# PRACTICAL PROBLEMS OF MODEL VALIDATION, SELECTING INPUT DATA AND MATERIAL PROPERTIES FOR ENGINEERING APPLICATIONS OF CFD FIRE MODELLING

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Computational Fluid Dynamics (CFD) models are becoming a common tool in commercial fire engineering analysis. Several models are currently available to engineers, both general purpose CFD codes and bespoke codes intended primarily for fire modeling applications. Fire Dynamics Simulator (FDS) is an example of such a specific-purpose CFD model.

Two aspects which are of great importance to fire safety engineering practitioners is the validation of CFD models for the particular phenomenon / problem being investigated and the selection of reliable material properties and physical parameters to describe the desired fire scenario.

The presentation will focus on the validation of FDS for structural fire engineering applications, particularly in the context of determination of thermal loading of structural steel and composite elements exposed to localized fires. Anecdotal evidence suggests that factors influencing the reliability of temperature calculations for unprotected structural elements exposed to fire are not sufficiently well understood by the fire safety engineering community.

The presentation will also discuss the problem of obtaining material properties and physical parameters for state-of-the-art fire modeling applications such as fire growth and fire suppression modelling. Material properties (e.g. ignition temperature) can be found in technical literature, however their values often vary and their applicability to the specific material being investigated is sometimes questionable. Material properties can be obtained from small-scale fire tests and laboratory measurements however these are often unavailable for the purpose of engineering and design analysis.