



Project Description

Kona Plaza, located right in the heart of Kailua-Kona, Hawaii, is a private condominium complex that features:

- 5 low-rise buildings
- 5-story structure.
- 4 residential levels above grade.
- Underground parking garage

Project Features:

- Significant deterioration of PT cables and concrete of the first-floor parking deck. It includes large deflections, broken cables, cracks and spalling.
- The post-tensioning system consists of 270ksi stress relieved ½" diameter 7-wire strand within a sheathing consisting of kraft paper.
- PT anchorages are non-encapsulated steel castings.



Kailua-Kona, HI

CAPABILITIES

- PT Cable Repairs
- Structural repair strategy
- Shoring Design

Developer:

Kona Plaza AOA

Architect:

William S. Tsao & Company

Project completion:

2022

Industry

Residential

Project type:

**EVALUATION/REPAIR
PARKING GARAGE**

Full Project Description

The Kona Plaza condominium project, built in 1971, is located in the very heart of Kailua Kona on the Big Island of Hawaii, just a few minutes walk from the pier. The complex features five (5) buildings, each consisting of four levels of residential units connected with exterior walkways. An underground basement level is used for parking that encompasses nearly the entire property.

Structural repairs to the parking deck were recommended after an extensive condition assessment performed by a local engineering team. The first-floor parking deck was originally constructed circa 1970 using post-tensioned (PT) cast-in-place concrete.

Kline Engineering & Consulting was retained to provide a solid structural repair strategy for the Northwest and Northeast sections of the Kona Plaza parking deck to determine minimum retrofit parameters for regulatory compliance, and structural integrity of the elevated concrete slab. Efficiency, safety and cost-effectiveness were key factors to consider during this repair project.

During phase 1 of the project, Kline team reviewed pertinent documents related to past evaluation reports and repairs on the structure from the last 15 years and performed a comprehensive structural analysis of the parking deck slab. Structural Analysis was used to determine if there were any deficiencies in the original design based on ACI 318-63 code used at the time of construction, and to aid in assessing the strength and serviceability of the existing PT slab.

In phase 2, Kline team completed a structural evaluation to assess the current condition of the PT slab based on the results of nondestructive inspections of the slab and PT. Based on these results, Kline designed shoring for the parking deck in compromised areas due to severe corrosion damage. Additionally, further inspections and testing such as test pits, concrete strength and chloride profile tests were performed which assisted on developing the repair strategy.

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