Improvement in the effectiveness of fire management measures based on lessons learned in the massive fire in Itoigawa City and Miyoshi Town

Building Department and Urban Planning Department

A massive fire occurred in the city of Itoigawa in December 2016 and a fire occurred at a large warehouse in the town of Miyoshi, Saitama, in February 2017. NILIM dispatched officials to the sites of these fires and conducted investigations to find the causes of the spread of these fires and the extent of damage and examinations to realize effective fire management measures.

Technical examinations to identify the causes of the spread of fire and to prevent another fire from

Based on the massive fire in Itoigawa City

A fire occurred at an urban area of the city of Itoigawa, Niigata, where an old building still remained on December 22, 2016. Strong winds caused the fire to spread in multiple directions and caused extensive damage to as many as 147 buildings that burned down.

In cooperation with the Building Research Institute, NILIM investigated the site of the fire and analyzed the situation to find to which buildings the fire had spread and how the fire had spread. They also conducted fire experiments and clarified that sparks were not likely to burn down and destroy modern-style tiled roofs. Through urban fire simulations, they also found that fire leaps and the number of buildings destroyed in the fire would decrease even with old buildings if they were equipped with fire control features.

Legislative reevaluations started based on the above findings to ensure safety in urban areas.

A wide area of urban zones burned

Experiment of scattering fire using tiled roofs

Example of calculation based on urban fire simulation

Based on the fire at a warehouse in Miyoshi Town, Saitama

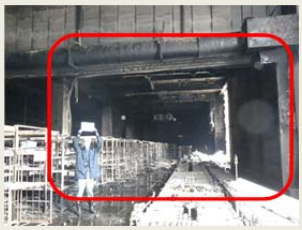
The massive fire in a distribution warehouse in Miyoshi town, Saitama on February 16, 2017 (total floor area: about 72,000 m^2) required about six days to suppress, and about two-third of the total floor area was burned down.

On-site investigations and experimental examinations conducted jointly with relevant organizations revealed that the automatic fire alarm system (analog detectors) and the short-circuit in wiring systems caused malfunctions in steel shutters, and belt conveyors blocked the closing movement of steel shutters (defect in fail-safe mechanism). These factors consequently failed to create fire control sections to localize the fire.

Based on the result above, legal systems are being revised concerning the structure fire control facilities installed in fire control zones and measures implemented on buildings with safety risks.

External appearance of the building after the fire

Collapsed roof due to the fire



Malfunction of fire shutters

Conveyors blocking the closing motion

Realization of effective fire control measures in already developed urban areas
Aim to improve the reliability of the movement of fire control facilities and to ensure fail-safe

☞ Relevant articles

- Report of examination sessions concerning fire control measures and firefighting activities based on lessons learned in the fire of warehouse in Miyoshi Town, Saitama (June 2017) http://www.fdma.go.jp/neuter/about/shingi_kento/h29/miyoshimachi_souko_kasai/houkoku/houkokusyo.pdf
- Report of the investigation of building damaged in the massive fire in Itoigawa City, Niigata that occurred on December 22, 2016 (NILIM Reference #980, July 2017) http://www.nilim.go.jp/lab/bcg/siryou/tnn/tnn0980.htm
- The desirable status of the future building standard systems (February 2018, third report of the Council for Social Infrastructure [reference]) http://www.mlit.go.jp/common/001222680.pdf