

# THE EFFECT OF THE NOISE AND VIBRATION LEVEL OF A CHAINSAW DURING SALVAGE CUTTING ON THE HEALTH OF ITS OPERATOR

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## INTRODUCTION AND PROJECT GOAL

Chainsaws are essential tools for logging. However, a high number of occupational accidents are associated with them. In addition to injuries such as cuts, the chainsaw operator is also exposed to the vibration and noise factors caused by the chainsaw. These factors can cause various health ailments.

The goal of this research was to evaluate the rate of vibrations at the front and rear handles of a chainsaw that affect its operator during the logging of trees. Two accelerometers were used to measure the vibrations. The vibration measurements on the chainsaw handles were carried out according to the valid standards: EN ISO 22867, EN ISO 5349-1, and EN ISO 5349-2.

Furthermore, the noise effect on the logger was measured. The noise was measured according to the applicable standards: EN ISO 22868 and EN ISO 9612. During the measurements, the microphone was firmly attached to the logger's helmet, close to his ear.

## MATERIAL AND METHODS

The total number of measured Norway spruce trees (*Picea abies* (L.) H. Karst.) was 121. Prior to logging, the diameter at breast height (130 cm) from the ground to the nearest 0.5 cm using a forestry caliper. Furthermore, the moisture content of each tree was also measured at a height of 130 cm from the ground.

The first group (Group I) included a total of 73 trees. The average value of the trunk diameter was 29.0 cm. The average moisture content of these trees was 93.5%. The second group (Group II) included a total of 48 trees. The average value of the trunk diameter was 32.0 cm. The average moisture content of the trees in this group was 20.0%.

To achieve the goal of the research the production process was split into the following operations: Cutting off tree buttresses; felling; delimiting.

Throughout the measurement, the chainsaw was operated by the same person. The same chainsaw was always used to log all the trees. Specifically, it was a Stihl MS 362 chainsaw.



Fig. 1: Chainsaw Stihl MS 362



Fig. 2: Accelerometers for measure vibrations and noise

## RESULTS AND CONCLUSION

In Fig. 3 you can see the vibrations acting on the logger the front handle of the chainsaw. The results show that in all measured operations the vibration at the front handle is higher in Group I.

Fig. 4 shows the vibrations acting on the rear handle of a chainsaw. In this picture, it can be seen that the highest vibrations at the rear handle of the chainsaw were measured at the Group II of trees during the "Delimiting" operation.

It was found that the logger is most exposed to noise when processing tree Group I during the "Delimiting" operation (Fig. 5). On the other hand, the lowest noise level was recorded during the "Felling" operation in Group I.

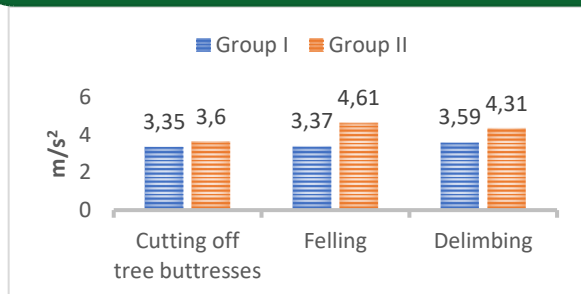


Fig. 3: Rate of vibrations at the front handle

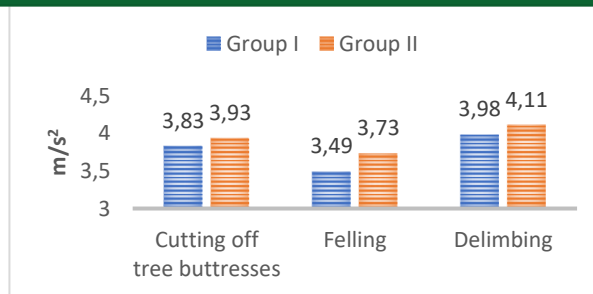


Fig. 4: Rate of vibrations at the rear handle

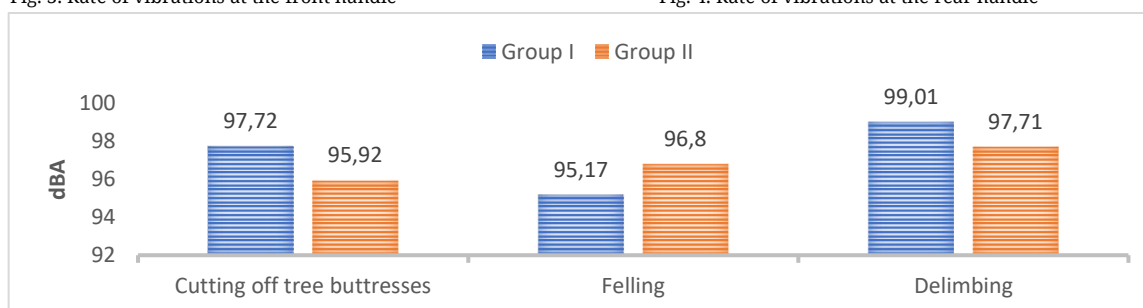


Fig. 5: Noise measurement values

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