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## **American Concrete Pavement Association Presents Annual Awards for Excellence in Concrete Pavements**

The American Concrete Pavement Association (ACPA) has named the recipients of its 20<sup>th</sup> annual “Excellence in Concrete Pavement” awards, which recognize quality concrete pavements constructed in the United States and Canada.

The awards program encourages high-quality workmanship in every concrete pavement project and serves as a forum for sharing information about highly successful projects. Projects are evaluated and voted on by judges from across the country and representing various stakeholder groups in the transportation-construction community.

The awards program recognizes contractors, engineers, and project owners who completed outstanding projects. One of the requirements of the program is that projects must be completed in the calendar year prior to judging, which is why projects described herein refer to dates prior to 2009. Recipients are formally recognized each year during a gala awards ceremony held at the ACPA’s annual meeting, this year in Orlando, Florida.

The awards fall into 12 discrete categories applicable to construction and rehabilitation of highways, roadways, and airports, and for the first time, industrial pavement facilities. The awards are presented in both gold and silver levels. This year, several projects tied for top honors in various categories. The award recipients by category are:

## Commercial Service & Military Airports

<b>Gold:</b>	<b>Main Base Runway Replacement, Edwards Air Force Base, Kern County, Calif.</b>
<b>Contractor/Engineer:</b>	<b>CH2M Hill-IHC, a joint venture of CH2M Hill and Interstate Highway Construction, Inc.</b>
<b>Owner:</b>	<b>U.S. Army Corps of Engineers (USACE)</b>

The 15,000-ft x 300-ft main runway at Edwards Air Force Base was the long-standing central hub for U.S. Air Force flight testing missions, as well as the west coast landing site for NASA's space shuttles. Built in 1952, the concrete runway was showing significant distress from alkali-silica reactivity, and thus, required reconstruction. This design-build project required innovation, perseverance, and some creative solutions to address some of the unusual challenges.

Prior to decommissioning the existing runway, a temporary 12,000 ft x 200 ft runway had to be built, as the construction project could not compromise flight operations. In effect, the project actually involved the design and construction of two runways in less than two years. This involved moving 44,000 truck loads of rock, sand, and asphalt, as well as more than 800,000 cu. yds. of earthwork.

More than 445,000 sq. yds. of existing concrete had to be demolished in nine weeks, and then, the crews placed a total of 28 miles of concrete pavement, measuring 33 ft to 38 ft wide and in thicknesses of 12 in., 16 in., and 20 in. Other complicating factors included unstable soils; the discovery of 700 waste drums that required disposal of hazardous waste contents; and even an archeological discovery and preservation of accretions of an old town on the site. Were those variables not challenging enough, crews dealt with the harsh environmental conditions of the high Mojave Desert, with daily temperatures sometimes reaching 110 degrees F, with low humidity and wind gusts often exceeding 25 mph.

**Silver:** Airfield Runway Upgrade, Johnstown, Penn.  
**Contractor:** Hi-Way Paving, Inc.  
**Owner:** U.S. Army Corps of Engineers  
**Engineer:** PBS&J Corporation

To the casual observer, this design-build, best value project seemed straight-forward enough, but some unique circumstances very quickly created some unanticipated delays that not only threatened the schedule, but also could have had a serious impact on the budget.

During the design phase, a stop-work order was issued, delaying the project by 126 days. Work was scheduled to resume in July 2007, but because of the owner's schedule, it was deferred to 2008. This could have impacted costs, but the contractor quickly developed a proposal to expedite the design and submittal process. It took more than a well-written proposal, however, and the contractor also had to hand-carry documents from Ohio to Nebraska, participate in "over-the-shoulder" plan reviews, shorten turn-around times, and do some informal partnering to get the job done.

The project began on August 22, 2007, and by November 22, the contractor had completed 90% of the project. This involved complete removal of an existing 7,003 ft long main runway, and replacement with a 16 in. concrete pavement.

The airfield required an adjacent cross runway to remain open for a time, and so the project continued into 2008. The reconstruction of the cross-runway, the final element that served as an intersection between two runways, did not begin until May 2008. Although the contractor had only 30 days to complete the intersection and re-open the adjacent runways, the work was actually completed early.

Safety was, of course, a major emphasis, and thanks to training and the focused efforts of more than 1,500 employees, vendors, and subcontractors, and base personnel, there were no lost-time accidents during the more than 400,000 man hours of the project. The successful completion demonstrated resolve, tenacity, and cooperation among all involved. As a result, the project was actually completed ahead of the scheduled deadline.

## Concrete Pavement Restoration (CPR)

<b>Gold:</b>	<b>2007-2008 Airfield Concrete Pavement Rehabilitation at Denver International Airport</b>
<b>Contractor:</b>	<b>Interstate Highway Construction, Inc.</b>
<b>Owner/Engineer:</b>	<b>City and County of Denver - Department of Aviation</b>

Contractors are accustomed to working in some pretty tight places, but when jet aircraft are taxiing just a few feet from the workzone, there can be no compromising safety, precision, and attention to detail.

This \$17.3 million CPR project involved removal and replacement of 83,000 sq. yds. (approximately 2,000 panels) of 17 in. thick pavement on taxiways and runways, as well as more than 450 in-pavement lights. The project also included 500 cu. ft. of spall repair, replacement of heavy-duty expansion joints, stabilizing (mud-jacking) 34 panels; joint sealing; and 4,000 sq. yds. of surface grinding.

The project was bid in August 2007, but delayed until 2008, which required that all major milestones had to be completed in the 2008 construction season. The contractor, Denver International Airport officials, and Federal Aviation Administration officials worked closely during the winter months to develop a workable schedule that would accommodate airfield operations, while allowing construction in four discrete areas. With aircraft taxiing only a few feet from the workzone, safety measures were followed unfailingly. This included safety training, weekly safety meetings, and constant monitoring. Foreign object debris (FOD) watchers were placed at critical areas to monitor traffic and clean-up FOD immediately to prevent damage to aircraft.

In addition to the special attention to safety, the contractor also had to address some significant change orders. These included replacing 2,000 sq. yds. of concrete around gate areas; correcting profile to address "heaving" concrete on a high-speed taxiway; an additional 54 light-can replacements; reconstructing a manhole vault; and some emergency sewer repairs.

