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Study of Fire Propagation and Soot Flow in a Pantry Car of Railway Locomotive

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Abstract : Fire accidents in trains bring huge disaster to human life and property. Evacuation becomes a major challenge in such incidents owing to confined spaces, large passenger density and trains moving at high speeds. The pantry car in Indian Railways trains carry inflammable materials like cooking fuel and LPG and electrical fittings. The pantry car is therefore highly susceptible to fire accidents. Numerical simulations have been done in a pantry car of Indian locomotive train using computational fluid dynamics based software. Different scenarios of a fire outbreak have been explored by varying Heat Release Rate per Unit Area (HRRPUA) of the fire source, introduction of exhaust in the cooking area, and taking a case of an air conditioned pantry car. Temporal statures of flame and soot have been obtained for each scenario and differences have been studied and reported. Inputs from this study can be used to assess casualties in fire accidents in locomotive trains and development of smoke control/detection systems in Indian trains.

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