# Transportation News

A Resource for Military Transportation Engineers

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## In This Issue



## Tri-Service Pavement Team Awarded 2003 NFESC Project Team of the Year

*From the Commanding Officer, Naval Facilities Engineering Service Center, W.J. Beary*

The Tri-Service Pavement Team is organized and headed by the Naval Facilities Engineering Service Center (NFESC) and includes representatives from each Engineering Field Division and Public Works Center, NAVFAC Criteria Office, NAVFAC HQ Public Works, Army ERDC, Army Transportation Systems Center, Air Force Civil Engineer Support Agency, and the Air Force Research Laboratory. The Team defines and validates all criteria for all DOD airfields, provides direct input to the NAVFAC HQ Chief Engineer, and provides direct support to frontline warfighters. (continued on page 2)

***Team members*** *from left to right, first row – CAPT Beary (Navy),Don Alexander (Army), Greg Cline (ESC), Bill Faustman (EFANE), Joe Woliver (EFDLant), Jack Scott (FAA), Greg Hider (EFDSouth); second row – Wayne Marsey (FAA), Steve Bennett (EFDSouth), Jim Greene (Air Force), Jim Dohna (EFDSW), Mike Tsuru (EFDPac), Todd Martin (EFDSouth); third row – Javier Malvar (ESC), Don Bennett (PWC Norfolk), Darrell Bryan (EFDLant), Dave Poage (EFDSW), Karl Cheng (EFDPac), Charlie Schiavino (ESC); fourth row – Mel Hironaka (ESC Ret.), Will Beverly (EFDSouth), Vince Donnally (EICO), Terry Sherman (Army), Gary Ching (CPF N46), Wade Henley (EFDLant); fifth row – Joe Holland (CALTRANS), James Ryan (EFDLant), Ron Kruse (USMC), Gene Gutierrez (Army), Mo Shahin (Army). Additional members recognized but not present: Mary Adolf (Army), Nolan Araracap (EFDSW), Al Bush (Army), Barin Chakrabarti (NAVFAC PW), Rick Donovan (Army), Nelson Eusebio (EFDSW), Jim Lesto (EFDSouth), Lino Macaraeg (EFDSW), Brian Pham (EFDSW), Ray Rollings (Army), Marion Styron (EFDLant), Gene Spaugh (EFDLant), Robert Walker (Army).*

## Not Too Late!

It's not too late to register for the Transportation Systems 2004 Workshop in Fort Lauderdale, Florida, 29 March – 2 April 2004. A workshop registration form and pull-out schedule are enclosed in this issue of the newsletter for your convenience. Register before 1 March 2004 and receive a discounted registration fee of only $250. After 1 March 2004 the price goes up. Fax (361-241-7913) or mail your registration form to International Meeting Planners (address available on the enclosed registration form), or register on-line at www.tsworkshop.net.

# Tri-Service Pavement Team Awarded 2003 NFESC Project Team of the Year (Cont'd)

(Continued from Page 1)

Of specific note, the Team has provided increased safety for pilots and crews with the void detection program, checking all Navy and Marine Corps airfields for possible voids that can result in catastrophic pavement failure. Deficiencies have been discovered at many airfields by the Team and have been repaired before accidents could happen. The Team's methods for improved structural assessments, in coordination with the Army and Air Force have resulted in more accurate load capacity evaluations, which has eliminated or significantly reduced some mission limitations. The Team has directly supported the warfighter, providing technical advice on dust suppressants and rapid repair technologies in Afghanistan, assessing load carrying capacities for the P3 aircraft recovery operations in Hainan China, and supporting field activities at a number of undisclosed activities in the South Pacific. Recent work by the Team resulted in new criteria for runways on glacial ice, and specifically addressed issues for the Pegasus runway on the Ross Ice Shelf that could not be used during summer months. By providing expert consultation and solutions, the Team routinely accomplishes millions of dollars in savings or cost avoidance at Navy airfields around the world. The Team also conducts periodic assessments at all airfields that identify the need for major repairs or upgrades. Often the Team is able to identify lower cost solutions to these major repairs, and provide data to allow for prioritization of scarce resources and organization of timing of repairs.

The Pavements Team represents the consummate "One Facilities Engineer Voice" business model. The many projects completed document the cooperation between NFESC and EFDs, and with other tri-service members of the Team and has been a model for the E-Net Communities of Practice because of the demonstrated benefits of a corporate unified Team approach to airfield maintenance. The Team's contributions will benefit the environment, NFESC, the Navy and DOD for years to come. Congratulations again on this award and thank you for a job "Well done!"

***Go*** *confidently in the direction of your dreams. Live the life you have imagined*

*Henry David Thoreau*

# Specification Revisions

## UFGS 02753, Concrete Pavement For Airfields And Other Heavy-Duty Pavements

The 4th draft of UFGS 02753 is being reviewed by the Tri-Services again. It's expected that the current 112-page TechInfo version will be reduced to 74 pages. Even though nearly 40 pages will be eliminated the specification will include text for the following tailoring options:

- Unit price or lump sum for measurement and payment
- Cylinders and beams or beams only for strength testing/acceptance
- Army/Air Force or Navy agency specific requirements

The Tri-Services will review the specification once again in January 2004 and turn in a manuscript to USACE, Hunstville in February 2004 for publication.

To access and select the different Tailoring Options in the SpecsIntact editor:

- Select Tailoring Options from the drop-down View menu, then
- Highlight the options you wish to retain. The text for the non-highlighted choices will be deleted during subsequent editing.

## UFGS 02921A, Seeding

UFGS 02921A, Seeding, has been revised to incorporate FAA guidance limiting grasses attractive to hazardous wildlife. When used to revegetate disturbed areas adjacent to airfield facilities, millet or large-seed producing grasses can form a hazard to aircraft by attracting foraging birds.

The Seeding specification has been revised in Part 2, Products, to include a Designer's Note on limiting seed types on airfield projects and a bracketed statement that, "Seed mixtures shall not contain millet or any other large-seed producing grass."

The revised specification is available on TechInfo at www.hnd.usace.army.mil/techinfo.

# Navy Favors Corp's Edge Loading Design for Concrete Pavements

At the Tri-Service Pavement Group Workshop held at Port Hueneme, California on 2-4 December 2003 the Navy decided to abandon the Portland Cement Association center load design in favor of Corps of Engineers edge load design. This closed a 30-year-old question on which method to recommend. The UFC 3-260-02 document will be updated to reflect this change.

## Life Cycle Cost of Drainage Layers

Many state and local governments are constructing pavements with permeable bases similar to the DoD. The National Cooperative Highway Research Program (NCHRP) undertook Project 1-34, Performance of Subsurface Pavement Drainage, to study the cost effectiveness of drainage layers for highway pavements. The research concluded that flexible pavements designed with a drainage system are cost effective in extending the pavement's life. This can be very helpful in convincing the DOD installations to agree to fund the additional cost of drainage layers. The report also indicates that day-lighting permeable aggregate bases (only where ditches have adequate depth) can be a very cost-effective design. A summary of the results is published in Research Results Digest number 268, dated November 2002. The document can be found at http://gulliver.trb.org/publications/nchrp/nchrp_rrd_268.pdf.

