

A mathematical model for simulating the environment in enclosures during the growth stage of hazardous fires was developed previously.

To use the model you must specify the energy release rate of the fire, certain heat transfer parameters, the area and height of the enclosure and the elevation of the fire above the floor. Solution to the model's equations would yield the time-varying thickness, temperature, and product of combustion concentrations of an upper smoke layer which starts to drop from the enclosure ceiling at the time of ignition.

In this paper the model equations are solved for the general class of fires whose energy release rate, \dot{Q} , and product of combustion generating rates, \dot{C} , are approximately proportional to t^n (t är tid och n större än eller lika med 0). For such fires, general results for the complete solution history of the enclosure environment are obtained and presented in the form of graphs, and where possible, by closed form analytic expressions.

Use of the results is illustrated in two example problems. The first of these ones involves a problem in smoldering combustion where, according to experimental data, the combustion zone can be simulated by an $n=1$ fire. The second one involves a prediction of the environment produced in an enclosure which contains an $n=2$ fire, which simulates a specific, large scale, flaming fire hazard.