DFW P401 Project: Owner Perspective

Pat McCollom, P.E.

Program Manager of Civil Infrastructure
Dallas/Fort Worth International Airport's Design, Code and Construction Department

- 24 years of experience
- Specialty in large airfield construction projects
- Experience at airports across the world
- Second tour of DFW Airport
- Currently managing five large-scale airfield projects and numerous landside public works projects

About the Owner: DFW Airport
P401 and 17C/35C

Runway 17C/35C
Significant need of rehabilitation

650,000 arrivals and departures were experienced at DFW, the fourth busiest airport in the world, in 2017. 40% of daily arrivals are handled by runway 17C/35C. 1983 is the original completion year for Runway 17C/35C construction.

Rehabilitation Solution Requirements
- Shortest downtime
- Longest possible pavement life
- Minimal need for future interruption for scheduled maintenance
- A cost-effective design and method of construction that emphasizes sustainability and helps to maintain DFW's carbon-neutral airport status.
**Scenario Analysis**

Eight potential rehabilitation scenarios

- Considered full removal/replacement
- After extensive alternatives analysis and stakeholder input, the team chose an asphalt overlay design, a DFW first.
- Ultimately selected a keel-only reconstruction, which included approximately 6,000 feet plus a full-width and full-length six-inch-thick HMA overlay.

**Selected Scenario**

“All the stakeholders involved with DFW, along with the end user and the FAA... all of us came together to create what I consider a think tank, and really think outside the box. We looked at what was best for DFW and then went forward with what was ultimately selected.”

Johnny Jackson
Program Manager for the Engineer of Record, Jacobs

DFW
Selection of Asphalt

- Consideration of project costs (initial and long-term maintenance)
- Minimizes runway closure durations (initial and long-term maintenance)
- Ability to quickly mill and replace the wearing course of the runway in future
- Shortest downtime
- Minimal future disruption
- Preserves good performing existing assets

“Ultimately, the asphalt advanced our capabilities with weather resistance and operational performance. It also provided us a cost-effective solution that allows us to plan for future rehabilitation projects that return our airfield to full operations in less time than what other products offered. That’s better for the airport and our airline partners.”

Khaled Naja
DFW's Executive Vice President of Infrastructure and Development Division

P 401 Mix Design

A key to success

- Much success attributed to the HMA mix design (PG 82-22)
- Helped meet production schedules and achieve mat densities
- Designed to enhance the logistics of getting enough material in a timely manner and enable the team to achieve density out on the runway
- P-401 specification is relatively stringent; the project’s mix design played within the allowable parameters
Four Lane Echelon HMAC Paving

An innovative solution:
- Minimized need for longitudinal joints in the middle section of the pavement
- Four machines were able to pave one half of the 150-foot-wide runway
- The 1,340-foot runway was paved in two passes
- Except for the transverse joints where daily/planned work ended, all joints were "hot" joints that did not require additional effort

3D Automatic Grade Control
Use of technology:
- Four paving trains were linked together
- GPS coordinates allowed for automatic grade control
- System accuracy allowed the paving to meet all surface smoothness requirements, both in the transverse and longitudinal direction
- Paving variances less than ¼ inch in 12 feet throughout the 2,010,150 sq. ft. of asphalt paving

Intelligent Compaction
Advanced, equipment-based technology:
- HMAC compaction using "Intelligent Compaction" (IC)
- Provides better quality control
- Involves the use of an accelerometer to measure changes in the amplitude wave of a vibratory roller or compactor
- Real time data, position and compaction, is graphically presented to the operator
- A real time decision can be made to stop application of compactive effort
Runway 17C/35C Rehabilitation
Opened March 10
- CMAA Award Winner (projects >$100M)
- First major rehab of original runways
- Hot mix asphalt overlay ~220K tons
- Complete lighting system replacement
- East airfield runway status lights
- Successful, under budget project valued at $100 million will lead the way for $1 billion in runway rehabilitation projects for DFW’s remaining six runways

Future Projects

“17C/35C is the first full runway rehabilitation we have embarked on and that’s important because we’d like it to be the archetype for what we’re going to do moving forward on the other runways. We have a lot of lessons learned and we must stay fluid as we learn things.”

Smita Radhakrishnan
DFW’s Assistant Vice President of Design and Project Management
2019 Airfield Pavement Assessment
Evaluating future projects

- Visual pavement condition index (PCI)
- Rolling Dynamic Deflectometer (RDD) testing
- Heavy Weight Deflectometer (HWD) testing

Airfield Assessment Status: Pavement and Electrical

- Airfield vault locations and electrical system design standards (equipment, transmission, controls)
- Predictive pavement performance with planned maintenance

Airfield Simulation
Next Runway: 18R/36L Rehabilitation

- Implement lessons learned from Runway 17C/35C rehab
- 100M+ major rehab of critical arrival runway
- Full-width and depth shoulder reconstruction
- PCC keel replacement + miscellaneous panel repairs
- Complete lighting system replacement
- Hot Mix Asphalt (HMA) overlays
- Conversion to mostly landside project
- 100% design complete in October 2019

Project Overview

- Temporary landside conversion
- Keel section reconstruction
- HMA overlay
- Shoulders & blast pad reconstruction
- Drainage improvements
- New electrical infrastructure and LED conversion
- NAVAID adjustments
- 18R ARFF Road realignment
- North AOA access gate

Project Efficiencies

- RW 31L-36R centerline light LED conversion
- RW 13R-31L storm drain improvements
- Electrical on TWs C and E

- SW EAT: TWs D2, WR, WQ, and E extension
Project Efficiencies
Provide large portions of the project to be constructed landside without the access constraints required by AOA.

Runway Closures

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<tr>
<th>Runway 13R</th>
<th>Mar 2020 - May 2020</th>
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<tbody>
<tr>
<td>Runway 18L</td>
<td>Mar 6 - May 4</td>
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<tr>
<td>Runway 18R</td>
<td>Mar 5 – August 3</td>
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<tr>
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<td>May 1 – August 30</td>
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Image source: FAA.gov

Coming Next
17R/35L Departure Runway

Image source: FAA.gov
Thank You