REF A18 — STRENGTHENING OF BASEMENT, WALLS & COLUMNS OF 85 FLOORS TALL TOWER

PROJECT	AL HABTOOR CITY TOWER, BUSINESS BAY, UAE
CLIENT	ALHABTOOR
CONTRACTOR	China Railway 18th Bureau
ENGINEER	MAK , Salama Struc. Engg.
IMPLEMENTATION	2023 - 2026

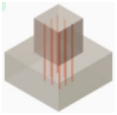
Applications	**PIR for Rafts, Columns and walls**
Design	**EOTA TR 069 (PIR), EC2-4 (HKD Anchors)**
Hardware	**HIT-RE 500, HDE Dispensers, TE-YX Drill bits, Corded and Cordless fleet + setting tools, HKD short anchors, Hilti Scanners PS 85, PS 250**
Software	**PROFIS Engineering**
Services	**Design, training to client, OST (Pullout), demos**

CHALLENGES

- Steel column piling through existing basements 85 m deep and PIR installation around it
- Submerged drilling
- Unqualified Competition products
- On-site test (Pull-out) profiling on metal deck slabs

HILTI TOTAL SOLUTION

- ✓ Efficient design using TR 069 for PIR around steel piling (columns), concrete foundation rafts and structural walls
- ✓ Optimized drilling depths
- ✓ Hilti's qualified and approved products & solutions
- ✓ Hilti's setting tools like HSS bits for accurate installation



LOAD / CONDITIONS: **Static**

PROJECT HIGHLIGHT **4 floors added to 85 floors as per original design by reducing design slab thickness & basement strengthening using post-installed rebars (PIR)**

PROBLEM STATEMENT AND OBJECTIVES

The project consists of 3 basements + ground + 85 floors (originally designed) residential tower, with a total built-up area of more than 274,000 sq.ft. It will house 1,701 residential units alongside retail spaces, health, and fitness amenities, as well as facilities catering to business needs, conferences, and diverse events.

The project will be the first in the GCC and MENA region to be constructed without foundations and will be directly built on **the piling made up of ES600 sections and rebars. These sections will penetrate existing three basement levels, reaching 85m deep. This arrangement then also required strengthening the steel concrete composite columns, concrete walls and rafts with PIR**.

Drop-in anchors (to hold the MEP utilities) were also required, and the client ALHABTOOR (Mr. Hussam Ward- Project Director and Mr. Yazan Awwad - Project Manager) was dependent on previous expertise from HILTI for this project work.

DESIGN APPROACH

The client and structural consultant were presented about the criticality of basement strengthening and advantages of using RE 500 against competition which were underperforming and not qualified mortars

Design method EOTA TR069 was selected for lesser embedment depth & the significant advantage of bond-strength comparison was highlighted as most of the rebars were of 32 mm in diameter.

Design suite PROFIS ENGINEERING training was given to the structural design team.

Wastage analysis comparison was done and Hilti HDE dispensers proved the least wastage and most economic benefit to the customer.

SOLUTION AND FINAL OUTCOME

Due to efficiency of Hilti's HKD short anchors (25 mm embedment depth) helped the client to reduce the slab thickness (from 150 mm to 130 mm) thus **leading to increase of 4 floors being added to the building of 85 floors which was as per initial design. Huge advantage and savings to the client.**

HDE Dispenser & Volume calculator training was provided to the contractor, leading to Quality, easy and fast installation at jobsite and overall productivity improvement along with full cordless fleet of Hilti tools

On-site pull-out tests for HKD anchors were also conducted at the site to determine and validate the actual capacity of these anchors in metal-deck concrete slabs and capacity profiling was done.

PIR on composite columns, walls and foundations

Efficiency in design adding 4 floors

Optimized Installation