For DoD roads designed with rigid pavement for tactical vehicle and truck traffic, the Transportation Systems Center recommends the use of a permeable base under the non-reinforced PCC. For rigid roads and parking lots designed primarily for cars and light trucks (design index of 1 and 2), the extra cost of providing a drainable base and subdrains may not be cost effective, given that the structural requirement for these roads is typically less than the minimum 150mm PCC thickness. The designer should consider the benefits of a permeable base to concrete durability in wet-freezing climates and improved ride qualities over the life of the pavement when choosing a design. For more information contact Dan Boyer, USACE Transportation Systems Center, (402) 221-7266 or dan.j.boyer@usace.army.mil.

## What's Wrong with this Picture?

**Read on to find the correct answer...**

## www.internet.addresses

www.hqda.army.mil/acsimweb/homepage.shtml
Army Chief of Staff for Installation Management (ACSIM), the Army proponent for Installations. Site provides organizational links (including links to the Installation Management Agencies (IMAs) and the installations under each IMA), functional links, and references. (continued on page 12)

## Best Practices Manual for Airport PCC Pavement Construction

The Innovative Pavement Research Foundation (IPRF) proudly announces the completion and release of the *Best Practices Manual for Airport Portland Cement Concrete Pavement Construction*. The 159-page user-friendly manual gives construction and inspection practices that, when used, result in long-term pavement performance of airport pavements. The Federal Aviation Administration (FAA) under a Cooperative Agreement with IPRF provided the funding. Soils and Materials Engineers, Inc. (Co-Principal Investigator: Dr. Starr Kohn) and Construction Technology Laboratories Inc. (Co-Principal Investigator: Dr. Shiraz Tayabji) were the prime and sub contractors, respectively, for the project, with Dr. Ray Rollings, USACE-ERDC as a contributing author. Mr. Terry Sherman and Mr. Richard Donovan, USACE-TSC, and Mr. Gene Gutierrez, USACE-Albuquerque, provided feedback at various stages in the development of the manual. An electronic version of the manual is available at www.iprf.org.

## FHWA Clears the Dust with Gravel Road Manual

In hopes of providing clear and helpful information for better maintaining gravel roads the Federal Highway Administration (FHWA) and the State of South Dakota published the Gravel Roads Maintenance and Design Manual. The manual contains guidelines to help answer questions about the maintenance and rehabilitation, drainage, surface gravel, dust control, and stabilization of gravel roads. The manual contains 125-color photos and can be found at http://www.ltapt2.org/gravel/gravelroads.htm.

## Pavement Construction Management Contract Available

The Transportation Systems Center (TSC) has awarded a 5-year Indefinite Delivery Type (IDT) contract to URS Group for Construction Management Services. This contract was developed as a Corps response to Air Force concerns over the quality of airfield pavement construction. The Air Force expects the Corps to have full time QA inspection during the paving operation and the Corps is committed to improving their track record. The contracts can be used to supplement the Corps' QA staff with paving experts during critical paving construction. Laboratory testing can also be included in the scope of work, but each required test will need to be negotiated with the task order. The contracts are set up to transfer contracting officer authority for an individual task order to the appropriate district responsible for the work.

It's been a difficult task disseminating information on the availability of this contract to the appropriate offices and team members. If you are involved in the design of an airfield or major road project, let your project manager and construction personnel know the contract is available for their use. A number of Corps Districts have been very satisfied with their URS Group contract experience. Contracts are also available for the design/evaluation of airfields/railroads/roadways. For more information contact Dan Boyer, (402) 221-7266 or dan.j.boyer@usace.army.mil.

***Nothing*** *is particularly hard if you divide it into small jobs.*

*Henry Ford*

## Sulfate Attack on Recycled Concrete at Holloman AFB, New Mexico

*by Ray Rollings, USACE, ERDC*

Holloman Air Force Base is a difficult place to build. It is located in the Tularosa Basin near Almogordo, New Mexico. The climate is semiarid with 8 to 11 inches of rainfall but the groundwater tends to be high because of the closed basin geology. The subgrade soils are all fine-grained, typically silty soils. Calcium sulfate (gypsum normally) is abundant in the soil and also as beds within the soil layers. Generally, at Holloman, a 2-ft layer of fill is placed over the poor-quality subgrade soils for construction to get out of the loose fine-grained subgrade soils, clear of the water table, and away from the gypsum. Any concrete built in contact with the ground (including the fill) uses Type V sulfate-resistant cement and a rich 7-sack mix to keep the permeability low.

During a major expansion of the base that included two large buildings, an aircraft ramp, access taxiway, roads, sidewalks, etc., the contractor proposed crushing and recycling concrete being removed from an aircraft ramp on the other side of the base. He proposed using this in lieu of the mandated 2-feet of fill and pavement base course. The concrete proposed for recycling was 35 years old, had been built of sulfate resistant cement, and was showing no distress. The existing pavement was being replaced because it was structurally inadequate to support a mission change at the base.

*Heaving at Holloman AFB, NM due to sulfate attack*

The government allowed the recycled concrete to be used. It was placed under good control and with good compaction. When heaving began appearing (see photo) an investigative team consisting of Ray and Marian Rollings, Toy Poole, and Sam Wong at USACE-ERDC and Gene Gutierrez, USACE-Albuquerque was sent out. Investigations found that the recycled material was undergoing sulfate attack, which developed expansive sulfate minerals (ettringite and thaumasite). The results of the heaving were impressive: several doors could not be opened because of upheaval of sidewalks outside the door, a stiff ribbed-mat foundation slab was rippled by the expansive pressures, and aircraft tires were cut by the lip that formed between a drainage trench founded on the subgrade and the adjacent pavement sitting on recycled concrete fill. The affects were so intense that a 6-inch core barrel could not be reinserted into its hole to continue drilling after it had been extracted for 10 minutes. The recycled concrete was under such pressure where the core was taken (through the floor slab of a building) that it was squeezing into the core hole. Drilling had to be continued with a 4-inch core bit.

This unexpected problem could happen again for a variety of still unproven reasons, after all it was sulfate resistant concrete, but from a practical point, recycled concrete should not be used where it will be in contact with sulfates, even if the recycled concrete is made with sulfate-resistant cement. It is not necessarily enough protection!

A draft paper with the gory details of this investigation has been submitted to ASCE for publication. For more information contact Ray or Marian Rollings at raymond.s.rollings@crl02.usace.army.mil or marian.p.rollings@crl02.usace.army.mil.

