

Whitetopping Provides Answer for Fernandina Beach Airport

By Dr. Jamshid Armaghani

Whitetopping is a concrete overlay placed on asphalt surfaces to restore the structural and functional service to a cracked or rutted pavement. It has been used for highways and roadways, and is proving to be the answer for airport pavements. Whitetopping provides a cost-effective and durable pavement overlay, which requires minimum, if any, maintenance during its 20 to 25 years of service life. It is also used to upgrade the pavement capacity to carry more and heavier traffic.

The thickness of whitetopping can range between two to 14 inches. The two main categories include ultra-thin whitetopping (UTW) and conventional whitetopping. UTW ranges in thickness from two to four inches. The joint spacing ranges from two to six feet and it's suitable for rehabilitation of asphalt pavements that are subjected to low or medium truck traffic. Preferred applications of UTW include street intersections and



Fernandina Beach Airport, Runway 8-26

mainline roads, as well as airport runways, taxiways and aprons. Conventional whitetopping ranges in thickness between five to 12 inches. The joint spacing can range between eight to 16 feet. It is effective for rehabilitation and restoration of asphalt pavements in highways and airports that are subjected to medium or heavy traffic.

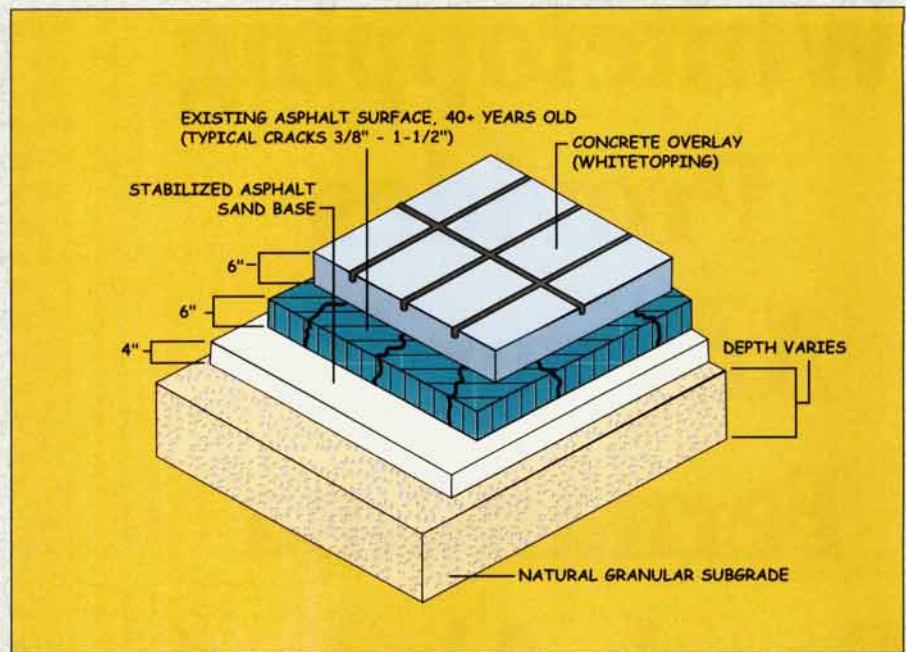
Whitetopping for Airport Pavements

Whitetopping is the most viable alternative for restoration of asphalt runways, taxiways and aprons at airports. It can be more cost effective than reconstruction with asphalt, and generally lasts up to three times as long as any asphalt overlay. An added advantage is the reflective, lighter color of whitetopping, which provides excellent visibility to pilots approaching airport runways.

Cracks in asphalt pavements can reflect through asphalt overlays resulting in shorter service life. But unlike asphalt overlays, cracks in the asphalt base do not reflect through whitetopping. This is due to the fact that concrete is a rigid surface with ten times higher stiffness than asphalt. Whitetopping is thus considered the best restoration layer on the worst asphalt pavement.

The first whitetopping project in a Florida airport was completed in 1996 at the New Smyrna Beach Airport. Between two to three and a half inches of UTW was placed on a severely cracked asphalt taxiway and apron. For the past six years, the UTW has had excellent performance.

In May 2000, another UTW project was completed in the Savannah/Harding Airport in Tennessee. The four-inch UTW was constructed on the severely cracked runway as a long-term pavement solution.



This diagram depicts how cracks in the asphalt do not reflect through the whitetopping layer.

Fernandina Beach Airport Project

The latest whitetopping project was awarded recently to restore two runways and a taxiway at Fernandina Beach Airport, a general aviation airport located in northeast Florida. After its excellent performance in New Smyrna, whitetopping became a viable answer for Fernandina.

The project includes Runway 4-22, Runway 8-26 and Taxiway C. The original asphalt pavement is 50 years old with severe cracking. Taxiway C and Runway 4-22 had previously been overlaid with asphalt, however in recent years, cracks from the brittle and old asphalt pavement reflected through the asphalt overlay. The most damaged area is Runway 8-26, which suffers from extensive block cracking.

