

PROJECT BRIEF

Flexural and Shear Strengthening of beams at a
Condominium Basement Car Park with the
TYFO® Fibrwrap® Composite System

MALAYSIA



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Just two months prior to the completion of this new condominium project in Kuala Lumpur, Malaysia, flexural and shear cracking was observed in the overhead beams at top-most level of the basement car park. Upon further investigation it was determined that the cause of this unexpected distress was an error at the design stage. This top deck was to serve as a landscaped garden at ground level and the original design had neglected to account for almost 0.75- to 1-metre earth loads that would be placed prior to landscaping. After filling in the earth during the landscaping stage, the cracks in the basement car parks beams were noticed.

A quick, cost-effective solution was sought by the owner as the deadline for occupancy was fast approaching. After exploring conventional retrofit techniques such as concrete jacketing or steel plate bonding, a retrofit proposal using the TYFO® Fibrwrap® Composite System was readily accepted by the clients; it was cost effective and required less than half the time as conventional techniques. The TYFO® Fibrwrap® Composite System uses aerospace technology and certified materials, i.e. carbon/glass/ aramid fibres and epoxy composites, and works on the principle of wrapping structural members such as columns, beams, slabs and walls to enhance ductility and load carrying capacity of the members.

Work on the distressed car park beams commenced by propping up all affected areas and removing the earth loads on the top deck. The beams were then epoxy injected to seal the cracks and finally strengthened in flexure and shear by placing the designed number of wraps to cater for the missing earth loads in the original design. Approximately 48 beams were strengthened in approximately 2 weeks time and the residential complex was opened on schedule.

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