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**ALUMINIUM WASTE IN ECONOMIC AND ECOLOGICAL SAFETY
MANAGEMENT AT METALLURGICAL AND MACHINE-BUILDING
ENTERPRISES**

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Abstract. The production of recycled aluminium alloys significantly contributes to sustainability, transition to low carbon production and circular economy. The apparatus of waste management and handling of aluminium waste at machine-building enterprises and enterprises of secondary metallurgy of Ukraine was analyzed. It was established that the relatively low quality of recycled alloys is mainly a result of waste sorting methods imperfections.

Key words: aluminium scrap, sorting, recycling, secondary alloys, ecological and economic safety.

Management of aluminium waste is one of the priority directions for the development of economic and environmental safety of powerful industrial enterprises of Ukraine. The importance of secondary resources in modern conditions is growing significantly, because they are the basis of ensuring sustainable development and are included in the main provisions of the circular economy, and their use allows both to increase the economic effect of the enterprise's economic activity and to reduce the environmental impact. According to the legislation [1], waste is any substance, material or object that was formed in the process of production or consumption, as well as goods (products) that have completely or partially lost their consumer properties and have no further use in their place formation or detection and which their owner gets rid of, intends to get rid of or must get rid of by disposal or removal.

From an economic point of view, “waste” can serve as the secondary material

resource as well as can be defined as losses that were not / cannot be recycled; an economic resource that is formed as a result of economic activity as a by-product that directly or indirectly affects the environment and may / may not be reused (recycled) by the enterprise on which it was formed or by an enterprise that provides waste management services, which leads to economic relations that allow obtaining economic and environmental results [2].

The scheme of waste management of aluminium at metallurgical and machine-building enterprises is shown on the fig. 1.

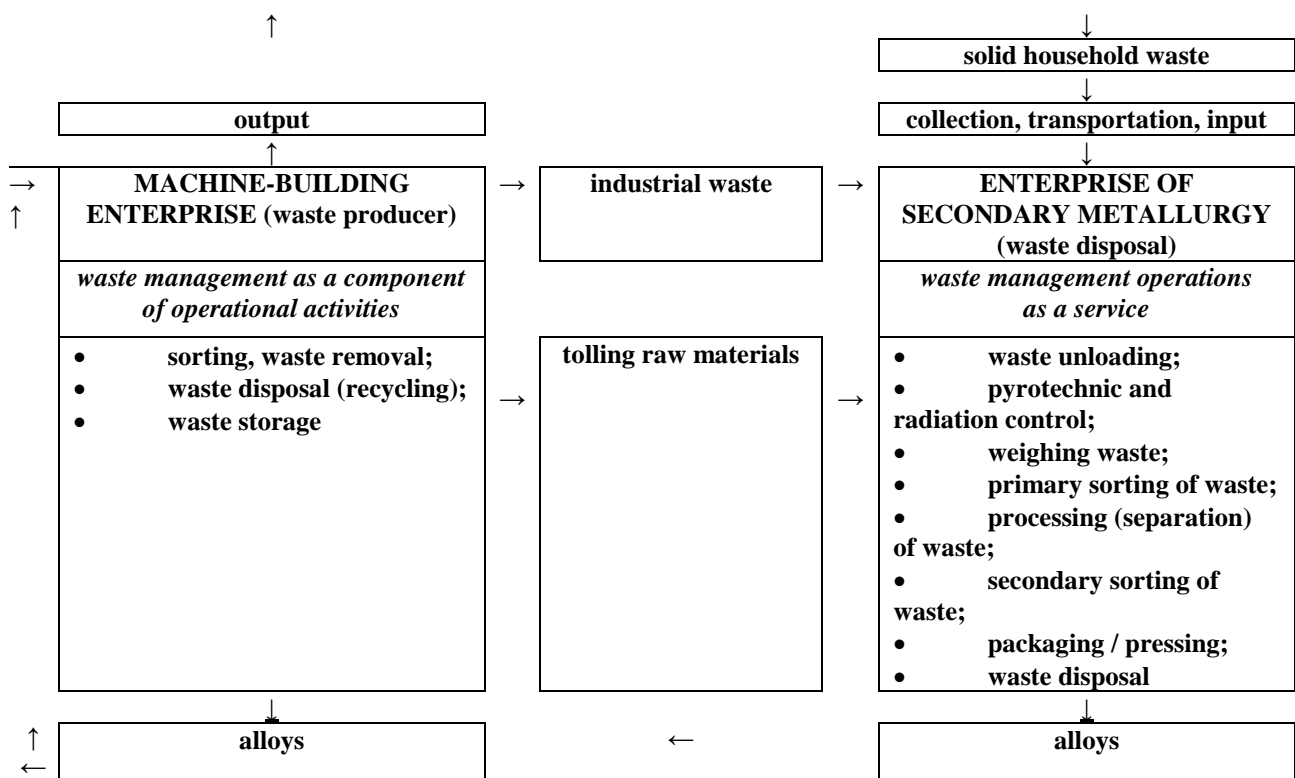


Fig. 1. Aluminum waste management

The main suppliers of aluminum waste are enterprises of the machine-building complex and the population. Industrial waste includes amortization scrap, which is formed during the modernization of equipment and tools; waste from the production of rolled products (shavings, scraps, scum); casting waste products (slags, trimmings, garbage, etc.); mechanical processing waste (offcuts, shavings, sawdust); slags, ashes, sludge, etc. Municipal waste consists of waste from households, including packaging, waste electrical and electronic equipment, large-sized waste, waste from the infrastructure of the settlement (does not include end-of-life vehicles, construction

and medical waste).

Waste is usually mixed with alloys of different marks and purposes, contains a wide range of alloying elements and metal impurities, as well as contaminated with grease and lubricating materials, non-metallic structural materials etc. As a result, different alloying elements and harmful impurities are present in the scrap which determines relatively low quality of secondary aluminum alloys. Most of enterprises of secondary metallurgy of Ukraine cannot provide high quality of secondary aluminium alloys due to the imperfection of waste sorting methods. It is also important to dispose aluminum production waste directly at machine-building enterprises within the framework of extended producer responsibility.

According to [3] if the current practice of systematic downcycling is maintained, the collected amount of aluminium scrap will soon exceed the capacity of wrought and cast alloy production to absorb the secondary aluminium. The research estimates that a scrap surplus will emerge in the coming years and that its size will grow to 5.4 million tonnes in 2030 and to 8.7 million tonnes in 2040. Without counter measures (in particular, in improving of aluminium waste sorting), this will necessitate an additional increase in primary aluminium production, which has a highly negative economic and environmental impact.

LITERATURE

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