In spite of the challenges of this project, the key milestones were all completed ahead of schedule, and as a result, the runway was opened 17 days earlier than expected.

**Silver:**                      **Cimarron Turnpike Pavement Rehabilitation**  
**Contractor:**                **TTK Construction Company, Inc.**  
**Owner/Engineer:**        **Oklahoma Turnpike Authority**

Restoration of the Cimarron Turnpike could have just been an ordinary project, but when the contractor saw an opportunity to save the Oklahoma Turnpike Authority some money, the project quickly turned from ordinary to extraordinary.

The turnpike was first built to provide a convenient, four-lane highway from Tulsa to northwest Oklahoma. Constructed in early 1970, the pavement lasted for more than 38 years, but D-cracking and base failures necessitated removal and replacement of some of the slabs, and patching in other areas.

The contractor saw an opportunity to submit a value-engineering proposal to make some significant changes to the pavement section. This involved deleting the compacted subgrade; a 4 in. open-graded concrete base; a geotextile separator fabric; and silicone joint sealant. Instead, TTK Construction Company recommended (and the Oklahoma Turnpike Authority approved) a 10 in. cement modified subgrade and hot-pour joint sealant. The result was a greater than \$456,000 net savings to the turnpike authority.

All pavement outside the slab replacement areas were dowel-bar retrofitted and diamond ground. Prior to the CPR project, the pavement measured 27.5 in./lane mile using a 0.2 blanking band, but afterward, the smoothness was 4.75 in./lane mile. During the construction phase the contractor faced some weather delays, but neither those delays nor the design changes prevented the TTK crews from completing the project on time ... and at a significant savings.

## County Roads

<b>Gold:</b>	<b>William White Blvd. (defense access road), Pueblo County, Colo.</b>
<b>Contractor:</b>	<b>Castle Rock Construction Co.</b>
<b>Owner:</b>	<b>Pueblo County, Colo.</b>
<b>Engineer:</b>	<b>Short Elliot Hendrickson Inc.</b>

Rugged terrain, harsh weather, potential disruptions to local businesses, and the unique needs of a U.S. Department of Defense (DoD) facility might seem the stuff of nightmares, but not for people involved in this unique county road reconstruction project.

William White Road connects State Highway 47 with the Pueblo County Airport, which is a DoD installation surrounded by a number of defense contractors. The existing asphalt was badly distressed and so, the decision was made to both reconstruct and build new sections with concrete. The 2.6-mile long project consisted of 98,700 sq. yds. of 10 in. doweled and grooved concrete pavement; 5,000 sq. yds. of concrete driveway; and 15,000 ft of integral curb and gutter. The concrete pavement was 65 ft wide in the reconstruction area and 60 ft wide in the new construction area. The entire reconstruction area required excavation to a depth of 3 ft, with no disruption to utilities, which included fiber optics, water, phone, and sewer.

To avoid disruption to area business access, the pavement was reconstructed in half-width sections, leaving gaps at businesses for access during peak hours. The reconstruction sections had to be completed within 120 days, which required some paving in the winter months.

The terrain also was a factor, because the site is in the high-plain desert region, which has several *arroyos* (dry stream beds that tend to fill with water quickly and unexpectedly after heavy rains). As such, reinforced concrete pavements or box culverts had to be installed before fill and subgrade preparations were made. Crossing the inlets was a challenge for the paver, so the side form was modified and special blocking was added to prevent the paver from falling into the inlets.

There also was a bridge that had to be resurfaced to account for the raise in profile elevation. The bridge also presented a challenge because it was 6 ft narrower than the concrete pavement, so a

significant amount of the work was done by hand. In spite of the challenges, the crews completed the project on time, within the budget, and with as little impact as possible to the traveling public, areas businesses, and the airport.

**Silver:** Polk Township 270<sup>th</sup> Street  
**Contractor:** Loch Sand & Construction Co.  
**Owner:** Polk Township, Missouri

The good news is this farm-to-market road seemed like a convenient way to bypass traffic associated with nearby business and industry, as well as a convenient way to get to two routes north and south of nearby Maryville, Mo. The bad news was that driving on the gravel and rough asphalt pavement sections probably added more adventure and a few more jolts than motorists desired.

The 270<sup>th</sup> Street project in Polk Township was the last road to be paved among a network of roadways reconstructed in the area recently. Along with the other Polk Township projects, this was a design/build project, and because it connected to existing Missouri DOT right-of-way roads, had to be designed carefully to meet the agency's specifications.

The project used the existing road profile, with some minor adjustments to improve the site distance and entry points off the main arteries. The new road required some excavation, including realigning a ditch for adequate draining, as well as removal of the existing roadway and re-grading and re-compacting the existing subgrade. With that work completed, a new 7 in. concrete pavement with 15 ft joint spacing was placed.

Transitioning to concrete pavement from the previous asphalt and gravel sections would just naturally be an improvement, but the contractor's use of an optimized concrete mixture, global positioning satellite technology, and attention to detail made a good concrete pavement even better. Thanks to the quality design and construction, road users now have a reliable road they can use to connect to the two separate routes north and south of the area.

## Divided Highways - Rural

**Gold:** Interstate-25, Cheyenne to the Colorado State Line  
**Contractor:** Interstate Highway Construction, Inc.  
**Owner/Engineer:** Wyoming Department of Transportation

Even a quick glance at the schedule for this project would have led most people to sum it up with a single word—impossible. That word is evidently not in the vocabulary of the contractor and agency involved in the reconstruction of Interstate-25, from Cheyenne to the Colorado state line.

The 4<sup>th</sup> of July holiday period, very quickly followed by the Cheyenne Frontier Days for 10 days in late July gave plenty of reasons to celebrate in Wyoming, but for the people involved in this project, the events added to the complexity of a 212-day project window to place 7.64 lane miles of 10-in. concrete. Were that not challenging enough, deep, soft subgrade and extremely high and damaging winds added to the drama of finishing this project on time.

Interstate Highway Construction had to remove and replace an almost 50-year-old plain concrete pavement on the northbound lanes of the interstate and replace the sections with jointed, doweled concrete pavement and concrete shoulders.

