



## Summary of the “Report on the Review Meeting for Fire Prevention Measures and Approach to Firefighting Operations after the Warehouse Fire in Miyoshi Town, Saitama Prefecture” (Part Two)

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Continuing from the previous issue, in this paper I would like to continue summarizing the “Report on the Review Meeting for Fire Prevention Measures and Approach to Firefighting Operations after the Warehouse Fire in Miyoshi Town, Saitama Prefecture” created on June 2017.

It should be noted that the opinion portion of this paper reflects my own personal view.

### Chapter 3 Status of Firefighting Activities

#### 1. Measures for fire incidents

##### (1) Current firefighting activities

A fire occurred on February 16, 2017 in the scrap material room on the 1st floor of the warehouse (the time is under investigation), and this was perceived at 09:14 by the Fire Department of the Iruma East Regional Firefighting Union by a 119 ambulance call from an individual related to the fire (using a mobile phone).

In the first mobilization, one commanding team, five firefighting teams (with 3 water tank trucks and 2 pumpers), one rescue team and one emergency support team, a total of eight teams, went into action.

Although a water-discharge system was established quickly and the fire in the scrap material room on the 1st floor, the origin of the fire, was suppressed early on, the fire spread to the 2nd floor through the belt conveyor and the power of the fire was at its peak on the 2nd floor.

At 09:30, as the second mobilization was requested, two firefighting teams (1 water tank truck and 1 pumper) went into action, and, in accordance with the



Status inside the scrap material room

Firefighting Mutual Support Contract in Saitama Prefecture, one commanding team and one firefighting team were sent to the site from Western Fire Department of Saitama Prefecture as an advance party. Since it was decided that firefighting would take rather a long time due to the speed at which the fire was spreading and the smaller firefighting force, a third mobilization as well as support from within the second block support in the Prefecture were requested, and then support from Saitama Prefecture overall was requested to the Governor of Saitama Prefecture, which resulted in the mobilization of multiple firefighting teams in the early part of the first day, including the Prefectural and Saitama Smart Team, all of them participating in the firefighting activities.

Although the third mobilization and prefectural support had been realized and the firefighters were spread all around the building, entry to the inside of the building and the discharging of water were difficult because the quantity of storage in the warehouse was so large and there were only a small number of openings on the 2nd floor.

Furthermore, the firefighters were occasionally forced to pull back because of the explosive combustions on that first day, but they continued to fight the fire by rearranging their formation.

Note that all employees were confirmed to have safely evacuated within 40 minutes of the breaking out, and there was no risk of the fire spreading to other buildings.

On the second day of the incident and thereafter, the demolition of external walls using large-scale heavy machinery from private companies and the discharging of water continued. At 09:30 on February 22, when there was no further danger of the fire spreading, the jurisdictional fire department declared the fire to have been suppressed, which marked the start of processing the remaining fire and watch activities, and at 17:00 on February 28 they declared the full containment of the fire.



Activity status of removing firefighting obstacles

### **(2) Status of water sources for firefighting**

The firefighting was conducted using five firefighting water tanks and eight fire hydrants both inside and outside the warehouse land, and sufficient water sources were secured during the initial activities. However, when water discharge was conducted using fire engines and water cannons after demolishing the external walls, a sufficient volume of water was not always available.

This was caused by the fire hydrants mainly being installed at the south side of the building, which prevented the necessary volume of water to be sourced for the bulk discharge of water, however, necessary measures were taken, such as increasing the supply pressure in the early stages from the outbreak of the fire.

### **(3) Activity status using heavy machinery**

Although the initial demolition of external walls was conducted by firefighting squads using their own engine cutters, which took a long time to create the openings, we requested the use of heavy machinery owned by private companies to conduct the large-scale demolition of the outer walls from the second day.

Although the demolition of the walls using private heavy machinery also required consideration of the fire status inside the building and the building structure itself as well as the additional problems of securing operators, the openings thus created were effective for both injecting water and exhausting smoke and heat.

### **(4) Status of securing safety**

Since explosions were heard and explosive combustions observed on the day of the outbreak and on the 4th and 5th days of firefighting, and because sounds similar to spray cans exploding were also heard from time to time, entry into the building had to be considered cautiously.

Although there was also a danger of collapse of piled up cardboard and other objects, we continued the discharge of water by entry into the building as much as possible while taking care of safety measures.

### **2. Evaluation of firefighting activities**

In this fire, since the evacuation was completed early and there was little risk of the fire spreading to nearby areas, we extended the firefighting by focusing the safety management on considerations of the characteristics of the warehouse. Although the supporting teams arrived in the early stages and we continued activities by discharging water from both inside and outside the building, we received the impact of a larger fire spread due to the explosive combustions in the midst of these activities, which is considered to be the reason we required six days to suppress the fire and 12 days for full containment.

From the viewpoint of early suppression, some items still remain as future issues such as the further assurance of vehicles which allow the bulk discharge of water and contracts with private companies to assure the availability of heavy machinery to demolish walls, and water supply trucks and mixer trucks to assure water sources.



