Rather than trying to devise amendments to rescue it, it would be better to abandon it and adopt a more rational and practical approach such as either the table of load factors for different load combinations in traditional limit state codes like in BS 5950 ... or will someone be really daring and propose the system of simple permissible stresses and 'allowable over-stresses' which works so well in BS 449? What's so wrong with the idea of making calculations simple?

It's possible to produce many arguments for and against the way the codes are written and it's possible to cite all sorts of anomalies (including for BS 449). Perhaps we can all agree that there are different interpretations? What we might also all be able to agree on is that the codes are there to deal with uncertainty and to provide a standardised way of design that requires the application of engineering sense. Moreover, to quote Dame Judith Hackitt again, what we don't want is 'a race to the bottom' where rules are 'interpreted' for commercial advantage.

Robert Wodehouse compliments Alastair Hughes on his attempts at making sense of the Eurocodes.

Alastair Hughes is making a good attempt at breathing some sense into the Eurocodes.

Most structures in the UK are six stories or below and do not warrant complicated and involved design codes. Therefore, regarding risk, I would recommend members read the CROSS newsletter, excellently produced by Alastair Soane, and his editorial in the May 2018 issue of *The Structural Engineer*. Figure 1 of Alastair's note sets out the relationship between the safety concerns relating to Construction (38%)/Demolition (1%) + In-Service Requirements (25%) and Design (36%). This shows the overriding risk considerations of the first three items outweigh the Design risk (64% > 36%).

The producers of the Eurocodes have had many years to evaluate the suitable parameters for loads/stresses, etc. such that risk levels can be contained and not exceeded. These were benchmarked to old elastic design codes to maintain similar overall factors of safety. Therefore, the benchmark was benchmarked!

Structures do not fail due to the minor inaccuracy of a partial factor being either 1.35 or 1.4. Structures fail due to gross design errors down to poor checking, incorrect or changed information (not verified), lack of supervision, or indeed gross misdemeanours where, for example, someone adds on an extra storey or additional load without checking the structure.

In this respect, common sense indicates that steel sections or precast concrete sections could have reduced dead load factors, whereas *in situ* concrete partial dead load factors should be considered on merit relating to construction procedure and geometry of the structure.

Obviously, new materials will result in different dead-to-live load ratios and structural sections/geometry, requiring new methods of analysis. In this respect, one has to differentiate between analysis on one hand and risk levels/ partial factors, as affected by installation/repair and maintenance, on the other hand. This is where adequate and relevant experience is vital.

The question of codes is one topic guaranteed to raise comment. So, in this case, Verulam will stay silent!

Precast concrete floors

Denis Camilleri and Albert Cauchi write in from Malta with some thoughts on precast concrete flooring following Nick Gorst's articles in the April, May and June issues.

We refer to the recommendations for cuts in planks to be made close to a support and for top cuts to be undertaken alternatively so as to keep clear of cores adjacent to the edge. But what happens when a hollowcore plank contains only four cores? Are the cuts then only made on two adjacent internal cores? When some of the cores are not infilled, does this affect the composite action because the T- or L-section of the composite slab is then partially hollow?

We would like to share Malta's experience in the use of these prestressed hollow planks. Here, such planks are generally utilised as transfer slabs, supporting about four floors of overlying cellular masonry residential construction. Slab spans generally vary from 3.5m up to 8m with end supports on masonry walls 230mm thick.

In these circumstances, it is considered that there is rigid support onto the masonry walling, with bearings varying from a minimum of 75mm for planks less than 350mm thick, up to at least 100mm for thicker planks. These planks are normally supported on continuous concrete padstones. The importance of a designed bearing width is stressed, since the remaining infilled reinforced dimension on the support can then form an integral part of the tied horizontal diaphragm action. This can then be incorporated with vertical ties to achieve the desired structural robustness. Noting the edge infill of these planks bears onto a reinforced concrete padstone which becomes L-shaped, the whole system acts as an encircling concrete tie. Proper detailing of the concrete stitching works to eliminate progressive collapse failures, as per EN 1991-1-7 Annex A.

For this transfer type of slab construction, shear loading is critical. And when high design shear values are required, core infilling provides high shear resistance.

When these hollowcore planks are supported on flexible supports, such as concrete or steel beams, the condition as noted in Figure 5b of Mr Gorst's Part 1 occurs[1]. Here, we believe[2] a reduction in the shear resistance in the region of 40–75% occurs. Any cross-sections with large voids and thin webs are particularly susceptible to strong reduction in shear capacity. Factors enhancing the shear resistance include adding reinforced concrete topping onto the floor and longer filling of the slab end voids. Further, the deflection of supporting beams is to be limited to within span: deflection ratios of 1/800 to 1/1000, or higher.

Could these recommendations justify the working of a flexible support so as now to be considered similar to that of a rigid support?

REFERENCES

► 1) Gorst N. (2018) 'Design of precast concrete floors in steel-framed buildings. Part 1: Slab design', *The Structural Engineer*, 96 (4), pp. 24–28

► 2) Pajari M. and Koukkari H. (1998) 'Shear resistance of PHC slabs supported on beams. I: Tests', *J. Struct. Eng.*, 124 (9), pp. 1050–1061

Fire spread in tower blocks

Melvin Hurst adds his thoughts on the Grenfell Tower tragedy.

I was particularly interested to read Allan Mann's timely article on fire engineering (Special Issue, January 2018). Not only has the Grenfell Tower tragedy concentrated every engineer's mind on the problems of