

#### 4. Determining the level of dustiness in the grain harvesting elevator

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**Introduction.** Dust, formed during the passage of the process, differs in its characteristics, but any dust is dangerous and harmful production factor and has negative impact on the human health.

**Materials and methods.** Determination of dust in the air of the working area is held by gravimetric method, the essence of which is to determine the difference in mass of the filter before and after passing through it determined volume of air. Air is drawn through the filter АФА-10 using electricity aspirator ЭА-3-20. Dust concentration determined in  $\text{mg}/\text{m}^3$  by calculation method.

**Results and discussion.** The grain harvesting enterprises, including elevators, have increased danger of the dust releasing into the environment. Even in normal operation of the enterprise grain dust has explosive concentration and easily passes from airtight in aerosol with the aerosol is explosive hazardous and aerogels – fire hazardous. Moreover, the elevator is formed not only grain dust, but also flour, which is smaller in size and more dangerous. In grain processing enterprises grain dust formed by any movement of grains in space or processing as a result of friction between grains or contact with a hard surface, strike, pouring, compression and more. These losses leading to the weight loss and bring the damage to the enterprise [1].

In the elevator of storage rye and wheat resulting from the technological operations with grain was received such dust concentration depending on the sampling: on the floor of elevators heads the dust concentration is  $80 \text{ mg}/\text{m}^3$  on the floor with weights and grain cleaning separators – by 240, on the grain oversilo floor – 90, and on the undersilo – 130. Most dust is formed during weighing the grain by grain strike of the surface and weights during cleaning on the separator of mechanical action (oscillatory motion). Also dangerous concentrations of dust were embossed when the grain was poured out of silo on a conveyor belt of undersilo floor.

The greatest amount of dust is released during transportation, unloading/loading operations, pouring from the previous to the next section of the technological process – that is, at the transition from one to another technological operation, as well as cleaning.

To reduce the dust emissions into the air the technological and transport equipment make the most closed, although to achieve complete sealing is impossible [2].

Workers what constantly being in dusty areas must use individual respiratory protection – respirators and masks.

**Conclusions.** So, at the elevator dust formed during all operations with the grain, the largest number – during the cleaning and unloading grain of the silos. Even small concentrations it is an explosion and fire hazardous and threatens to the life and health of peoples.

#### References

1. O. Dufaud, M. Traore, L. Perrin, S. Chazelet, D. Thomas, Experimental investigation and modelling of aluminum dusts explosions in the 20 L sphere, *J. Loss Prev. Process Ind.* 23 (2010) 226–236.
2. R.K. Eckhoff, *Dust Explosions in the Process Industries*, 3rd ed., Gulf Professional Publishing, 2003.