

## Root Cause Failure Analysis and Rehabilitation Engineering for Waste Treatment Tank

A Midwest Chemical Facility approached Brindley Engineering to determine why the roof of a concrete wastewater treatment tank was failing and to design a replacement roof and other tank repairs based on the failure assessment. Due to the criticality of the roof from a safety as well as economical perspective, the new roof had to be designed for a minimum 20-year design life.

### BE the Solution

Based on the results of our assessment, BE determined that the root cause of the panel failure was the hollow voids throughout the design section (hollow core panel), coupled with the lack of a proper protective coating for the extreme atmosphere of the tank, led to excessive section loss in the core strands due to the condensation of corrosive vapors from the contents of the pit. This led to strand failure and subsequent failure of the panels. To address this, Brindley modified the design of the panels from a hollow-core to a solid prestressed panel and applied an extreme-environment coating system to protect the concrete and embedded steel.

### Our Challenges


Selecting the protective coating and concrete mix design to be used for the new panels was challenging because of the different types of chemicals present in the tank at varying concentrations and the need to pre-apply the coating due to the logistical constraints of applying this coating during an abbreviated outage. The mix design was also particularly challenging as it had to be light-weight, chemically resistant, strong, and had to minimize cracking. Because the panels also had to be pre-fabricated and pre-coated, Brindley also provided engineered lift plans for the installation of the heavy panels.

### BE the Result

*Our ability to identify the root cause, followed by providing creative solution options for the Client and meticulous detailed engineering once the best option was selected led to a finished repair that was very cost / schedule efficient and safe to execute.*

### Contact Us

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View of tank after cleaning – Ready for Inspection