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Soil Compaction by a Forwarder in Timber Harvesting

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Abstract : Industrial plantation forest is the producer of logs in Indonesia. Several companies of industrial plantation forest have been successfully planted with fast-growing species, and it entered their annual harvesting period. Heavy machines such as forwarders are used in timber harvesting to extract logs from stump to landing site. The negative impact of using such machines are loss of topsoil and soil compaction. Compacted soil is considered unfavorable for plant growth. The research objectives were to analyze the soil bulk density, rut, and cone index of the soil caused by a forwarder passes, to analyze the relation between several times of forwarder passes to the increase of soil bulk density. A Valmet forwarder was used in this research. Soil bulk density at soil surface and cone index from the soil surface to the 50 cm depth of soil were measured at the harvested area. The result showed that soil bulk density increase with the increase of the Valmet forwarder passes. Maximum soil bulk density occurred after 5 times forwarder Valmet passed. The cone index tended to increase from the surface until 50 cm depth of soil. Rut formed and high soil bulk density indicated the soil compaction occurred by the forwarder operation.

Keywords : bulk density, forwarder Valmet, plantation forest, soil compaction, timber harvesting
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