The project also included rehabilitation of four bridges, and overlay of the port-of-entry (while replacing static and weigh-in-motion scales); installation of median cable guardrail; new right-of-way fencing; a roadway management system; interchange lighting; and a winter road-closure station. More than 2,500 heavy trucks, along with passenger cars traveling the route also presented traffic control challenges. The project required close coordination of construction with train schedules because of bridges that crossed over railroad tracks.

Value engineering proposals to crush the concrete on grade, and to substitute geotextile for the lime-stabilized subgrade, not only saved money for the agency, but also allowed the project to be completed quickly. The project was the first in Wyoming to feature a longitudinally tined texture. Innovation, hard work, and attention to detail allowed the contractor to finish the project early ... and to earn 100% of available incentives for thickness and 63% for smoothness.

**Silver:** Interstate-70 Reconstruction, Saline County, Kansas  
**Contractor:** Koss Construction Co.  
**Owner:** Kansas Department of Transportation

Many people talk about partnering, but this contractor and agency once again demonstrated how mutual trust, respect, and communications can produce high quality, smooth pavement that will serve the citizens of Kansas for many years to come.

Reconstructing 26 lane miles of a divided, four-lane highway can be a daunting task to complete in any circumstances, but when the project involves new technologies and several surface textures, the challenges can be almost incalculable.

Not so for Koss Construction, which partnered with the Kansas DOT to build 4 miles of the eastbound roadway using a two-lift concrete paving process with seven different surface types. Although two-lift paving process is common in Europe, it has had extremely limited applications in the United States. If this were not challenging enough, there were seven different surface types.

Innovation was a key emphasis, not only because of the two-lift construction and different surfaces, but also because the top lift used two different mix designs. The contractor also used rhyolite admixtures with a special interground performance enhanced pozzolan made from Class F fly ash to mitigate alkali-silica reactivity on the top lift's mix design. Other innovations included an exposed aggregate section, in addition to the traditional surfaced and ground sections. Another innovation was a knife mounted under the paver pan to create a center line joint that did not require sawing or sealing.

In support of this project, Koss provided 19 experienced supervisors to manage a workforce of 165, underscoring the company's serious commitment to quality and workmanship. Koss used its own quality control laboratory and highly qualified personnel to administer the QC plan that was approved by the owner. As a result of this teamwork, backed by experience, expertise, hard work, and extra effort, the citizens of Kansas now have an innovative, high quality, smooth pavement they can be proud of for many years.

## Divided Highways - Urban

<b>Gold:</b>	<b>Interstate-75, Birch Run Creek to Bridgeport Interchange, Saginaw Country, Mich.</b>
<b>Contractor:</b>	<b>Interstate Highway Construction, Inc.</b>
<b>Owner:</b>	<b>Michigan Department of Transportation</b>
<b>Engineer:</b>	<b>Rowe Professional Services Co.</b>

Removing and replacing an urban pavement is challenging, but when the project also involves bridges, storm sewer pipes, and other elements, the project becomes even more complex. None of the challenges was a match for the innovation, experience, and skill of the people involved in this difficult project.

The \$50 million Michigan DOT project involved reconstruction of 6.5 miles from Birch Run Creek to the Bridgeport Interchange. The contractor removed and replaced three lanes of existing concrete pavement, but the project also involved widening to the median, adding a fourth lane, valley gutter, and a permanent barrier wall; and reconstruction of a park-and-ride facility. Adding to the complexity was the removal, replacement, and widening of four bridges.

Storm water pipes up to 25 ft deep added to the complexity of the project, as each required substantial deep sheeting and dewatering to accommodate the traffic while the storm sewer was placed in phases. To help mitigate public impacts, a moveable barrier wall was used to provide three lanes of traffic in the high flow direction—northbound for heavy recreational traffic on the weekend, and southbound for traffic returning to the Detroit area.

A new barrier gate system, the first of its type in Michigan, was installed in the median barrier wall to allow authorized vehicles entry with a key code. This provided critical access to the opposite roadway without going to the nearest interchange, while also allowing fast action in emergency situations.

The project also required a five-year material and workmanship warranty on the concrete pavement, and in response, the contractor used an internal quality control (QC) program that involved a detailed, job-specific QC plan and the requisite documentation to meet the DOT requirement.

The project had no major accidents and no lost-time. With a sharp eye on quality, the contractor earned 85% of the available incentive for strength, and 100% for the smoothness on the mainline paving. Equally important, road users now have an excellent section of Interstate that will provide years of quality service.

<b>Silver</b>	<b>Interstate-355 South Extension (I-05-7709), Will County, Ill.</b>
<b>Contractor:</b>	<b>K-Five Construction Corp.</b>
<b>Owner:</b>	<b>Illinois State Toll Highway Authority</b>
<b>Engineer:</b>	<b>Harry O. Hefter Associates, Inc.</b>

Placing a quarter million square yards of concrete pavement and appurtenances in 15 months is a daunting task in even the ideal conditions, but when four months of that schedule are lost to harsh winter weather, it's easy to see why this project was especially challenging.

K-Five Construction placed about 4.3 miles of new pavement on the northbound and southbound lanes of I-355 in suburban Chicago, along with median and outside bituminous shoulders in each direction and cast in place median concrete barrier wall as the divider. The contract was one of several awarded by the tollway authority and one of four projects constructed by the contractor. All told, K-Five constructed more than 400,000 sq. yds. of concrete pavement on the four projects, and this particular project, at 250,000 sq. yds. of concrete, represented the longest project with the most concrete paving of all those awarded.

K-Five had to coordinate other projects that interfaced with this project, including construction of four cross-road bridges, a toll plaza facility, and fiber optic cable installation. Temporary bridges and creek crossings were constructed around the two bridges being built on the mainline portion of the highway. Subcontract activities had to be coordinated carefully because of the limited capacity of the creek crossings, as well as in consideration of environmental factors. The mainline bridge construction also

had to be coordinated and staged to ensure the paving equipment could cross the completed bridge decks and to ensure the schedule was maintained.

If the 11-month window for paving did not present enough challenges, near record rainfall in the fall of 2006 and the summer of 2007 further delayed progress, and in fact, so much so, that the tollway authority ordered acceleration to maintain the original completion date.

