

### **Modelling of damaged RC beams strengthened by fibre composite plates**

Ziraba Y.N., Baluch M.H., Sharif A.M., Al-Sulaimani G.J., Azad A.K., Basunbul I.A.

Engineering Computations (Swansea, Wales)

Vol. 12, Issue.7, 1995

**Abstract:** This paper presents a finite element model for analysis of damaged RC beams strengthened or repaired by externally bonding glass fibre reinforced plastics (GFRP) on the tension side of the beams. The salient features include: (i) the introduction of a thin, six - noded element to simulate behaviour of the concrete/epoxy glue/GFRP interface and)ii(a scheme of loading a virgin RC beam to a prescribed displacement to simulate damage, unloading and then reloading the damaged RC beam fortified by an externally bonded GFRP plate. Results are presented for RC beams repaired by plates of varying thickness and a transmutation of failure mode is noted from classical flexure for the case of external reinforcement in the form of thin GFRP plates to a unique concrete cover rip off failure for thicker GFRP plates and not predicted by the ACI shear strength formula for diagonal tension failure of unplated RC beams of similar geometry.