

AN INNOVATIVE TIMBER FELLING SYSTEM BASED ON JAPAN'S TRADITIONAL TECHNIQUE

Keio University



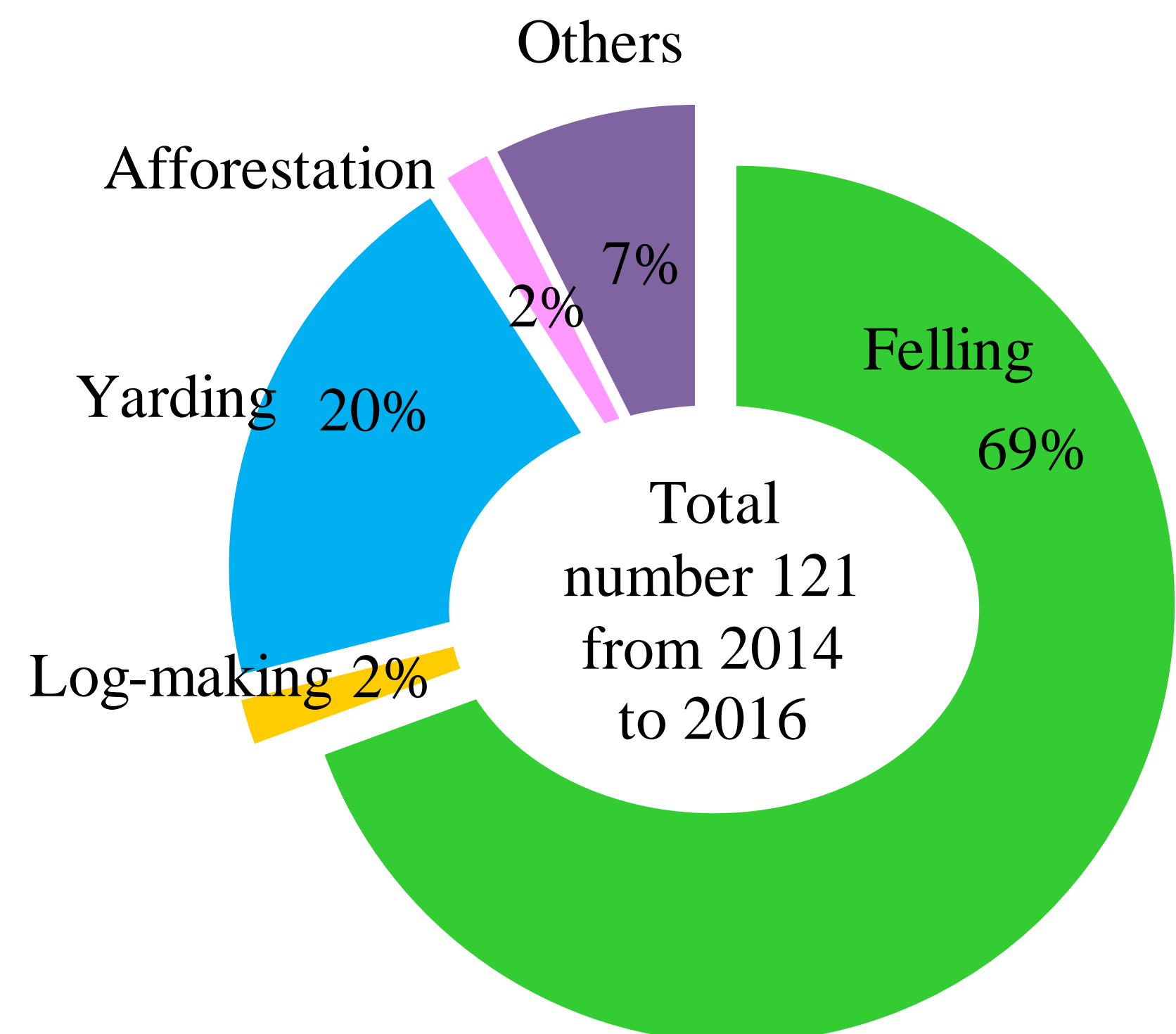
Keywords: Tree-felling operation, Japan's traditional timber felling technique, Three-hinge tree felling method ("Mitsuhimo-giri")

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ABSTRACT

In an effort to revitalize Japan's forestry by technological development, the authors have so far developed and proposed two innovative timber harvesting systems with mobility in forest land. Both systems embodies unique ideas from mechanics and informatics perspectives. One of the two systems is a portable tree-felling machine with a removable and interchangeable chainsaw. The other system is a tree-felling manipulator which performs the three-hinge tree felling method ("Mitsuhimo-giri" in Japanese), Japan's traditional timber felling technique. It is equipped with a drill and an end mill which was newly developed by the authors as a cutter. The machine targets trees of larger diameters. This paper reports the latter machine (Manipulator II). This R&D project will be presented at FORMEC 2019.