Among the innovations on this project were 10 experimental test sections implemented under the aegis of NCHRP 10-67 Experimental Surface Texture Study. Of those, two were test sections added at the request of the ACPA Noise and Surface Characteristics Task Force. This project presently serves as one of the concrete pavement industry's test sites for its "Next Generation Concrete Surface." Another innovation was the use of a compact dowel bar inserter directly on the slipform paver, thereby eliminating placement of dowel baskets. This was the first such use of this equipment in the state of Illinois. Innovation, attention to detail, and excellent quality are all hallmarks of this project, which will serve motorists in one of the nation's busiest metropolitan areas for years to come.

<b>Silver</b>	<b>Interstate-235, IM-NHIY-0235-1 (092) 003, in Oklahoma County</b>
<b>Contractor:</b>	<b>Duit Construction Co., Inc.</b>
<b>Owner:</b>	<b>Oklahoma DOT</b>
<b>Engineer:</b>	<b>The Benham Companies, LLC</b>

It seemed only logical that Oklahoma's largest single project in terms of its more than \$29 million value, should have a 500-day schedule to complete all the work. After all, the project included the removal of sections of 4-lane, divided highway near downtown Oklahoma City, placement of a 6-lane divided highway with an extra high-occupancy vehicle lane and ramp lanes. It also included replacing two bridges and the addition of \$5 million in decorative retaining walls and sound walls in the area.

Although 500 days were allotted, Duit Construction bid only 439 calendar days, then went on to complete the project in only 396 calendar days. A+B specifications were used to help ensure timely completion. The project also had penalties on lane rentals and some internal milestones, including a \$135,000 per lane per 24-hour period whenever the lanes were shut down due to construction. Given the contractor's exceptional performance in constructing under traffic and ahead of schedule, Duit

achieved 45% of the time incentive, or \$645,000. In addition to the durable, reliable highway sections, motorists, area residents, and other citizens will also enjoy the aesthetics of buffalo and scissortail flycatcher birds, which adorn the newly-constructed retaining and sound walls.

## **Industrial Pavements**

**Gold:** Oklahoma Welcome Centers' parking areas, STPY-136E (127) EH in Kay County/STPY-105 (138) EH in Beckham County, Oklahoma

**Contractor:** Duit Construction Co., Inc.

**Owner:** Oklahoma Department of Transportation

**Engineer:** Tetra Tech FHC

There is a lot to be said about first impressions, and for the drivers of more than 42,000 cars, trucks, and recreational vehicles (RV's) crossing into the Sooner State from Texas or Kansas, the Welcome Centers on Interstate 40 and Interstate-35 stand to make a very good impression, thanks in part to concrete pavement.

The facilities include parking areas, restrooms, pet areas, watering fountains, and RV facilities, and feature displays of native American culture that is so closely tied to the state's heritage.

Duit Construction Co., Inc. was the prime contractor/site work contractor on both projects and worked closely with the general contractor, Atlas General Contractors, which constructed the buildings on a separate contractor. As site-work contractor, Duit constructed a water system, including a stand pipe and sewage system lagoons; demolished original facilities; and prepared the building pad for Atlas.

The pavements were constructed in 8 in., 9 in., 10 in., and 11 in. thicknesses and from two different concrete mixes. Duit had to address complex patterns in the joint design and construction, and used guidance from ACPA to ensure proper types of tied- and doweled-joints were used. Some 34 different radii made the joint layout challenging, and so, numerous tapers were included to ensure against premature failure.

Completion of both projects was timed to meet scheduled grand openings, which in turn, coincided with the 100<sup>th</sup> year celebration of Oklahoma's statehood. The new welcome centers, featuring bright and aesthetically pleasing concrete pavements and ramps to and from the highways, will stand as a gleaming beacon to motorists for many years to come.

**Silver:** Williston Point Road Improvements, Fort Riley, Kans.

**Contractor:** Smoky Hill, LLC

**Owner/Engineer:** U.S. Army Corps of Engineers

Tight curves and steep grade can present challenges to any construction project, but when those condition exist on a busy thoroughfare, the challenges are even greater. Williston Point Road is one of the busiest routes on the U.S. Army's Fort Riley military installation.

The existing asphalt pavement had quickly deteriorated, so it was removed and used as surfacing on the shoulders. The new pavement section was a 24 ft. wide, 9 in. doweled, jointed concrete pavement with a 6 ft. aggregate shoulder. The project also included six reinforced concrete boxes, two of which were triple 12 x 12 ft. boxes, required temporary detours to move traffic safely around the construction areas.

The terrain also presented some challenges during construction. Some of the rock cuts exceeded 25 ft., and fills were required to eliminate both a hairpin curve and some of the steepest grades. Even with these improvements, the project had superelevations and 6% grade. In fact, a 200 ft. diameter roundabout was built on a 4.85% grade. The project also had a mandatory construction window of 6 months after the initial road closure. The work also included major tree clearing, rock excavation, blasting, and earthwork, all of which required close coordination to keep earthwork, bridge work, and paving on schedule.

## **Municipal Streets & Intersections (Greater than 30,000 Sq. Yds.)**

<b>Gold:</b>	<b>State Highway 59: Donkey Creek to Interstate 90, Gillette, Wyo.</b>
<b>Contractor:</b>	<b>Concrete Works of Colorado, Inc.</b>
<b>Owner:</b>	<b>City of Gillette, Wyo.</b>
<b>Engineer:</b>	<b>WWC Engineering</b>

What do you get when you combine harsh weather, a tight schedule, and some complex construction details with the busiest traffic corridor in the state of Wyoming? The answer for those involved in this construction project was a well-orchestrated project completed ahead of schedule.

Concrete Works of Colorado, Inc. planned to complete in one season the reconstruction of Highway 59 from Donkey Creek (to the south) to the Interstate-90 interchange (to the north). The project involved removal of severely distressed asphalt pavement, and then, replacement with more than 81,000 sq. yds. of 9 in. concrete pavement, as well as widening Highway 59 through the City of Gillette. The widening resulted in the equivalent of 10 lanes (three through lanes in each direction, as well as double left-turn lanes at all intersections and shoulders).

