FIRE SAFETY PLAN AT OCCUPATION AREA UNDER BRIDGE TO MINIMIZE FIRE DAMAGE ON BRIDGE

Jiyoung Rhee, Jaewon Shim, Taesun Chang, Nagyoung Kim
Korea Expressway Corporation[1]
need@ex.co.kr, this2pass@ex.co.kr, tschang@ex.co.kr, ynagkm@ex.co.kr

Abstract

The fire accident at Bucheon elevated bridge (2010), which charged 15 billion won for bridge restoration, made people realize that the area under a bridge was no longer a rest area immune to fire hazard without an active supervision and that a systemic management. The purpose of this study is to establish the fire safety plan for the utilization of spaces under highway-bridges. Thus, the several field-surveys were preferentially conducted to identify the major fire sources and the risk factors. Then the proper materials and the countermeasures for the fire-safety of bridge were reviewed by the various fire-tests and CFD simulation. Based on the results of them, the fire-safety plan for the facilities, vehicles and stock-piles under bridge was suggested.

As of 2019, there were 354 of occupation areas under highway-bridges; sports center, distribution terminal, parking lot, materials yard and others. There have many facilities built mainly with EPS (Expanded Poly-Styrene) sandwich panels, which is not generally guaranteed for fire retardant performance. Those areas are frequently visited by users and vehicles – which has a long duration of fire. Distribution terminal and material yard often require storage of inflammable materials inside and outside the facility.

The fire-safety plan for the facilities and stock-piles under bridge were introduced as follows. First, it is recommended to use the incombustible material as the temporary building material such as sandwich panel, FRP and so forth, under bridge. Second, the fire-safety criteria for the parking lot under bridge are suggested. Finally, the fire-safety plan demands that the flammable and volatile materials under bridge are thoroughly removed, and stockpiles under bridge are controlled by the simple software developed by the results of several CFD-simulations and the database of various goods based on thermal characteristics. In addition, Korea Expressway Corporation is operating a procedure to make sure of the fire-safety of the occupation area in advance before approving the service spaces under the bridge.

Keywords: Fire safety plan, Underbridge, Flame retardant performance, Fire-safety criteria, Stockpile control

[1] South Korea