



## FACTS&FIGURES

**Project:** Runway Reconstruction

**Location:** Coles County (IL) Memorial Airport

**Runway Age:** 40+ years

**Dimensions:** 6,500 ft. long, 150 ft. wide

**Approx. Cost:** \$5.3 million

**Project Funding:** 90% Federal, 5% State, 5% local

**Timeline:** 15 months—mid-July 2013 to mid-Sept. 2015; 113-day runway closure

**Lead Consultant:** Hanson Professional Services

**General Contractor:** Howell Paving

**Rubblization Subcontractor:** Antigo Construction

**Other Subcontractors:** Moore Electric; Dunn Co.; Varsity Striping; Cardinal Landscapes

**Strategy:** Rubblize concrete in place; use rubble as base for new asphalt pavement

**Key Benefits:** Speed; reduced material expense; no materials sent to landfill

**Outcome:** Project was completed under budget & before deadline; airport remained open for helicopter & aerial applicator traffic

**Accolade:** Howell Paving received 2015 Contractor of the Year/Award of Excellence from IL Dept. of Aeronautics for the project

# Reconstructed Runway Rises From Rubble at Coles County Memorial

BY DAN VNUK



Before Coles County Memorial Airport (MTO) in Mattoon, IL, reconstructed its 41-year-old main runway, the project team looked far and wide for the best way to keep costs down and cause the least possible disruption of day-to-day operations. The preferred strategy? Rubblization, a process that breaks down existing concrete into small, uniform chunks, thereby making it an ideal base for subsequent layers of asphalt or concrete.

With the project completed last September, airport officials report that the non-traditional method saved time, prevented the need for any materials to be hauled to a landfill and ultimately helped contractors finish the \$5.3 million project under budget and in less time than anticipated.

In addition, MTO never had to completely close. Despite a 113-day runway closure, the rural Illinois airport remained open for helicopter and crop dusting traffic throughout the entire project. Typically, the county-owned Part 139 airport averages about 35,000 operations per year, with the field's

fixed-based operator, Aerinova, helping serve a mix of general aviation, business and unscheduled charter traffic. Located between Mattoon and Charleston, the airport draws business from three major cities: Chicago, St. Louis and Indianapolis. Last year, MTO received an Outstanding Achievement Award from the Illinois Public Airports Association.

The project to rebuild Runway 11-29, plus a full parallel taxiway and apron, began in July 2015 and was completed in late September the same year. The project cost \$5.3 million and was 90% federally funded, with state and local authorities each paying 5% of the remaining balance.

MTO Manager Andrew Fearn explains that the 6,500-foot long, 150-foot wide runway was originally built in 1974 with 14 inches of concrete over a 7-inch asphalt base. "It began showing signs of distress in the mid-1990s and had undergone four



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light rehab and patching projects over the next 15 years for a total of \$1.8 million," chronicles Fearn. "A fifth rehab project was considered in 2013 at a cost of \$1.1 million, but a full pavement survey revealed more extensive amounts of joint failure than anticipated. The pavement had finally become too costly to maintain, and a permanent solution was needed."

MTO consequently hired Hanson Professional Services to help chart a new course for the runway, and Jeff Litherland, PE, served as the company's lead engineer on the project.

An analysis of various reconstruction options ruled out overlaying the existing runway, because extensive cracking made it prohibitive for use as a base. Removing and replacing the runway, the most expensive option with the greatest impact on operations, was also rejected. Costs to rebuild the existing runway with asphalt pavement were estimated at \$9 million; with concrete, projections rose to \$15 million. After careful analysis, the Coles County Airport Authority gave asphalt the nod.

## Design & Construction

Hanson engineers suggested rubblization because it saves time and transportation costs by converting existing concrete pavement into the equivalent of a high

quality base layer onsite. MTO not only circumvented the expense of purchasing and transporting new base materials for the new pavement, it also saved the cost of breaking, excavating and transporting the old pavement to a disposal site.

Specialized equipment breaks up the old concrete into small pieces to produce a base for new pavement. This results in a smoother final surface than would be obtained if contractors applied new asphalt over an unbroken concrete surface, explains Litherland. The technique has been used on roads since the late 1980s, and is now experiencing wide acceptance for concrete airport runways, he reports.

Specifically, rubblizing airfield pavement is 52% less expensive than removing and replacing concrete, says Litherland. Furthermore, it reduces reconstruction time, diminishes the impact on the traveling public, and is an environmentally friendly "green" process, he adds.

"After all options were considered, it was evident that rubblization and a 4-inch minimum asphalt overlay would mitigate the existing concrete pavement failures," says Fearn. "In addition, we could save time, material and cost by repurposing material on site."

Hanson used FAARFIELD software and guidance materials from the FAA to design the project.

## Let's Get Ready to Rubble

A bid of \$4.71 million won Howell Paving the construction contract, and Antigo Construction served as its rubblization



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*Rubberizing existing concrete into small pieces created a smoother final surface than if contractors had applied new asphalt over an unbroken concrete.*

subcontractor. Larry Leitch, senior vice president of operations for Howell, notes that his company has worked with rubberization on projects for the Illinois Department of Transportation since the early 2000s, so it was confident in the design strategy Hanson promoted.

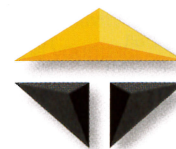
The FAA recognizes rubberization for runway projects in Engineering Brief 66: "When used in a flexible pavement section, the intent of rubberizing existing concrete pavement is to prevent reflective cracks typically associated with hot mix asphalt overlays placed directly on existing PCC [Portland cement concrete]

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pavements. Reflective cracking is prevented by obliteration of the existing pavement distresses and the destruction of the existing slab action."

Rubblizing reduces the existing Portland concrete pavement into particles by at least 75% as determined by visual inspection. The largest dimension cannot exceed 3 inches at the surface, 9 inches in the top half of the previous pavement, and 15 inches in the bottom half of the pavement, explains Antigo Construction President Matt Shinnars.



MATT SHINNARS

Because it was rubblizing thick airfield concrete, Antigo pre-cracked the PCC pavement with a single-hammer guillotine breaker device to help achieve the required size rubble pieces. Crews then completed the concrete breaking process using

a 16-hammer MHB Badger Breaker® developed in-house by the contractor. Next, workers used a grid roller to further pulverize the concrete particles at the surface and begin the compaction process, followed by a 25-ton pneumatic-tire roller and smooth drum vibratory roller for final compaction and seating.

"One of the key benefits of the rubblization process is that it is 'green,' as the existing concrete pavement and base is recycled in place," says Shinnars. "It reduces the need for new materials; there is also a reduction in truck movements and equipment usage. We've experienced good, long-term performance of the asphalt overlay, and the asphalt surface can be replaced as needed over time leaving the rubblized layer as is. Finally, the accelerated construction reduces impact on the travelling public and reduces associated emissions."

Special effort was made to keep the subgrade dry during rubblization. An old,

but still functional, underdrain on the 29 side of the runway was kept and replaced afterwards, and a new underdrain was installed on the 11 side.

During construction, the runways were closed for 113 calendar days while crews worked concurrently on both sides. "Weather was a huge factor and we were fortunate to have a dry period for most of the project," recalls Leitch. Ultimately, though, he credits the crews, other contractors, engineers and airport for the project's success.

"Rubblization worked exceedingly well, and time will tell on its longevity," says Fearn, with cautious optimism. "I am extremely satisfied with the runway rehab project and its outcome. The project went smoothly thanks to the excellent planning and preparation by Hanson Professional Services and an outstanding group of contractors led by Howell Paving." ✈️

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