of Engineers' Sacramento District they were given the project to design and provide project management, construction management and fiscal closeout. At a pre-design meeting with the installation and other potential airfield customers a cost of \$28 million price was determined for the "ultimate wish list". In order to generate a viable project that could be

constructed for the \$18 million forwarded to Congress, the Transportation Systems Center was called to a design charette to create ways to comply with current criteria, mission requirements while reducing the total estimated costs. The team successfully reduced the project to \$18 million by: reducing the runway length to 10,000 feet, deleting the main apron from the project, obtaining materials from a quarry to be developed on base and constructing two batch plants (concrete and asphalt) rather than importing in all the materials. The Sacramento District continued to investigate alternatives



High severity cracking on the runway at Michael AAF

(use of recycled materials and refinements to the structural section) and developed a scope for a 12,000-foot runway that still met the \$18 million restriction.

The project to reconstruct the runway was identified as a "congressional add" and was slated for design in FY02 and construction in FY03. However, to date, it has been pushed out into "future year" execution. The installation and AMC Test & Evaluation Command, as well as the Air Force, are concerned, as the existing 13,125 foot asphalt runway is in poor condition and will likely be shut down or will have severe limitations placed on its use very soon.

With so many projects being designed to cost rather than to need an important lesson can be learned from this project. As stated by Paul Feldman, project engineer for Sacramento District, "To avoid such underfunding issues in the future, I would recommend that some good cost engineers be included in each phase in order to bring that expertise into the mix as early as possible".

For more information contact Paul Feldman, USACE Sacramento District, (916) 557-7817. ✉

Changes in the Drainage Layer Specification

Due to the inability to take density tests for open graded material (OGM), the requirement has been eliminated from the drainage layer specification (UFGS-02714A). However, density testing is still required for rapid drainage material (RDM). The OGM will have to rely on the test section to develop a rolling pattern for compaction.

For stabilization, the asphalt criterion has been changed to permit the new Superpave performance graded asphalt cement.

The specification has a new look thanks to Huntsville, it is now in the Unified Facilities Guide Specification (UFGS) format. In addition, the Transportation Systems Center has tailored the specification so that when you are using OGM all you see is the OGM portion of the specification.

For more information contact Dan Boyer, (402) 221-7266, or e-mail dan.j.boyer@usace.army.mil. ✉

Hoge Award Recipient at TSMCX

In recognition of her exceptional service Ms. Bettyjo Carmody of the Transportation Systems Center was granted the General William M. Hoge Award on 15 June 2001. The Hoge Award annually recognizes sustained, unselfish and noteworthy contributions to the Omaha District. Ms. Carmody received the award for exceptional administrative support to the Transportation Systems Center and the Corps of Engineers. Her extraordinary dedication, positive "can do" attitude and selfless service reflect great credit upon her, the Transportation Systems Center and the Corps of Engineers. ✉

U.S. Army's Helipad Clearance Requirements Now a NATO Standard

A Standardization Agreement (STANAG) was submitted for ratification at the NATO Airfield Services Working Group meeting that establishes the U.S. Army's helipad clearance requirements as a NATO standard. The STANAG was ratified by most member nations and is now considered a NATO standard. A ratified standard indicates that the member nations agreed to some degree to the standard. Once a nation has ratified the standard their documents need to be amended to implement the change. For this standard, the U.S. criteria were adopted and therefore no changes will be required for the U.S. By following TM 5-803-7/AFMAN 32-1123(I)/NAVFAC P-971 (soon to be published as UFC 3-260-01), "Airfield and Heliport Planning Criteria" designers are in compliance with the NATO standard.

At the meeting establishing a study to use the U.S. standards for fixed wing airfields as a NATO standard was also proposed. Member nations agreed to have the U.S. submit a proposal for the next meeting. HQ AFCESA and the Transportation Systems Center also presented proposals for further study of airfield pavement issues: ACN/PCN method of reporting pavement strength, PCI method of reporting pavement condition, and a new method of reporting pavement friction. These proposals will be studied in the next meeting in January 2002.

For more information contact B.J. Skar, Transportation Systems Center, (402) 221-7262. ✉

A ship in a safe harbor is safe,
but that is not what a ship is built for.

by William Shedd

Source: Good Stuff, 370 Technology Drive,
PO Box 3019, Malvern, PA 19355-9617 ✉

Teaming Up to Aid the Army in Theater of Operations

U.S. Army Corp of Engineers division and district personnel are "teaming" up to form the newly organized Field Force Engineering (FFE) Infrastructure Teams. Teams have already been set up in the first two divisions, Pacific Ocean Division and North Atlantic Division. These teams bring to the Army's warfare operations the Corps' unique capabilities for complex military construction, management of large-scale infrastructure development, and environmental balance.