In addition to the paving, the project also involved 10,000 feet of curb and gutter; a raised, colored median and median skirt; a sidewalk/bike path; precast box culverts; and a range of other items that would have proved daunting for even the most experienced road builders.

Making matters even more interesting, the subgrade preparation for the project included excavation of some 50,000 cu. yds. of unclassified material and muck, with as much as 8 ft of unsuitable materials being removed and replaced in some areas. Twelve inches of crushed rock subbase and 4 in. of crushed rock base course were placed on a geo-grid of geotextile fabric.

The project was constructed in numerous phases and sub-phases, which required more than 25 individual bulkheads in both the northbound and southbound directions. Of course, very harsh weather conditions also threatened to slow the project, but the weather was no match for the tenacity,

dedication, and hard work of all involved. The contractor earned significant smoothness incentives and earned a \$1 million early completion bonus.

**Silver:** Havana and 40<sup>th</sup> - Stapleton Filing 7, Denver, Colo.  
**Contractor:** Castle Rock Construction Co.  
**Owner:** Forest City | Stapleton, Colo.  
**Engineer:** J.F. Sato

Just a few of the challenges of this roadway reconstruction project were to pave in the dead of winter; while also meeting sustainability requirements, including environmental concerns and aesthetic considerations.

The project involved reconstruction of Havana Street from Interstate-70 to Smith Road, as well as new construction on 40<sup>th</sup> Ave. in Denver. Castle Rock Construction Co. completed the project, which consisted of 38,700 sq. yds. of 10.5 in. doweled and grooved concrete pavement; 900 sq. yds. of 8 in. concrete pavement; 15,000 ft of curb and gutter; media cover; and sidewalk. The project was aimed at widening Havana St., while also providing better access into the Stapleton Redevelopment area, as well as surrounding area.

Also, because the project encompassed two railroad crossings, special agreements had to be reached between the owner and the railroad. The agreements were not in place at the time construction began, so the paving sequence had to be changed to meet the schedule.

As a result, the contractor had to pave in December and January, which required a plan for snow removal, ground-frost prevention, and cold weather paving. To prevent ground frost, the contractor used ground heaters and cover, and when the falling temperatures required additional measures, the contractor used heated water to product concrete in a wet batch plant.

The contractor used a special cement containing fly ash to meet environmental programs established by Forest City, the City of Denver, and Colorado Bill Governor (D). The design of 40<sup>th</sup> Ave. also was

changed from solid concrete from curb-to-curb to landscaped median islands, which made the project more aesthetically pleasing.

### **Municipal Streets & Intersections (Less than 30,000 Sq. Yds.)**

**Gold:** South Main Street Design/Build Project, 1<sup>st</sup> St. to Halsey St., Maryville, Mo.  
**Contractor:** Loch Sand & Construction Co.  
**Owner:** City of Maryville, Mo.  
**Engineer:** Snyder & Associates

After the winter months ending in March 2008, Maryville, Mo., city officials realized there was a serious problem with a 2,400 lineal ft section of South Main St.

The existing roadway, which was comprised largely of asphalt overlays, had deteriorated to the point the city was dumping and grading rock on the roadway as a daily maintenance routine. With Main Street as the primary artery for the city, and with a population of about 20,000 college students, officials determined something had to be done quickly.

Although taxpayers in April 2008 approved a capital improvement program tax, the problem was discovered a few months prior, so the city advertised it as a design/build project. The contractor proposed removing the deteriorated roadway a full 32 feet in width, and then, placing concrete pavement, as well as curb and gutter. To manage the project, while allowing access for all affected, the contractor built the project in two phases. The first was a section of two city blocks, where most businesses are located, then phase two would include the rest of the project. As part of the phase two work, Loch quickly found some unsuitable subgrade, which had to be addressed. In all, the project consisted of 8,117 sq. yd. of base; 6,297 sq. yd. of mainline paving; 2,790 ft of curb and gutter; and 2,198 sq. yds. of sidewalks and driveways.

Weather also was a factor, but not enough to slow down the project. Although the contractor had 5-1/2 months to complete the project, the work was finished a month ahead of schedule.



**Silver:**                   **Intersection of Douglas & Oliver St. Improvements**  
**Contractor:**           **Pavers Inc.**  
**Owner:**                 **City of Wichita, Kans.**  
**Engineer:**             **K.E. Miller Engineering**

Reconstructing this busy intersection was important because the four narrow lanes, with no controlled left turns had become the scene of numerous automobile accidents. At the same time, the needs of area businesses also had to be considered.

The city's plan called for widening the intersection to five lanes, with dedicated turn lanes, new traffic signals, and brick crosswalks. With 40 businesses adjacent to the roadway, the city promised business owners that all work would be complete by October 31, 2008, assuring them construction would not spill into the prime holiday shopping season.

To assure on-time completion, the city had a specified daily damage rate of \$5,000 per calendar day for each day past the deadline, as well as a like incentive per calendar day, up to 20 days or \$100,000 for if the work was complete and the road open to unrestricted traffic.

Prior to the start of construction, the contractor and city officials met with business owners to lay out the plan. A number of business owners expressed opposition, fearing they would not have access to their property. The contractor not only assured access, but also offered to assist with deliveries, including unloading trucks in the direction of traffic, as well as carrying items to the door. The contractor also worked closely with the phone company, energy company, and gas utility to ensure major utility relocation, as well as to safeguard against service disruption. The contractor even developed a separate traffic control plan to install new waterline system and services along with the majority of the sewer system. Although the utility work and relocation took three hours longer to complete, the contractor and city developed a plan to reduce the phasing from four to three phases.

The final result was the contractor opened the road to unrestricted traffic 21 days ahead of the October 31, thereby earning the \$100,000 bonus.

**Silver:** University of Michigan-Flint, Kearsley Street Reconnect  
**Contractor:** Angelo Iafrate Construction Co.  
**Owner:** University of Michigan  
**Engineer:** Rowe Professional Services Co.

The idea of reconnecting two University of Michigan-Flint (UM-Flint) campus facilities with the downtown area was part of the City of Flint’s traffic-pattern master plan. The plan called for re-establishing the connection between the cultural center located on the east side of Interstate-475 with the main campus and downtown areas, located on the west side of the same highway.

