



IOWA SCENE

Reconstruction/Recycling of an Asphalt Runway (17/35) Chariton Municipal Airport

Project Report #22
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During the 60 years since Chariton, Iowa established its municipal airport, that facility has undergone a number of facelifts. In 1919 two local men were among the early Iowa aviators to build and crash their own plane. So ended one pioneering effort but interest in private flying which grew during the 1930's was hampered by lack of suitable facilities. For a permanent site the city bought 120 acres of farmland in 1945, 3 mi. west of town, along US 34. Their original north-south strip was turf surfaced. After World War II further improvements were made to satisfy flyers returning from military service and to meet commercial needs of Chariton businesses such as the Hy-Vee grocery chain, Johnson Machine Works and many others. In 1955 runway lighting and the terminal building's construction offered improved features.

Runway 17/35 was first paved in 1965. It consisted of a 3 in. granular subbase, followed by a 6 in. rolled stone base and a 75 ft. x 2,200 ft. seal coated bituminous wearing course. During 1977, 17/35 was reconstructed 60 ft. wide and 2,800 ft. in length using a 4 in. subbase, 6 in. granular base and 1½ in. hot mixed asphaltic concrete surface course. Numerous navigation aids were added in subsequent years, and taxiways plus tie down spaces were provided. When air traffic growth exhibited need for expanded service, Runway 10/28 was added in 1989. It consists of a 6 in. portland cement concrete pavement 75 ft. wide x 4,000 ft. long, placed on a 4 in. granular subbase and 8 in. stabilized subgrade. 4 in. longitudinal subdrains installed on both sides for the full runway length provided relief from freeze-thaw reaction.



In 1997, due to deterioration of the existing pavement, the Federal Aviation Administration (FAA) approved Chariton's grant application for funds to rehabilitate Runway 17/35. Environmental considerations dictated the importance of reusing existing 17/35 runway material. Strength and stability were paramount in the structural design analysis. Since premium quality aggregates in the Chariton area are very expensive, alternates were examined consisting of (1) replacement with an untreated 14 in. granular base versus (2) recycling of the existing base in-place with added fly ash to take advantage of its cementitious properties.



Although generally having deteriorated into a non-repairable condition with severe map-cracking, surface spalling and major full-depth thermal cracks, a unique design prepared by Snyder & Associates called for pulverizing the entire old runway structure in-place, either by milling and reprocessing or simply reprocessing to a maximum particle size of 1½ in., then incorporating 12-15% fly ash and spreading this salvaged material to create a 12 in. x 75 ft. x 2,800 ft. stabilized base. This would be followed by the proposed 5 in. PCC pavement. New lights, a connecting PCC taxiway and turn-arounds were included.



Final plans for this 1997 project consisted of removal by milling 20,900 SY of old pavement, adding 1,600 tons of Class C fly ash, constructing 26,750 SY of fly ash treated soil plus recycled aggregate base, placing 25,400 SY of 5 in. PCC runway paving, installing 7,200 l.f. of 4 in. plastic subdrain and other associated work. At the May 15 letting for FAA project #3-19-0014-01, Cedar Valley Corporation

(CVC) of Waterloo, Iowa submitted the low bid totalling \$775,760. Following FAA acceptance and a pre-construction conference, work started on June 30. Completion was required within 75 working days.



Test analysis performed by Terracon Consultants, Inc. concluded that 1,600 tons of Class C fly ash for base stabilization purposes would be needed. This ash was obtained by CVC from approved Midwest Fly Ash Company sources at Ottumwa and Council Bluffs. Using a CAT RM-350 Reclaimer, CVC found that two passes generally were sufficient to meet the required gradation for its full 16 in. depth and produce sufficient base material for spreading to 79 ft. total width. At isolated cases near centerline, a third pass was performed to obtain uniformity. Using the same machine, fly ash spread at the rate of 119.6 lbs./SY met the specified 12% content requirement. The surface applied ash and mix water, introduced by spray bar within the mixing chamber, provided optimum minus 2% conditions suitable for compaction by a tractor-towed sheepsfoot roller and final shaping by motor grader.



Ideal Ready Mix of Chariton furnished 12-7 CY trucks to transit mix concrete using P-501, non D-Cracking Class 3 coarse aggregate and Monarch cement. Constructed with CVC's new GOMACO 2800 two-track slipform paver the outer two 25 ft. wide full-length lanes were poured to stringline on August 27 and September 3. The locked-to-grade 25 ft. wide center pass was completed on September 15.

Batch weights for the 7 CY C-3WR-C20 mix included 3,199 lbs. cement; 11,228 lbs. coarse aggregate; 9,976 lbs. fine aggregate; 32 oz. air entraining admixture and 120 oz. water reducer. Cylinder break records to verify compliance with the specified 4,400 psi compressive strength required at 28 days ranged from 5,470 to 7,850 psi, all within 1½ in. slump. Texture was created by longitudinal towed burlap drag. Profilograph readings documented a near zero roughness finish for the runway. FAA procedures determined when construction traffic access might be authorized for contraction joint sawing and sealing, subject to meeting compression test requirements. Longitudinal drains adjacent to the outer runway edges were installed after the outside lanes were paved.



On Saturday, November 1, 1997, following completion of all major construction items, Major Mary Stierwalt, other local officials, the Chamber of Commerce 'Ambassadors' and interested spectators joined in a ribbon cutting as City Administrator Ed Elam taxied his Bellanca onto Runway 17/35, marking the beginning of a new generation of services to aeronautics interests at the Chariton Municipal airport.

Through this successful demonstration of base reconstruction that incorporated readily available fly ash, many failing rolled stone airport runways and roadbeds on highways, roads and streets across Iowa can be reconstituted as a serviceable foundation for PC concrete paving.

Receipt is gratefully acknowledged for the assistance and information relative to this project from:

Ed Elam, City Administrator, Chariton
David Moeller, Snyder & Associates, Inc.
Mark Bare, Cedar Valley Corp.