All Division 3 (Forest Operations Engineering and Management) Meeting

201 - Sustaining the emerging bioeconomy - Innovations in forest harvesting & transportation

KG I - 1139 (Uni Freiburg)

IUFRO17-1503 **Productivity and cost of cable-assisted felling and extraction in the Pacific Northwest, USA**

Green, P.* (1); Chung, W. (1); Crawford, R. (1); Garland, J. (1); Leshchinsky, B. (1); Sessions, J. (1); Wimer, J. (1)

(1) Oregon State University, Corvallis, Oregon, United States

Abstract: Logging and timber falling in the Pacific Northwest continue to be one of the most dangerous jobs in the United States. Mechanization for steep slope harvesting may be successful in reducing logging-related accidents and provides operators the ability to continue working in the face of an aging and declining workforce. However, with such a significant capital investment required of forestry heavy machinery, productivity and cost models are often given heavy consideration when determining both economic and operational feasibility of a harvesting system. This study has two main objectives. The first is to develop four different productivity and cost (hereafter denoted as P&C) models of current and new harvesting systems used in the Pacific Northwest with several different measurable external independent variables. The second objective is to be able to make comparisons at a harvest-unit scale between the four systems through not only P&C analysis, but also between safety and environmental impacts. Safety and environmental impacts are out of the scope of this specific study, but anticipated to be addressed through collaboration with other studies. The four different systems analyzed are: 1) conventional hand-falling with both tower-yarding and grapple yarding as the extraction method, 2) cut-to-length harvesting with a cable-assisted harvester/forwarder, 3) cable-assisted feller-buncher machine paired with a tethered skidder for extraction, and 4) cable-assisted feller-buncher machine with grapple yarding. The overall goal of this ongoing research is to be able to optimize harvest layout and system design. From haul route locations, to skyline corridors needed, all aspects will go into unit layout planning. It is the intention of this study is to give contractors and landowners tools necessary to design steep-slope harvesting operations efficiently and safely in a systematic and efficient way.

Productivity/cost, cable-assist tech.

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IUFRO17-2854 **Roll over protective structure for quad bikes**

Nordfjell, T.* (1); Edlund, B. (2)

(1) Department of Forest Biomaterials and Technology, Swedish University of Agricultural Sciences, Umeå, Sweden; (2) SLU, Department of forest biomaterials and technology, Umeå, Sweden

Abstract: World-wide, Quad bikes are used by many private wood lot owners and farmers in work like transportation of equipment, seedlings or fire-wood, or just to get out to the work place. Unfortunately, the risk of accidents when driving a quad bike is high. In Sweden about 6 persons per year are killed in Quad bike accidents, in Australia about 13 persons. About half of the fatal accidents are work related. The other half is recreational related. The quad bike has rolled over in a majority of all fatal accidents. Studies on stability, dynamic handling and rollover crashworthiness has demonstrated the importance of a roll over protective structure (ROPS), if quad bikes at all can be recommended for work activities. Such ROPS has to protect in rear, front and (most often) lateral roll over, without reducing the stability on the vehicle and without hindering an operator in driving. This is difficult to reach, since a quad bike is small (1.2 m wide, 350-450 kg) and the operator often drives both sitting and half standing. A number of ROPS have been tested, and a new design will be presented, aiming to fulfil basic rollover crashworthiness demands, and practical needs in work activities.

ATV, occupational safety, chest and head injury

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IUFRO17-3481 **Education in safe chainsaw usage and its long term effects**

Häggström, C.* (1); Edlund, B. (1); Lindroos, O. (1); Nordfjell, T. (1)

(1) Swedish University of Agricultural Sciences, Umeå, Sweden

Abstract: Injuries are serious problems in motor-manual forest work. For prevention, a formalized training and examination called "Motorsågskörkortet" (chainsaw license) was developed 14 years ago, and is since 2015 legally required when professionally using chainsaws in Sweden. The license has 10 levels, with the levels A and B covering normal forest work such as felling, delimbing and cross-cutting. The study aim was to investigate the long term effects of the license on the user's knowledge and risk awareness in chainsaw work. A questionnaire was sent to 3,000 holders (professional users and non-industrial forest owners) of the license. Results show that, when redoing the theory tests 1-9 years after license approval, 75% passed on level A but only 52% passed at level B. Moreover, time since license approval did not influence the re-test results. Ninety-nine percent said that they became safer in their chainsaw usage due to the license education, out of which 30% had become much safer. Women did to a greater extent than men consider themselves to work safer after the license. We conclude that the chainsaw license fill an important role to increase safety in motor-manual felling for both professional users and non-industrial forest owners.

Certification Chainsaw License Safety "Säker Skog"