The project called for the removal of the existing asphalt, concrete curb, and aggregate base, and construction of a 4 in. aggregate base and 9 in. concrete pavement.

The intersection of Kearsley St. and Wallenberg St. was determined to be the gateway point, and as such, most of the aesthetic features were designed for this area. Three logos were applied in the area, with two in the sidewalk crossings and the third in the intersection.

The intersection logo consisted of three colors of concrete and two separate stamp patterns. The concrete crosswalks were a red blend with an old brick herringbone pattern. The intersection concrete was an integral colored concrete (caramel bluff) and was stamped with a Roman slate texture. The UM-Flint logos were applied on the colored concrete using a water-based pigment. A custom template was laser-cut from steel, and then bush hammers were used to remove about ¼ in. of concrete. Next, a water-based pigment was applied to complete the logo. The result is greater access and mobility, as well as a durable and aesthetically pleasing pavement that will last for many years.

## Overlays

**Gold:** Interstate-77 Reconstruction Design-Build project, Yadkin County, N.C.  
**Contractor:** The Lane Construction Corp.  
**Owner:** North Carolina DOT  
**Engineer:** HDR Engineering, Inc. of the Carolinas

The use of overlay technology, and more specifically, an unbonded concrete overlay on the existing concrete roadway, helped the contractor address the challenges presented by a very tight schedule and some stringent traffic control requirements. The project was a total of 26.1 lane miles and used 11 in. thick concrete for mainline sections, 13 in. in full depth reconstruction areas, and 9 in. on ramps and loops. The overlay was placed on existing continuously reinforced concrete with 1.5 in. of surface course bond breaker, while the FDR areas used 6 in. of stone and 4 in. of asphalt base course.

The concrete pavement portion of this design-build project was scheduled to begin in mid-September 2007 and was scheduled for completion in May 2009. The contractor completed the project in November 2008, almost six months ahead of schedule.

Because of holiday and seasonal restrictions, Lane had very short time windows to complete the work on various sections before they needed to be re-opened to traffic. To address the challenge, the projects were separated into multiple sections that allowed completion of each section over a span of two to three months.

Traffic had to be in a two-lane pattern, and the contractor could not close or narrow a lane during holidays, summer weekends, or during NASCAR sporting events taking place in nearby Charlotte, N.C. The design-build team solved the challenge by placing a detour the entire length of the project, allowing for a two-lane crossover pattern in the median. The challenge also was met by completing the concrete paving in phases. Because the ramps, loops, and bridge tie-ins could only be closed for 11 days, the construction team worked around the clock to complete the work during these closures.

One innovation used on the project was the use of wireless maturity testing. The process, which involved a wireless, hand-held device that collected data from microprobes in the concrete, helped estimate the time at which the new concrete obtained sufficient strength to allow construction equipment onto the slabs to continue the next phase of construction.

**Gold:** Project NHY-033N (012), Sequoyah County, Okla.  
**Contractor:** Duit Construction Co. Inc.  
**Owner/Engineer:** Oklahoma DOT

U.S. 59 passes through some very scenic views in Sequoyah County. Motorists travel along steep, 7% grades past Wildhorse Mountain and along Robert S. Kerr Lake, but the roadway was experiencing premature deterioration .

The one-year-old, 10 in. asphalt pavement placed on 8 in. of lime-treated subgrade in this location was shoving, heaving, and rutting severely. Facing imminent and complete failure of the pavement, the Oklahoma Department of Transportation (ODOT) decided to correct the problem with a 7 in. doweled jointed plain concrete pavement. Like many agencies, ODOT was facing a shortage of roadway funds and had to use maintenance funds to repair the roadway. Luckily, bids for the project came in 22.5% below the engineer's estimate.

Time was critical, as only 30 calendar days were allotted for the project, which involved 1.61 miles of four-lane divided highway, for a total of 7.05 lane miles. The work was done in two phases and involved moving daily traffic (estimated at 7,120 vehicles/day, of which 21% was truck traffic) in a two-lane, head-to-head configuration while the adjacent side was repaired.

When Duit Construction Co. arrived on the scene, the northbound lanes had to be closed before they failed completely. Duit's crews repaired and overlaid the northbound lanes first, then switched traffic and completed the southbound lanes, ultimately completing the job within the 30 day schedule.

During the planning stage, typical sections were drawn by hand in a set of contract plans just three pages long. ODOT District I Engineer Darren Saliba and his staff were credited with the idea of preparing the simple set of roadway plans in order to complete the design in a timely manner. This allowed ODOT to bid the project quickly to make the repairs before the roadway failed.

An optimized gradation mixture design using the Shilstone method were credited with creating a concrete pavement that is strong, long lasting, and cost effective. The average compressive strength of the concrete was 4,460 psi for the mainline sections. ODOT uses what is called a Class AP concrete on the shoulders. The mixture is about 1,200 psi less than mainline sections. Although there were some concerns about using dowels on such thin slabs, as well as with using a automated dowel-bar inserter, Duit credited proper stringline practices and proper maintenance of the automated dowel-bar inserter with a problem-free approach to the concerns.

One other challenge was that, just to the north of this project, there was another reconstruction project going on, making coordination of the projects challenging and adding complexity to the lane switches and overall traffic management.

**Gold:** US-131 Concrete Overlay, Kent County, Mich.  
**Contractor:** Ajax Paving Industries, Inc.  
**Owner:** Michigan DOT, Grand Rapids Region  
**Engineer:** Michigan DOT-Grand Rapids Transportation Service Center

The Michigan Department of Transportation's (MDOT's) final link in the improvements on U.S. 131 from Ann Street in Grand Rapids to 17 Mile Road in Cedar Springs was a 6.5 in. concrete overlay project of 26 lane miles of the highway.

The U.S. 131 corridor north of Grand Rapids has experienced tremendous growth, and following that growth, traffic volumes have increased significantly.

One of the challenges of this project was a bridge over 6 Mile Road on southbound US-131. The bridge is narrow and was not able to handle conventional construction traffic configurations. The project used MDOT's split/merge traffic plan, which enabled two lanes of traffic to be maintained in each direction.

There was a considerable effort to correct the old roadway's parabolic surface, superelevation, and crown-cross slope to bring the road up to current standards.

