

## **ABSTRACT**

In the last decades, FRP composites have been widely used for constructing entire civil structures. One of the challenging issues for building with pultruded FRP composites is understanding the behavior of bolted joints. In this paper, the results of a numerical analysis performed on different types of bolted composite joints with different geometry and subjected to tensile loads are reported. The aim of this study is to examine the distribution of shear stresses among the different bolts by varying the number of rows of bolts as well as the number of bolts per row. The study also considers the presence of variable diameter washers and their influence on the bearing stresses of composites with different fibre orientations.

For verification of the validity of the analytical models, numerical results are compared to experimental results reported elsewhere. The results of this study showed that in multi-bolt joints, the load is not distributed equally due to varying bolt position, bolt-hole clearance, bolt-torque or tightening of the bolt, friction between member plates and at washer-plate interface. The results also indicated that in the presence of washers, the stress distributions in the fibre direction, varying fibre inclinations, are decreasing for each value of washer pressure.