

Completion of Frame Erection for New Research Building at Tsukuba Research Institute
Research Base for W350 Plan and the Scientific Study of Wood

Sumitomo Forestry Co., Ltd. (President and Representative Director: Akira Ichikawa; Headquarters: Chiyoda-ku, Tokyo; hereinafter Sumitomo Forestry) announced that the frame erection (construction and assembly of structural materials) for the new research building at Tsukuba Research Institute was completed on December 4, 2018. This research building will be the research base for the W350 Plan announced in February 2018, and work started on it in March, as a base for disseminating a wide range of expertise related to advanced technologies the scientific study of wood and timber. Technologies used in this building will form the foundation for the W350 Plan. The total construction cost, including works within the premises, is approximately 2.5 billion yen, and the date of building completion is aimed at May 2019.



The new research building is a three-story building with a floor area of 2,532.67m². The beams, pillars, and walls use *arawashi** exposed timber that has either received Ministry of Land, Infrastructure, Transport and Tourism (MLIT) certification or has been designed using the semi-fireproofing technique. In addition to solar panels being installed on the roof, the introduction of absorption water chiller-heaters fired using wood pellets will significantly reduce carbon dioxide emission. Besides research and development of greening technologies for non-residential wooden architectural structures, green layout for improving intellectual productivity within office spaces will also be verified. The roof, balconies, and external walls will also be used as places for greening experiments.

It has been 27 years since Tsukuba Research Institute was opened. The deterioration of the main research building and increase in staff have become issues needing to be addressed. New technologies related to wooden structures are used in the new research building. Energy saving technology and renewable energy will also be used with a view of achieving a zero energy building (ZEB).

This facility has been accepted as a fiscal 2017 leading project under the guidance program for sustainable wooden buildings and other structures being promoted by MLIT. Plans include an office for housing 140 persons, and a gallery, etc., to provide information about timber.

* *Arawashi* is a finishing method where structural materials of wooden buildings, such as pillars and beams, are made visible.

■ Overview of Facility

Enterprise	Tsukuba Research Institute, Sumitomo Forestry Co., Ltd.
Location	3-2 Midorigahara, Tsukuba-shi, Ibaraki Prefecture, Japan
Building Area	1,120.27 m ²
Floor Area	2,532.67 m ² in total; Level 1: 1,001.95 m ² ; Level 2: 894.44 m ² ; Level 3: 636.28 m ²
Structure	Original post-tensioned structure; 3-story, semi-fireproof structure
Use	Research facility
Project Management	MOCCA (Timber Solutions) Department, Sumitomo Forestry Co., Ltd.
Design	Atelier Asami kazuhiko, le style h Co., Ltd.; MOCCA (Timber Solutions) Department, Sumitomo Forestry Co., Ltd.
Construction Company	Kawada Industries, Inc.
Construction Time	From March 26, 2018 to the end of May 2019 (planned)

■ Overview of New Research Building

(1) Structural characteristics

The wall pillars of the new research building adopt an original structure utilizing post-tensioning^{*1} techniques, where blocks of laminated veneer lumber (LVL) which are 1,200 mm long on each side and 300 mm thick are stacked in a checkered pattern with steel poles running through them to resist horizontal force. Exposing the timber of the structural materials achieves space with warmth.



^{*1} Post-tensioning is a construction method where high-strength steel poles and wire ropes running through load-bearing members are tensioned to increase the fixation of position between members.

(2) Fire prevention and resistance verification

The main beam is a flitch beam with a semi-fire-resistance rating of 60 minutes certified by MLIT. As the evacuation safety performance, such as evacuation routes during fires, has been verified through obtaining MLIT certification, regulations on interiors and other regulations have been eased, and the plan has secured a degree of freedom in design. This research building is the first in Japan to obtain MLIT certification based on the full building evacuation safety verification method^{*2} which targets wooden architectural structures.

^{*2} A method for verifying safety performance where everyone within a building is able to evacuate safely to the ground level given a pre-determined fire scenario.

(3) Environmental characteristics

The building aims to be a zero energy building (ZEB) by installing solar panels on the roof to create energy, and adopting absorption water chiller-heaters fired using wood pellets to reduce carbon dioxide emission. In addition, skylights are installed on the upper part of the atrium to allow sunlight to shine on the inner courtyard of the first floor during all seasons. Updrafts are generated within the atrium to provide effective natural ventilation.

(4) Greening plan

Greening which can be applied to wooden buildings will be used on the roof, balconies, and external walls. This will help the research and development of new green technologies for non-residential wooden architectural structures. The office space will be used for verifications such as green layouts that seek to improve intellectual productivity.

Sumitomo Forestry has embarked on the concept W350 Plan to construct a 350-meter-tall wooden high-rise building in 2041, which will mark the 350th year since foundation of the business. With this new research building as a base, Sumitomo Forestry will seek the further development of research technologies that increase the value of wood.