



## CECOST

### The Centre for Combustion Science and Technology

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#### **The CECOST organisation**

The Centre for Combustion Science and Technology, CECOST, was founded in 1996 at the Lund Institute of Technology, in close collaboration with Chalmers University of Technology and the Royal Institute of Technology. The Centre is funded by the Foundation for Strategic Research. The purpose of CECOST is to address, in the form of research projects and a National Graduate School, the range of problems that arise in regard to theories, processes and methods concerning fuel-air preparation, the combustion chamber, post-combustion treatment, exhaust gases, combustion residues and pollutants etc. For more information of CECOST organisation: <http://www.cecOST.lth.se/>

#### **The Flame Spread Project**

Flame spread is an important concept in fire hazard analysis, as it governs the in many cases fast growth of a fire. Recently the concept of flame spread has been incorporated into CFD calculations. The use of CFD modelling of flame spread gives improved possibilities for a physically sound modelling approach compared to present semi-empirical models, but also sets higher demands on detailed knowledge of boundary conditions for the modelled scenario.

The Swedish Foundation for Strategic Research (SFF) initiated the project *CECOST - Flame Spread* in 1999 as a four-year research project within the Centre for Combustion Science and Technology (CECOST) framework. The aim of this research project is to improve CFD simulation of flame spread and fire growth. The project contains improvements of models for important physical sub-processes, as well as experimental work for validation purpose. The project includes the following subprojects/partners:

- **Flame Spread Experiments and Validation of CFD Code**  
SP Swedish National Testing and Research Institute, Fire Technology and Chalmers University of Technology, Department of Energy Conversion
- **Measuring Techniques**  
Lund Institute of Technology, Department of Combustion Physics
- **Turbulence and Heat Transfer Models**  
Lund Institute of Technology, Department of Heat and Power
- **Solid Wall Model**  
Lund Institute of Technology, Department of Fire Safety
- **Pyrolysis Model**  
Göteborg University, Department of Physical Chemistry

## **Flame Spread Experiments and Validation of CFD Code at SP**

SP has at present (2001) carried out a series of large-scale flame spread experiments<sup>1</sup>. In these experiments two building materials, low density fibreboard and particleboard, were studied as well as polymethyl methacrylate, a polymer with predictable pyrolysis behaviour. Important issues to study were material behaviour, boundary conditions of the test set-up and measurement techniques. However, the goal was that the outcome of the work would be a series of experiments enough well characterised for validation of CFD simulations. The Swedish Rescue Service (SRV), the Swedish Board for Fire Research (Brandforsk) and SBUF financially supported the experimental work.

Successful simulations of the experiments described above as well as of room scenarios has been conducted using SOFIE CFD software including semi-empirical flame spread sub-models.

For further information, please contact Per Blomqvist, [per.blomqvist@sp.se](mailto:per.blomqvist@sp.se).

1. Blomqvist P. and Van Hees P., "Upward flame spread experiments – a preparatory study" SP Technical Report 2001:32.