

Fire statistics have shown that, during the period 1986-1997, approximately 75% of fires occurred within structures. One of the factors that determines the overall effect (severity) that these fires have, is the growth phase. This growth occurs by a process known as surface flame spread. Surface flame spread research is presented in this report and can be divided into two individual parts, namely, 1. The development of a simple expression that links the time to ignition of a material to its exposed heat flux level. 2. The incorporation of this simple time to ignition expression into a model that can analyse the upward flame spread characteristics for various different combustible materials. Thirty one different materials were investigated in the flame spread model and the results are described in this report. Twenty-four of the materials come from the European Standard Room / Corner test and the rest are from Finnish research using a Vertical Wall test method. An equation that could satisfactorily represent the time to ignition of a given material was obtained and the research into the analytical flame spread model has produced very satisfactory comparisons between the calculated values and those obtained from the experimental studies undertaken by three different Scandinavian research programs.