SUMITOMO FORESTRY

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For immediate release

Sumitomo Forestry Co., Ltd

World's First Shake Table Testing of a Full-scale 10-Story Mass-Timber Building Begins in the U.S

Participation in the “NHERI TallWood Project” and our own experiments in the 2nd phase

On April 20, the NHERI TallWood Project, in which Sumitomo Forestry Co., Ltd.(President and Representative Director: Toshirō Mitsuyoshi; Headquarters: Chiyoda-ku, Tokyo) participates, began world's first shake table testing of a full-scale 10-story mass-timber building. The experiment will be conducted at the University of California, San Diego (UCSD). The first phase which will run through early June, is now carried out by U.S. researchers adhering to the U.S. West Coast seismic practices. In the second phase, after the completion of the first phase, the building will be retrofitted to our original test specimen, and tested under Japanese earthquake resistance standards.

The NHERI TallWood Project is funded by National Science Foundation (NSF)[*1] and United States Forest Service (USFS) and led by the Colorado School of Mines. In this project the seismic performance and construction technology of medium and high-rise wooden buildings will be examined by building a test specimen using post-tensioning seismic technology[*2]. Sumitomo Forestry has been participating in this project as a strategic partner since June 2020, and will apply the knowledge gained from this testing to the construction of medium- to large-scale wooden constructions we are promoting in Japan and overseas.

Panoramic view of the 10-story Wooden test building

*1 NSF (National Science Foundation)
A federal agency established in 1950 to promote science and technology in the United States. The NSF has produced many innovative research results, including more than 160 Nobel Prize winning discoveries.

*2 Post-tensioning seismic technology
A technology that increases the fixation between the structural components by applying tensile stress to high-strength steel rods or wire ropes that are threaded through the load bearing members.

Outline of Experiment

<Phase 1>

In 2021, the United States revised The IBC (International Building Code), which serves as the recommended norm for building standards in each state, to allow the construction of wooden buildings up to 18 stories. In accordance with this revision, the first phase of the experiment will be conducted by U.S. researchers to verify the seismic performance of a new construction method for medium- to large-scale wooden constructions called post-tensioning seismic technology, and a full-scale shake table test of a 10-story wooden building specimen will be conducted. Using seismic

waves based on the level of disasters on the West Coast of the United States, we will verify the damage status of components and its impact on buildings. Through this experiment, we will gain knowledge about the seismic capacity of post-tension structures and the construction technology.

Experiment: “NHERI TallWood Project” Shake table Testing of 10-story mass-timber building
Location: University of California, San Diego (UCSD) Outdoor Shake Table
・Period: April 20th to June 6th, 2023
・Structure: Mass-timber construction (post-and-beam) + Post-tensioned wood rocking walls
(Similar structural system as our Tsukuba Research Institute Fire Resistance Verification Building)
・Number of floors: 10 floors
(Plan) 9.7m×10m, (H) 34.14m, (Floor) [1F] 3.96m, [Other] 3.35m
・Material: (Column beam) LVL*3, (Load-bearing wall) CLT*4, MPP*5

NHERI TallWood Project: http://nheritallwood.mines.edu/
UCSD Outdoor Shake Table : http://nheri.ucsd.edu/

*3 LVL (Laminated Veneer Lumber)
A wood material made by laminating and bonding veneers made of peeled logs in parallel directions of fibers
*4 CLT (Cross Laminated Timber)
After arranging the laminar, the wood material is laminated and bonded so that the fibers are in an orthogonal direction
*5 MPP (Mass Plywood Panel)
A large-section wood material made by laminating plywood by secondary adhesion. A wood-based material developed in the United States that is not standardized in Japan yet

<Phase 2>

After the U.S. experiment, we will conduct our own experiment in the second phase. The test building in the first phase was renovated to our original post-tension specifications to withstand the seismic force of the Japanese earthquake resistance standards. This second phase has been planned in cooperation with Associate Prof. Shiling Pei, Civil and Environmental Engineering, Colorado School of Mines, other U.S. researchers and Isoda Laboratory, Research Institute for Sustainable Humanosphere, Kyoto University. We verify resistance to seismic activities using seismic waves generated in Japan and seismic waves that require resistance confirmation under the Building Standards Act. Through both phases, we will verify the safety of buildings and establish technologies for medium- to large-scale wooden constructions.

We will accumulate knowledge through a series of experiments and consider more accurate methods for predicting earthquake behavior. In order to strengthen connections with large-scale wood construction companies in the United States, we will utilize the results of this experiment for medium- to large-scale wooden constructions that we develop in Japan and overseas.

We have been researching post-tension seismic resistance technology as one of the technologies for constructing medium- to large-scale wooden buildings since 2014. This technology was adopted for the first time in the fire resistance verification building of our Tsukuba Research Institute, which was completed in 2015. It was also adopted in the new research building of the same institute completed in 2019. For private purposes, it was also used in Building 15 of Sophia University's Yotsuya Campus in 2022. We will accelerate research and development to increase the value of wood by repeatedly verifying that we can contribute to the promotion of

medium- to large-scale wooden buildings, constructing buildings from wood, lignification, and the realization of a decarbonized society, focusing on the knowledge gained from these experiments.

The Sumitomo Forestry Group is globally engaged in wood-centered businesses, including forest management, the manufacture and distribution of timber building materials, detached houses, medium- to large-scale wooden construction contracting, real estate development, and wood biomass power generation. In February 2022, we announced our long-term vision “Mission TREEING 2030” in anticipation of 2030, the target year of the SDGs. We will increase the amount of CO2 absorbed by forests by running the “Wood Cycle” of Sumitomo Forestry, and contribute to decarbonization not only for our company but also for society as a whole by fixing carbon over the long term through the popularization of wooden buildings.