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# DEVELOPMENT OF METHODS FOR REDUCING THE VOLUME OF ASPIRATION DURING OVERLOADS OF GRANULAR MATERIALS BY BUCKET ELEVATORS

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Aspiration is one of the most effective methods that have been used to control dust in conveying free-fl owing materials [1-2]. As the power of technological equipment increases, there is an increase in the power intensity of aspiration systems and in the loss of the free-flowing material in extracting dusted air from aspiration shelters. The requirement arises to attain the highest sanitary-hygienic effect with less expenditures. The most common methods for decreasing energy consumption by aspiration is decreasing the volumes of air penetrating through leaks and the volumes of air ejected by the stream of the free-fl owing material [3- 4] by organizing ejected air circulation in the charging chute.

The purpose of this article is developing the methods of reducing the induced air volume and analyzing the numerical calculations of transloading nodes of loose materials in bucket elevators.

Aspiration volumes in the classical aspiration layout for elevator handling of grain are determined by balance equations. Basic components of both equations comprise volumetric flow rates of air entrained into aspirated cowls through leaking joints and process openings by the negative pressure (maintained inside cowls by an aspiration unit) and flow rates of air transferred in ducts.

Flow rates of transferred air may be determined using algorithms devised by solving combined non-linear equations with a joint use of iteration and bisection methods.

Regularities of air cross-flow and circulation patterns in conveyor-to-conveyor grain handling with a bypass duct connecting the inner chamber of a double-walled cowl with the cowl of the driving drum can be studied using equations for pressure losses in ducts and air flow rate balance equations for cowls and junction points. Analysis of these regularities has shown that efficient operation of the bypass duct requires negative pressure inside the cowl of the upper unaspirated conveyor to exceed the negative pressure in the buffer (inner) chamber.

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