EFFECT OF LONGITUDINAL WEB STIFFENER OF I-SHAPE FRP COMPOSITE BEAMS USING THE COMPLEX FINITE STRIP METHOD

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Key words: Buckling, FRP composites, finite strip method, orthotropic material, longitudinal stiffener.

Summary. Effect of longitudinal stiffener of I-shape section of FRP composite beams has been evaluated in present article.

1 INTRODUCTION

FRP sections obtained through the pultrusion technique particularly represent a class of products with interesting properties of durability and lightness. Optimum location of longitudinal stiffeners in web plates under in-plane bending are investigated (Figure 1).

Figure 1: Location of longitudinal stiffener

Figure 2: Strip forces and degrees of freedom

2 NUMERICAL STUDY

In present article the parametric study is performed using complex finite strip method. The force vectors are defined by the equation (1) as shown in figure 2. The stiffness and geometric...
matrices were evaluated using the virtual work.

\[ p_1^T = \begin{bmatrix} p_{y1} & i p_{x1} & p_{y2} & i p_{x2} \end{bmatrix} \quad ; \quad p_0^T = \begin{bmatrix} m_1 & p_{x1} & m_2 & p_{x2} \end{bmatrix} \]

(1)

3 CONCLUSION

Figure 3 shows the critical stresses of I-shape section under pure bending for different web aspect ratio. As shown in the figure 3 for the web aspect ratio between 150 and 400, the optimum position of longitudinal stiffener is between 0.14bw to 0.21bw close to compressive flange.

4 REFERENCES