# Engineering Brief # 18

Date: September 22, 1977

In Reply Refer To: AAP-580

Subject: Engineering Brief No. 18, Use of a Non-Woven Fabric to Reduce Reflective Cracking

From: Chief, Airports Engineering Division, AAP-500
To: All Regions

Attn: Chiefs, Airports Divisions

Engineering Brief No. 18, Use of a Non-Woven Fabric to Reduce Reflective Cracking, describes the placement of a non-woven fabric, prior to overlay, in an effort to minimize reflective cracking.

The purpose of Engineering Briefs is to keep FAA field offices informed of new developments in construction which are being tried on a case-by-case basis in one or more regions, but which are not necessarily known to other regions and ADOs. Any comments you care to offer on the use of non-woven fabrics will be appreciated.

ORIGINAL SIGNED BY:
J. W. BUSHEE
for, LEONARD E. MUDD

Enclosure

ENGINEERING BRIEF NO. 18

USE OF A NON-WOVEN FABRIC TO REDUCE REFECTIVE CRACKING
AT NEW HANOVER COUNTY AIRPORT, NORTH CAROLINA

On September 2, R. Worch and E. Aikman, Airports Engineering Division, visited the New Hanover County Airport, Wilmington, North Carolina, to observe the placement of a non-woven fabric (petromat) prior to overlaying the existing pavement.

Due to extensive cracks in the existing pavements the plans called for placement of a non-woven fabric on the surface prior to overlay in an attempt to reduce reflective cracking, and consequently, reduce long range maintenance costs.

Two general schemes were followed in placing the fabric. The first involved the continuous placement of the fabric on Runway 5-23. The second scheme involved placing strips of fabric on taxiway "C".

The sequence of operations on Runway 5-23 follows:

1. All major cracks in the existing bituminous concrete pavement were filled with bituminous material.

2. A tack coat was applied at the rate of 0.2 gallon per

square yard.

3. After application of the tack coat the fabric was rolled out in 12-1/2 foot widths. This was accomplished by a mechanical spool unrolling attachment mounted in front of a small garden tractor. Brushes mounted immediately behind the spool applied pressure to the fabric in order to remove air bubbles and insure contact of the fabric with the runway surface.

A cross wind was blowing at the time of placement and tended to lift the fabric off the pavement. The contractor's immediate solution to this problem was to run the wheels of a truck over the edge of the fabric. It is recommended that the fabric be bonded to the tack coat by rolling with a small pneumatic roller immediately after laydown. In addition, the fabric should be laid as smoothly as possible to avoid wrinkling.

4. The fabrics were overlapped approximately one inch in the longitudinal direction. The contractor advised that the overlap was about 4 inches when work first commenced, but this had created a slippage plane.

5. The fabric was placed approximately 100 feet ahead of the paving machine which was supplied from trucks rolling over the in-place fabric. No apparent damage to the fabric was caused by either the paver or trucks.

6. After the bituminous overlay material was placed, rolling operations were carried out in the normal manner.

The sequence of operations for overlaying taxiway "C" was essentially the same as for Runway 5-23, except the fabric was placed in 36 inch wide strips over the longitudinal and transverse joints in the existing Portland Cement Concrete (PCC).

Due to the narrow strips, the fabric adhered to the tires of the asphalt delivery trucks and was picked up from the surface. In an effort to eliminate this problem the contractor spread a thin layer of bituminous mixture over the fabric, with little success. In addition, the fabric had a tendency to slip and bunch up under the action of the paving machine.

The solution to these problems was to place the fabric in 12 1/2 foot widths over the entire width of the PCC taxiway. This had been planned for the bituminous concrete runway but not for the PCC taxiway.

A crack survey has been made on a portion of the runway and a control section, without Petromat, will be overlayed in order to evaluate the effectiveness of Petromat in reducing reflective cracking.

The in-place cost of the fabric for this project is $1.05 per square yard.

Numerous schemes have been employed in the past in an attempt to reduce or eliminate reflective cracking. To date, no fool proof technique for designing reflection crack proof bituminous overlays has been developed other than to reconstitute the existing pavement into a base course. (See Engineering Brief No. 14).

An R&D study to investigate the use of non-woven fabrics for control of reflection cracking has been recommended by Airports Programs. In addition, we have requested an R&D effort be initiated to study various methods of preventing reflection cracking, including sand, slurry seal, and open-graded mixtures.

ORIGINAL SIGNED BY:
RICHARD J. WORCH
Civil Engineer