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Editorial

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This issue brings three papers in three different areas – steel, concrete and loading.

The first paper by Ellobody (2012) examines the strength of steel castellated beams, comparing against both test data and codes. Further, parametric studies on geometry and steel strength were made. The use of high strength steel is of particular interest to the industry, since this is becoming far more readily available. Castellated beams, by using holes in the web, allow services to pass through, thus allowing a reduced height within the ceiling void. The 'floor build-up' height is often one of the factors affecting choice of materials, so further design data for the use of castellated beams will be of use to the steel industry.

The second by Peng and Ho (2012) presents a new stress–strain model for concrete. A number of stress–strain 'blocks' have been produced over the years with slightly varying results. These have resulted in slight variations on how design standards calculate the capacity of reinforced concrete sections. Most of the blocks have been based upon uniaxial compression tests, assuming that concrete in bending would behave in a similar manner. This paper examines the effect of bending (or strain gradient) in concrete to see how this affects the capacity. The researchers find that the use of the standard design stress–strain blocks in bending capacity calculations results in an underestimation of capacity. Compressive element capacity is not significantly affected.

The last paper (Yuksel and Arslan, 2012) combines a difficult loading problem with emerging computational methods. The use of 'artificial neural networks' is nothing new, but is increasingly used in the structural engineering context. In this case, a complex series of loading patterns is examined with the method and compared to more standard methods. Personally, I suspect that the widespread use of this method is some way off, but this paper provides another milestone along the way to being able to easily find critical loading for complex structures.

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