

Abstract

Influence of timber harvesting technology on changes in utility value of wood from post-hurricane areas

Abiotic damage to forests which are caused mainly by hurricane winds, takes the form of windbreaks and windfalls. In recent years, these damages have become catastrophic and they are cyclical. Timber damage and the specificity of harvesters using may result in something other than optimal, previously planned wood structure of the timber in the post-hurricane areas. The structure of the timber from disaster stands differs from the timber structure as part of planned cuttings. There is a shift in a timber from higher to lower quality classes. The quality of timber on disaster areas may change in a short time, which is related to the influence of weather conditions and the type of damage to the wood.

The aim of the study was to determine the changes in the timber structure of harvested and sold wood material on post-hurricane plots in relation to wood harvesting carried out under standard conditions. The differences were determined in comparison to the year preceding the year with the wind damage occurred, taking into account the level of use of multi-operational machines on post-disaster areas.

Original data were obtained in stages. It was from the regional directorates of State Forests and the General Directorate of State Forests. Data from the information systems of the State Forests (SILP) were subject to classification and statistical analysis.

In total, over the years 2005 - 2017, the State Forests made 433 310 thousand. m³ of wood. Surface damages which damage exceeded 5,000 m³ of wood, amounted to 18,534,453 m³ over the above-mentioned years, which is over 4% of wood obtained as part of cleaning up large areas of disaster after hurricane winds. The original damage size factor W was determined, which was calculated for all wind damage over 5,000. m³. The average amount of such damage in the analyzed years in Poland, expressed by the W factor has been specified as 0.76.

Significant changes were found in the structure of timber harvesting and sold wood in the marketing year in which there was a hurricane wind in the scope of:

- change in the category of small-sized timber share (M) from 5.94% to 4.38% in the year of wind damage;

- changes in the share of wood of higher quality classes in large-sized timber - the average annual share of timber in higher quality classes in large-sized wood decreased from 13.49% to 10.74% in the year of the hurricane.
- changes in the average price of SO WC0 1 wood in the year before the occurrence of the damage amounted to PLN 186.93 / m³, in the year of damage, after applying the price adjustment factor (KC), it decreased to the level of PLN 185.06 / m³.

It was found that the difference in the average size of the sales groups in the year before the hurricane (162.60) and in the year of wind damage (158.30) was small and amounted to 3% - it was not statistically significant. It has not been found that the structure of wood harvesting and sold timber is simplified on the post-hurricane surfaces. No changes were found in the average price of total timber and the price of short timber (logs and medium-sized timber). Changes in the share of large and medium-sized wood remain at a similar level - the differences were not significant.

There was a greater decrease in wood of higher quality classes harvested in post-hurricane areas with the use of multi-operational machines (-4.05%) compared to the areas where motor-manual technology was used (-1.53%). Moreover, the dependence of changes in the share of wood of higher quality classes in large-size wood on the damage size factor (W) (negative correlation) and on the share in sales of strategic timber buyers (positive correlation) were determined.

The dissertation comprehensively presents the problems of the quality of wood obtained in Poland on post-hurricane surfaces during the transformation of the wood harvesting technology, the transition from motor-manual technology to fully mechanised technology with the use of harvesters.

Keywords: timber harvesting, harvester, fully mechanised model of wood harvesting, wood quality, wood harvesting structure, wind.