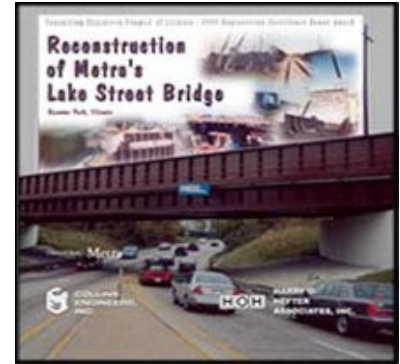


**Reconstruction of Lake Street Bridge
Hanover Park, Illinois, U.S.**

Metra

Consulting Engineers Council of Illinois—2003 Engineering Excellence Honor Award

Collins was selected by Metra to serve as the structural and railroad engineering consultant for the design of a replacement structure for Metra's West Line Bridge No. Z-70.5 over Lake Street in Hanover Park, Illinois. The existing bridge was a four span deck girder structure with sizeable timber substructure units immediately adjacent to the edges of the Lake Street roadway.



The project involved the design and construction of one of the largest double track railroad bridges of its kind in the United States. The new bridge incorporates a through girder design with over 14-foot-deep girders in order to provide an unimpeded clear span of more than 136 feet across Lake Street. The considerable increase in roadway opening afforded by the new bridge, which eliminated the existing substructure immediately adjacent to the roadway, made for a significantly safer grade separation at a location prone to accidents due to tight clearances and roadway curvature. In addition to providing greatly improved safety for the motoring public as a final outcome, the project also employed sophisticated applications of temporary structures, runaround tracks, and construction staging to minimize any disruption to normal commuter traffic on both the roadway and rail line.

The precarious location of the existing timber bents, coupled with the tight horizontal curvature of the roadway through the bridge, posed a serious safety concern for the motoring public, which along with the deteriorated condition of the aged structures dictated the need for replacement. Collins worked extensively in the preliminary design stages with both Metra and the Illinois Department of Transportation (IDOT) to develop a new bridge design and replacement scheme that would fully satisfy both the commuter and freight traffic needs of the rail line, as well as accommodate IDOT's future plans for the Lake Street roadway.

Based on a proposed three lanes of traffic in each direction with minimal center median, Collins arrived at a single span, through girder design allowing for a clear distance between abutments of approximately 101 feet perpendicular to the roadway. Because of the nearly 45 degree skew of the bridge to the sharply curved roadway, however, the required roadway clearance resulted in a girder span from center to center of bearings of 146 feet. In order to accommodate a span length of this great size, while carrying two railroad tracks on just two outside girders, Collins designed welded steel girders for the bridge with an overall depth just slightly in excess of 14 feet and with flanges that were up to 4 inches thick. In addition to the normal complexities inherent with a through girder railroad bridge, Collins' efforts also took into very careful consideration the special design requirements resulting from the fracture critical nature of the new bridge's two girder system.

Ultimately, Collins prepared and delivered a highly detailed set of contract plans and specifications, which in addition to specifying the requirements for the new bridge super and substructures, also specified the details of temporary support structures for the assembly and staged roll-in of the new through girder bridge; temporary earth retaining structures to support the active track embankments between construction stages; and temporary runaround track and bridge facilities to allow both Metra tracks to remain in service throughout the vast majority of the construction period.