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## Memphis Runway Reconstructed in Record Time

Proving high quality, fast track construction is possible in record-setting time, Memphis-Shelby County Airport Authority (MSCAA) reconstructed a 9,300-foot runway, including deep drainage, at the Memphis International Airport in only eight months, approximately five weeks ahead of schedule.

The \$38 million contract at the world's busiest cargo airport was awarded to ACPA member, Lane Construction Corp. Kimley-Horn & Associates was the design consultant. Allen & Hoshall handled construction management.

The new runway, 18R-36L, was built to handle heavy, wide body aircraft including the Airbus A-380. There is no other project with the same magnitude and scope that has been done in such a short time, according to MSCAA.



***The Memphis International Airport has three north-south runways and one east-west runway, all capable of handling heavy, wide-body aircraft.***

The project had a broad scope and was very complicated. The entire runway, utilities, and drainage were demolished. The project consisted of going down as deep as 30 feet in six different places to install the new storm water drainage system, water lines, and sewer.

Proper subgrade preparation was necessary due to Memphis' predominantly clay and silt soil. All the excavated material was mixed with three percent Code L lime to dry it, and placed in stockpiles to be used as the project progressed.

A typical runway section contains six inches of soil cement, eight inches of cement treated base, four inches of open graded asphalt, and 19 inches of concrete. The pavement is thicker than normal because Memphis needs to handle heavier aircraft than most airports because of Federal Express hub operations. Before shutting down Runway 18R-36L for reconstruction, MSCAA spent the previous year reconstructing an adjacent taxiway and turning it into a temporary runway. All involved parties credit the extensive two-year planning process for the success and speedy completion of the project.

MSCAA made sure that the consultants, owner, contractor, and inspectors were all housed in the same complex at the airport. Everyone had immediate access to all team members. The goal was that any problem or issue must be resolved (or on the path to resolution) during the same eight-hour shift, which would save an immense amount of time.

"We went back to basics. We did it the old fashioned way - check, check, and recheck. We made decisions on site, and the contractor was always our teammate, never an adversary. The teamwork and partnering played a tremendous role in the success of the project," said Joe Polk, MSCAA manager of construction administration.



***The runway reconstruction project at Memphis International Airport project was completed 30 days ahead of schedule, giving [The Lane Construction Corp.](#) a \$2.5-million incentive.***

The contractors MSCAA had initially consulted said it would take seven days a week, working around the clock, to complete the project within the nine-month time frame. Lane Construction, however, worked one 12-hour shift per day after they finished the demolition.

"We are very pleased with the performance of the contractors, designers, and suppliers. The project exceeds our expectations in quality, performance standards, and time to construct," said MSCAA president Larry Cox.

## **Concrete Pavement Provides Environmentally Sound Deicing Facility**

***Project wins ACPA 2002 pavement award***

In November of 2000, the Pennsylvania Department of Environmental Protection ordered the construction of an environmentally sound deicing facility at the Pittsburgh International Airport in Pittsburgh, PA.

The facility was expected to accommodate widebody aircraft in time for the 2001-2002 winter season.

The project involved installing more than 71,000 square yards of 16-inch-thick concrete pavement with a high-density polyethylene liner under the entire area.



***The American Concrete Pavement Association named the project a 2002 Excellence in Concrete Pavement Awards winner in the Commercial Service & Military Airports category.***

The project was awarded to Hi-Way Paving, Inc./Trumbull Corp. Joint Venture who used a GOMACO SP-2600 paver and PS-2600 belt placer-spreader to pave alternating lanes of pavement. A Rex Model S batch plant was located on a paved parking lot within ½ mile of the construction site.

A 2,400-lineal-foot network of drains was installed in deep trenches to catch the deicing fluid and move it through 4,600 feet of pipeline as large as 66 inches in diameter on its way to a 1.4-million-gallon holding tank.

Given the time constraints and the added congestion that the construction caused the airport (which had 423,000 aircraft landings the previous year), many phases of the construction were conducted concurrently-adding to the high risk of the project. Nonetheless, the project was turned over to the airport for the deicing season.

