

## **CAR FIRES WITH SPRINKLERS**

### **A study on the Eurocode for sprinklers**

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The effect of sprinklers to the design value of the fire load [MJ/m<sup>2</sup>] is taken into account in SFS-EN 1991-1-2 Annex E using factors considering different active firefighting measures. Two factors deals with sprinklers and take into account: automatic water extinguishing system and independent water supplies. In our case the applicability of the Eurocode factors is studied for car fires numerically by modelling the fires with the program FDS Version 5.5.3 of NIST. Three medium-size car fires are modelled without and with the typical sprinklers used in car parks and temperatures were measured.

The first results of this research have been published in ASFE conference Prague 20.4.2013. The main conclusion was that the Eurocode reduction of the fire load with sprinklers gives the same maximum temperatures as the simulation with sprinklers up to the first peak of the heat release rate (HRR). The Eurocode reduction does not take into account the fact that adjacent cars do not ignite, as is the case with the developed model and as observed on the other tests. If it is used to simulate temperatures after the first peak of HRR, the temperatures are very conservative based on these results.

The next step after this is to simulate more severe car fire scenario according to Schleich (2010) where four cars are situated in a group. Car fires are again modelled without and with sprinklers at the roof and gas temperatures are recorded. Some simulations are also done supposing that one of the sprinklers of the fire area will fail to perform the basis for the statistical analysis to consider the safety concept of the Eurocode.