FFE is a new term encompassing engineering activities in support of Army deployment operations. Activities of the FFE include:

- ✉ Plan, design, and build the infrastructure
- ✉ Environmental engineering and/or baselining
- ✉ Technical assistance to warfighters
- ✉ Contract construction
- ✉ Real estate acquisition

To prepare for their mission the FFE Infrastructure Teams are receiving training to help Corps personnel understand the Army organization and what type of engineering support will be required during a deployment. Except for a few key personnel, the team will provide technical support from their home office. The process is being tested in the army's contingency training exercises throughout the world. The Transportation Systems Center is supporting the Readiness Branch at HQ USACE with the development of training sessions, concentrating on the evaluation of roads and airfields to support troop movements and on the construction of new transportation facilities.

TeleEngineering is the critical link to the success of the FFE. TeleEngineering is a communications tool supported by personnel from the Engineering Research and Development Center, Waterways Experiment Station. TeleEngineering gives soldiers in the field the capability to quickly send information to sources, tap the technical expertise of Corps and other organizations, and receive an expedient answer to the problem. More information on TeleEngineering is available in Volume 20 of *Transportation News*.

For more information on FFE Infrastructure teams contact Dan Boyer, (402) 221-7266 or B.J. Skar (402) 221-7262 of the Transportation Systems Center. ✉

What's Wrong with this Picture?



Read on to find the correct answer...

PAVER 5.0 Improvements

PAVER allows users to make informed decisions in planning for pavement maintenance and repair projects. With the release of PAVER 5.0 this fall comes many improved features.

The **Tables** area on the menu bar has been enhanced. The system tables are used by all databases regardless of which one is on-line.

- ❖ **Define User Fields - Additional User Fields:** Allows the user to define user-specific fields.
- ❖ **M&R Plan Tables - Major M&R:** Tab 5 is a Priority Table that is a function of branch use and section rank. Branch use priority and section rank priority can be defined by tabs 3 and 4, respectively.
- ❖ **Condition Tools**
 - ❖ **Define Condition and Age Categories:** Allows the user to define ranges for conditions and ages to be used in all reports.
 - ❖ **Select Condition Types:** The user can select conditions that will be shown throughout Paver.
 - ❖ **Define User Distress Indices:** The user can define any distress index for any selected groups of pavements.

Visual Menu options are used when dealing with specific databases.

Enhancements include:

- ❖ **Selectors:** The user can use various selector functions. The selection tools serve as a broadcast system. Making a selection using any of the tools will be reflected throughout the system.
- ❖ **Inventory - Copy and Move Data:** Allows the user to move work history and inspection data among inventory items.
- ❖ **Inspection - All Conditions and Assignments:** Allows user to view the condition and family assignment for any given section. Also available as a new tab in **Inventory\Sections**.
- ❖ **Reports:** Two new options for reports are available.
- ❖ **Flexible Report:** Allows the user to select columns to be used in the report.
- ❖ **GIS Reports:** Provides inventory and PCI data reports.
- ❖ **Condition Analysis - Condition Analysis Report:** Output includes GIS views.
- ❖ **M&R**
 - ❖ **M&R Plan - Plan Mode - Determine Budget Requirements** has been added that allows:
 - ❖ Elimination of backlog in the number of years specified for the plan (under the **Timing** tab).
 - ❖ Determination of budget required to maintain the current PCI or achieve a desirable PCI in the number of years for the plan.
 - ❖ **Policies and Costs** - The user now has the option to use M&R cost by condition for all years. This is useful in determining the consequence of no major M&R for a specified time period.

For your added convenience, PAVER 5.0 also provides:

- ❖ Docking of windows by right clicking the diamond icon
- ❖ The distress manual when you right click on a distress in the **PCI** Inspection form.

