Mid-Ohio Sports Car Course Project

A RACE AGAINST TIME

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The Mid-Ohio Sports Car Course is a permanent road course with both a 2.4-mile, 15-turn configuration and a 2.25-mile, 13-turn layout located in Lexington, Ohio. It was originally constructed in 1962 for weekend sports car racing by local businessmen. In 1972 and 1990, the entire 2.4 miles of road course was resurfaced. The track is often referred to as the "country club" of racetracks. Mid-Ohio Sports Car Course attracts approximately 500,000 spectators, competitors and guests to the facility each year.

As part of Mid-Ohio's aggressive capital improvements campaign for the 2006 racing season, it was their desire to remove all of the existing concrete patches in the turns that created an inconsistent racing track surface; resurface the entire track; remove and replace existing concrete curbs; and construct two connector roads in the "keyhole" section of the track, which would allow the track to hold two racing events simultaneously.

Kokosing Construction Company, Inc. was approached by Mid-Ohio in September 2005, and after several meetings and design changes entered into a design-build partnership to begin construction on Nov. 6, 2005.

Meeting the Challenges of a Difficult Job

The challenge in constructing the project was the narrow window of opportunity to build it. Mid-Ohio racetrack operates everyday of the week, starting in the first week of April through the first week of November. Kokosing's main concern was the feasibility of the scope of work involved, due to the tight schedule. The majority of the work was asphalt paving, and the scheduled reconstruction time of the project is normally not conducive in Ohio for asphalt paving; especially with the type of special polymerized asphalt mixes involved.

On Nov. 6, 2005, Kokosing began milling the existing 40-foot-wide track (71,000 square yards) and performing pavement repairs. The concrete patches had to be removed (3,250 SY) to allow for a consistent full-depth asphalt pavement section. Throughout the track,

numerous areas of unstable base were uncovered and various undercuts were performed (2,050 cubic yards). In areas where the base could not support an undercut, cement stabilization (11,000 SY) had to be performed. Due to the unexpected poor condition of the base, the planned pavement structure had to be modified. The track was divided into eight sections, each with its own unique pavement design. Most of the sections received 3 to 4 inches of 301 asphalt base (12,700 TN). The few sections with sufficient asphalt and aggregate were strengthened with 2 inches of 446-1H asphalt intermediate. The entire track was paved with 1.25 inches of 442 Superpave, 9.5mm asphalt leveling (4,400 TN) and 1.5 inches of 442 Superpave, 9.5mm asphalt surface (5,100 TN).

In addition to the reconstruction of the existing track, Kokosing constructed two new crossovers in the infield of the keyhole area. These were field-designed and the location had to be changed numerous times to accommodate Mid-Ohio's safety needs. The crossovers involved installing 12-inch storm pipe (1,400 linear feet), catch basins (3 EA), removing the existing infield (3,250 CY), installing 304 aggregate base (3,500 tons), and paving the new crossovers with asphalt (1,100 TN).

Because of the eight different pavement sections, the elevations of the existing curbs that lined the inside and outside of the turns needed to

be modified to match the new finished surface elevation. Consequently, the existing concrete curbs were removed and replaced (3,350 LF) with a consistent type of curb throughout the track. The curbs were slip formed with a special attachment to match Mid-Ohio's criteria. This work was added midway through the project and had to be accelerated and planned as not to interfere with the continuous track reconstruction.

As a result of the project team's pre-planning, scheduling, double shifting of various crews throughout the eight different types of pavement sections, coordination of asphalt paving, plant, and terminal crews, Kokosing was able to complete the majority of the project by December 2005. Winter set in early and it became apparent that the weather was not going to cooperate to allow for warm enough temperatures to place the polymer asphalt intermediate and surface courses. The project was suspended for the winter and the wait for warm temperatures began.

