

A Smooth Ride

Airport Transit System Extension at O'Hare International
Optimizes Use of Property for Growth



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When the new Airport Transit System (ATS) debuts at O'Hare International next year, travelers will no doubt be thrilled with its ease and convenience. But otherwise they may take no special note.

Of course, that's kind of the idea – to provide a smooth, seamless, uneventful ride between the terminals and the new, offsite multimodal transit center (a consolidated rental car and parking facility).

While hurrying to their flight or to their car, travelers will be essentially unaware that, from a design and engineering point of view, the short trip between the terminals and the transit center may be the most exciting 1,800 feet of new rail in the country.

Changing the Way Millions Will Travel

The new Transit Center represents one of the largest infrastructure modernization projects in the country – if not the largest.

The Transit Center – a 4.5 million square-foot facility – will relocate and consolidate all of the airport's rental car offerings. It will provide 4,100 rental car parking spaces, as well as rental car maintenance areas, quick turnaround areas and a 74,000 square foot customer service lobby. It also will provide 2,200 public parking spaces.

The Transit Center will free up more than 400,000 square feet of terminal space and streamline many airline and airport functions. It will serve more than 30,000 travelers daily and greatly reduce traffic and congestion around the terminals.

Selected by the City of Chicago Aviation Department, TranSystems designed both the transit center and the above-grade ATS extension that will link it to the terminals.

Two Rail Lines, 28 Spans

The design of the new ATS extension guideways included soil-bearing drill shafts, hammerhead and straddle-bent piers and steel girder superstructures for the inbound and outbound directions. This included 28 spans ranging from 43.5 feet to 157.5 feet.

What Makes This ATS Extension So Unique?

While this is a rail system, it's a people mover with unique guidelines and codes that establish minimum requirements for safety and performance. These standards – the Automated People Mover Standards established by ASCE – also cover the design, construction, operation and maintenance of the guideways themselves.

Working within ASCE guidelines, the design team had to find unique solutions for nearly every span of the guideways. Challenges included:

Guideway geometry. The rails are aligned along spirals and tangents and involve reverse horizontal curvature. The guideways follow these alignments however the steel girders use a series of continuous horizontal curves to parallel the rail spirals, thus simplifying girder fabrication.



EXPERIENCE | Transportation

Continued on next page

Elevation changes. While the entire extension is above-grade, the key elevation change came where the extension tied into the existing ATS. The transition needed to be smooth, with no “bump in the road.”

Right-of-way limits. The extension crossed over Mannheim Road – a significant thoroughfare – as well as buried utilities, including a 90-inch water main. Both the Illinois Department of Transportation and the Joint Action Water Agency had established significant right-of-way limits. There also was the newly constructed and widened Mannheim Road that needed to be protected.

As a result, the longest spans were over Mannheim Road: 157.5 feet for the inbound guideway and 156 feet for the outbound.

Vertical clearances. Mannheim Road and the transit center required specific vertical clearances for safety. The guideways needed to provide this clearance but the resulting spans had to ensure sufficient load capacity as well as deflection and vibration control.

Rail crossover. There is a rail crossover just south of the transit center where inbound and outbound trains can switch tracks. TranSystems designed the steel to support that crossover, taking into account the 49-foot separation between the two guideways and the resulting horizontal and lateral force effects. The crossover region needed to be designed so that all girders had the necessary stiffness to minimize horizontal deflection.

Architectural aesthetics. The ATS of course extends into the new transit center, so for this section the team had to coordinate closely with the architects. The goals were to be aesthetically pleasing while providing proper vertical clearance, load support and deflection control. For this section, integral caps and corbels were incorporated into the pier designs to provide the required vertical clearance.

An Ideal Situation for Rail

The Multimodal Transit Center at O’Hare is under a half-mile from the terminals, just minutes away. And a half-mile is the ideal distance for using rail between airport terminals and transit centers.

With rail, you’re able to:

- ▶ Transport people above-grade, essentially creating new space
- ▶ Eliminate roadway congestion, including shuttle buses
- ▶ Reduce dependence on roads and potentially free up land for terminal expansion
- ▶ Expand or adapt as needed, creating no permanent obstacles



The O’Hare ATS extension shows that unique, long, multiple-span bridge systems using ASCE guidelines can work effectively. Designers and engineers can create cost-effective solutions that make minimal use of real estate while navigating through numerous obstacles and requirements.

In the end, rail allowed O’Hare International to optimize the use of their existing property while still allowing for future reconfiguration and growth.

About the Author

Mike Lenett is an assistant vice president with 26 years of experience in transportation engineering, primarily in structural design, task and project management. He serves as the bridge team leader, the structures technical lead and project manager on numerous state, county and municipal transportation projects.

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