

failure of the concrete layer between the longitudinal rebars and sheet.

Appendix A. Notation

The following symbols are used in this paper:

A_f	Area of CFRP plates corresponding to the balanced ratio.
A_s	Area of tensile steel reinforcement.
A_s'	Area of compressive steel reinforcement.
A	Depth of the equivalent rectangular compression block.
B	Width of the rectangular beam section.
C	Depth of the neutral axis.
C_b	Depth of neutral axis in section with a balanced ratio.
D	distance from centroid of outermost tensile steel reinforcement to extreme concrete compression fiber
E_c	modulus of elasticity of concrete
E_s	modulus of elasticity of tensile steel reinforcement
E_f	tensile modulus of elasticity of FRP sheet
f_{fu}	ultimate tensile strength of FRP sheet
f_y	yield strength of tensile steel reinforcement
f_y'	yield strength of compressive steel reinforcement
K_m	reduction factor
M_n	nominal flexural strength of the strengthened beam without taking into account the reduction factor
β_1	factor relating depth of equivalent rectangular compressive stress block to neutral axis depth
ϵ_c	compressive strain in concrete
ϵ_{cu}	ultimate compression strain in concrete (0.003)
ϵ_{fu}	nominal ultimate tensile strain of the FRP sheet
ρ_f	FRP reinforcement ratio
ρ_{fb}	balanced FRP reinforcement ratio

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