



# Waterfront Line Bridge: Structural Retrofit Success

## Case Study

The Waterfront Line Bridge, situated in Cleveland, OH, and constructed in 1996, had been facing significant structural challenges in carrying the current light rail loads. Years of overuse had led to multiple forms of distress throughout the structure, hampering its capacity. To address these issues, DYWIDAG undertook a successful structural retrofit, supplying and installing external post-tensioning tendons for this curved segmental box girder bridge.

## PRODUCTS

External post-tensioning  
Custom stressing jack nose

## LOCATION

USA - Cleveland, OH

## SCOPE

Supply  
Installation,  
Technical Support  
Post-tensioning  
Repair & Strengthening

## OWNER

Greater Cleveland Regional  
Transit Authority

## GENERAL

CONTRACTOR  
Great Lakes Construction

# Context

The Waterfront Line Bridge serves as a vital link between downtown Cleveland and popular lakefront attractions, such as FirstEnergy Stadium and the Rock & Roll Hall of Fame. This 645-foot long, five-span continuous post-tensioned segmental concrete box bridge carries the Waterfront Line over Norfolk Southern Railroad and city streets, enabling seamless transportation.

During previous inspections, separations between post-tensioned segments were discovered, highlighting structural concerns within the bridge. The bridge itself is a continuous, precast, post-tensioned, segmental, single-cell box girder, supported by reinforced concrete abutments and welded steel HSS pipe bents. The bridge has five spans and an overall length of 645 feet. Spans 1 through 5 have the following lengths: 95 feet, 158 feet, 139 feet, 158 feet, and 95 feet respectively. When traveling away from Tower City, the bridge curves left on a 300-foot radius through Span 1 and from Span 2 runs tangent through the end of Span 4 and then curves right on a 137.5-foot radius at the end of Span 4 through Span 5.

Great Lakes Construction enlisted the DYWIDAG team to assist with its rehabilitation.



# Solution

In the pursuit of enhancing the Waterfront Line Bridge, provisions were made for future tendon additions. Although no external box tendons were initially implemented, MPA anchors were strategically cast at the segment ends to accommodate future enhancements. DYWIDAG, serving as the original supplier of post-tensioning components for internal tendons and future anchor locations, contributed to this stage of the bridge's development. A comprehensive plan involved the addition of ten (10) 19-06 and two (2) 10-06 external, bonded multi-strand PT tendons.

DYWIDAG undertook the critical task of furnishing and installing the new external tendons. The project posed a challenge due to the limited box height of only 48". However, DYWIDAG adeptly adapted to the tight working conditions by designing a custom stressing nose specifically for their jacks. This innovation allowed them to successfully complete the installation process.

