

INDUSTRIAL CATEGORY

Delayed Coking Unit Chute Slab Repair & Protection

SUBMITTED BY STRUCTURAL GROUP

Delayed coking units are critical in oil refineries. These units sit on large reinforced concrete tabletop structures that support large vessels. A common configuration of these structures includes an angled chute slab that conveys processed coke from the drum to a collection area. Many coking units have utilized steel plates to protect the chute from repeated impact of hot coke product.



Over years of operation in this intense environment, the coking unit in a refinery in the United States was experiencing deterioration of both the steel plates and the approximate 64 x 33 ft (20 x 10 m) x 3.5 ft (1 m) thick concrete chute slab. After a comprehensive condition assessment, testing showed cracks and warps in the coking unit due to expansion of the embedded steel anchors for the plate. Although minor repairs were made in the past to the plates, an innovative floating



plate design replaced the carbon steel plates with stainless steel and removed the embedded anchors. Moving the new 40,000 lb (18,145 kg) stainless steel slide plates into their final position on the chute slabs was the most complex portion of the project. Due to the overhead restrictions of the coking unit, the moving and lifting was engineered to be executed in multiple phases. This method also allowed the steel plates to expand and contract separately from the concrete and be easily removed during future concrete inspections and/or plate replacement.

A detailed plan was developed to perform the repairs and plate installation in a short duration turnaround. With an emphasis on performing the work safely, this was the first repair of its kind and has proven to significantly lengthen the service life of the unit. After one year of operation, the plates were tested and showed no major deterioration.

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