## Rail Track Standards

To help installations operate in a safe environment Technical Manual 5-628, *Railroad Track Standard*s, gives the required inspection frequency of Army and Air Force railroad tracks. The rail inspections and testing requirements in the manual are supported by the Federal Railway Administration's *Track Safety Standards* published in the Code of Federal Regulations and should be taken seriously by installation personnel. The Transportation Systems Center (TSC) can provide technical support and help obtaining railroad contractors to conduct the inspections.

The manual also requires "internal rail defect inspections" every 3 to 6 years, which requires an ultrasonic testing high-rail machine. This testing is also recommended in the guide specifications when relay rail is utilized for replacement rail in maintenance operations. The TSC has recently experienced some difficulties writing a contract with the two prime contractors that provide these services. The TSC is in the process of negotiating new contract liability language that is agreeable to both the government and the contractors. If your organization has been successful in contracting the ultrasonic testing machine or if you would like more information on rail inspection services, contract Dan Boyer, TSC, (402) 221-7266 or dan.j.boyer@usace.army.mil.

## Wanted…

PCASE (Pavement-Transportation Computer Assisted Structural Engineering) is looking for Districts to host the FY04 PCASE Regional Workshops. We've been all over the World and now we need you to pick our next stops.

PCASE is the software used for the design and evaluation of pavements (airfields and roadways). To help users understand how to use the many facets of the software we offer hands-on workshops. Our workshops have been very successful at not only demonstrating and providing hands-on use of the software but also in providing the engineering background (criteria) used in design and evaluation.

Generally the workshops are hosted by the Corps of Engineers (at no cost to the Districts with the exception of the minimal time it takes to set things up) and are free to participants. Sorry, but for all non-USACE hosting agencies we have to charge the hosting agency a fee (for the instructors' time, travel and per diem), but it's still free for participants.

The hosting agency only needs to provide the date, time and space (and preferably computers). We like to have room for 20 attendees and computers (including power sources). It's a bonus when the hosting agency can provide the computers too, but it's not necessary for we can have attendees bring their laptops. We'll provide a list of hardware requirements.

The hosting agency sets the agenda and topics to focus on (design and/or evaluation). The workshop is usually 2 days in length (3 days if we cover layered elastic evaluation). The hosting agency gets first grabs at the number of seats we save for them. If there is more room available we invite other DOD agencies and then non-DOD participants.

A sample agenda is available on the Workshop page of the PCASE website at www.pcase.com. If you are interested in hosting a workshop contact Mary Adolf, (402) 221-7265 or mary.j.adolf@usace.army.mil.

## ASTM D 6690-01 Combines Standards

*by Nick Dubas, USACE DA Intern*

In case you haven't heard… The American Society of Testing Materials (ASTM) implemented ASTM D 6690-01, "Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements" on 10 June 2001. The standard combines ASTM D1190, "Specification for Concrete Joint Sealer, Hot-Applied Elastic Type," ASTM D 3405, "Specification for Joint Sealants, Hot-Applied, for Concrete and Asphalt Pavements," and Federal Specification SS-S-1401C. The specification classifies materials into four types:

**Type I**
Sealant capable of maintaining an effective seal in moderate climates (formerly ASTM D 1190).

**Type II**
Sealant capable of maintaining an effective seal in most climates (formerly ASTM D 3405).

**Type III**
Sealant capable of maintaining an effective seal in most climates. Special tests are included (formerly Federal Specification SS-S-1401C).

**Type IV**
Sealant capable of maintaining an effective seal in climates experiencing very cold temperatures.

The Unified Facilities Guide Specification (UFGS-02760A), "Field Molded Sealants For Sealing Joints In Rigid Pavements," has been modified to reflect this change.

# The Transportation System Center's "Coalition of the Willing"

*by Rick Donovan, USACE, Transportation Systems Center*

Early in 2003, the Transportation Systems Center (TSC) assembled a coalition of willing pavement engineers to provide on-site construction assistance in support of the U.S. Air Force's missions in Thumrait, Oman and Base X, Bahrain.

At Thumrait Air Base, Oman, the Air Force's 823rd Red Horse Squadron (RHS) was constructing the largest apron in Red Horse history. This apron was 980 feet wide by 2,100 feet long, slipformed in 20 feet wide lanes, each 16 inches thick. The base course, Portland cement concrete (PCC), and hot mix asphalt concrete (HMAC) materials were supplied by local vendors subcontracted by the U.S. Air Force's on-site AFCAP contractor, RMS.


*Night Paving Operations at Thumrait AB, Oman*

The TSC involvement began in January 2003 by providing submittal review assistance to the 823rd's Director of Operations, Captain Kevin Merritt. As the related construction problems escalated, it became apparent that on-site assistance would be critical to timely construction progress. Working with the 823rd RHS and Mr. Bob Verser at HQ Air Combat Command (HQ ACC), the TSC established a home-office and on-site support staff consisting of a "coalition of the willing" pavement specialists, including: Rick Donovan and Terry Sherman (TSC); Jack Scott (FAA Northwest Mountain Region); Andrew Harrison and Wayne Hodo (ERDC); and Gene Gutierrez (CESPA). Over a period of 6 weeks, January through March 2003, the team personnel rotated in and out, matching the construction progress with the right expertise, as the work progressed from base course, through PCC test-section and production paving, to the startup of the HMAC operation. On-site tasks included continuing review of mix design and materials submittals; plant inspections and trial batch production; coordination with the on-site Gomaco paver representatives; CQC and QA laboratory visits; and full-time inspection during paving operations.

At Base X, Bahrain, the U.S. Air Force was constructing a large ramp, using a local contractor. At HQ ACC's request, Andrew Harrison detoured through Base X on his return from Thumrait AB, and found that the contractor's problems were overwhelming the Air Force's base project engineer. Mr. Harrison's observations, combined with the voluminous TSC comments on the Contractor submittals, indicated that quick action was required to educate the Contractor and maintain the project schedule.

*Paving operations at Base X*

Working with the Corp's Transatlantic Programs Center (CETAC) and Mr. Bob Verser at HQ ACC, the TSC established a home-office and on-site support staff to augment the 384th CES presence. The team consisted of: Terry Sherman and Rick Donovan (TSC); Jamal Fakhouri and Bill Carson (CETAC), John Hawkins (USACE, Omaha), Jim Shoenberger (ERDC), and Gene Gutierrez (USACE, Albuquerque). Over a 5-week period, starting 22 April 2003, the team personnel rotated in and out, matching the construction progress with the right expertise. The work consisted of hands-on calibration of equipment and concrete batch plants and construction of numerous PCC test sections. The Contractor struggled with learning the slip forming operation and eventually abandoned it in favor of fixed-form paving operations. Daily meetings were used to coordinate plant activities and the production laydown, but progress seemed excruciatingly slow. Finally on 14 May 2003 a successful fixed-form test section was laid and the operation geared up for paving the production lanes. Once full production capacity was reached, the team returned home on 23 May 2003, leaving Jamal Fakhouri (CETAC) and Lt. Hassell (384 CES) to oversee the construction until the project was completed.

