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AGE STRUCTURE OF COMPACT SAWING MACHINES USED FOR LOGGING

Władysław Kusiak, Dariusz Gorycki
Agricultural University of Poznań

Abstract. Compact sawing machines (compact saws) are among the most popular machinery used in the process of logging. Their technical condition influences the work safety to a large degree and is dependent on the period of use (age) of the compact sawing machine. Examinations of 212 compact sawing machines used by 61 forestry services plants proved that the average time period of their use was 5 years.

Key words: compact sawing machine (compact saw), age, technical condition

INTRODUCTION

Compact saws are among the basic tools (machines) used for logging and working with such compact sawing machinery is considered one of the most dangerous occupational works. Taking into consideration the fact that their technical condition, apart from the skill of the operator and the difficulty of the operation itself, is one of the basic factors influencing the work safety, research to discover the period of use (age) of the respective compact sawing machines was undertaken.

Several publications on the assessment of technical condition of compact sawing machines have been issued by authors such as: Ciesielczuk et al. [1998], Skarżyński [2002 a, b], Trzciński [1995], however none of them raised the period of use of a machine as a criterion for assessment of technical condition of the machine.

In the opinion of the authors, because of wearing out of the machine at work, occurrence of breakages of respective elements, introduction of a new generation of compact saw models and the time period of machine work predicted by the producers, time of use of a compact sawing machine seems to be an obvious indicator of assessment of the technical condition. In relation to the above, research was under taken on determination of age (time period of use) structure of the compact sawing machines used in forestry works.

Corresponding author – Adres do korespondencji: Dr inż. Władysław Kusiak, Department of Working Environment Engineering of Agricultural University of Poznań, Wojska Polskiego 38/42, 60-627 Poznań, Poland, e-mail: kusiak@au.poznan.pl

AIM OF THE PAPER

The aim of the paper was to determine the age of compact sawing machines used by employees of forestry services plants. Because of the energy and money consuming measurements it was necessary to determine the technical condition of compact sawing machines. The main criterion used in this paper was the time of use of the machine, i.e. its age. It was assumed that the period of technical efficiency of a compact sawing machine used professionally was 3 years and the undertaken research aimed at determination of percentage of respective compact sawing machines in individual age groups.

METHODICAL ASSUMPTIONS

The area of the research encompassed three neighbouring forest districts of National Forests: Jeleśnia and Sucha Beskidzka belonging to the Regional Directorate of National Forests in Katowice and the Myślenice Forest Inspectorate included into the Regional Directorate of National Forests in Cracow. The above listed forest inspectorates are characterized by similar natural-forest conditions, climate and conditions of the forest management. All the compact sawing machines used by the plants were examined and assessed including the maintained and repaired ones. Basic information about the producer and model for each machine had been gathered and number plates were read for the machine number. In order to determine the actual number of years of work of the machine the owner added this information stating the date of purchase of the machine. In cases when the number plates were missing (8 items, that is 3.8), possible damage making it illegible (35 items, that is 18.5%) the time of use was determined basing on the information received from the owner of the machine.

When determining the age of compact sawing machines, information was also gathered on the occurring defects and the repairs made, especially to such parts as: motor, coupling, carburettor, oil pump, decompressor, ignition system, silencer, brake spring, crankcase, supply system, condition of switches and operating throttle levers, starter. Moreover, mechanical damage resulting from use and random events was also examined, as a wrenched-off brake lever, broken casing, etc., although it influenced the general assessment of the technical condition according to the above given criteria.

CHARACTERISTICS OF THE USERS OF COMPACT SAWING MACHINES

It was found that a total number of 65 forestry services plants were active in the researched area, 4 out of which did not have any compact sawing machines as they specialize in providing different types of services. Among the examined plants small ones, with 2-4 compact sawing machines, belonging to the firm – that is its owner or owners, are the most dominant. In 31 cases compact sawing machines are owned by the forestry services plants (ZUL), using 117 compact sawing machines. Two of the plants gave the machines belonging to the firm to the workers to use. 4 firms use both their own compact sawing machines and machines owned by the employed workers, and in 18 plants only compact sawing machines owned by the workers are used. In case of one person

firms the sawing machines were considered the property of the firm. Such firms have at least 2 compact sawing machines in equipment that similarly as in larger companies are leased seasonally to the employed workers to perform specified works.

In the area covered by the analysis Husqvarna compact sawing machines are prevalent both in terms of number of models and the number of used machines (Table 1).

Table 1. Factum of the number of models of compact sawing machines according to respective producers
Tabela 1. Zestawienie liczby modeli pilarek według poszczególnych producentów

Producer Firma	Number of models Liczba modeli		Number of compact sawing machines Liczba pilarek	
	items – sztuki	percentage procent	items – sztuki	percentage procent
Husqvarna	23	53.49	167	78.77
Stihl	15	34.88	38	17.92
Solo	3	6.98	3	1.43
Dolmar	1	2.33	2	0.94
Oleo Mac	1	2.33	2	0.94
In total – Razem	43	100.00	212	100.00

Assuming the generally applied division of compact sawing machines because of the swept motor capacity it can be observed that medium compact sawing machines of swept capacity of 40-60 cm^3 are prevalent – their share in the total number is over 85%. Large compact sawing machines (over 60 cm^3) constitute over 12%, and small (up to 40 cm^3) – nearly 3% (Table 2).

