

## Full scale Fire Experiment using a Three-story Wooden School Building (Preliminary Experiment)

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### 1. Introduction

Because wood absorbs CO<sub>2</sub>, as trees grow, they effectively prevent global warming, using wood to construct buildings stimulates the forest industry, and by encouraging forest growth, prevents disasters such as landslides. Wood's superior capacity to adjust humidity contributes to greater interior comfort, and by taking advantage of the technical skills of local craftsmen, its use can be counted on to train technologists and stimulate regional industries.

Japan's Building Standard Law stipulates that three-story school buildings must be fire-resistive buildings to ensure fire safety, but the Act for Promotion of Use of Wood in Public Buildings Etc. enacted in October 2010 requires a review of building standards guided by necessary research.

In response to this need, the Building Department began to collect data necessary to provide technical standards for three-story wooden school buildings in 2011 and started research to prepare proposed standards in order to review the Building Standards to permit the construction of quasi-fire resistive three-story school buildings which would use wooden material more easily when certain specifications are satisfied.

### 2. Aim of the full-scale fire experiment

At this time, members such as columns, walls etc. of a three-story school building must ensure fire resistance performance such that they are neither broken, transfer heat, nor crack even after 1 hour of exposure to heat, but specifications limit the quantity of wooden materials which can be used. To encourage the use of wood, in addition to quasi-fire resistive performance which requires performance during heating that is easily achievable even using combustible wood, full-scale experiments etc. will clarify the requirements necessary for fire safety (stipulated specifications, etc.). It is now hypothesized that, for example, surrounding open space which reduces the impact of toppling etc. will be ensured. First, specifications for wooden interior finishing material etc. will be hypothesized based on a survey of schools, next, based on specifications which clarify

the performance based on member experiments and class-room scale fire tests, an actual building will be constructed on the NILIM site and used for the fire experiment (Photo 1).

This experiment is positioned as a preliminary experiment because it is an experiment of unprecedented scale, then with specifications and experiment method adjusted based on its results, the full scale fire experiment will be carried out based on specifications which hypothesize standardization in fiscal 2012.

The aim of the full-scale fire experiment is to gain knowledge concerning the process of spread of fire and smoke flow in an entire building, degree of impact of flying sparks and radiant heat on the building's surroundings, whether or not the building collapses, and if so, the extent it collapses, all knowledge which could not be confirmed without performing a fire experiment using a full-scale building.

### 3. Conclusions

The results of the two full-scale fire experiments described above will be used to prepare proposed standards which ensure the fire safety that will be required of a three-story wooden school building.



Photo 1. The Experimental Three-story Wooden School Building