Ajax Paving Industries, Inc. placed the 6.5 in. unbonded concrete overlay on the existing 40-yr-old concrete pavement, using a 1 in. asphalt separator layer. The original pavement was on a 6 in. aggregate subbase on 12 in. of sand subbase. Some full-depth reconstruction was required at areas under bridges where the roadway passed over the freeway or transitioned down to bridge decks on the freeway and over streams or local roads. (The areas requiring reconstruction used 10.5 in. of concrete.)

A Shilstone-type well-graded concrete mixture, with three aggregates, was used. The mixture, which contained 40% slag cement, used only 294 lb/cu. yd. of portland cement.

Prior to beginning the paving, the contractor identified areas on the existing pavement that had “tented” because of incompressibles in the old pavement joints, and improper expansion joint maintenance during the life of the original jointed reinforced concrete pavement.. The repairs had to be made in a manner that the additional traffic from the traffic control switch would not degrade the roadway during construction.

The peak-hour traffic was very high, because the highway is used as a commuter route and a weekend destination route to northern areas of Michigan. The contractor handled all of the challenges presented on this project.

## **Reliever & General Aviation Airports**

<b>Gold:</b>	<b>Delphi Municipal Airport Runway 18-36 Rehabilitation (AIP 1-18-0117-09)</b>
<b>Contractor:</b>	<b>E&amp;B Paving, Inc.</b>
<b>Owner:</b>	<b>Delphi Board of Aviation Commission</b>
<b>Engineer:</b>	<b>NGC Corp.</b>

This airport was the first full concrete overlay to be build on an airport runway in Indiana. Initially built in the early 1970's the 2,652 ft. asphalt pavement runway was poorly drained and in need of complete rehabilitation. The airport's consultant, NGC Corp., initially designed a 5 in. asphalt overlay over a full-depth repaired (FDR) base. Because of sharp increasing in hot mix asphalt costs, an alternate design using 5 in. of concrete on FDR was developed.

After discussions with potential bidders, a third alternate was developed for greater than 5 in. of concrete on the existing asphalt surface. When the project was let, the third alternate was 22% lower than the original bid for asphalt on FDR.

E&B Paving and NGC Corp. worked closely to find efficiencies and reduce the actual contract time down to 38 days, primarily by eliminating a second pavement marking application. The initial 5 in. P-501 thickness was increased to 5.75 in. to ensure a 1.25% cross slope from the center line, funding for which came from revising other contract items downward. The contractor paved in 20 ft. wide lanes and placed about 1,300 lineal feet per day, completing the paving in six days.

Profilograph testing revealed extraordinary smoothness, allowing E&B to achieve a maximum 106% pay factor for both smoothness and strength based on P-501 percent within limit requirements. The overlay project saved the Delphi Board of Aviation Commission about \$200,000 against a \$900,000 rehabilitation budget. As a result of this success, three more concrete overlay projects, at this writing, have been bid at other Indiana general aviation airports.

**Silver: Construction at Paulding County Regional Airport, Dallas, Ga.**  
**Contractor: APAC - Tennessee, Inc.**  
**Owner: Paulding County Regional Airport, Georgia**  
**Engineer: The LPA Group Inc.**

Georgia's newest airport in approximately 25 years is not only part of an award-winning master plan, but also stands as a testament of how value engineering and long-term benefits factored into the use of concrete pavements. The project also underscores concrete's sustainability benefits, as the pavement plays an important role in protecting endangered species.

The airport was planned as a key component of Paulding County's long-term economic development strategy. The master plan for 10,000 acres of planned development and greenspace received the U.S. Economic Development Administration's Excellence in Economic Development Award in 2007.

One significant challenge was to find a way to protect the Cherokee darter, a small fish on the federal endangered species list. Although the airport construction was not considered to impact directly the streams where the darters have been found, the small fish are sensitive to temperature change, and so, there was a concern that runoff from an asphalt pavement would increase the temperature of the streams. The LPA Group and the Fish and Wildlife Services, developed an innovative stormwater management plan, but there was still concern about the temperatures of the asphalt. The permitting agencies realized concrete is cooler than asphalt, which sparked interest in using concrete pavement. Also, it was determined the projected cost of an asphalt overlay in approximately 10 years would exceed the additional initial cost of using concrete, the decision was made to use concrete pavement.

The design team coordinated with the contractor and ACPA for value-engineering to meet the available funding, and as a result, the team was able to reduce the amount of steel, while still meeting FAA criteria. APAC-Tennessee placed 135,820 sq. yds. of 10 in. concrete pavement with 12.5 ft. joint spacings. One of the significant challenges was that the grand opening of the airport was set before the project was ever awarded. Interim milestone deadlines were established, and APAC-Tennessee finished the project on time. The airport was officially opened to traffic in November 2008, and since then, pilots have reported the airport runway is one of the smoothest on which they have ever landed.

## **State Roads**

**Gold:** Reconstruction of U.S. 34 in Union County, Creston, Iowa  
**Contractor:** Cedar Valley Corp.  
**Owner:** Iowa DOT

This project generated some major concerns, because the city of Creston would have been temporarily divided in two if the highway were closed. Numerous businesses were vocal with the Iowa DOT in expressing they wanted no disruption to commerce during the reconstruction project.

The 49 ft. back-to-back paving was staged one half at a time to maintain traffic, and the plans called for continuous access to the highway or designated side streets for all businesses and residents along the highway. The staging was developed around the concerns, and called for dividing the project into eight work areas, four on each side of the existing highway to minimize impact to local businesses.

Immediately after the award of the project, Cedar Valley Corporation submitted a revised, detailed schedule to the Iowa DOT Engineer. The schedule improved constructability and expedited the construction period by cutting the staging from four phases to two. At a public meeting prior to the pre-construction meeting the contractor had the opportunity to address many of the most serious issues and concerns. With the concerns addressed, the public support grew for Cedar Valley's plan.

As the work began, heavy rains fell, and more than 50 in. of rain fell during the construction period. Adding to the challenges were "horrific" utility conflicts, which were exacerbated by different elevation conflicts and a lack of awareness where some of the certain utility locations were. Still, the revised staging enabled completion of the challenging paving project, allowing the contractor to place 8 lane miles of 9.5 in. concrete on 20 ft. joint spacings, and at the same time, averting flooding that could have threatened the downtown area were it not for expert planning, coordination, and communications.