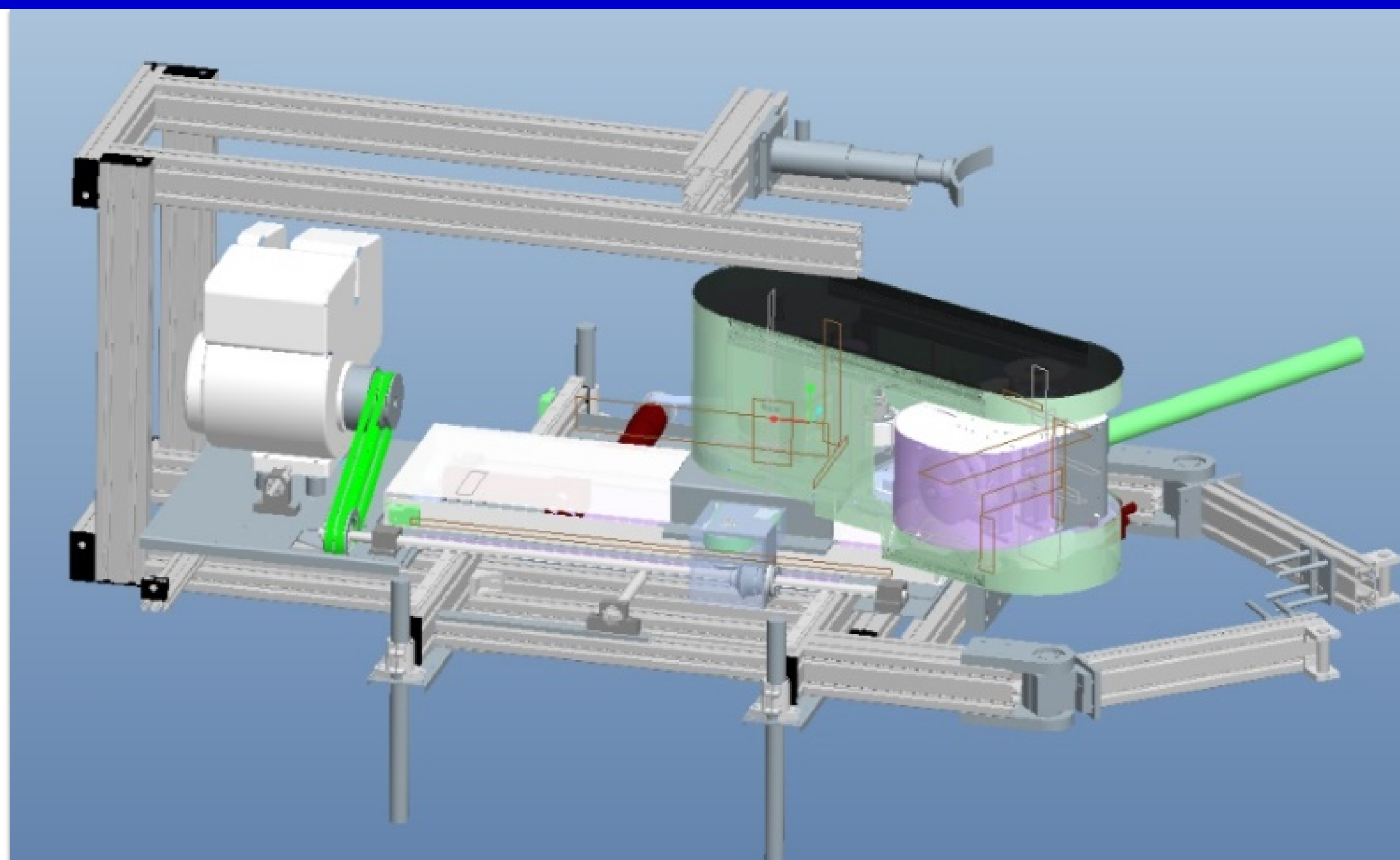
BACKGROUND



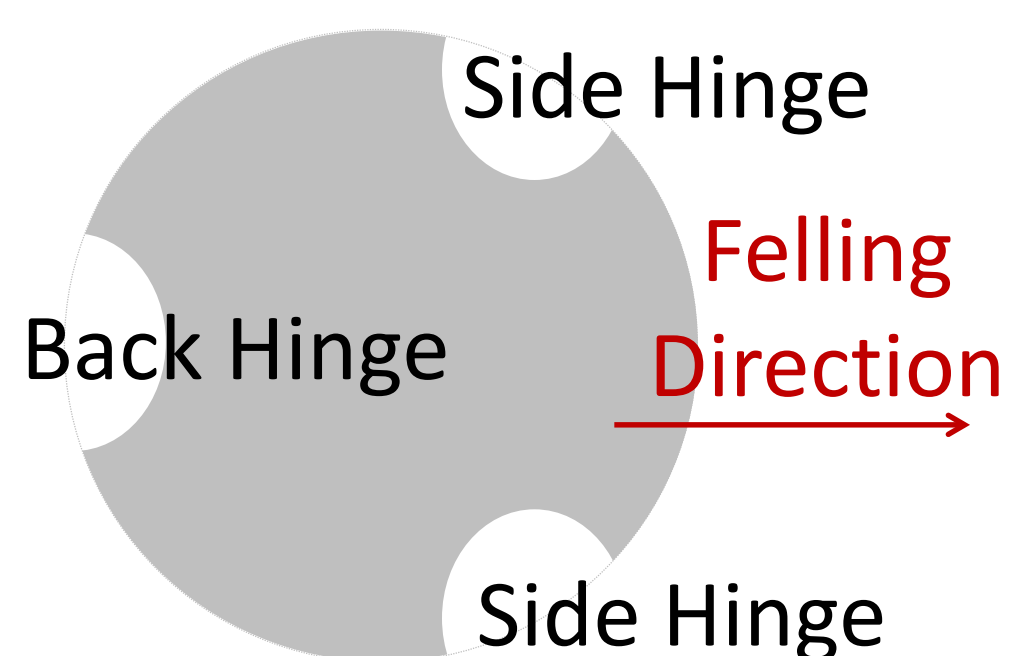