Mid-Ohio's desire to be operational by April 1, 2006, was waging a battle with Mother Nature. Kokosing's first goal and responsibility was to place a smooth and durable asphalt surface, even at the expense of delaying Mid-Ohio's opening. Fortunately, on March 30, 2006, a window of warm weather arrived and the polymer surface installation was able to begin and was completed on April 2, 2006, six days prior to the start of the racing season.

Innovation of Construction Techniques and Materials

Due to the design-build nature of this project, most of the techniques and materials used were innovative by necessity: cement stabilization for marginal sub-grade conditions; profiling of the track to maintain the track's history; and designing, producing and placing a product that would exceed the customer's expectation. All of these solutions were the brainchild of the project team, several engineers and a consulting firm who on a Sunday afternoon formulated ideas on scratch paper. This kind of "shirt-sleeve" management was prevalent throughout the project.

One of the main goals of this project was to produce a smooth surface that would withstand the extreme shear forces generated by the race cars and motorcycles. The project team researched and experimented with various types of mixes before deciding to use 442 Superpave, 9.5mm asphalt, utilizing special polymerized asphalt for both the leveling and surface courses.

Kokosing utilized wide paving practices (20 feet wide) in order to construct a single longitudinal joint on the 40-foot wide track. The joint was sealed with a specialized pavement joint adhesive to increase the performance and longevity of the longitudinal joint.

Recognizing that the density of the asphalt was the most important aspect of durability, Kokosing paid special attention to compaction. Three vibratory rollers, along with a three-wheel roller, were used to achieve mat compactions in excess of 94 percent and joint compactions exceeding 93 percent, which exceeded the owner's specifications.

The most visible and easily measured aspect of the finished product would be the smoothness of the asphalt surface. To achieve maximum smoothness for the cars and super bikes that reach speeds in excess of 200 mph, the use of a material transfer device was imperative. With the many super-elevated turns, elevation changes, and low-overhead clearance issues, the use of a traditional material transfer device was not an option. Consequently, the project team searched for and located a non-contact, low-profile material transfer device to accomplish this.

Mid-Ohio Project Scope of Work

- 71,000 SY of pavement planing
- Removal of 3,250 SY of concrete patches and replacement with full-depth asphalt
- 2,050 CY of sub-grade undercuts
- 1,400 LF of 12" storm drain
- 11,000 SY of cement stabilization
- 3,250 CY of excavation
- 3,500 tons of #304 aggregate base
- 3,500 LF of concrete curb
- 12,700 tons 301 Base Asphalt
- 654 tons 446 1H Leveling
- 4,400 tons of 9.5 mm Super Pave Leveling Course
- 5,100 tons of 9.5 mm Super Pave Surface Course

Sensitivity to the Environment

Prior to construction on the project, Kokosing installed several construction access points, utilizing aggregate to minimize tracking of dirt and other debris onto public roadways. Filter fabric fence was installed in the areas that were disturbed in construction of the crossovers and in areas where the storm pipe was installed. Kokosing Materials Inc.'s polymer asphalt terminal and hot-mix facility (Mansfield Plant-6), located in Mansfield, produced the project's asphalt materials. Both of these facilities incorporate state-of-the-art environmental controls that exceed agency standards. The hot-mix facility was recently recognized by the National Asphalt Pavement Association for its environmental stewardship and received the agency's Diamond Achievement Award.

Conclusion

Mid-Ohio was able to open the track for racing on April 8, 2006. On May 19, 2006, Mid-Ohio hosted the first spectator event of the year, the American LeMans Racing Series. The smooth asphalt surface, newly constructed crossovers, and concrete curbs received rave reviews from the racing teams. In regards to the resurfacing of the road course, six-time AMA Superbike champion Mat Mladin stated, "The surface is beautiful. I can't complain about the surface at all. This is probably the best surface we go to anywhere as far as being smooth and having some decent grip."

Mid-Ohio's dedication to improving the safety and performance of the race track, and Kokosing's commitment to meeting and exceeding their customer's expectations, resulted in a finished product that will allow Mid-Ohio to continue their reputation as the most competitive road course in the country.

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