A planning team was formed to review the restoration/reconstruction options, and to oversee the design, specification development and construction of the project. The team included representatives from the City of Fernandina Beach, the Florida Department of Transportation

(FDOT)-District 2 Aviation, Passero Associates (Design Consultant), Earth Tech (District 2 General Consultant) and the Florida Concrete & Products Association (FC&PA). The City of Fernandina Beach, FDOT and the Federal Aviation Administration (FAA) will provide the funding for the project.

Restoration/Reconstruction Options

The planning team evaluated three restoration/reconstruction options including a thin asphalt overlay, complete reconstruction with asphalt and whitetopping. The three options were evaluated based on life-cycle costs over a 25-year period, and other factors such as long-term performance and environmental issues associated with removal and disposition of the existing asphalt and asphalt-stabilized base material.

The thin asphalt overlay had the lowest initial cost. However, due to reflective cracking from the old asphalt pavement, the pavement would require multiple



Fernandina Beach Airport, Runway 4-22

and expensive milling and resurfacing over its service life. The second option, complete reconstruction with asphalt, would involve removal of the asphalt layer and the stabilized base, then reconstruction of the new pavement, placing a new stabilized base and a thicker asphalt layer. With the reconstruction option, at least one, and possibly two, resurfacings would also be anticipated during its service life. The reconstruction option was determined to be costly with respect to the actual cost of reconstruction and subsequent resurfacings. In addition, the planning team reviewed the environmental effects of removing the old pavement and the decision to go another route came to fruition.

Whitotopping was determined to be the best and most cost-effective option. It would be placed on the existing asphalt surface without the need for milling or the removal of the existing pavement. No material would be removed from, or brought to the project site, which negates any environmental concerns. Also, based on the

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volume and type of traffic that the pavement will undergo, the predicted service life of the whitotopping option would be at least 25 years, requiring minimum, if any, maintenance. And as mentioned previously, an added advantage to choosing

whitotopping is the reflective, lighter color of whitotopping provides exceptional visibility to pilots approaching airport runways.

Design and Material Specification

After receiving input from the planning team, Passero Associates prepared the design for the project, which included six-inch thick whitotopping on Runway 8-26, and five-inches to be placed over Taxiway C and Runway 4-22. The size of the whitotopping panels for Runways 8-26 and 4-22 is 5 feet by 6.25 feet, and for Taxiway C, 4 feet by 4 feet. The project also includes full-depth, 11-inch concrete, which will extend the length of the both runways and Taxiway C.

The FAA Concrete Specification P501 was also modified to account for specific construction aspects of the whitotopping. Some of the modifications included thorough cleaning of the asphalt surface, early saw-cutting of the panel joints as well as the use of fibers in the concrete mix. A sacrificial slab will be required to determine an accurate time frame for saw-cutting the joints.

By providing a guarantee beyond the minimum 5-year requirement, the bidding contractors demonstrated full confidence not only in the concrete itself, but also in their ability to produce quality whitetopping that will require minimum, if any, repairs during its extensive service life.

Recycling Old Pavement

The project scope also includes recycling of the existing asphalt to be used as shoulder material on Runway 8-26. This process involves pulverizing the asphalt and its base from the area outside the whitetopped section of the runway, then transporting the pulverized material to the shoulder area, which would then be blended with cement and stabilized.

Long-Term Guarantee

The project includes an innovative contracting method requiring long-term pavement guarantees. The bidding contractors were required to provide a minimum five-year guarantee on all whitetopping pavements. They also had the option to extend the guarantee period to 10 years and receive certain credit on their bid price

for every guarantee year beyond the fifth year. The contractor would be responsible for repair of distresses that exceed certain thresholds during the guarantee period.

Project Bidding Process

The project was advertised this past August, and the bids were opened in September. Four major contractors bid the job. All contractors included a 10-year guarantee for the whitetopping. The lowest bidder was Ajax of Detroit, Michigan. The bid prices for the concrete whitetopping items were below the engineer's estimate.

First Guarantee Airport Project

The Fernandina Beach project is considered the first whitetopping airport project in the country with a 10-year guarantee. By providing a

guarantee beyond the minimum 5-year requirement, the bidding contractors demonstrated full confidence not only in the concrete itself, but also in their ability to produce quality whitetopping that will require minimum, if any, repairs during its extensive service life. The bidding process also demonstrated that the concept of pavement guarantees could be successfully applied to pavement construction. The fact that all contractors bid the job with a 10-year guarantee, and the winning bid included prices below the original estimate is a confirmation that guarantees can be incorporated in paving contracts. Long-term guarantees will improve quality of construction, and ensure a long-lasting pavement beyond its predicted service life.

A pre-construction conference is planned for December, and construction is scheduled to start in January 2003. The entire process will be documented and the various construction phases will be recorded on videotape for training purposes. Look for follow-up information in upcoming issues of *Florida Concrete*.

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