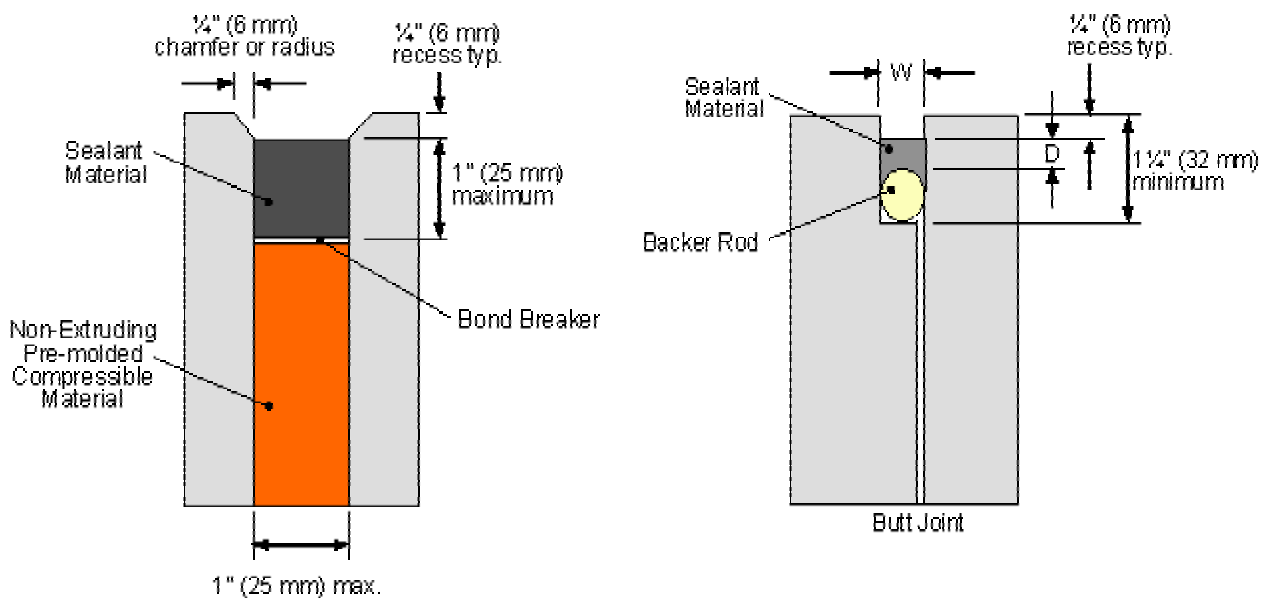
## Technical Tip

# Sealing the Deal

## *A guide to sealing airport pavement joints*

Joint sealants are used in concrete airport pavements to keep out incompressible materials and to minimize water infiltration, reducing the risk of foreign object damage (FOD). To perform well, sealant materials must withstand repeated extension and compression as the pavement slabs expand and contract with temperature and moisture changes. The size and shape of the sealant cross-section affects the sealant material performance. Details 1 through 4 show common sealant configurations for airfield pavements.

For hot-poured sealants, the shape factor ( $W/D$ ) typically equals 1. For silicone and two-component cold-poured sealants, it is typically 2. For preformed compression seals, the  $W$  is normally sized for the slab length and climatic conditions & region of the pavement.



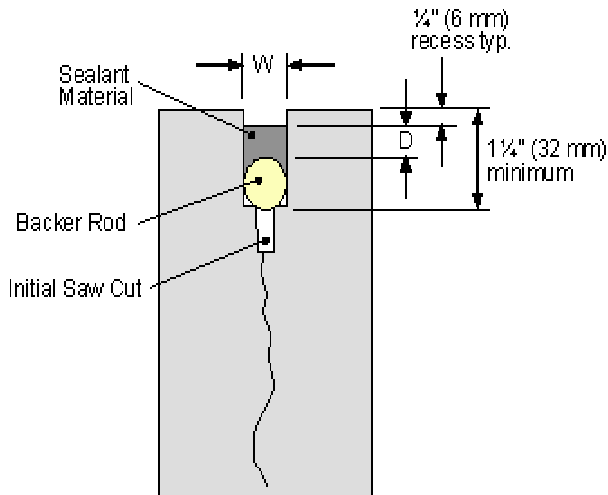
**Detail 1 – Isolation Joint**

**Detail 2 – Construction Joint**

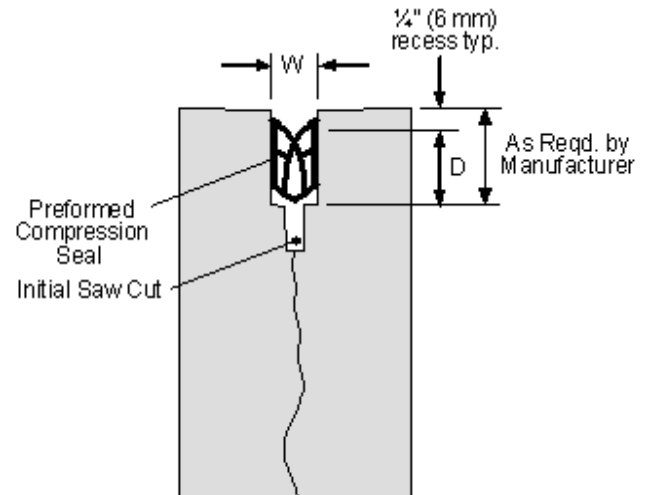
For poured joint sealants, the lower the depth-to-width ratio or shape factor, the lower the strain on the sealant during joint movement.

The required shape factor will depend on the properties of the sealant and the amount of joint movement. Joint movement is related to the joint spacing and to the maximum seasonal temperature change in the slab.