Fire spread on the west side



Fire spread on the east side

## Chapter 4 Proposal

### 1. Measures for preventing the initial spread of the fire

Measures to make sure the spread of fire is stopped in the initial stages shall be taken after reflecting on the fact that the initial fire could not be extinguished because the fire compartments could not be formed appropriately and the initial actions were not sufficiently taken.

#### (1) Measures regarding the secure operation of fire shutters

##### (I) Reinforcement of damage prevention for the short circuit of wires

At MLIT, policy making is necessary to prevent damage from the short circuit of wires by mandating large-scale warehouses to take any one of the following measures.

- Measures to localize damage from the short circuit of a wire by such means as installing a breaker for every block of a certain length
- Measures to securely prevent the occurrence of a short circuit at the junction between an analog detector and the wire by such means as increasing the resistance using fire-proof tape

Note that this does not apply to cases where measures are taken to prevent the wire being heated to a high temperature in the fire by such means as installation of a sprinkler system.

##### (II) Measures to prevent fire shutter closure difficulties

At MLIT, policy making is necessary, in collaboration with the FDMA, to strengthen the measures to prevent fire shutter closure difficulties targeting those large-scale warehouses which are considered to be relatively high risk as with (I).

Note, however, that for the method of implementation, with the recent background of diversification of warehouse uses, it is considered more appropriate for MLIT to first show the basic policy to realize the secure closing of shutters, and then for the individual business owner to take the necessary measures using their own ideas along with the basic policy.

More specifically, it is assumed that the business owners should strengthen their own inspections and as a mechanism to check the status of such inspections the system should be organized based on the following procedures.

- i) At MLIT, maintenance management guidelines including the following content shall be created and shall be widely known to business owners who operate warehouses.
  - a. Points of attention for the inspection of fire shutters
    - o The following items shall be thoroughly inspected by clarifying the inspection schedule specifically checking the presence of intersections with conveyors.
      - Detectors and fire shutters shall work correctly.
      - Objects that can cause fire shutter closure difficulties are not left unattended.
      - The system interlocking with the conveyors shall work correctly in conjunction with the fire shutters.
    - o The owner of maintenance for the fire shutters including the inspection of the above items (hereinafter "maintenance owner") shall be appointed.
    - o The maintenance owner shall record the result of the inspection and store such record document appropriately.

- b. Points of attention for inspection at a new installation or a change of conveyors
  - o When a conveyor is newly installed or changed, the following items shall be thoroughly inspected.
    - Conveyor is not installed in a position which prevents the fire shutter closing.
    - It must be confirmed that, in the case of a conveyor with an interlocking system, the interlocking system has a mechanism (fail-safe mechanism) whereby the conveyor does not prevent the shutter closing even when the interlocking system loses power or the relevant wire causes a short circuit.
    - To secure evacuation safety, the area which employees use continuously for working shall conform to the regulations in the Building Standards Act for living space (for example, the setting of a walking distance to safely reach the evacuation stairs directly and the installation of emergency lights).
  - o An owner shall be appointed to confirm the conformance of the above items in the event of installing a conveyor or changing the conveyors in a warehouse (hereinafter "installation owner").
  - o The installation owner shall record the result of the inspection and store such record document appropriately.
- ii) MLIT shall instruct the business owners of large-scale warehouses to create a maintenance management plan based on the maintenance guidelines shown in i) above for each warehouse and execute the plan.



Setting the openings

- iii) The specified administration agency shall in conjunction with the fire department investigate that the maintenance management plans in ii) are created and appropriately executed to secure safety.

It should be noted that, since these points of attention are also preferably considered on the base of voluntary adoption by warehouses other than large-scale warehouses, MLIT should in conjunction with the FDMA make these known to the wider community.

## (2) Initial actions by business owners

Business owners are required to implement highly effective firefighting training periodically such as water-discharge exercises actually using the outdoor fire hydrants or indoor fire hydrants, in order to improve the effectiveness of initial actions after the breakout of a fire.

It is also necessary to execute the training in order to make the 119 emergency call as quickly as possible by assuming an exact location for the fire or burning materials and executing a simulated emergency call in a role-playing style.

Although no human casualties from delayed evacuation occurred in this fire this time, evacuation training focusing on the following items is effective to enable the quick and appropriate evacuation of many employees in the event of a fire.

- By assuming that the fire shutters are already closed, it is necessary to confirm that each employee has identified the evacuation route to outside through the side gates and that all employees working inside can smoothly evacuate before any real danger appears by actually walking along such routes. Also, the necessary improvement points identified during the training, such as those concerning evacuation routes and the system, shall actually be implemented.
- By assuming that some fire shutters are not closed in an area where evacuation has been completed, it is required to confirm the procedure to start the manual operation of equipment near the fire shutters.

The FDMA should be engaged in promotion activities whereby business owners plan such effective training sessions to meet the situations of large-scale warehouses and all the owners should actually implement such training.