Table 2. Factum of the swing machines used in size classes according to the swept motor capacity
Tabela 2. Zestawienie użytkowanych pilarek w klasach wielkościowych według pojemności skokowej silnika

Size classes Klasy wielkościowe	Models – Modele		Machines – Egzemplarze	
	number liczba	percentage procent	number liczba	percentage procent
Small (up to 40 cm^3) Małe (do 40 cm^3)	5	11.63	6	2.83
Medium (40-60 cm^3) Średnie (40-60 cm^3)	9	20.93	181	85.38
Large (over 60 cm^3) Duże (pow. 60 cm^3)	29	67.44	25	11.79
Total – Razem	43	100.00	212	100.00

Husqvarna compact sawing machines are used mostly, models 254 XP and 357 XP, which constitute 40% of all used compact sawing machines. Of the total number of 55 plants 42 have both of these models or one of them. 18 plants has both Husqvarna 254

XP and 357 XP (together 50 compact sawing machines). 13 plants use the model HQV 254 XP (20 compact sawing machines) and 11 use HQV 357 XP (16 compact sawing machines). Another type of compact sawing machine used also for logging is HQV 346 XP.

TIME OF USE (AGE) OF THE COMPACT SAWING MACHINES

The conclusion of the analysis of the time period of use of the compact sawing machines is that the most numerous are the compact sawing machines of the age between 1 and 3 years, that constitute a total of 49% (104 machines). The number of the machines staying in use for a longer time is diminishing as their age is increasing. Compact sawing machines aged 4-10 years constitute 44% and the ones older than 10 years are used more rarely (7%).

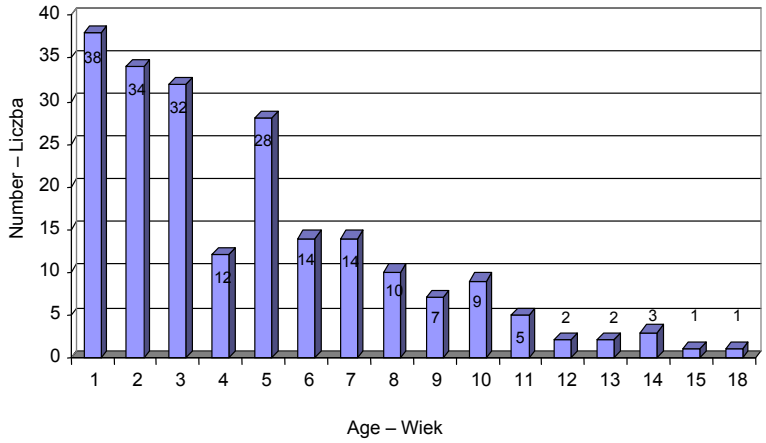

Fig. 1. Time period of use (age) of the compact sawing machines used by the forestry services plants in forest inspectorates Jeleśnia, Myślenice, Sucha Beskidzka
Rys. 1. Okres użytkowania (wiek) pilarek wykorzystywanych w zakładach usług leśnych na terenie nadleśnictw Jeleśnia, Myślenice, Sucha Beskidzka

Average age of all the compact sawing machines examined was about 5 years. The number of compact sawing machines determined as substitute, with destination for backup works in case of a breakdown is small – 12 machines, their average age is 7 years. Average age of the multifunction of compact sawing machines (medium size class) and compact sawing machines used for hard work is 4 years, while for those used for light work only is 6 years.

CONCLUSIONS

1. Assessment of the age of the compact sawing devices was conducted in 65 forestry services plants performing their operations in the area of three forest inspectorates. In total assessment of age for 212 machines has been conducted.

2. Use of 43 compact sawing machines produced by 5 companies was stated. Most of the compact sawing machines – 167 (over 78%) were produced by the Husqvarna company and they are in the equipment of 51 forestry services plants (93%). The most popular models were HQV 254 XP and HQV 357 XP that made a 40% of all compact sawing machines.

3. Among the used compact sawing machines medium ones are the most popular – of swept motor capacity from 40 to 60 cm^3 and power of 2.0 to 3.4 kW, of which there were 181 machines (85%).

4. Average use period (age) of the sawing devices was 5 years. The most numerous group were the compact sawing machines of the age of 1, 2, 3 years (49%). The number of compact sawing machines diminishes along with the increase in the period of use (age) of the machine, and the oldest compact sawing machine in use was produced 18 years ago. Average age of multifunction of compact sawing machines and those used for hard works is 4 years, for the light compact sawing machines – 6 years and for the backup ones – 7 years. A noticeably smaller number of compact sawing machines of 4 years of age was registered, which can be explained by the recession present in the forestry in 2001.

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STRUKTURA WIEKOWA PILAREK UŻYTKOWANYCH PRZY POZYSKIWANIU DREWNA

Streszczenie. Pilarki spalinowe należą do najpowszechniej używanych maszyn w procesie pozyskania drewna. Ich stan techniczny w znacznym stopniu wpływa na bezpieczeństwo pracy i jest zależny od okresu użytkowania pilarki (wieku). Badania 212 maszyn użytkowanych w 61 zakładach usług leśnych dowiodły, że ich średni okres użytkowania wynosi 5 lat.

Słowa kluczowe: pilarka, wiek, stan techniczny

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