For more information contact Rick Donovan, USACE-TSC, 402-221-7269 or e-mail richard.l.donovan@usace.army.mil.

# Concrete Expert's Passing Causes Void in Pavement Community

*by Lora L. Johnson, USACE-ERDC*

Dr. Bryant Mather, 85, died Wednesday, 4 December 2002. Dr. Mather was one of the nation's foremost experts on concrete. He retired in 2000 as the Director of the Structures Laboratory of the U.S. Army Engineer Research and Development Center in Vicksburg. While the laboratory director, he managed a staff of 200 employees with a research program of approximately $50 million. He had 59 years of service with the Corps of Engineers and was associated with the Waterways Experiment Station since 1946. Until his death, Dr. Mather continued to serve as Director Emeritus.

President Jimmy Carter made Dr. Mather a charter member of the Senior Executive Service in 1979. He was named the U.S. Army Corps of Engineers Civilian Employee of the Year in 1992. Dr. Mather was also the recipient of the Army's Meritorious Civilian Service Award and the Decoration for Exceptional Civilian Service (twice). Dr. Mather was an honorary member and past president of both the American Concrete Institute and the American Society for Testing and Materials. He was also an honorary member of the American Society of Civil Engineers. Dr. Mather received numerous scientific and engineering awards and honors from professional organizations and societies throughout his distinguished career. He was the author or co-author of almost 800 technical reports and professional papers.

A native of Baltimore, MD, Dr. Mather had a Bachelor's Degree in geology from Johns Hopkins University and did graduate studies at Johns Hopkins and American Universities. He received an honorary doctorate from Clarkson University in 1978. He was also an amateur entomologist and honorary life member of the American Museum of Natural History. Eight species of insects are named *matheri* in his honor. He donated his moth collection, one of the most extensive private collections in the country, to Mississippi State University in 2001.

Dr. Mather was preceded in death by his wife, Katharine. He is survived by friends, co-workers, and professional colleagues worldwide.

# JRAC Program Transforms the U.S. Military's Approach to Rapid Contingency Airfield Engineering

The Joint Rapid Airfield Construction (JRAC) program is a unique research and development effort focused on providing a vitally important capability to the U.S. Military. The program is a U.S. Army sponsored research and development initiative for upgrading existing or constructing new contingency airfields in-theater with a low logistical footprint. Functional areas include airfield site assessment, site selection, construction, soil stabilization, and repair, with all areas focused on speed and efficiency.

# JRAC Program (Cont'd)

The JRAC program is currently a six-year (FY02-FY07) research and development effort being executed by three ERDC laboratories. Specific goals for the JRAC program include:

- Reduce airfield site selection time from the current 4 - 8 days to 2 - 4 days
- Reduce weight of soil stabilizer materials from the current 8 - 10% to 4 - 5 %
- Reduce cure time of stabilized soils from the current 28 days to 1 day
- Reduce time to double airfield throughput by increasing maximum-on-ground (MOG) rating from the current 4 days to 2 days
- Reduce time to construct C-130 / C-17 capable contingency airfield from the current 30-45 days to 15-20 days

JRAC will dramatically increase contingency airfield upgrade and construction capabilities and thereby transform the U.S. military's approach to rapid contingency airfield engineering.

The JRAC program will demonstrate its tools, technologies, and systems developed thus far in a major field exercise this summer. This exercise will include a mock rapid site assessment and selection, and the rapid construction of two C-130 aircraft aprons at Ft. Bragg's Sicily Assault Landing Zone. Current schedule is for the JRAC exercise to take place during 12-18 July 2004, with active participation from several U.S. Military engineering units and the United Kingdom's 12th Brigade Royal Engineers.

For more information visit the JRAC website at https://jrac.erdc.usace.army.mil (it is .mil restricted) or contact Dr. Gary Anderton, USACE-ERDC, (601) 634-2955 or e-mail gary.l.anderton@erdc.usace.army.mil.

## Good Things Found Can be Lessons Learned for All

"The best QC/QA documents of any airfield projects within the past few years, " according to TSC director, Terry Sherman and Gene Gutierrez, USACE-Albuquerque, were found during construction inspection of the Fixed Wing Aircraft Parking Apron, Phase I, at Fort Hood Texas last December. What made the documentation so good? The documentation was completed for each lot and included pay adjustment determination and actual test measurements for smoothness, grade and thickness. It also included profilograph printouts, concrete batch tickets, flexural strength tests results, and edge slump and surface deformation measurements. Inspection of the construction resulted in a few construction deficiencies and several design recommendations for the Phase 2 project. Construction deficiencies included improper key dimensions, missing keys, overworking of joint edge and failure to properly edge the longitudinal construction joint during paving. Design recommendations included: 1) use neoprene compression seals in lieu of hot pour, 2) use dowels in lieu of keys, 3) provide standard joint details, 4) provide elevations at each corner of the slab, 5) stabilize the drainage layer, 6) use new detail for HMA/PCC junction, 7) be sure UFGS 02749 and 02753 are properly edited (no blanks or options), 8) use UFGS in lieu of TXDOT for base course, and 9) delete transverse profilograph requirements.

For more information contact Terry Sherman, USACE-TSC, (402) 221-7260 or terry.w.sherman@usace.army.mil.

## Alaskan Runway Receives Performance Award

The Asphalt Pavement Alliance announced that Runway 10-28 at the United States Air Force's Eareckson Air Station (formerly Sheyma Air Force Station) in Alaska has won a 2002 Perpetual Pavement Award. To qualify for this award, a pavement must meet strict criteria and demonstrate long-life characteristics of Hot Mix Asphalt (HMA), in addition to excellence in design, quality in construction, and value to the public. All winning pavements were constructed at least 35 years ago. Engineers at the National Center for Asphalt Technology (NCAT) evaluated nominations and a panel of industry experts validated the winners.
The award-winning runway was constructed on Shemya Island, part of the Aleutian Island chain. The island, located 1,500 miles west/southwest of Anchorage, Alaska, is just 2 miles long, north to south, and 4 miles wide, east to west. Temperatures range from a high of 63 degrees F to a low of 7 degrees F. Annual average precipitation is 30.3 inches, which includes an annual snowfall of 70 inches.

In 1967, the date upon which the nomination is based, the Army Corps of Engineers, Alaska District, did a major rehabilitation of the 10,000-foot runway, which was constructed during World War II. It reestablished the surface grades of the pavement by removing high spots with a heater-planer and filled in the low areas with one to four lifts of 2 1/2-inch HMA leveling courses. The Corps of Engineers then overlaid the entire runway with a 1 1/2-inch HMA surface course. This rehabilitation allowed the runway to support unlimited twin tandem aircraft operations (C-135 and C-141 aircraft up to 290,000 pounds) for more than 10 years.

In 1976 the runway received a 2-inch HMA overlay after it was hot-planed and leveled. This was the first HMA overlay project that used the Corps of Engineers' new Pay for Performance specifications, which stated that if the contractor did not meet certain requirements for mat density, joint density and asphalt content, its pay would be reduced. The contractor, Dickerson Construction, produced a high-quality HMA overlay.

