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ANALYSIS OF CHIP SEPARATION METHODS

АНАЛІЗ МЕТОДІВ ВІДДІЛЕННЯ СТРУЖКИ

Chasov D. P. **Часов Д. П.**
Candidate of Technical Sciences, Associate Professor,
Associate Professor at the Department of Mechanical Engineering and Welding Technology
Dniprovsk State Technical University
кандидат технічних наук, доцент,
доцент кафедри технології машинобудування та зварювання
Дніпровський державний технічний університет

Beyhul V. O. **Бейгул В. О.**
Candidate of Technical Sciences, Associate Professor,
Associate Professor at the Industrial Engineering Department
Dniprovsk State Technical University
кандидат технічних наук, доцент,
доцент кафедри галузеве машинобудування
Дніпровський державний технічний університет

Bobrov V. V. **Бобров В. В.**
Postgraduate Student at the Department of Mechanical Engineering and Welding Technology
Dniprovsk State Technical University
Kamianske, Dnipropetrovsk region, Ukraine
аспірант кафедри технології машинобудування та зварювання
Дніпровський державний технічний університет
м. Кам'янське, Дніпропетровська область, Україна

One of the new, promising directions in mechanical engineering is the complex mechanization of chip transportation from the cutting area of the machine to the area of its processing and briquetting.

Unfortunately, the domestic industry lacks effective equipment for transporting and processing chips, which would ensure an economical processing process with minimal overall dimensions and energy consumption.

The problems of transporting chips and the cutting zone, separating oil from chips, and cleaning oil from chips became especially acute in the current period, the period of the creation of gear cutting machines of a new range with a fully automatic work cycle. Existing and proposed installations for transporting chips from the cutting area of the machine, separating and cleaning oil from metal impurities have a complex device, are bulky, have low productivity, a short service life and, most importantly, have a significant energy consumption. We will analyze the most common methods of separating liquids from mechanical impurities in the form of chips and sludge.

The most common method of separating chips from the lubricating and cooling liquid in domestic and foreign practice is the gravitational settling of chip particles in settling tanks and their subsequent removal from the bottom by scraper-type conveyors.

The use of scrapers has a negative effect on the surface of the gutter. Also, this structure has significant dimensions and carries an environmental hazard (infusion of biologically active substances). The technological implementation of this installation requires a powerful drive, which must move the settled particles of chips and sludge.

The periodic chip separation system includes a tank in which a mesh filter is installed, has the following disadvantages:

– periodicity of the separation process;
– low degree of cleaning of liquid from chips;
– high complexity of system maintenance;
– low level of culture and production aesthetics.

The installation for separating contaminated liquid from shavings with a strip filter consists of a container that has a scraper conveyor, a pumping station, a point for feeding the mixture and unloading cleaned shavings from the container.

The disadvantages of this installation include:

– high cost of installation;
– complex automation system;
– large dimensions;
– high labor intensity of the process of cleaning the shadow areas of the container from chips and sludge;

– elements of the scraper conveyor work in a liquid environment, which complicates the repair conditions and worsens the operational characteristics of the installation.

In domestic practice, the issue of cleaning chips from liquids has not yet been resolved at machine-building plants. In order to increase the metallurgical value of shavings as a secondary raw material and increase income due to the sale of shavings, it is advisable to work on the development of effective equipment for cleaning shavings at enterprises of large series and mass production.

Uncleaned metal shavings are sold at reduced prices, causing huge damage to both the enterprise and the state as a whole. From the domestic equipment for cleaning liquids from chips, imperfect types of equipment are used. On the basis of the above, there is a need to create effective equipment to solve tasks related to preliminary processing and cleaning of chips.

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