For more information, contact Dr. Mo Shahin at CERL, (217) 373-4466, m-shahin@cecer.army.mil, or the Micro PAVER Support Center at (217) 333-5414. ❖

ETL for Snow and Ice Runways

by Ray and Marian Rollings, ERDC

The U.S. military has provided air support to the U.S. Antarctic program since at least the 1960s. The Air Force is currently routinely operating LC-130 and C-130 aircraft in and out of McMurdo Station and surrounding camps for the National Science Foundation (NSF). Less routinely, other USAF aircraft such as the C-5 and C-141 have flown missions to and from McMurdo Station. Snow and ice airfield criteria have evolved over time for these operations, and operations have been conducted without incident. However, the criteria evolved on an ad-hoc basis over the years, and there is no approved Air Force criteria for such conditions. Consequently, a team consisting of Ray Rollings, George Blaisdell, Marian Rollings, and Jason Weale, from the USACE, Cold Regions Research and Engineering Laboratory (CRREL) is preparing a draft Engineering Technical Letter (ETL) for design and evaluation criteria for snow and ice runways.



C-141 aircraft in the Antarctic

The team is pulling together criteria based on older work by CRREL and the Navy at Port Hueneme and incorporating data from trials conducted last December and January at McMurdo Sound to develop a draft ETL. This winter (summer in the Antarctic) an AFCESA pavement evaluation team will conduct an evaluation at McMurdo Sound using the draft ETL criteria. The ETL will then be finalized after the lessons learned from the evaluation have been incorporated. AF-Air Mobility Command, NSF, and AFCESA are sponsoring the development of the ETL.

For more information contact Ray Rollings, ERDC, (603) 646-4821 or Marian Rollings, ERDC, (603) 646-4822. ❖

A Wish Comes True

Ever wish when using the PCASE programs that a vehicle not in the database would magically appear? Now you can create your own magic. Available in PCASE2.0 (at a website near you) is a Vehicle Editor that allows you to input (and edit existing) vehicles in the database.

In order to get vehicles added to the database, PrePCASE2.0, ERDC had to be begged to research and plug in the data. If and when ERDC had the time to do the deed, the database had to be edited for each program (design and evaluation, layered elastic and empirical). Patches or new full setups then had to be sent out to update the database. That's only for airfields – roadways are another subject (see article on page 9).

All that is history now with the dawning of PCASE2.0. Now, with PCASE2.0, there is a reusable software component to add, edit and delete vehicles. The Vehicle Editor is a graphical user interface to a vehicle database, and exposes vehicles and their corresponding properties to the pavement design and evaluation software packages, as well as any future software packages that will require vehicle data.

The vehicle editor was created to allow users of the PCASE software to model any vehicle they encounter in their designs or evaluations of airfields and roads. This component eliminates the restrictions PCASE users often encountered (and whined about) by not having the exact vehicle available to them. So quit your whining and try it out (see article on page 9 for instructions on how to use the Vehicle Editor).

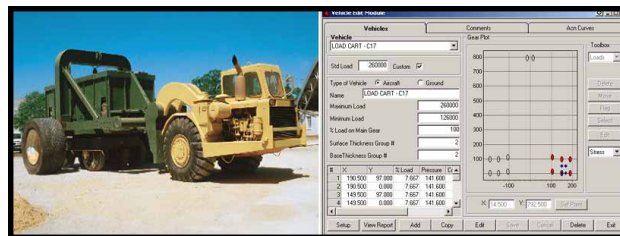
For any problems or questions contact the creator, Robert Walker, ERDC, (601) 634-2145 or PCASE manager, Mary Adolf, (402) 221-7265.

Vehicle Editor Case Study - Accelerated Pavement Testing

By Reed Freeman, ERDC

The Vehicle Edit module has proved to be a valuable tool for designing and analyzing pavement test sections that are trafficked as part of research projects. In these projects, traffic is applied to the pavements with loaded trucks, aircraft load carts, or the Heavy Vehicle Simulator-Aircraft (HVS-A). The figure below shows a load cart for the C-17 aircraft that was built and used recently by the USACE Geotechnical and Structures Laboratory in Vicksburg, MS. The 6-tire C-17 gear is positioned under the green basket, which carries enough lead to simulate an aircraft load. Only the gear carries a significant load; loads from all other tires are negligible. As an example of traffic that can be applied by the HVS-A, the figure shows dual B-52 tires with its corresponding image as modeled in the PCASE Vehicle Editor.

When applying accelerated aircraft traffic to pavement test sections, the loads will typically involve some characteristic that is slightly different than the true aircraft. For example, the C-17 load cart includes a single gear, without the aircraft's adjacent gear. The dual B-52 tires on the HVS-A are applied without the tandem tires that exist on the true aircraft. Also, due to hardware limitations, the B-52 tires were inflated to 1720 kPa (250 psi), rather than their typical level of approximately 2070 kPa (300 psi).