Evaluations of the runway in 1986 and 1990 showed it was still in excellent shape overall. In 1990, it did receive one 5-foot by 10-foot patch at the centerline. The runway was evaluated again in 1993; there was almost a total absence of cracks of surface deterioration. A pavement condition survey conducted in January 2001 rated the runway as "good" to "very good."

The HMA airfield has performed exceptionally well under severe weather conditions and heavy aircraft loadings for 35 years with only minor repairs. Most runway pavements constructed in Alaska have an approximate life span of 15 to 20 years.
"Air Force leaders in Alaska are extremely proud of the men and women who built the airfield at Eareckson Air Station almost 60 years ago and have maintained it ever since," says Lieutenant Colonel Mark Tissi, 611th Civil Engineer Squadron Commander. "Just as Eareckson was critical to our nation's defense in World War II and throughout the Cold War, the installation continues to be vital as a testbed for developing a Ground-Based Mid-Course Missile Defense system. The durability of its airfield provides a strong foundation for that success."

More information on the Asphalt Pavement Alliances' Perpetual Pavement Award Winners is available at http://www.asphaltalliance.com/upload/APA_Announces_2002_Perpetual_Pavement_Award_Winners.pdf. The full article on Runway 10-28 can be viewed at http://www.concretepaving.com/cpo/article.asp?article_id=61058.

# Air Force Civilian Wins Air Force Engineer Award

*By MSgt. Michael A. Ward, Air Force Civil Engineer Support Agency, Public Affairs*

An Air Force civilian has been named the 2002 Professional Engineer of the year by a major national engineering society.

James L.Greene, a pavements engineer for the Air Force Civil Engineer Support Agency, was named Air Force Federal Engineer of the Year (civilian category) by the National Society of Professional Engineers (NSPE).

Green received the award during a National Engineers Week luncheon in Washington D.C. last year. He was also recognized as one of the top 10 finalists for Federal Engineer of the Year for 2002.

"This award is a personal honor for me, the highlight of a 38-year federal career," he said. "However, design, evaluation, and maintenance of airfield pavements is a team effort that includes AFCESA management, AFCESA pavements teams and engineers, the Air Force major command pavements engineers, Army Corps of Engineers, Navy and Federal Aviation Administration pavements engineers. We work together to develop criteria and standards for the entire airfield community."

Greene is the pavements program manager for AFCESA. His responsibilities include developing standards and criteria for design, evaluation, maintenance and repair of Air Force pavements, providing guidance to MAJCOM and base pavements engineers and technical oversight of the Air Force Pavements Evaluation Team. The pavements team is one-of-a-kind Air Force team responsible for evaluating the strength and viability of airfields throughout the world.

"Our pavements teams routinely perform a valuable service for the Air Force by providing the data needed to manage and keep our airfields in operation," Green said. "They have been especially valuable during Operation Enduring Freedom where they have evaluated more than 40 airfields, providing the basis for aircraft operations."

In 2002, the team received the Commander-in-Chief's Annual Award for Installation Excellence.

Other accomplishments by Mr. Green and the Air Force pavement community include development of a new design manual for airfield pavements, development of common specifications for airfield pavements that can be used by all government agencies and guidance on contingency construction and development of criteria for rapid repair of bomb damaged airfields. Greene also developed and presented criteria to NATO on design and management of NATO airfields.

A unique highlight of his career came in 2001 when he visited Antarctica and worked with Air Mobility Command, the Army Corps of Engineers and the National Science Foundation to publish criteria for a unique snow-covered, ice runway to support AMC operations.

Greene, a long-time Panama City, Florida, resident, has been with AFCESA since 1977. He holds a bachelor's degree in civil engineering from Auburn University and serves on several national and international professional committees. He is a registered professional engineer in Florida and Alabama.

AFCESA is a field operating agency that provides professional support, training, equipment, management practices and computer and technical support to Air Force civil engineers world wide. The 250-person agency is headquartered at Tyndall AFB, Florida.

# Kudos to…

The **Transportation Systems Center** received a Certificate of Commendation from USACE, Pacific Ocean Division, for its vital supporting role in planning, design, construction and renovation of 18 airfield projects within Pacific Ocean Division's Area of Responsibility. The TSC support included technical reviews and workshops on Airfield Paving and Pavement-Transportation Computer Assisted Structural Engineering (PCASE). According to POD, "Terry Sherman and his small staff have been doing an outstanding job of supporting us with professional technical advice in a very timely manner. Notwithstanding the fact that POD is just one of several MSCs and DOD agencies that the TSMCX serves, the TSMCX response has always been insightful and incandescent, in more ways than one."

**Mr. Vince Donnally**, NAVFAC for his recent promotion on the EICO staff. Mr. Donnally has been a long time member of the EICO team and has now been promoted to Special Assistant for Aviation Facilities. His new responsibilities will ensure integration of aviation requirements from NAVAIR, CNI, and CFFC into facility criteria.

## New Additions to PCASE2.06

The PCASE Committee is proud to announce the release of PCASE 2.06. The software for design and evaluation of airfield and roadway pavement can be downloaded from the web site at www.pcase.com.

PCASE 2.06 is now considered the official version and should be used for all Tri-Service designs and evaluations.

In addition to fixing a few minor problems the following features were added for the release of PCASE2.06:

- WinJULEA added to the Utilities menu
- Function added to check for the latest version
- Added Properties Box to allow user to set defaults for such items as Shattered Slab versus First Crack
- Evaluation now automatically saves before running or printing a report
- Works with Windows XP

After you have installed the software there are tools available to help you get started and navigate through the software. On the bottom of the opening screen is a "HELP" button which provides an explanation of each module and a "Getting Started" button which refers you to the PCASE tutorials. If you have never used PCASE, we recommend that you print out the tutorials and follow along as the tutorials guide you through the software. Within the HELP/UTILITIES module (accessible by clicking on the button at the top of the screen) the Help has video instructions (.AVI files) and access to the aforementioned HELP and tutorials.

## PCASE 2004 Projects

The following are PCASE projects being worked on. Many of them will be available this upcoming year.

**PCASE Help File Update** – the PCASE help system is being updated with the latest screen shots and video help files. The example walk-throughs are also being updated.

**PCASE Users Manual –** a comprehensive user's manual for PCASE is being developed.

**Vehicle Editor Sharing System** – a process is being created by which users can share vehicles within the desktop.

**PCASE Design Program Modifications –** modifying the design module to include an option for designing shoulders, adding rigid compaction requirements, providing default dry unit weights and moisture contents for depth of frost penetration and identifying the controlling frost design.

**PCASE Tri-Service Web Portal (Formerly Data Server) –** the tri-service web portal which is a web-based computer system that serves as a central data location for technology transfer of multiple formats of transportation related data is being completed. All resources on this system are accessible from any Internet connected machine.

