

SCI CONSULTANCY: DEVELOPMENT ENGINEERING SUPPORT FIRE



Client:

ArcelorMittal is the world leader in steel industry, with 280,000 employees in over 60 countries, an industrial presence in more than 20 countries, a turnover of \$65.1 billion and a production output exceeding 73.2 million tonnes (2009).

The group offers its multinational customers a full range of quality products as well as global solutions which meet the users' expectations in their main application domains.

www.arcelormittal.com

SCI develops fire testing software for composite floor slabs for ArcelorMittal

The Steel Construction Institute has developed 'FRACOF', a specialist piece of software which calculates the ultimate load carrying capacity of composite floor slabs taking into account the enhancing effects of the membrane actions within the slab during a fire.

Designed for ArcelorMittal, and with support from CITCM, the FRACOF software also checks perimeter beams and provides a critical temperature for each of them.

Design guidance

Along with the software, SCI has provided a Design Guide and Background Document to provide designers with useful information about the engineering approach implemented in the software, and help achieve the aim of acceptance of this method outside the UK.

Following its calibration and quality assurance checks the FRACOF software is now available and can be downloaded from <http://www.arcelormittal.com/sections/index.php?id=122>

This software which is based on VB.NET benefits from the following features:

- An interface which can offer its information in English or French;
- It can accommodate the common steel grades, sections and steel decks as well as providing the 'User Defined' option for more flexibility;
- It takes into account the degree of shear connection of the beams and construction type in calculations and providing limiting temperatures for each of the perimeter beams;
- It has the ability to consider flat slabs as well as composite slabs with steel decking;
- It carries out heat transfer analysis to design for 'Standard', 'Parametric' and 'User Defined' fires;
- It provides a summary and detailed report for the slab and perimeter beams along with a graphical output for the temperatures and resistances.

As part of this project, SCI was also involved in a full-scale destructive furnace test on an 8375mm × 6660mm composite slab. The aim was to calibrate the engineering approach implemented in the software. FRACOF is now being disseminated and successfully used throughout Europe supported by CITCM.