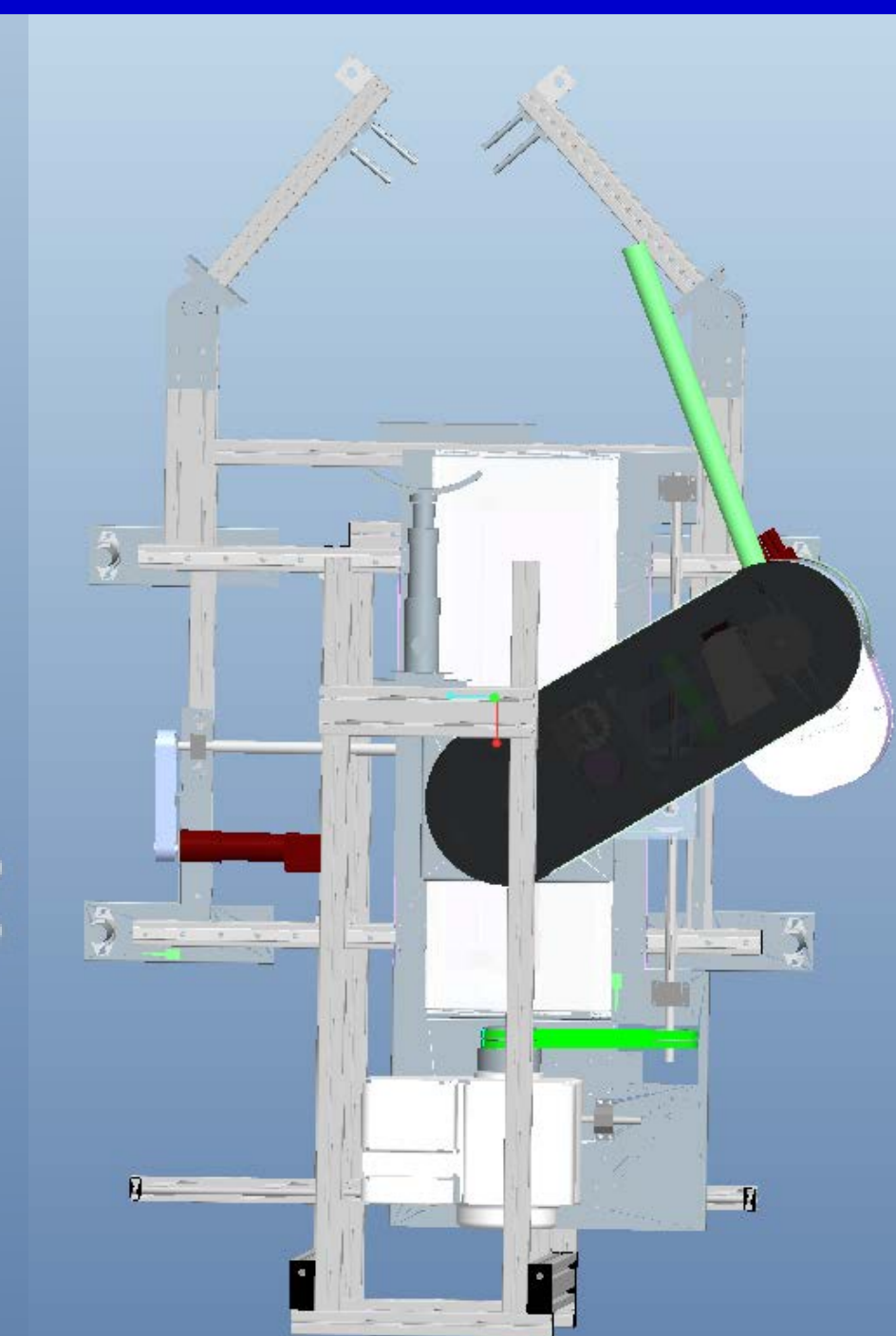
Deaths in forestry operations