## PCASE 2004 Projects (cont'd)

**PCASE Computer Based Training** – the computer-based training is being completed and will be posted to the tri-service web portal.

**Data Server Module (DSM) for Concrete Pavement for Airfields Specification UFGS-02753** - a client software module to be used on the Data Server is being completed. This will provide the contractor with software to input UFGS 02753-related information and automatically upload to the Internet site. This will also link to the specification and provide an executive summary of results. At the Data Server site the information will be permanently stored and available for future use (i.e. material source for future construction, litigation for failed construction, pavement evaluation reports, etc).

**One-Screen Airfield Pavement Evaluation (APE) program** – a "one-screen" version of the Airfield Pavement Evaluation program is being developed so users don't need to download the PCASE full setup to run evaluations.

**PCASE/GIS** –all pertinent PCASE modules are being updated to include GPS coordinates.

**On-line Runway Length program** – an on-line runway length program (for Navy criteria) is being developed.

**Automated Estimates for Modulus and CBR** – a system that will guide the user through a series of questions to produce reasonable estimates for material properties, given any level of information, is being completed.

**Uncertainty Analysis for Design** – putting the finishing touches on this program so the user can input ranges for load, structure, etc. and the answer provides a cumulative distribution of necessary thicknesses for design and provides "a feel" for his/her level of conservatism.

## PCASE/PAVER Integration Complete

PCASE and PAVER are now compatible and can be used on the same computer provided you are using PCASE2.04 or later (current version PCASE2.06) and PAVER5.1. PCASE is the software for the design and evaluation of airfield and roadway pavement. PAVER is an Engineered Management System (EMS) designed to assist engineers and managers manage the pavement network, determine maintenance and repair requirements, and direct resources to maximize return on investment. PCASE and PAVER are in the processes of adding more mapping capabilities in preparation for GeoBase integration (process/framework for putting all bases and information in a GIS format).

PCASE2.06 is available for download at www.pcase.com and PAVER5.1 is available through distribution centers identified on the PAVER website at http://owww.cecer.army.mil/paver/Paver.htm.

## Check the Record

USACE Engineering and Construction Bulletin No. 2003-2, *Latest Versions of Technical Instructions (TI) and Unified Facilities Criteria (UFC) Documents*, 21 February 2003, advises that when using a printed or downloaded version of a TI or UFC, be sure to check TECHINFO at www.hnd.usace.army.mil/techinfo/index.asp to ensure that the latest changes are included. Instead of relying on the publication date, printed below the TI or UFC number on each page, check the "Record of Changes" near the front of each document. The publication date, the date under the document number, does not necessarily reflect the date of the latest changes.

## Alaska Engineering Design Information System

*by Terry Tucker, USACE-ERDC*

The Cold Regions Research and Engineering Laboratory (CRREL) and the University of Alaska (UA) are developing a web-accessible Alaska Engineering Design Information System (AEDIS). The AEDIS, available at https://m2.crrel.usace.army.mil/aedis/index.html, consists of an analysis toolkit for engineers using a broad array of geospatial environmental data based on a Geographic Information System (GIS). In its current state of development, the AEDIS contains permafrost distribution, soil distribution, towns and roads, digital elevation and aspect, and other environmental and geographic data layers. The site includes useful climate summaries for over 200 sites in Alaska, along with snow depth and load information and recurrence intervals. Automated toolbox algorithms have been applied to calculate mean freezing, thawing and heating indices. Other calculators are available for daylight length, soil freezing and thawing, and a variety of climate statistics. Mean monthly maps of precipitation and temperature for the State are included. Users can "point and click" on a data site displayed on a map or "drag" over a map region to designate a location of interest, then select from a menu a variety of data layers and climate tabulations for that location. Future improvements to the AEDIS include adding more geospatial environmental data and expanding the engineering tools. Enhancements will allow engineers to use tools to estimate soil bearing capacity, climate change trends, freezing and thawing layer depths, statistics for wind, precipitation, and, snow load estimates, and other engineering parameters derived from calculations requiring geographical and climate data.

Future plans include expanding the concept to other regions of the U.S. using the robust AEDIS platform as a template to develop the Engineering Design Information System (EDIS). The EDIS will allow planners, designers, builders, and operators of infrastructure access to environmental and geographical data like air temperature, snow load and depth, wind speed and direction, permafrost distribution and soil types, hydrology, stream flow prediction, and other design considerations. It is intended to provide essential engineering information for building sites and transportation corridors, to select optimum transportation routes, to design constructed works, and to program facility maintenance, repair, and replacement. It is also designed to allow resource managers to manage their land usage and plan operations. A particular advantage of the EDIS concept is its capability to clearly display trends of climate change and other spatially and temporally varying information. Another advantage is the ease with which the system can be updated. Funding is needed to develop the EDIS.

For more information contact Jerome Johnson, USACE-ERDC, (907) 353-5179, Jerome.B.Johnson@erdc.usace.army.mil, Karen Henry, USACE-ERDC, (603) 646-4188, Karen.S.Henry@erdc.usace.army.mil, or Stephen Flanders, USACE-ERDC, (603) 646-4302, Stephen.N.Flanders@erdc.usace.army.mil.

## What's Wrong with this Picture?

No, it's not a drunk pavement marker. The overlay slipped due to a poor bond.

## www.internet.addresses (cont'd)

www.specs.fhwa.dot.gov
The FHWA launched this new site that features highway construction DOT specifications from across the country. It includes emerging specifications in the areas of quality assurance, performance-related, warranty specifications, and other innovative specifications. You can select from 3 specification categories: Standard Specifications and Supplements, Innovative and Emerging Specifications, and ASTM Publications.

www.pcase.com/workshop.htm
On the PCASE Website at the bottom of the Workshop page, pavement-related PROponent SPonsored Engineer Corps Training (PROSPECT) courses are listed for FY04. A link is provided to find out more information about the offered courses.

www.concretepavements.org
The website contains basic information about the International Society for Concrete Pavements (ISCP), including:

- Background on the organization
- Calendar of Events
- Meeting agenda and minutes

It also contains many interactive features including:

- A link to a forum where members can post questions and discussions concerning technical and Society issues
- A "help wanted" bulletin board, where members can solicit help in reviewing papers, organizing events, soliciting speakers for events, etc.
- Member surveys for providing input to officers, board members and committee chairs in organizing ISCP activities

## Soil bioengineering: Roadside Management Alternative

*by Nick Dubas, DA Intern, USACE, Omaha District*

Looking for a way to incorporate more sustainability concepts into your design or increase your SpiRiT* rating? Consider soil bioengineering…

"Soil bioengineering uses live plants and plant parts as building materials for engineering and ecologically sound solutions to erosion control, slope and stream bank stabilization, landscape restoration, and wildlife habitats." Compared to traditional geotechnical and hydraulic solutions, soil bioengineering provides equal or better economic and environmental results.

