The Eurocodes

why? what? when?

Sallyanne Lewis & Sarah Finnegan of Buro Happold give a personal view on what the Eurocodes are like to use on a live project, the EU Residence Palace

This briefing is predominantly concerned with Basis of Design (Eurocode 0), Actions on structures (Eurocode 1) and Design of steel structures (Eurocode 3).

The European Union Residence Palace will be the new Conference Facility for the European Union Council of Ministers in Brussels. It is a new build and refurbishment project incorporating predominantly steel construction with some reinforced concrete. We had a choice of designing the structure to Eurocodes or Belgian standards and decided that this was a great opportunity for us to use the Eurocodes on a live project.

Q: What is your first impression of using the Eurocodes?

A: The first thing that strikes you when you start to look at the Eurocodes is how many different sections there are, and how many are required to carry out a simple design. Add onto this the national annexes and you can find yourself with a very large pile of documents on your desk. However we did find the steel code to be quite logically set out and as long as you are prepared to do a bit more preparation it is not too difficult to follow. The code is set out in terms of 'type of force' such as axial or moment instead of the BS which is grouped by 'type of element'. This is one of the major changes in the code which we found refreshing and more reflective of actual design problems.

Q: How easy is it to find the necessary information to aid design?

A: One of the main aspects of designing to Eurocodes is that you need design handbooks as well as the actual codes to complete a design. When we started the design not many of the guidance materials were available. One of the problems we found is that a lot of books and guidance material has been published over the years during the development of the Eurocodes and it is difficult to verify whether they still apply to the current codes. We did find websites such as 'Access Steel' useful, especially the worked examples. There is currently no 'Blue Book' for the steel sections, which means scheming element sizes takes longer.

Q: How does using the Eurocode in another country affect the design?

A: Using the Eurocodes for the first time was further complicated as we where actually using the code on a Belgian project rather than in the UK. Also, the engineering for this project was very complicated irrespective of which code was used.
Like the UK, the Belgian National Annex for steel has not yet been published. Therefore we had to agree coefficients and load factors with the Belgian checking engineer. We have also found that we (in the UK) are not necessarily behind Europe in our use of the new Eurocodes.

Q: How does using the Eurocodes affect how you plan a project in terms of programme and resource?

A: Using the Eurocodes doesn't change the design process, but it is necessary to programme in more time for preparation to use the code, and more time for checking calculations. For some areas

Above: External view of the EU Residence Palace ***(Photo courtesy Polygon Graphics)***

Left: Internal view ***(Photo courtesy Studio Valle Progettazioni)***

of the project we ran a BS design in parallel to the Eurocode design, to double check the results and to give us confidence.

The majority of experienced engineers who are familiar with the Eurocodes are in academia rather than in industry. Therefore we found that with specific questions about the code, rather than the engineering philosophy, we sometimes consulted external sources such as the Steel Construction Institute.

Q: Did you use any specific software?

A: We didn't use any external software for design, mostly due to the particular design issues with the project and because there is not a lot of current software available. However we did find that developing our own design spreadsheets was essential, to speed up repetitive design, and because even a simple beam design appears to be much longer than what we have been used to in BS, with many more coefficients.

Q: Do you think people are reluctant to use the Eurocodes, and if so why?

A: As we all know nobody likes to make large changes and this is what using the Eurocodes means. Unlike code changes in the past (such as the change from BS 449 to BS 5950), where only one code changed at a time, the change to Eurocodes is a much bigger step as many codes are changing at once. An engineer designing a relatively standard building in the UK would most likely have to visit at some time EC 0, EC 1, EC 2 (Eurocode 2 – concrete), EC 3 and their various parts as a minimum, which are all unfamiliar codes.

The codes themselves look daunting, as there are many more equations and coefficients to decipher, not all the equations are included in the codes, and the symbols for familiar properties and the member axes conventions have changed. One of the most confusing changes is the actual language of the code – Loads is now Actions, Imposed Load is now Variable Action etc.

Experienced engineers will say that the engineering is still the same so it shouldn't matter which code you use, which is true to a certain extent. However I would say that I know how to drive a car, but that doesn't mean you could drop me in a new city, with all the signs in a foreign language and expect me to go straight to my destination. I will get there eventually, but it might take more time, and involve some wild gesticulating conversations with the locals!

Project details
Client: Régie des Bâtiments
Engineer: Buro Happold
Architects: Studio Valle Progettazioni and Philippe Samyn & Partners

Issue No: 11

Further Information

- This briefing is prepared by the Standing Committee on Implementation of Eurocodes (see www.istructe.org/technical/db/705.asp for details). Please email suggestions for questions to be answered through this column to Berenice Chan (E:berenice.chan@istructe.org)
- Eurocodes Expert website – the first port of call for information on Eurocodes - www.eurocodes.co.uk