



Night Paving with Asphalt is the Answer to Rehabilitating Runway at World's Busiest Airport

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How do you rehabilitate a runway at the world's busiest airport? The answer is carefully, quickly, with asphalt and at night.

There are some obvious reasons for that. There's no time during the day to schedule laydowns on a runway at the world's busiest airport. Consequently, the contractor must do the work at night. And even when working at night, the contractor doesn't have many hours to pave. Probably six at most. Usually, they can't start paving until midnight. Then, if they don't get their equipment completely off the runway by precisely 6 am the next morning, they'll pay a heavy penalty--\$10,000 or more.

Bob Hart, Senior Project Engineer with the Chicago office of HNTB Corp., put it this way: "Because of the tight time frame at O'Hare and the huge penalties involved in keeping the runway closed too long, there was no other way to rehabilitate the runway than to do it at night and with asphalt." HNTB has designed several rehabilitation projects for some of the busiest runways in the world. The structural overlay of the runway at O'Hare is one of their recent projects.

Experienced Paver

The overlay, which incorporates Superpave criteria, was done in conjunction with a substantial reworking of the lighting system for Runway 9R-27L. "There was so much electrical work that the prime contractor was an electrician," says Hart. Allied Asphalt of Chicago was the paving contractor.

Allied has many years of experience in placing asphalt in the Chicagoland area and handled the O'Hare project with little difficulty,

according to Allied Paving Superintendent Bob Housholder. "We know what we're doing out on the runway because we've been involved with similar airport projects at O'Hare for many years," said Housholder.

Stringent Specification

Runway 9R-27L was a bit different, however. It was designed to carry aircraft weights well in excess of 60,000 pounds with tire pressures greater than 100 psi. Because of the tight time constraints, and in order to meet the stringent asphalt mixture P-401 specification (modified), HNTB:

1. required a larger maximum aggregate size than usual;
2. demanded a 30 percent higher stability requirement than ever before, and;
3. specified an asphalt cement "which, as written, dictated supplying a binder with a grading equivalent to PG 76-22," according to Asphalt Testing Lab's Manager, Kevin Nelson.

The tough mixture requirements were part of the challenge; getting the job done within specification and on time was the other. "The availability of materials coupled with our past experiences at O'Hare led us to develop a special type of mixture," stated Glenn Anderson, Quality Control Manager for Allied Asphalt. The special mix allowed Allied to place up to 2,500 tons of mix per night during the paving operation, although many times the runway demand allowed only six hours of paving per night.

Paving in Echelon

In order to ensure the maximum tonnage placement, especially while paving with the mainline mix, the

contractor operated with two pavers in echelon, each placing 25-foot-wide mats. "The exceptionally wide placement of the asphalt mix meant using the big Barber-Greene pavers' hard-tail extensions," said Housholder. "The hard-tail extensions allowed each paver to place asphalt mix in 25-foot widths." Allied met every longitudinal joint requirement set by the P-401 specification. Six vibratory rollers coming right behind the pavers compacted the 50-foot-wide mats.

Again, the many years of runway experience helped Allied ensure the proper placement of over 48,600 tons of hot-mix asphalt on this project. Housholder said his company achieved the best production and placement when producing the mix near 340°F. Placing and compacting was done at 310°F whenever possible. "You just don't let it cool much before you roll it," he added. "The rollers come right behind the pavers."

Mix Design

The mix itself was designed using Marshall 75-blow design. The air voids level, Voids in Mineral Aggregate (VMA) and the Voids Filled Aggregate (VFA) criteria all met or exceeded Superpave recommendations. The aggregate structure consisted of 3/4-inch top-size material and a very high level of manufactured sand. Approximately 75 percent of all material passing the No. 8 sieve was manufactured.

This aggregate structure design, coupled with the aggregate materials supplied by Vulcan Materials, and the binder supplied by Seneca Petroleum, enabled Allied to compact the 310°F mat right behind the paver. This allowed the airport to land flights almost immediately after paving. Both project and inspection personnel said there were little or

no pavement indentations, even on the nights when planes landed just minutes after opening the runway to traffic—proof that the mix performed better than most mixes specified under the current P-401.

Although the binder is costing around 10 percent higher than the type specified for conventional mixtures, the Department of Aviation and HNTB anticipate using the mix in the future. Production on the project was not compromised even with several new specification requirements. Given the challenges involved, project team members felt the project went smoothly. "There is plenty of experience out there to indicate that the new binder products work," says HNTB's Hart, "so, collectively, we decided to just do it!"

Always On Time

Although paving contractor Allied Asphalt had to push to begin paving operations on time every night and push to end them on time the next morning, they did not pay costly penalties. Paving equipment was completely off the runway by 6 am every morning. If not, the Aviation Administration would have charged Allied \$10,000 for the first 15 minute delay, then \$5,000 more for any part of an additional 15 minute delay.

The big planes are rolling again on one of the world's busiest runways—all night long and all day long. And both HNTB and Allied are ready to do it again on some other runway. "We always enjoy the challenge," says Housholder, "especially if it's different or hasn't been done before. We learn something new on every project. On this one, we're glad we didn't hold up traffic. We did a good job, but if we do it again, we'll probably do it even better." ▲