Road construction often results in increased soil erosion accompanied by dramatic effects to water, land, and wildlife resources. In the state of Washington, sediment pollution control has become a priority due to the effects on endangered species of salmon. The Washington State Department of Transportation (WSDOT) has taken the initiative to study the benefit-cost analysis of soil bioengineering. After close inspections of 88 potential sites, three sites, located at Chelan, Raymond, and Forks-Lost Creek, were chosen for the study.

The following conclusions were recognized from the analysis:

- Cost savings, based on the life-cycle analysis, were realized in all three projects from the soil bioengineering method.
- Environmental benefits were significant.
- More benefits were generated dollar for dollar in roadside stabilization by the soil bioengineering method than the traditional method.
- If the investment in a traditional method is lump sum, then the soil bioengineering method will probably be more cost-efficient.
- The soil bioengineering's economic efficiency increases throughout the duration of its life cycle.
- A greater increase in soil bioengineering benefits versus those of the traditional method is also realized as the pollutant uptake effectiveness increases.
- Soil bioengineering projects will be favored by lower discount rates. However, unless environmental benefits significantly outweigh the cost savings benefits, the discounting effects will not be strongly evident.
- The environmental benefits of soil bioengineering are more likely to be recognized in urban and industrial areas rather than rural areas in regards to air quality improvements and runoff reduction.
- When environmental compliance is required, soil bioengineering is more likely to be utilized for roadside management than the traditional method.

Soil bioengineering should not be viewed as the only solution to erosion control and slope stability problems, however. Conventional engineering approaches should also be considered in conjunction with soil bioengineering. The production of better economic and environmental results compared to traditional geotechnical and hydraulic solutions has led to soil bioengineering being a viable economic alternative in roadside management.

*(Source: Hagen et. al., Transportation Research Record, No. 1794, Paper No. 02-2101)*

*For more information on SpiRiT see *Transportation News* article "USACE Raises SpiRiT", Volume 23.

# Farmer's Loop Road Site Dedicated to Permafrost Research

*by Marie Darling, ERDC-CRREL Public Affairs Specialist*

**FAIRBANKS, ALASKA-**The U.S. Army Engineer Research and Development Center's (ERDC) Cold Regions Research and Engineering Laboratory (CRREL) and the National Geotechnical Experimentation Sites' (NGES) Geo Council have partnered to advance permafrost research in soils.

Members of ERDC and the Geo Council celebrated with a Farmer's Loop Road dedication ceremony on Sept. 23, 2003 in Fairbanks, Alaska.

CRREL owns and maintains the Farmer's Loop Road site which consists of 135 acres of ice-rich permafrost soils, making it ideal for testing the response of piling and other foundations to permafrost creep and frost-jacking. Geotechnical and transportation research has been conducted at this site since the late 1940's. Past projects have included experimental permafrost foundations, the measurement of frost heave forces on piles, long-term influence of vegetation on permafrost stability, experimental road surfaces, insulation of roads and thawing of permafrost by passive solar means. Most recently, Farmer's Loop Road has been used by CRREL for bioremediation research.

"Farmer's Loop Road can trace its history back to the mid 1940's and the completion of the Alaskan-Canadian Highway, one of the epic construction projects undertaken during World War II. Many people don't realize that the Corps of Engineers played an important role in the ALCAN Highway construction," said Dr. James Houston, ERDC Director, in his dedication ceremony remarks. "The construction of the ALCAN Highway was not without problems and suffered considerable failure due to an almost unknown-at-the-time phenomena called permafrost. It was the difficulties working in cold regions and with permafrost that led to the creation of the site we are standing on today."

With the addition of the Farmers Loop Road site, the NGES Program now has seven sites available to the geo-community to advance the state-of-the-art in the areas of in-situ field testing, field instrumentation, prediction of soil behavior and foundation prototype testing.

The Geo Council serves as a forum for exchanging ideas and information among geo-engineering associations and professions, construction organizations, and government agencies. It was founded in 1996 in recognition of the growing importance of geotechnologies in shaping the American future.

CRREL is one of seven laboratories that comprise the Engineer Research and Development Center (ERDC). The ERDC is the premier research and development facility for the U.S. Army Corps of Engineers with more than 2,000 employees, $1.2 billion in facilities, and an annual research program exceeding $660 million. It conducts research in both military and civil works mission areas for the Department of Defense and the nation.

CRREL is the only Department of Defense laboratory addressing problems and opportunities unique to the world's cold regions. Located in Hanover, N.H., CRREL has field offices in Fairbanks and Anchorage, Alaska.

***Ribbon Cutting Group*** *(from left to right): Mr. James Wuebben, Acting Director, Cold Regions Research and Engineering Laboratory (CRREL); Mr. Joe Roberto, Deputy to the Commander, ERDC, Engineer Research and Development Center (ERDC); Dr. Rick Morrison, Deputy Director, ERDC; Dr. James Houston, Director, ERDC; Dr. Karen Henry, ERDC-CRREL; Dr. Jean Benoît, University of New Hampshire; Mr. Peter Smeallie, Executive Director, The Geo Council.* Image provided by USAERDC/CRREL

# Calendar of Events

**Airport Pavement Design Seminar**
ACPA/Portland Cement Association (PCA)
Skokie (Chicago), IL
9 - 11 February 2004
http://www.pavement.com/Activities/Education/AptDesign.html

**World of Concrete**
Orlando, FL
17 – 20 February 2004
http://www.pavement.com/

**Association of Asphalt Pavement Technologists Annual Meeting**
Baton Rouge, Louisiana
9 – 11 March 2004
www.asphaltechnology.org

**American Concrete Institute Convention**
Washington D.C.
14-18 March 2004
http://www.concrete.org/EVENTS/EVENTS.htm

**World of Asphalt® 2004 Show and Conference**
15-18 March 2004
Nashville, Tennessee
www.worldofasphalt.com

**Transportation Systems 2004 Workshop**
Fort Lauderdale, Florida
29 March – 2 April 2004
www.tsworkshop.net

**Asphalt Pavement Innovations Conference**
Peoria, Illinois
7 - 8 April 2004
www.bradley.edu/continue/file/api04.html.

Continued on page 15

# Southwest Asia (SWA) Airfield Pavement Construction Lessons Learned

*by Rick Donovan, USACE, Transportation Systems Center*

As with any project the lessons learned are as valuable as the final product. The following lessons learned are based on projects at Masirah Island and Thumrait AB, both in Oman, and Base X, Bahrain. They are broken down into general, asphalt, concrete, and base course categories.

