

Consideration after Persistent Self-Burning of Buses

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A double-deck bus fire occurred on 1 February 2012, and another one on 8 May 2012 in Hong Kong. The whole bus was burnt completely as reported [1,2]. It was lucky that there were very few passengers on the bus in both cases. Otherwise, it might turn as disastrous as in other fires of crowded buses [3-9] in China, or the recent bus fire inside the longest tunnel of Taiwan [10]. The big transport system fire that took place in Daegu, Korea in 2003 [11] was a horrible lesson. The author had warned of potential bus fire hazards [12-18] years ago after so many such accidents.

If a small fire starts in an air-conditioned bus with good thermal insulation materials, flashover will occur easily. If a flashover big fire occurs in a tunnel, the heat released by a burning bus will bring serious consequences. It is very important to provide appropriate protection for buses. However, no evidence shows that additional fire protection measures are implemented to lower the risk of post-flashover fires in local buses.

Accidental fire must be prevented, and if it occurs, the growth must be controlled to limit the fire size and spread to other combustibles. It should be noted that many foam materials are used in buses for seating and thermal insulation. Adding fire retardant can only delay ignition by a small fire. The peak heat release rate might be reduced. The burning process will be very different under high radiative heat fluxes. Fire protection system and smoke control system must be installed to prevent big disasters.

Passengers must be protected by proper fire safety management schemes, such as getting access to updated information about the emergency such as blocking one lane of Lion Rock Tunnel on 27 May 2012 [19], keeping the escape routes clear and installing additional emergency exit doors. An upper limit of luggage carried by passengers should be set. Flammable liquids such as paint thinner must not be allowed to be brought onto the bus. Many arson fires which started from thinner had been reported, including one in a local subway train car [20,21].

In conclusion, fire protection for buses should be upgraded by [12]:

- Preventing fire or retarding its growth and spread
 - Control fire properties of combustible items.
 - Prevent spilling of fuel.
 - Set limit on luggage carried by passengers.

- Protecting occupants from fire effects
 - Always keep escape routes clear.
 - Provide instant notification of the emergency and appropriate instructions for evacuation.
 - Build additional emergency exit doors.

- Minimizing the impact of fire
 - Maintain structural integrity of the bus.
 - Provide warning signals to other vehicles in the highway.
 - Minimize destructive effects on adjacent buildings, tunnels and bridges.

Little bus fire research was reported in the literature [12-18] in the past decade. More effort should be made to carry out in-depth investigations on probable bus fire hazards. Appropriate hardware fire safety provisions can then be installed and workable software fire safety management implemented. Otherwise, big disasters [2-11] might occur. The recent big fire [22] on Fa Yuen Street in November 2011 is a horrible lesson, and it was just a matter of luck that the recent bus fires [1,2] did not lead to disasters.

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