

WP4: Benchmarks for structural fire engineering

Essential Items in recording of benchmark studies

The most important principle in recording a benchmark study is that another researcher should be able to recreate the case in all its essential details from the combination of textual, graphical and numerical information provided.

Different software tools are based on different assumptions and use different approaches, largely because they have been designed for different purposes. Hence, it should not be assumed that all the input data will be common to all software, or that results should be identical when compared. For example, the inclusion or exclusion of high-temperature creep, and the assumptions made about its behaviour, can change the results for simple steel beams in fire very considerably.

The essential parts of a well-documented benchmark study are:

1. Report: a description of the study

For uniformity in the deliverable to be produced, this should fit into the template provided on the IFER website. For advanced studies it may take the form of a technical paper, not more than 12 A4 pages in length, but must give the information necessary for the study to be re-created. For simpler cases the description should also be formatted to the same template, but can describe the case more briefly; a few pages should be adequate to describe the case fully.

The report should contain some description of the software used, including references to key published papers and documents. It should also describe any assumptions, either inherent in the software or explicitly made in the setup of the case, which could vary between software codes.

If the study has been compared with experiments, then a brief description should be given and key references cited.

2. Input spreadsheet: Data needed to create the model

This should take the form of an easily readable spreadsheet; it is suggested that Microsoft Excel workbooks should be used, but a simple ASCII format such as “comma-separated” would also be acceptable. Clearly, each case is unique and requires its own types of numerical data, so a single template is inappropriate. However, the workbook should consider its users by providing any notes or figures which may be necessary to understand the data. An example is provided on the IFER website.

3. Output spreadsheet: Key results

This should be in spreadsheet format, and present results from the benchmark study in appropriate detail. A typical Excel workbook would contain graphical plots of key deflections, stresses/strains and temperatures, as well as manageable tables of numerical results (not whole output files). An example is provided on the IFER website.