Source: Ministry of Agriculture, Forestry, and Fisheries (2018) "Heisei 29 Nendo Shinrin Ringyo Hakusho," [FY 2017 White Paper on Forests and Forestry].
Forestry Agency "Rinyacho keiei-ka shirabe" [Study by Forestry Manamegent Improvement Division, Forestry Agency].

PERSPECTIVE DRAWING OF II



TOP VIEW DRAWING OF II

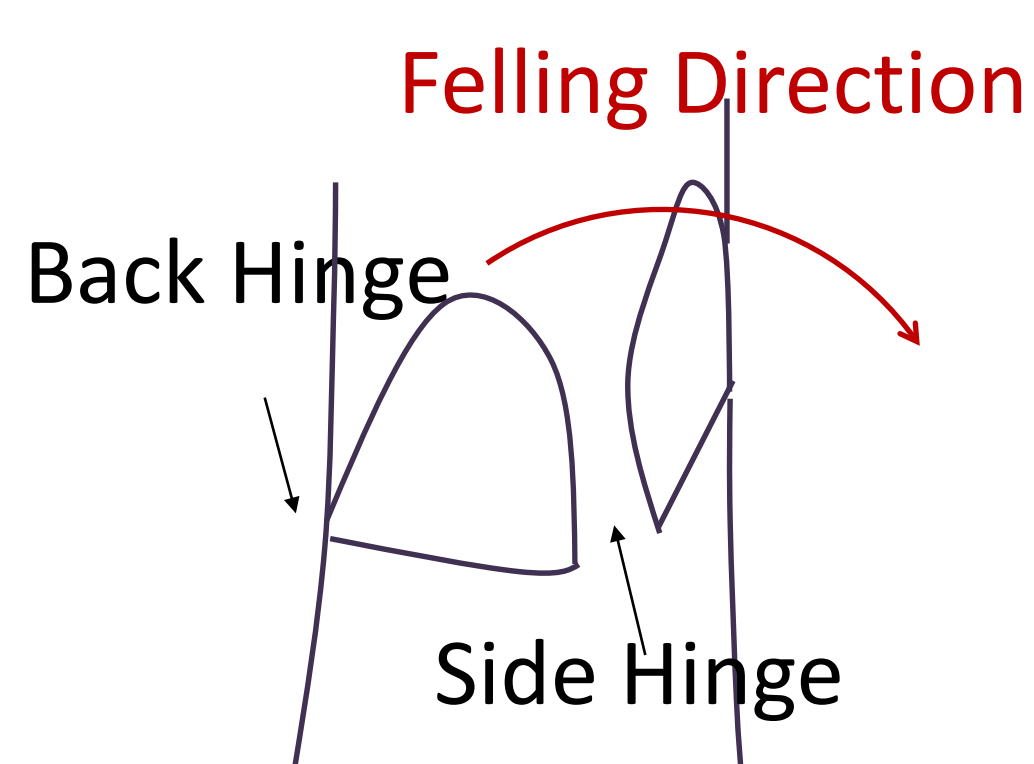


Cross-section of three-hinge tree felling method

EXPERIMENT PHOTO OF II



EXPERIMENT PHOTO OF III



Longitudinal section of three-hinge tree felling method