

Powerful Profile

Lightweight Extrusions Shoulder a Heavy Design Load

Aluminum Deck on Kentucky Highway Bridge

This fall, school buses crossing the Kentucky State Road 974 bridge over Howard Creek in Clark County, Ky., will drive over an extruded aluminum bridge deck. It will be the first aluminum bridge deck in Kentucky and one of a handful of load-bearing aluminum transportation structures in the country.

In 2002, the Kentucky Transportation Cabinet (KyTC), Kentucky Transportation Center (KTC), South Eastern Center for Aluminum Technology (**Secat**), and national representatives of the aluminum industry met to explore the possibility of deploying an aluminum bridge deck as part of the rehabilitation and upgrade of an existing bridge. KyTC submitted a proposal to the Federal Highway Administration's Innovative Bridge Research and Construction program, which was subsequently awarded in 2003.

The design features 12 deck panels fabricated from extruded profiles welded side by side. The profiles were constructed from 6005-T6 alloy by Bayards Aluminium Constructions B.V., in the Netherlands, in cooperation with KTC and TNO Building and Construction Research.

According to Dr. Issam Harik, of KTC, the three primary advantages of the aluminum deck are:

- . •Reduced dead load—the aluminum deck weighs approximately 80 percent less than the steel reinforced concrete deck it is replacing, which permits increasing the load limit for trucks crossing the bridge;
- . •Durability—aluminum is expected to increase the lifespan of the deck many times over that of a conventional reinforced concrete deck; and
- . •Rapid construction—the aluminum deck can be placed in one day and the bridge opened to traffic later that same day.

Harik says the initial cost is the primary disadvantage of the aluminum deck.

At press time, the construction schedule called for the extruded deck panels to be placed on the bridge on July 18. In lieu of the traditional bolting or welding

Photo: Bayards Aluminium Constructions B.V.



On July 18, twelve aluminum deck panels — fabricated by Bayards Aluminium Constructions B.V. (www.bayards.nl) — were scheduled for installation on this Kentucky bridge to replace the existing steel reinforced concrete deck. The new deck weighs approximately 80 percent less than the old one — thus increasing the load limit for trucks crossing the bridge.

connections, the aluminum panels will be secured to the supporting beam sections and to one another using mechanical clamps. The clamps can be tightened to a desirable pre-tensioning level. Each panel comes with a 20-mm thick protective layer. Upon the completion of the installation process, an additional 80 mm of asphaltic concrete will be added as topping.

“We hope that this new bridge will initiate renewed interest in the use of aluminum in bridge construction in Kentucky and nationwide,” says Dr. Subodh Das, president of Secat. “Secat will work with the Aluminum Association, Aluminum Extruders Council, and aluminum producing and fabricating companies along with state and federal transportation departments to promote the expanded use of aluminum in bridge construction.”