When comparing the performance of these test sections to U.S. Army Corps of Engineers designs, these differences between test section traffic and real traffic need to be considered. The Vehicle Edit module has allowed analyses to include

precise representation of both load carts and HVS-A traffic. Researchers simply define new aircraft, such as "Load Cart C-17" and "HVS-A B-52." Similar to the test section traffic, these vehicles included only six tires and two tires, respectively. In addition, the contact pressure associated with each of these tires matched measured values precisely. Improved representation of test section traffic will lead toward improved developments in both design methods and design criteria.

What's Wrong with this Picture?

Nope this isn't a kiddie ride at the local carnival. Hopefully it was obvious what was wrong with the picture, but what was the cause? Improper spacing of the rail during construction to account for temperature expansion of the rail and leaving the wood shims, used for spacing the rail, in place after construction.

Test Drive the Vehicle Editor

To try out the Vehicle Editor the first thing you will need to do is download the software from the PCASE website at www.pcase.com. The Vehicle Editor is a component of PCASE2.0. *Caution – PCASE2.0 is still being tested so you may encounter bugs. If you do e-mail pest control at support@pcase.com.* Download the file “PCASEFullSetup200.exe” from the “Downloads” link on the website, and install it on your local PC. Once the software is installed, double-click the “EMS Desktop” icon that now appears on your Windows desktop. Follow the steps below to add a vehicle.

Example Walk Trough for the Vehicle Editor - To begin, click the “Vehicle Edit” button in the top tool bar of the desktop. The Vehicle Edit form is now active. The tab labeled “Vehicles” will be automatically selected. The “Setup” button located in the bottom left corner of the form will give you three options: 1) displaying all vehicles 2) displaying aircraft only and 3) displaying ground vehicles only. Whichever option you choose, it will be reflected in the dropdown list located in the top left corner of the form.

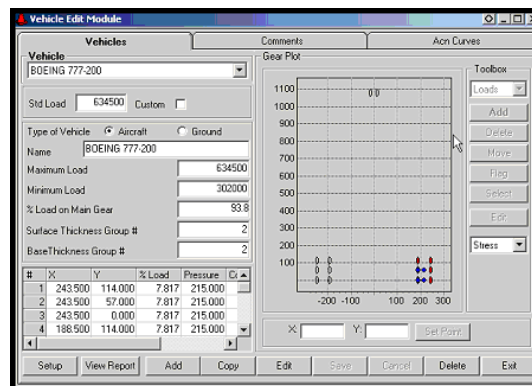
To add vehicles, click the “Add” button located at the bottom of the Vehicle Edit form. The form’s fields will be blank. On the left side of the form, there is a box named “Type of Vehicle”. You may either choose ground or aircraft. For this walkthrough, choose ground. The next step is to add the name of the vehicle. The name you will use is M998, HMMWV, 1.25-ton cargo/troop carrier, 4x4. Now add the maximum and minimum loads for the vehicle. Enter “7900” for the maximum load and enter “5600” for the minimum load. You will also have to add the standard load and that is located above the “Type of Vehicle” box. Enter “7900” for the standard load. The % Load on Main Gear, the Surface Thickness Group #, and the Base Thickness Group # will remain the same. Now you are ready to add the table below.

M998, HMMWV, 1.25-ton Cargo/Troop Carrier, 4x4

Tire #	x-coor	y-coor	% Load	Highest Tire Inflation Pressure	Contact Area (in ²)	Tire shape
1*	35.8	130.00	20	26	60.8	0.49
2*	35.8	0.00	30	26	91.2	0.73

* You do not enter the Tire #. The program does it for you.

You will notice on the right of the form that there is a graph with 2 tires representing the tires you put in the table. The X and Y coordinates are exactly as you entered in the graph. Now you are ready to save this information. Click the “Save” button located at the bottom of the form. When you click save, evaluation stress points are being made (blue dots) and mirror images of the tire locations are being produced. You have now completed the process of adding a vehicle. You can edit a vehicle by clicking the “Edit” button and make your changes accordingly.



Vehicle Editor screen in PCASE2.0

For your added convenience there is a “Comments” tab and “ACN Curves” tab located at the top of the Vehicle Editor form. “Comments” tab allows you to save notes about your vehicle. The “ACN Curves” gives you graphs for your flexible and rigid Aircraft Classification Numbers (ACN).

