ISSUES IN THE STABILITY BEHAVIOUR OF PULTRUDED GFRP MEMBERS

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Pultruded glass fiber reinforced polymer (pGFRP) members are widely applied in industrial settings, particularly those subject to aggressive operating environments such as rail operations and oil and gas exploitation. pGFRP is also receiving greater attention in more conventional structural engineering applications. Due to the slenderness of pGFRP members their structural performance is often controlled by buckling behaviour. Although many design approaches treat pGFRP stability in a manner similar to hot- or cold-rolled steel, the behaviour is, in fact, notably different. Buckling and post-buckling behaviours of pGFRP are affected by both the material anisotropy and the relatively low stiffness to strength ratio. This presentation summarises efforts aimed at identifying and describing the buckling behaviour of pGFRP members. Global (Euler and lateral-torsional) and local buckling behaviours are described for both I- and box-shaped pGFRP members. The interaction between local and global buckling modes is also identified and shown to significantly affect moment capacity in the typical and practical structural application space of these members. An extensive experimental programs are reported and contrasted with analytical and computational analyses as well as with extant code/standard-promulgated design equations. An update on the progress of design standards development for pGFRP structures will also be presented.

Kent Harries is presently the Leverhulme Visiting Professor at the University of Bath and is the Bicentennial Board of Visitors Faculty Fellow and Associate Professor of Structural Engineering and Mechanics at the University of Pittsburgh. Harries is a Fellow of the American Concrete Institute (FACI) and the International Institute for FRP in Construction (FIIFC) and a Professional Engineer (P.Eng.) in Ontario, Canada. He is Senior Editor of the *Journal of*

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