

In November 2015, a new storm water drainage system was completed in Jackson, Miss., for the Jackson-Medgar Wiley Evers International Airport (JAN). The airport has two runways and encompasses some 3,300 acres. It services approximately 20 commercial aircraft daily and also is home to the 172nd Airlift Wing of the Mississippi Air National Guard.

An integral part of the project's required installed efficiency was the use of 13,000 ft of thermoplastic pipe in diameters up to 5 ft. The new pipe was used to replace reinforced concrete pipe (RCP) that was failing, and also for new runs. The project was designed and overseen by WEI/AJA, a joint venture between Waggoner Eng. and AJA Management & Technical Services, both of Jackson.

Picking Plastic

"Originally, the project was designed using reinforced concrete pipe in order to meet FAA [Federal Aviation Administration] specifications," Pentecost said. "But I liked the idea of fewer joints. Generally, in concrete pipe, that is where we have the most issues, and, on that airfield, most of the pipe was fairly deep."

In addition to meeting long-life and other performance criteria, the pipe would need to provide an efficient means of installation. Safety and speed were critical factors.

"Speed was the key," Pentecost said. "There are only two runways, so shutting down one for an extended period of time to install the pipe was not a favorable option."

The bid specifications from Waggoner Eng. included a thermoplastic pipe from Advanced Drainage Systems Inc. (ADS) and called for ADS HP pipe to be considered as an alternate.

ADS HP pipe is a high-performance polypropylene pipe designed and manufactured for gravity-flow storm drainage applications. It couples advanced polypropylene resin technology with a dual-wall profile design for performance and durability. The smooth interior wall offers additional strength as well as flow. The pipe meets ASTM F2736, ASTM F2881 and AASHTO M330 for the respective diameters. It is approved for use by the U.S. Army Corps of Engineers for storm drainage applications.

The pipe has a patented extended, reinforced bell with a polymer composite band and dual gaskets that add safety within each joint. Joint performance meets or exceeds the 10.8 psi laboratory performance standards per ASTM D3212 requirements. Pipe sections are 20 ft long and can be easily moved with minimal equipment and crew. In addition to its use in storm water drainage, the pipe also is used in other under-pavement airport areas, including deicing pads, runways and taxiways.

"The ADS HP pipe fit the specifications and, at the same time, the FAA was in the process of approving that pipe," Pentecost said. "It all just kind of fell together."

"It was after we advertised the project that the FAA approved the pipe. So we included it as an alternate by addendum prior to the bid. For Hemphill Construction, this was the first time they used it, and they seemed to like it because the pipe was easy to handle and install," he said.

Taking the Field

The multiphase project began in January 2015 and was completed in the fall. The system was designed for a 25-year storm. The WEI/AJA team reevaluated the hydraulics of the entire field and resized some areas that had added or expanded buildings and parking lots. The watertight pipe ranged from 24 to 60 in. in diameter, and traditional precast structures also were used.

The new pipe was installed as the old RCP was being removed, using the same pathway. Burial depth ranged from 4 to 16 ft and averaged 8 to 10 ft.

Pentecost and his team planned to specify a granular material for bedding in the design process, but ADS preferred to use a select sandy material instead of having granular material to the springline of the pipe and another backfill material above it.

"It sped up construction for sure," Pentecost said of the pipe. "Every piece of pipe we installed required at least one taxiway closure. During construction, staging and closures were required throughout, so the quicker the crew could complete an area, the more convenient it was for everyone at the airport." **w&wd**

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Flying High

By Steve Cooper

Mississippi airfield installs thermoplastic pipe for new storm water drainage system

"The project was initiated because the airport was having issues maintaining the airfield," said Will Pentecost, P.E., project manager for WEI/AJA. "The original concrete pipe had reached its design life. It had been in the ground for well over 60 years and it was starting to experience joint failures, causing sinkholes, which were safety risks. What they had was a safety issue for maintenance personnel, and the sinkholes could have caused damage to an aircraft. There were some large sinkholes on the airfield where they were losing material through the concrete pipe joints. Also, if the drainage could not be maintained, it would allow water to accumulate and would have been a concern because birds would congregate there and increase the potential for bird strikes."

"We conducted an evaluation of all the storm drainage on the airfield and compiled a report on the condition of each pipe run and inlet. We then designed a project to meet the airport's budget and needs at the time and to immediately address the worst areas," he said.