

Sumitomo Forestry Co., Ltd.
Forest Research and Management Organization
ATOUN Inc.
Nara Institute of Science and Technology

Forestry Assist Suit – Reducing Burden by 17% Display at International Robot Exhibition 2017

The Forestry Assist Suit Research and Development Consortium will display its TABITO-03 prototype, the first forestry assist suit that can reduce muscle strength burden by 17%, at the International Robot Exhibition 2017. The consortium is composed of Sumitomo Forestry Co., Ltd., the Forest Research and Management Organization, ATOUN Inc. and the Nara Institute of Science and Technology. Development is proceeding with the aim of practical implementation in 2025.

The exhibition will be held at Tokyo Big Sight from 10 a.m. to 5 p.m. on November 29 (Wed) through December 2 (Sat). It will be displayed at the service robot corner inside the New Energy and Industrial Technology Development Organization (NEDO) booth.

TABITO-03 is a forestry assist suit that supports walking on sloped surfaces. Pressure sensors on the soles of the feet and angle sensors at each joint are used to determine the worker's posture, and the motor operates in accordance with the timing of body movements. On uphill slopes, the suit pushes the worker's body up by assisting the legs in lifting up and stepping down to improve ease of walking. On downhill slopes, the burden on the wearer's knees is reduced by applying breaks to knee movement. A total of four motors have been installed, with one each on the left and right sides of the waist and one on each knee. These are operated by a battery and can be used for three hours.

Reforestation work necessarily involves diverse topography and surfaces. When working in steep forest areas, forestry workers make their way to the site while climbing up difficult and steep paths like mountain trails. Practical implementation of the forestry assist suit would make it possible for people to climb up and down such paths within a short amount of time without using their physical strength, greatly increasing work efficiency.

The TABITO-03 can reduce the muscle strength burden of forestry workers by up to 17%. This is the first time that burden reduction has been converted to data in the area of forestry. Moreover, by allowing the assist suit to carry the saplings and planting equipment, etc., amounting to several tens of kilos shouldered by the worker, the load on the shoulders and legs can be further reduced. The consortium will continue evaluations with the aim of rapidly developing a practical device that can reduce the labor burden of reforestation work by 20%.



Evaluation of TABITO-03

In Japan, trees planted after the Second World War are reaching the time for felling. As demand for domestic timber increases and felling proceeds, saplings need to be regularly planted in land after felling, and reforestation needs to be promoted to enable the sustainable development of the forestry industry. Although the mechanization of felling and transportation is progressing, the mechanization of reforestation work is sluggish, while the labor force shrinks and ages. Therefore, the efficiency of reforestation work needs to be increased.

Sumitomo Forestry Co., Ltd. (President and Representative Director: Akira Ichikawa; Headquarters: Chiyoda-ku, Tokyo; hereinafter, Sumitomo Forestry), the Forest Research and Management Organization (Chairperson: Haruo Sawada, Location: Tsukuba-shi, Ibaraki Prefecture), ATOUN Inc. (President: Hiromichi Fujimoto, Headquarters: Nara-shi, Nara Prefecture), and the Nara Institute of Science and Technology (President: Naokazu Yokoya, Location: Ikoma-shi, Nara Prefecture) started developing the forestry assist suit for use during plantation in 2015. This was adopted as a five-year research project* supported by the government in 2016 and these organizations now form the Forestry Assist Suit Research and Development Consortium.

* Ministry of Agriculture, Forestry and Fisheries “Innovative technology development/emergency development business (including leading projects)” Research and development of forestry assist suits to reduce the burden in reforestation work

■ Research data from demonstration testing of TABITO-03 forestry assist suit

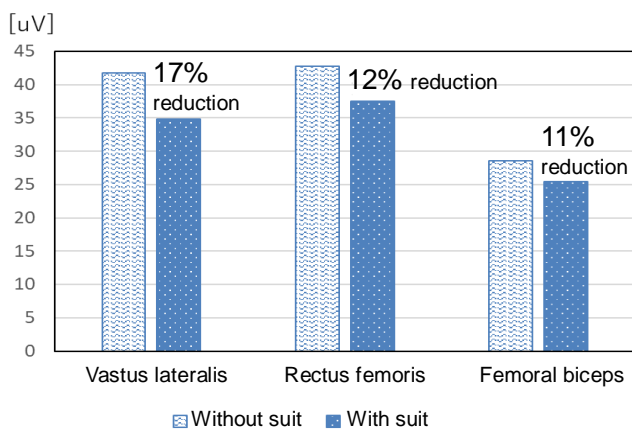


Figure 1. Comparison of myoelectricity voltage on upward slopes

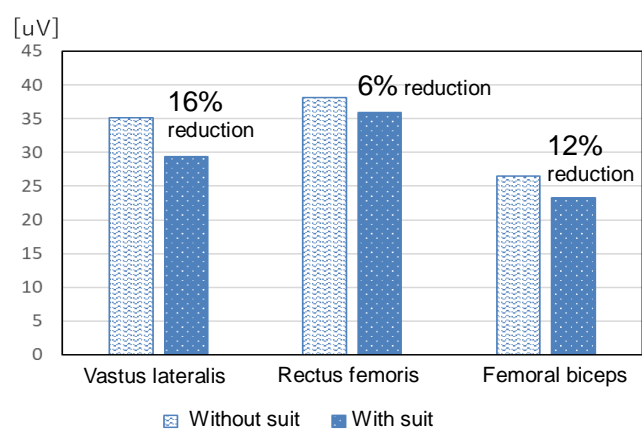


Figure 2. Comparison of myoelectricity voltage on downward slopes