

UNIVERSITI TEKNOLOGI MARA

**THE EFFECT OF SURFACE PREPARATION ON
BONDING PERFORMANCES OF BEAM
STRENGTHENED WITH GFRP PLATE**

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Dissertation submitted in partial fulfillment of the requirements for degree
of Master of Science in Civil Engineering (Structures)
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ABSTRACT

Fiber reinforced polymers (FRP) have been increasingly used over the past few decades in a variety of structures and have become a popular alternative in construction world. It is one of the effective techniques for strengthening and repairing the reinforced concrete (RC) beams under flexural loads. The bond strength is a fundamental aspect of the structural behavior, since the performances of the concrete-reinforcement system depends on the interface. This study focused on the effect of surface preparation on bonding performances of beam strengthened with GFRP plate. Three beams with the dimensions of 100 mm × 200 mm × 1500 mm were subjected to four-point flexural loading test. One beam was considered as unstrengthened control beam, the second beam and the third beam were tested under two different surface preparations which are rough (groove) surface and smooth surface. Experimental data on load, deflection, strain and failure modes of each of the beams were obtained and compared based on the GFRP as the strengthening material. The results indicated that rough (groove) surface preparation increased the ultimate strength of FRP strengthened beams compared to the smooth surface and unstrengthened beams.

Keywords: Bonding performances, flexural behaviour, Fiber Reinforced polymer, interfacial stress, reinforced concrete beam, surface preparation.