For preformed, compression-type seals, manufacturers provide recommendations for seal widths depending on the slab size and climatic conditions.



**Detail 3 – Field Poured Sealant**



**Detail 4 – Preformed Seal**

For additional information, see ACPA publication "Airfield Joints, Jointing Arrangements and Steel" (TB017P). To order ACPA publications, go to the ACPA website, [www.pavement.com](http://www.pavement.com); call toll-free 1-800-868-6733; or fax requests to 847-966-9666.

Contact [Jim Lafrenz](mailto:Jim.Lafrenz@acpa.com) at 847-966-2272 for more information or if you have any questions about this article. Would you like to submit a technical question? Send an e-mail to [ACPA](mailto:ACPA@acpa.com) or call [Bill Davenport](mailto:Bill.Davenport@acpa.com) or [James Martinez](mailto:James.Martinez@acpa.com) at 847-966-2272.

### **ACPA Literature Showcase**

## **Concrete Pavement Repair Manual**



This pocket-sized field manual (JP002P) is an excellent resource for inspectors, engineers, contractor crews, and anyone involved with concrete pavement repair on both airfields and roadways.

The guidelines cover concrete pavement repair and restoration techniques including full and partial-depth patches, diamond grinding, and load transfer restoration. Numerous photos and diagrams depict the repair scenarios. This manual is an annotated reprint of the U.S. Department of Defense Tri-Services military manual UFC 3-270-04.

**The cost of this publication is \$24.00.** To order JP002P, access <http://www.pavement.com/ecommerce/main.html>; call toll-free 1-800-868-6733; or fax requests to 847-966-9666.

## **Free Registration for World of Concrete Through ACPA**

ACPA encourages early registration for the World of Concrete (February 16-20) through ACPA's website, [www.pavement.com](http://www.pavement.com), and save the \$40 registration fee. This annual trade show for the concrete industry will be held at the Orange County Convention Center, 9800 International Drive, Orlando, Fla.

The world's largest annual trade show for commercial construction is the ultimate showcase for concrete equipment, products, and technology. In February, these three aspects combine to deliver personal interaction with manufacturers, hands-on experience with the latest products and in-depth training from industry experts. More than 50 seminars and demonstrations will feature technical issues including ACPA's "Concrete Pavement Mega-Demo," a demonstration of an unbonded overlay. Register now by clicking on the World of Concrete banner below, or click on the World of Concrete banner on ACPA's website, [www.pavement.com](http://www.pavement.com), and receive the following ... compliments of ACPA.

- **Free registration for exhibits - a \$40 value**
- **Reduced seminar fees - \$10 savings per seminar**



[Click on the logo to register online with the ACPA code.](#)

[Click here to print a registration form to fax with the ACPA code.](#)

Don't miss this opportunity to register for free ... Even if you are not sure which seminars you will be attending, you can always add them to your registration at a later date. Be sure your registration form contains the ACPA registration code: A14.

### ***Concrete Pavement News Digest***

**ACPA Announces Airport Pavement Design Seminar ...** ACPA has scheduled the 2004 Airport Pavement Design Seminar to be held February 9 - 11 ... The 2003 Fall Airport Design Seminar (October 7 - 9) sold out within weeks of its announcement ... ACPA urges those interested to sign up as soon as possible ... Scheduled at ACPA offices in Chicago/Skokie, the three-day seminar is geared toward entry-level and project engineers.

It will consist of: A comparative analysis of the [Federal Aviation Administration](#), [Portland Cement Association](#), and military design methods, an explanation of FAA specifications and design requirements, and preparation for construction and construction techniques for pavements, concrete mix designs, and adjustments ... The seminar is \$650.00 for ACPA members, FAA employees, and state aviation officials; \$875 for nonmembers ... To register, contact [Polina Demidova](#) at 847-966-2272 ...

For more information or questions about the seminar, contact [Jim Lafrenz](#) at 202-842-1010.

**Department of Defense Hosts Transportation Systems Workshop ...** The Department of Defense is hosting a workshop to share innovative technologies in the design, evaluation, maintenance, and construction of airfields, roads, and railroads ... The workshop, titled "Transportation Systems 2004 Workshop," will be held between March 28 and April 2 at the Wyndam Bonadventure Resort, Fort Lauderdale, Fla. ...

**ACI Calls for Papers ...** The American Concrete Institute is calling for presentations on innovative uses of precast concrete systems for pavement construction and rehabilitation ... The presentations will be given at a half-day technical session during the Fall 2004 ACI Convention (October 24 - 28, 2004) in San Francisco, Calif. ... Possible topics include design of precast panels, approaches to installation, and construction case studies ... The deadline to submit an abstract is October 30 ...

**ACPA Concrete Pavement Progress** is published four times a year and covers current practices and case histories in the concrete pavement industry. ACPA **Concrete Pavement Progress** is distributed free of charge to public officials, ACPA members, executive committee, board of directors, and affiliated chapter/state paving associations.

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