New Method for Handling Roadway Traffic

With the development of PCASE2.0 there has been much discussion on how to handle traffic for “roadway” design by the CBR method. Problems exist with the current criteria in that there is no way to handle specialty vehicles. One alternative discussed was returning to the method of selecting vehicles and converting them to Equivalent Single Wheel Loads (ESWL). Another alternative would be to convert to standard trucks. Whatever the method for analysis the only apparent change to users will be the traffic input. Users will select the type of ground vehicle using the pavement and how many of each, very similar to the way traffic is handled for airfield design. After the best method of analysis is selected and approved by HQ USACE it will then be implemented into PCASE2.0.

CAPP Program Available on Website

The Contingency Aircraft Parking Planner (CAPP) program developed by Applied Research Associates (ARA) is now available on the PCASE website at www.pcase.com. Since the completion of the program for HQ AF-AMC in 1998 the program has been available but not easily accessible. The PCASE Committee, after a recent demonstration, thought CAPP would be useful to designers for planning aircraft parking, determining airspace requirements and also for providing aircraft information. As a result, PCASE has agreed to put it on the web site and is considering future improvements and integrating it into PCASE2.0.

Kudos to...

Kordon Kiel, Airfield Pavement Engineer with the Transportation Systems Center. Mr. Kiel received a Product Delivery Team Award from Tulsa District for his outstanding efforts on the Runway Keel Project, Tinker AFB, OK. Mr. Kiel provided extensive technical review and consulting services for this Design-Build Airfield Pavement project. Through the continued efforts of the project delivery, the District was able to increase the scope of this project to provide concrete for the north end keel within the Air Force's budget. In addition, the original construction schedule of 289 days was reduced by 35 percent to 198 days.

John Gregory, Airfield Lighting/NAVAIDS Engineer with the Transportation Systems Center. Mr. Gregory received a Certificate of Achievement and Commander's Coin from the 11th Aviation Regiment for his outstanding efforts in support of the Illeshiem Army Airfield Runway Improvement Project. Mr. Gregory provided technical review for the installation of Category I approach and runway lights. His unmatched expertise in aviation lighting assured the aircrews with the best available aeronautical infrastructure.

Terry Sherman, Director of the Transportation Systems Center. Mr. Sherman received a Certificate of Appreciation and Commander's Coin from the Albuquerque District for his outstanding technical support of Albuquerque District on Airfield Pavement Repair Projects at Holloman AFB, Kirtland AFB and Cannon AFB, NM. Services provided included conducting on-site Airfield Paving Workshops, on-site/telephonic technical consulting for each project and providing recommendations for mitigating alkali silica reaction (ASR). Gene Gutierrez, CESPA Materials Specialist and TSMCX Special Consultant also provided outstanding technical support on the above projects.

Did you or someone you know receive an award for transportation-related work? We'd like to acknowledge the hard-working individual and give them a Kudo too. Send your Kudo acknowledgements to Mary Adolf at mary.j.adolf@usace.army.mil.

Bright New Interns Add Expertise to the TSMCX

by Angela O'Connor

Meet Angela O'Connor and Tammy Lambeth, both Department of the Army interns who are spending a portion of their training experience at the Transportation Systems Center. Their training program began in May 2001 when they received their B.S. in Civil Engineering from the University of South Alabama. They are both currently anchored in the Design Branch at the Mobile District.

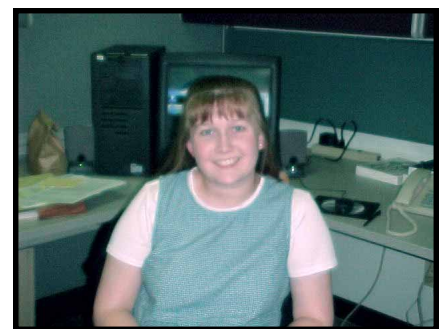


Angela O'Connor, Mobile District, interning at the TSMCX

geotechnical, and environmental. They are also very excited about their future plans to attend training courses that involve pavement construction and design, drainage design, concrete design, surveying, and 1391 preparation. Throughout their time at the Transportation Systems Center, the interns have participated in project reviews, closing out contracts, PCASE2.0 review, and project tracking. Both have enjoyed becoming familiar with the functions and role of the TSMCX as well as picking the minds of the staff.