**GENERAL (plans and specifications design phase)**

- Local construction likely will use British Standards vs. ASTM standards. Be knowledgeable of British Standards and how they compare to American standards. There is no one-to-one correlation between the ASTMs and British Standards, especially for standard aggregate gradations.
- Require plant equipment to run on a continual basis for a minimum amount of time prior to being accepted. Spare parts should also be required.
- Require a written plan for the delivery/production of materials for the entire supply chain (trucks, drivers, gate clearances, etc.). This makes the contractor actually think of how they are going to provide the product and not just say they can do it.
- Incorporate Liquidated Damages and termination clauses for contractors and subcontractors into contract specifications. An experienced Contracting Officer is needed that will hold the contractor responsible for meeting the specifications. Must have penalties for late delivery of vehicles and materials incorporated into contracts.
- Know the contractor's capabilities and be able to disqualify inappropriate/inadequate contractors from bidding a job.
- Proper planning is essential in support of construction activities. Send in a planning team to the project location months prior to the project start to set up contracts, test materials, rent equipment, etc. Short-notice projects in this region do not do well. Local capabilities of contractors, material properties, etc. must be researched.

**GENERAL (post-award and preconstruction phase)**

- Check contractor qualifications and request references from past projects. Verify that project personnel are qualified and have previous asphalt and/or concrete experience before being assigned to an airfield project. Critical personnel are the project engineer, inspectors, materials testing technicians, and equipment operators. Airfield pavement work cannot be properly done when critical personnel do not have experience in the field and are getting on-the-job-training.
- Conduct Airfield Pavement Workshops – workshops should be conducted before paving operations commence. These workshops provide the opportunity to share lessons learned, identify good construction practices, and establish a common understanding for both the contractor and agency staff.
- The contractor's testing laboratory should be inspected for the type of construction activities being performed prior to the start of the project. Most testing procedures based on ASTM methods require review and changes to the contractor's laboratory equipment and procedures.
- Do not put project personnel on the ground until you're 90% complete on material stockpiling. Material deliveries may take 2 or 3 times longer than promised. An adequate supply of suitable materials must be available prior to starting plant operations.
  Verify that all submittals are complete and accurate. Requiring submittals in .pdf format can expedite e-mailing for review assistance.
- Shutdown projects on windy days with reduced visibility (due to dust and sand in the air). Equipment operations are dangerous with limited visibility.
- Do not increase the project scope after the schedule is already set and expect to stay on same schedule.
- For QA planning purposes use 1 person at each plant and 1 person on each paver when both concrete and asphalt are being placed.

**ASPHALT**

- Verify the batch plant is a modern plant and is in good condition. Check the capacity of the plant and ensure it meets the production requirements for the project. Breakdown periods can be extended when parts cannot be found locally. The plant manufacturer should train operators and maintainers of the plant. An engineer and materials testing technician should be on-site to tweak the Job Mix Formula (JMF) and ensure the plant is operating properly and meeting specifications.
- Verify the equipment for the project is capable of meeting the specifications. Check rental equipment to ensure it will provide the compaction required for airfield quality asphalt.
- Verify that the job mix formulas (JMF) meet specifications by using a third party testing lab working for and paid by the Government. A submittal stating the JMF meets specification should be independently verified.
- Always place an asphalt test strip prior to full scale paving operations. This should be done a week to two weeks prior to a paving start to ensure the operation is ready. Allow for testing time of the test strip cores to verify the JMF meets specifications.
- Asphalt prime/tack coats are usually cutbacks vs. emulsions and actually perform better.

# Southwest Asia (SWA) Airfield Pavement Construction Lessons Learned (Cont'd)

**CONCRETE**

- Larger or multiple plants are needed to support more than 200 cubic yards per hour output. Plant capacity in SWA is smaller than their rated capacity due to increased mixing time for hot, dry aggregates. For example, the plant at Thumrait was rated at 250 cubic yards per hour, but produced at a maximum rate of 180 cubic yards per hour.
- Plant cooling capacity – contractors have capability to provide chilled water; however, these low-slump paving mixes do not include enough water to adequately cool the concrete mass. A chipped ice plant is needed, but none were encountered in SWA. Alternatives are night placement (concrete is still hot since the aggregate stockpiles are exposed to day time sun) and expedient finishing and curing practices.
- Avoid slip-form paving unless the crew is experienced with the equipment and have successful airfield construction experience. It is extremely difficult to "learn as you go" with slip-form paving. Verify the concrete mix design is for slip-form paving (i.e. a stiff mix with good aggregate gradation).
- Good quality aggregates and sand may be difficult to obtain. Aggregates are usually not washed due to scarcity of water and dust content tends to be high. Verify aggregates are tested to meet specifications and do not contain expansive clays or other deleterious materials. Native sand is usually a low quality, wind-blown, rounded sand that is high in silts and clay; and often must be blended with a crushed, manufactured sand to meet ASTM C-33 fine aggregate gradation.
- Protect stockpiles from being contaminated by wind-blown dust and other contaminates.
- Portland cement may not be available in bulk deliveries. Some areas only have Portland cement available in bags, which must be broken down for use in large batch plants.
- Admixtures, pozzolans, joint sealant, epoxy, curing compounds and other ingredients may not be readily available in the country and may need to be shipped from other countries. Dowel bar epoxy and injector systems are hard to find. Contractors want to hand mix and use caulking guns because of cheap labor costs. Full depth saws are hard to find with capacity to saw airfield pavements full depth.
- Avoid placing concrete on windy days (common during the months of March - June). Use wind blocks for concrete until a curing compound can be applied to prevent excessive moisture loss and shrinkage cracks. Proper curing is critical with the wind and heat common in the desert.
- Verify that Slipform pavers are ordered with enough common spare parts and maintenance items to last the duration of the project. The new Gomaco pavers at Thumrait had a vibrator fail every week. The old Gomaco paver at Base X had a number of substandard vibrators.
- Need adequate capacity of forms/stringline to support high volume paving operations. Roughly twice the length of materials should be available so additional lanes can be set while paving another lane.

**BASE COURSE**

- Base course in the region commonly contains a high amount of sand and fines and less course aggregate when compared to common base course material in the U.S. Ensure the material meets specifications and demand the quality in the specifications.

# Calendar of Events (Cont'd)

Continued from page 12

**5th Int'l Conference on Case Histories in Geotechnical Engineering**
New, York, New York
13 - 17April 2004
web.umr.edu/~eqconf/5thCHConf/

**5th Int'l Conference on Cracking in Pavements: Risk, Assessment and Prevention**
Limoges, France
5 - 8 May 2004
www.cp2004.unilim.fr/UK

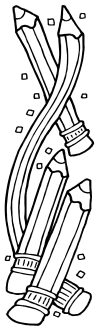
**Design and Construction of Long Lasting Asphalt Pavements Conference**
Sponsored by ISAP, NAPA, US DOT/FHWA, Alabama DOT and APA
Auburn, Alabama
7 – 9 June 2004
www.ncat.us

**American Concrete Institute Convention**
San Francisco, CA
24 - 28 October 2004
http://www.concrete.org/EVENTS/EVENTS.htm

**Transportation Research Board Annual Meeting**
Washington DC
9 January 2005
www.trb.org

***Every** job is the autobiography of the man who did it, so autograph your job with excellence.*

*source unknown*



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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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