

**МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ БІОРЕСУРСІВ І
ПРИРОДОКОРИСТУВАННЯ УКРАЇНИ
ІНСТИТУТ МЕХАНІКИ ТА АВТОМАТИКИ АПВ НААН
ДЕРЖАВНИЙ БІОТЕХНОЛОГІЧНИЙ УНІВЕРСИТЕТ**



***ЗБІРНИК
ТЕЗ ДОПОВІДЕЙ***

***X Міжнародної науково-технічної конференції з нагоди
116-ї річниці від дня народження
доктора технічних наук, професора,
члена-кореспондента ВАСГНІЛ,
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«КРАМАРОВСЬКІ ЧИТАННЯ»

***23-24 лютого 2023 року
м. Київ***

Machinery & Energetics. Journal of Rural Production Research. Kyiv. Ukraine. 2021. Vol. 12. No 4. P. 129-138. <http://dx.doi.org/10.31548/machenergy2021.04.129>.

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УДК 631.001.04

GRAIN LOSSES AT THRESHER AND GRAIN PURITY IN BUNKER OF GRAIN HARVESTER

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The main indicators of the quality of work of grain harvesters are the total loss of grain after the thresher and the cleanliness of the grain in the hopper (Fig. 1). Losses of grain during threshing and separation are divided into direct, or irreversible, and indirect [1]. The first includes grain lost in one way or another that cannot be collected, the second includes grain that has lost its sowing, productive or bread-making qualities [2]. During harvesting and postharvest processing, the grain is subjected to mechanical action, as a result of which it is injured. Mechanical damage (macro- and micro-damage) negatively affects both seed and food grains [3].

Macro damage includes crushed, flattened and crushed grains [4]. Microdamages include grains with damaged germ, shell, and endosperm, as well as hidden internal defects such as dents, clogged areas, and cracks [5].

Grains with macro damage are usually few. The number of grains with microdamages sometimes reaches 50–80% or more, which sharply reduces the quality of seed, marketable, baking, and other grains. 0.5 tons of rye, 0.3 tons of spring barley, 0.2 tons of spring wheat, 0.6 tons of oats, and 0.8 tons of corn are not

harvested from 1 ha of injured seeds. Therefore, every 10% of damaged seeds as future seeding material reduces productivity by an average of 0.1 t/ha.



Fig. 1. Combining grain.

Damage to grain during threshing, separation and transportation depends on many factors. These include: physical and mechanical properties of the threshed mass; parameters and design features of threshing and separating devices of combines; technological regulation and mode of operation of the main mechanisms of the harvester, especially threshing and separating devices, technical condition of parts, etc.

The threshing and separating device is the main working body of the threshing machine of the grain harvester. The execution of the technological process and other working organs of the thresher depends on the quality of its work. Based on the results of research, it was found that up to 60–70%, and this is the main share of injury to grain material, is caused by threshing and separating devices. Depending on the design features of the threshing-separating devices, modern grain harvesters are divided into three main types: combines with a classic scheme of threshing-separating devices, rotary and combined types of combines.

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УДК 631.001.04

EFFICIENCY OF GRAIN HARVESTER WITH CLASSIC SCHEMETHRESHING-SEPARATION DEVICE AND WITH AXIAL-ROTOR TYPE

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Combine harvesters with a classic threshing-separating device scheme have gained the greatest distribution throughout the world. Characteristic features of this type of threshing-separating device are the presence in the design of a ball or pin threshing drum and a keyboard straw shaker. Due to the structure of the straw shaker, combines with a classic threshing-separating device scheme are also called keyboard combines.

Threshing of the bread mass in the threshing-separating device of the classical type is carried out due to impacts and wiping of the bread mass, which moves tangentially in the gap between the drum and the drum. Part of the grain, together with chaff and small impurities, falls through the drumming grid and is directed to the sieves of the grain cleaning system, and the threshed mass, which still has a lot of grain, moves further and enters the straw shaker keys. As a result of the reciprocating