When they are not training and out of the office, Tammy relaxes by canoeing and playing racquetball and Angela loves to swim, fish, and design with stained glass. Angela married her high school sweetheart, Patrick, a year and a half ago, who is pursuing his Civil Engineering degree. Tammy is currently engaged in planning her upcoming October wedding to Bryan Jilcott.

At the completion of their two-year trek, the ladies hope to find a permanent home in the Design Branch at the Mobile District. ✂



Tammy Lambeth, Mobile District, helping out the TSMCX while in intern program

You must learn from the mistakes of others. You can't possibly live long enough to make them all yourself.

by Sam Levenson

Source: *Communications Briefings*, Volume XX, No. I, 1101 King Street, Suite 110, Alexandria, VA 22314 ✂

New IDC Contract Awarded to HDR

A new Indefinite Delivery Task Order Contract for the Design/Evaluation of Railroads and Roadways Worldwide was awarded to HDR Engineering. The contract is available for use by any Corps district in support of the Army and Air Force construction or maintenance programs through the Transportation Systems Center. The contracts can be used for either military or civil works projects with a \$1 million limit on each task.

This contract can be used for any of the following:

- ✚ Pavement design and evaluation
- ✚ Specialized consulting services
- ✚ Preparation of plans and specifications
- ✚ Incidental facilities or structures design
- ✚ Railroad track design and inspection
- ✚ Nondestructive testing/evaluation
- ✚ Bridge evaluations
- ✚ Evaluation of transportation construction problems

The Transportation Systems Center also has two other IDC contracts available for use:

- ✚ Implementation of Engineering Management Systems (EMS) of PAVER or RAILER
- ✚ Construction Management of Airfields and Roadways Worldwide

To use the contract or to obtain more information contact Dan Boyer, (402) 221-7266, or e-mail dan.j.boyer@usace.army.mil. ✚

Spaces Available in FY 2002 Pavements Technology Courses

The U.S. Army Engineer Research and Development Center (ERDC-MS) at the Waterways Experiment Station, Vicksburg, MS has proposed several short-term courses of instruction for the PROponent SPONSORED Engineer Corps Training (PROSPECT) Program in FY 2002. Course lengths range from five to eight workdays. The courses are a combined effort between ERDC-MS and the U.S. Army Corps of Engineers Professional Development Support Center (PDSC) in Huntsville, Alabama and Headquarters, U.S. Army Corps of Engineers (USACE).

The following list of final courses and dates are for your basic scheduling and planning information.

COURSE	TITLE	HOURS	DATES
050	Flex Pvmnt Construction Quality Verification	36	15-19 Oct 01 29 Apr– 3 May 02
400	Pavement Construction Quality Verification	60	23 Jan – 1 Feb 02
085	Pavement & Drainage Design & Construction	60	26 Feb - 7 Mar 02
115	Pvmnt Eval, Maint, & Repair for Eng & Tech	60	2-11 Apr 02

More detailed information, such as tuition, course descriptions and how to register visit USACE's Professional Development Support Center website at pdsc.usace.army.mil. ✚

Calendar of Events

ACI Fall Convention

Dallas, Texas
28 October – 2 November 2001
www.aci-int.org

Beneficial Use of Recycled Materials in Transportation Applications Conference

Washington, DC
13 – 15 November 2001
Rmrc@rmrc.unh.edu

Computers for Construction 2001 & A/E/C Systems

Philadelphia, Pennsylvania
13 - 15 November 2001
www.aecsystemsfall.com
info@aecsystemsfall.com

NAPA Asphalt Pavement Conference

14 – 16 November 2001
Austin, Texas
Cprouty@hotmail.org

American Concrete Pavement Association Annual Convention

San Diego, California
27 November – 1 December 2001
www.pavement.com/calendar.html

National Pavement Expo/West

Las Vegas, Nevada
29 November – 1 December 2001
www.pavementonline.com

Transportation Research Board

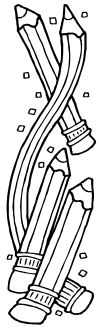
Washington D.C
13 – 17 January 2002
www.trb.org

National Pavement Expo

Nashville, Tennessee
30 January – 2 February 2002
www.pavementonline.com

NAPA's 47th Annual Convention

San Francisco, California
3 – 7 March 2002
www.hotmix.org
cprouty@hotmail.com ✚



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Fax this page to Mary Adolf, Transportation Systems Center, FAX (402) 221-7261 or e-mail a message to mary.j.adolf@usace.army.mil.

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