The Swedish Fire Research Board has been supporting the development of a computerized Fire Demand (FD) Model which simulates the suppression of post-flashover charring and noncharring solid fuel fires in compartments using water sprays from protable hosenozzle equipment used by fire departments.

The output of this FD Model shows the exthinguishing effects of hose-nozzle systems emitting water spray at various flow rates and droplet sizes. The calculations are based on a heat and mass balance accounting for gas and surface cooling, steam-induced smothering, direct extinguishment of the fuel and water spray induced air inflow and venting of heat and products of combustion.

As part of this effort, the Building and Fire Research Laboratory at the National Institute of Standards and Technology conducted several full-scale fire suppression tests.

These tests were carried out in a test configuration simulating av significant portion of a building room and corridor system. The test series involved fully involved room fires which were allowed to burn for approximately eight to ten minutes. At the end of this time, measurements were made of room conditions during manual fire suppression using water hose streams.

This report summarizes the room fire cionditions before and during fire suppression, and compares these to FD Model predictions. Based on these tests, modifications were made to the model. These modifications are described as well as recommendations for the future.

The temperature-time histories predicted by the FD Model are shown to compare favorably with the experimental results. In general, they are higher than that observed, and therefore conservative, an expected result stemming from the generally conservative, assumptions upon which the FD Model was built.

Moreover, higher values of water exposed fuel fractions achieve predicted temperature time histories that are close to that observed.