

Towards a brand new structural material standard

Good design is synonymous with sustainable construction. The newer structural material of fibre reinforced polymer (FRP) provides construction with a range of mechanical and other properties that are well-suited for structures possessing a low life-cycle environmental cost. In 2007, the American Society of Civil Engineers (ASCE) and the American Composites Manufacturers Association (ACMA) signed a three-year agreement to develop a pre-standard for the *Load Resistance Factor Design (LRFD) of Pultruded Fiber Reinforced Polymer Structures*. This future LRFD standard for this newer structural material is expected to help structural engineers and architects use pultruded FRP composites in building and transportation designs and bring benefits – such as its strength-to-weight ratio, resistance to corrosion, low maintenance and long life cycle – to infrastructure.

The class of construction to be designed by the ASCE standard is for simple frames that have simple shear connections between members and bracing to transfer lateral loads to the ground. The draft standard will consist of mandatory provisions and commentary containing guidance on the application of the provisions of the standard. This standard is to provide design criteria for engineering grades of FRP pultruded rod, plates, and shapes used as structural members in construction. It will be applicable to the design of buildings and other structures where public safety is the key consideration and rational design criteria are required.

American academic teams are responsible for drafting the eight chapters in the standard. However, there is strong UK support to these teams, and Toby Mottram of the IStructE Re-

search Panel and Warwick University is using knowledge and understanding gained from research with pultruded FRP shapes to support the preparation of a chapter for the design of bolted connections. Additional UK support to



Cooling tower structure of pultruded FRP shapes

the American project is being made through publications from research at the Universities of Cardiff, Lancaster and Warwick. Research funded by EPSRC has provided results from coupon and full sized specimens that are required in the calibration process of the strength formulae.

At the completion of the project in Autumn 2010, the draft standard will be submitted to the ASCE Standards Committee on Structural Composites and Plastics for further action in accordance with the ASCE consensus process.

For further information on the Institution of Structural Engineers' Research Panel please contact Ben Cresswell Riol (020 7235 4535; E-mail: ben.cresswellriol@istructe.org; or visit www.istructe.org/research).