Demolishing an opening

## 2. Measures to implement more efficient firefighting

To be prepared for cases where a fire cannot be suppressed in the early stages, it is necessary to build an environment which allows more efficient firefighting.

### (1) Strengthening measures in the fire department

#### (i) Creating a security plan for each warehouse

To execute efficient firefighting activities for large-scale warehouses, it is necessary for the Department to create a security plan which describes the activity policy for responding to a fire in each warehouse as well as critical information for firefighting such as the location/department of vehicles, entry routes, firefighting water resources, disaster prevention center and firefighting facilities. It is also essential that the fire department implements training in accordance with such security plan in collaboration with the business owners.

#### (ii) Creating firefighting guidelines for large-scale warehouses

When a fire breaks out in a large-scale warehouse, the difficulty level and the danger of firefighting activities are high, meaning that there are more points to be noted than for usual building fires. According to the results of a questionnaire conducted with fire departments governing large-scale warehouses, such

guidelines are not created in 80% of these departments.

Accordingly, in order to execute quick and appropriate firefighting paying full attention to the safety of firefighters in the event of a fire in a large-scale warehouse, it is necessary to define specific activity guidelines for such firefighting at each fire department ahead of time.

#### (iii) Efficient firefighting squad activities for wide areas and extended periods

During the fire at the warehouse in Miyoshi Town, multiple firefighting squads were mobilized and executed activities for an extended period.

Since a fire at such a large-scale warehouse requires controls including the assurance of safety management for many teams and has so many areas of activities that need to be monitored over a wide area, the role of the commanding team which centrally governs the entire range of activities is particularly important for efficient firefighting.

Therefore, engagements such as collaboration and enriched education are needed in order to realize more efficient and orchestrated activities.

(iv) Closing contracts for demolition of exterior walls and replenishment of water

Since large-scale warehouses only have a small number of openings in the exterior walls, the firefighters entry into the inside in the event of a fire is often restricted, and the continuation of firefighting is also difficult due to the sealed structure which causes high density smoke and heat to be confined within.

In the case of the warehouse fire in Miyoshi Town, an exterior wall of the warehouse was demolished using heavy machinery from private companies which allowed effective firefighting. As this case indicates, in each fire department, it is also requested to close contracts for demolishing activities and water replenishing activities with local construction companies or other parties.

In such cases, it is also effective to discuss and agree how such expenses for support should be borne.

(v) Providing appropriate information to residents

To reduce the anxiety of residents, it is necessary for firefighting bodies to provide on-site information on the firefighting status, etc. to the residents. It is also essential to provide appropriate information to the mass media in a timely manner.

For this purpose, it is effective to create manuals, etc. ahead of time to provide this information smoothly.

(vi) Advisor system for large-scale fires, etc.

Since large-scale warehouses are growing in number all over Japan, and the difficulties and dangers of firefighting are high when a fire spreads widely in these warehouses, a knowledge base of experts is an effective way to carry out more efficient firefighting.

## **(2) Guidelines on measures for reducing damage in the early stages**

It is considered that the owners of large-scale warehouses can secure the minimum necessary fire prevention level by correctly implementing the measures described in 1. above. However, when such

a fire spreads widely in their warehouse, having an environment which allows firefighters to conduct activities efficiently under the fighter's-life-first policy and completing the firefighting as early as possible is also considered important in view of preventing the further loss of products inside the building.

Therefore, it is considered beneficial to demonstrate methods used to smoothly fight fires as measures that business owners can engage with based on the lessons learned from the large-scale fire in Miyoshi Town and the characteristics of large-scale warehouses. Hence, the FDMA in collaboration with MLIT should create guidelines for business owners in consideration of the following points and promote the execution of measures that meet the individual situation at each warehouse.

(i) To prepare for the event of a fire breaking out on the 2nd floor, it is effective to provide a gate which allows the direct entry of firefighters using a ladder for example, or a staircase and an emergency elevator with a compartmentalized attached room as an effective route of entry.

(ii) When there is a fire compartment which does not face an exterior wall of the warehouse, since such compartment can make firefighting extremely difficult, it is effective to implement the following measures.

- Provide a water discharge outlet from a connected water supply pipe in a room attached to the stairs or in the lobby for an elevator.
- In cases where a central vehicle road is provided, provide shutters which form a fire compartment in this area with a smoke exhaust function which removes the smoke and install an outlet from a connected water supply pipe in such a compartment.
- In cases where there are no attached rooms or lobby or central vehicle roads mentioned above in the central part of the building, install sprinklers in this area.

## **● Conclusion**

The FDMA will, on receiving the proposals in this report, implement engagements in collaboration with MLIT as (i) thorough execution of efficient training at businesses to meet the situations at large-scale warehouses, (ii) creation of a security plan for each warehouse by each fire department to execute

firefighting more efficiently and promote the closure of contracts with the private sector, and (iii) creation of guidelines on providing routes to allow earlier entry to buildings and methods of discharging water to the central parts of buildings.