



AIRPORT WHITETOPPING

Project Report #6

Fort Madison, Iowa

June, 1991

Engineers and airport authorities face ever-increasing challenges to modernize and maintain worn out and deteriorating airport runways. Paving techniques now allow construction of a Portland cement concrete (PCC) runway with minimal inconvenience to the airport user, while utilizing the existing asphalt base. A concrete solution - Whitetopping - (concrete resurfacing over existing asphalt) will increase the load-carrying capacity of a runway and offer a highly visible, debris-free, non-skid surface providing many years of maintenance-free service.

When an asphalt pavement is badly cracked, full of potholes or rutted from heavy loads, Whitetopping is a cost-effective rehabilitation alternative with proven performance. More than 250 miles of pavement have been modernized since Iowa's first Whitetopping project was paved in 1960 on a Farm-to-Market road in Woodbury County. In 1971 the first airport Whitetopping was constructed in Storm Lake, Iowa followed by projects in Centerville, Clarion, Waverly, Corning and Carroll. The performance is outstanding, above and beyond the expectation of new pavements on grade.

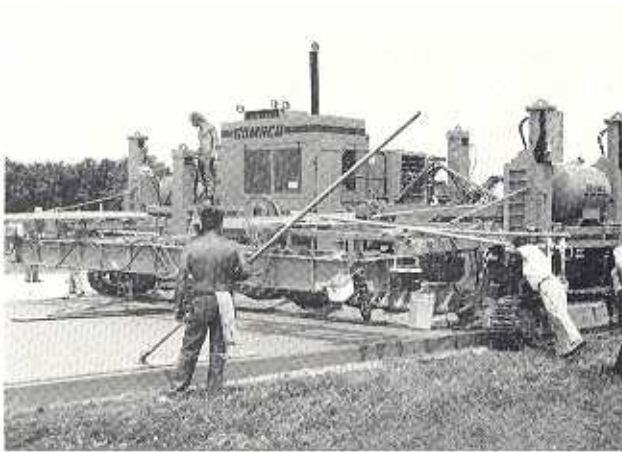
Fort Madison, Iowa recognized the grim promise of future expensive maintenance on their asphalt runway using traditional overlay procedures and, therefore, explored various alternatives for rehabilitation. Serving the best interests of the community's taxpayers, city leaders specified Whitetopping for renewal of their existing 75 ft. wide by 4,000 ft. long runway. In January 1991 a \$603,451.60 contract was awarded to Shipley Construction Company of Burlington for the major airport runway improvement project. Construction of three 25 ft. wide by 4,000 ft. long lanes began in May 20 and flight traffic service was resumed July 3, 1991. The design thickness was a nominal 6 in., but a minimum of 4.5 in. at several locations was permitted.



In January 1991 a PCC contract letting attracted five contractors whose bids ranged from \$603,451.60 to a high of \$800,762.50. The engineer's estimate was \$774,744.00. The cost to furnish and place the 41,350 square yards of 6 in. Class C concrete was \$12.56/SY.

Plans, specifications and design criteria, prepared by French-Reneker-Associates, Inc. of Fairfield, required approval of involved agencies and included the runway, a new taxiway, holding area, runway lights, electronics and beautification features. Construction inspection and quality control was performed by French-Reneker. To prevent undesired keying action at the interface of old and new pavement, open transverse cracks in the old surface were filled with flowable mortar just prior to placing new PC concrete, water was applied at a rate sufficient to cool the surface and to prevent premature set. Half-round keyways provided connection between adjoining pours. A center line longitudinal saw cut (1.25 in. deep) and transverse construction joints at 12.5 ft. intervals were placed to control cracking.

Elevation control for Shipley's GP-2500 GOMACO slipform paver was referenced to stringline settings computed to establish the desired riding quality and thickness demands. The west 25 ft. wide pass was placed first, followed at 7-day intervals by the center pour and the east pour. White pigmented curing compound was applied at the rate of 0.05 gals./SY. Texture was achieved by an astro-grass drag and transverse broom with tines spaced at 0.75 in.



Fort Madison Ready Mixed Concrete Company supplied transit mixed concrete to the airport paving site in a unique manner. At their plant location, materials were batched into mixers and driven across the street until specified drum revolutions were completed. After discharging into non-agitated dump trucks, those vehicles traveled to the paving operation some three miles north. The water/cement ratio was held below 0.5489, air content uniformly was verified at $6\% \pm 1.5\%$ and slump stayed near 1.5 in. to 2.0 in.

Both the producer and contractor were highly pleased with the rate of delivery, uniformity of mix and paving quality resulting from this production method. Riding quality from profilograph traces averaged 3.65 in./mile, with a low of 1.23 in. and high of 3.89 in.

For this Fort Madison airport project, PCC paving was once again considered the best buy on a life-cycle economic basis by providing the city with a low-maintenance product possessing superior-load carrying capacity, resistance to deformation, maximum visibility and non-skid characteristics.

The owner is calling it the "smoothest airport runway in Iowa."

Jerry Long of French-Reneker-Associates, Inc., said, "Whitetopping has been shown to be a most practical rehabilitation to the typical surface deterioration common to aging asphalt runways."

Additional information may be obtained by contacting the Iowa Concrete Paving Association at (515) 278-0606.