**Silver: Reconstruction of SR-26, Riverdale City, Utah**  
**Contractor: Geneva Rock Products and Granite Construction Company**  
**Owner: Utah DOT**

Riverdale Road, a major urban arterial in northern Utah, links four major cities to two Interstate highways, Interstate-15 and Interstate-84. As one of the most congested commercial corridors in Utah, the road carries some 47,000 vehicles per day.

The project involved reconstructing the distressed five-lane asphalt roadway into a seven-lane concrete facility. One of the challenges was that traffic on the original five lanes had to be maintained during peak hours, from 7 a.m. to 9 p.m., during the construction process. This also meant access had to be maintained to more than 50 businesses along Riverdale Road via 36 separate driveways.

Because of the volume of traffic and the concentration of businesses in the area, Geneva Rock Products and Granite Construction Co. had 82 separate concrete pavement placements. The project was completed in three phases, and involved 40,000 cu. yds. of excavation; 6 in. of untreated base course; 3 in. of  $\frac{3}{4}$  in. asphalt; and cap of 10 in. to 11 in. concrete.

Crews worked seven days per week and both day and night to complete the project, which also included improvements to pedestrian facilities; landscaping; drainage; street lighting; and reconstruction of five signalized intersections. The crews logged more than 200,000 man hours with no accidents and an exceptional safety record overall. A business district advisory committee was established to assess local business owners and operators' satisfaction with the contractor. The overall satisfaction increased as the project progressed and a 92% approval rating was achieved on the final vote. The crews not only completed the three-phase job on what was the most congested roadway in Utah, but also did it in a single season. The project proved that concrete pavements can be placed with only minimal impact to the community, and stands as a shining example of a high quality, smooth, and efficient roadway that will last for many years.

### **Urban Arterials and Collectors**

**Gold:** Highway 10/Connect, Detroit Lakes, Minn.  
**Contractor:** Shafer Contracting Company, Inc. and Hoffman Construction  
**Owner:** Minnesota DOT  
**Engineer:** HNTB

A complex realignment project of an inter-regional corridor through a high traffic community in the west central Minnesota's lake country required skillful engineering, ingenuity, and hard work, all balanced with a sharp focus on sustainability and culture.

The goal of this design-bid-build project was to improve safety and mobility along the Highway 10 corridor. The project design balances mobility on Highway 10 with access for local traffic movements, and of course, harmony with the surrounding cultural and natural resources.

This complex project required careful coordination of several different features, including: demolition of five businesses and nine residential properties; realignment of 1.5 miles of railroad tracks; improvement of the busy intersection of Highway 59 and Highway 34; and construction of a five lane bridge over two railroads. Other features includes: realignment and new construction of the highway;

realignment of Pelican River; construction of water retention ponds, vortex systems and a rain garden; and reconstruction of the historic Big Detroit Lake scenic overlook.

Shafer placed a total of 12 lane miles of concrete pavement with joint spacings of 15 ft. In addition to the scale and complexity of the project, there were also a number of details that could have affected the schedule. For example, the project was constructed in a fully developed business district dependent on summer tourism and Highway 10 traffic. Business owners were concerned about access, and so the project was completed in a large number of construction phases, which made coordination a challenge. Short work schedules and the major environmental considerations also added to the complexity, as did the unusual aspects of moving 1.5 miles of double main railroad tracks, having to adjust the location of proposed underground utilities because of conflicts with abandoned systems, and coordination with railroad specifications.

Even so, the project was completed safely, efficiently, and ahead of schedule. The contractor also earned 83% of the available incentive possible for ride quality, which underscored the quality and attention to detail that went into the project. As a result, Minnesotans and visitors to the area have a corridor that showcases a perfect balance of mobility, sustainability, and the culture of this unique and picturesque region.

**Silver:** Reconstruction of SR-66, Diamond Ave., Evansville, Ind.  
**Contractor:** E&B Paving, Inc.  
**Owner:** Indiana DOT  
**Engineer:** Woolpert, LLC/CTE and AECOM

Reconstruction of a busy urban roadway can be challenging, and even dangerous under any conditions, but particularly so when it's built under traffic.

E&B Paving had to completely remove an existing 9-in. concrete roadway, then construct a new road that included four new travel lanes, center median island, and new turn lanes. Other elements of the

project included improvements at four major intersections, reconstruction of ramps, street approaches, driveways, curbs, sidewalk, and installation of new signs and signals.

Much of the first season in 2007 was devoted to construction of the nine modified manholes, which also involved excavation and sheeting to a depth of approximately 45 ft. The second season in 2008 focused on the concrete pavement placement. Early in the project, E&B requested and received changes to the maintenance of traffic, which allowed one phase of the project to be eliminated. Safety also was a major concern, and so at the contractor's request, the speed limit was reduced to 30 mph. The actual concrete paving, the placement of 13.2 lane miles of 11 in. concrete with 18 ft. joint spacing, was all completed at night. Crews paved from 7 p.m. to 4 a.m. to accelerate construction and accommodate local traffic and business access.

The contract completion date requirement was June 1, 2009, but the project was 98% complete seven months ahead of schedule. Experience, skill, and attention to detail created a pavement that will play a vital role in mobility and commerce for many years.

### **About the ACPA**

The American Concrete Pavement Association is the national trade association for the concrete pavement industry. The primary mission of the ACPA is to create and maintain a strong national presence through dynamic, strategic leadership; effective technical expertise and resources; and persuasive advocacy on behalf of the concrete pavement industry.

Founded in 1964, the American Concrete Pavement Association is headquartered in Chicago at 5420 Old Orchard Road, Skokie, IL 60077. Telephone: 847/966-2272. Fax: 847/966-9970. The Association's Washington, DC office is located at 500 New Jersey Ave., NW , 7th Floor, Washington, DC 20001. Phone: 202-638-2272. Fax: 202-638-2688. Visit our technical website at [www.acpa.org](http://www.acpa.org). Visit our public website at [www.pavements4life.com](http://www.pavements4life.com).

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