FDOT Aviation Office Experience with the TransTech Joint Maker™

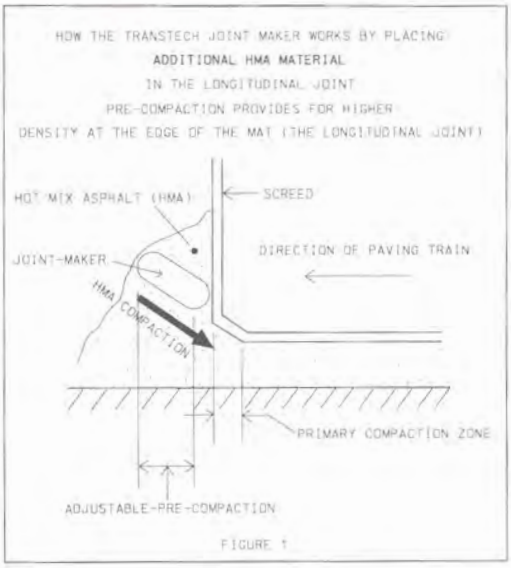
by J. David Scherling, PE, State Airport Pavement Engineer

On airport hot mix asphalt (HMA) pavements, cracks often appear along longitudinal paving lane joints. Where these cracks occur, other problems also appear, such as ravelling and eventual pavement subsidence in the area of the crack due to erosion by water in the crack. These problems are the result of substantially reduced density in the joint area and a substantial difference in density between the mat area and the joint area of the HMA pavement. Consequently, the FAA is very concerned with the "joint density", i.e., the lack of pavement density in the immediate area of the joint and the lack of density uniformity across the paving lanes.

Therefore, with the recent P-401 Plant Mix Bituminous Pavement Specification update, the FAA is requiring joint testing with specific joint density and uniformity standards. The FAA lower specification tolerance limits are 96.3% of laboratory maximum for mat density and 93.3% of laboratory maximum for joint density. Furthermore, when the FAA accepted the FDOT highway HMA specification, P-331, (Type S-1) for airport use, the additional requirement for joint density became even more stringent. FDOT P-331 requires, for 100% payment, that both the mat and joint density be 98% of the control strip density (which must be a minimum of 96% of the maximum laboratory density).

In an effort to meet the new joint density requirements, contractors have taken various steps to establish a paving compaction practice that promotes the higher joint density properties. Several rolling techniques, together with an edge cutting wheel (pizza cutter) have been demonstrated to improve the joint densities and compaction uniformity. For further information, see "Evaluation of Longitudinal Joint Composition Techniques for Asphalt Pavements" by Kendhal and Rau, NCAT, 1994.

During 1995, the opportunity was afforded FDOT Aviation Office to test a relatively new piece of joint density equipment called the TransTech Joint Maker™. Attached to the asphalt paver, the Joint Maker completely automates construction of the longitudinal joint. The equipment improves asphalt paving lane joint density by forcing more HMA material into the joint area and pre-compacting the joint as the paver lays down the mat (see Figure 1). The U.S. Army Corps of Engineers, testing the equipment, have observed results that indicate that the Joint Maker is forcing much greater aggregate interlock at the joint plane. Typically, joints formed by traditional means are dominated by the fine aggregate in the mix. Cores taken on joints formed by the Joint Maker seem to have a significant percentage of larger aggregate spanning the plane of the joint.



The Joint Maker equipment, purchased through a pavement rehabilitation grant, was used on the Perry-Foley Airport taxiway project. Project engineering was furnished by PBS&J of Orlando, FL, and the prime contractor was Anderson Columbia of Lake City, FL. Density results were compared with pavement placed without the use of the equipment. The TransTech representative was on site to aid in the installation and to observe the paving process. The results of cores taken and density test analysis furnished by CAL-TECH TESTING, Inc, are as follows:

Without Joint Maker System	
Mat Average	97.6%
Joint Average	94.6%
Joint Density Reduction	3.0%

With Joint Maker System	
Mat Average	97.0%
Joint Average	95.4%
Joint Density Reduction	1.6%

The joint density was obviously higher using the TransTech equipment, but possibly more important was the uniformity achieved with the joint maker. Further, this improvement was accomplished with little or no hand luting, nor extra costs involved with additional effort such as, the pizza cutter with tack coat. Contractors should note potential significant cost savings which could ultimately translate into reduced project funding.

It remains to be seen what the effects of time, traffic, and weather will be. When the equipment was first introduced, about four years ago, Bruce Loev, P.E., of PBS&J, was project engineer on a test project on the Albany County Airport in New York. He reports that the results were not only readily apparent from the density tests, but that after four years cracks have appeared along the joints paved without the TransTech Joint Maker™. No cracks have occurred where the joint maker was used.

FDOT engineers will continue to monitor the Perry-Foley project, but they are encouraged by the excellent joint density results obtained. With equipment such as TransTech Joint Maker™, reduction of longitudinal joint failure is an obtainable goal. For more information, contact TransTech Systems, Inc. at 1-800-724-6306.

Albany (NY) County Airport
Paved 1991

With Joint Maker
(Photo 1994)

Without Joint Maker
(Photo 1994)

Aviation Office
Florida Department of Transportation
605 Suwannee Street, MS-46
Tallahassee, FL 32399-0450