ANALYSIS OF AIRFLOW IN THE PIPE IN PNEUMATIC CONVEYING SYSTEMS

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Abstract. It is the aim of this article to examine and analyze the air flow and velocity in the pipe when seed cotton is being transported by air. There is a discussion in the article about how seed cotton, as it moves through the pipe, affects both the air flow rate and velocity in the pipe during its passage. The investigation revealed that the air flow in the pipe is variable, thus many tests were carried out to get it to move consistently. Air flow affects the seed cotton and the pipe, reducing pressure and speed and increasing consumption.

Keywords: Pneumatic systems, seed cotton, airflow, velocity, volume, resistance, friction.

Introduction. The obtained equations are used in the example of VS-10M and VS-12M ventilators used in the cotton industry. was analyzed using the Maple 2020 program on the computer at different values of the nominal pressure $R_n = 5\ kPa$ and $6\ kPa$; $d_q = 0.4\ m$ and $d_v = 0{,}6\ m$and. K The change of dynamic and static pressures obtained as a result of the analysis along the length of the pipe are presented in Figures 1 and 2. `

we can observe that the dynamic pressure does not change along the length of the pipe, therefore, it is high at large values and low at low values. K_b

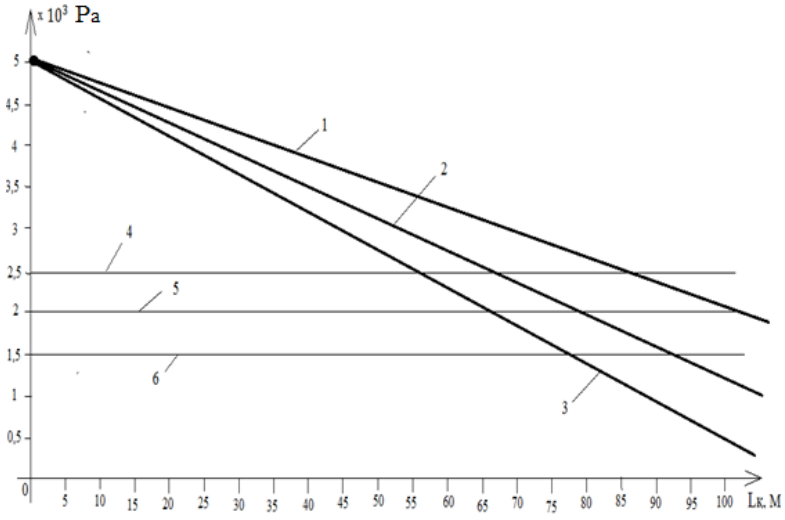

Figure 1. Distribution of dynamic and static pressure along the pipe length *(in the case of the VS-10 M fan)*

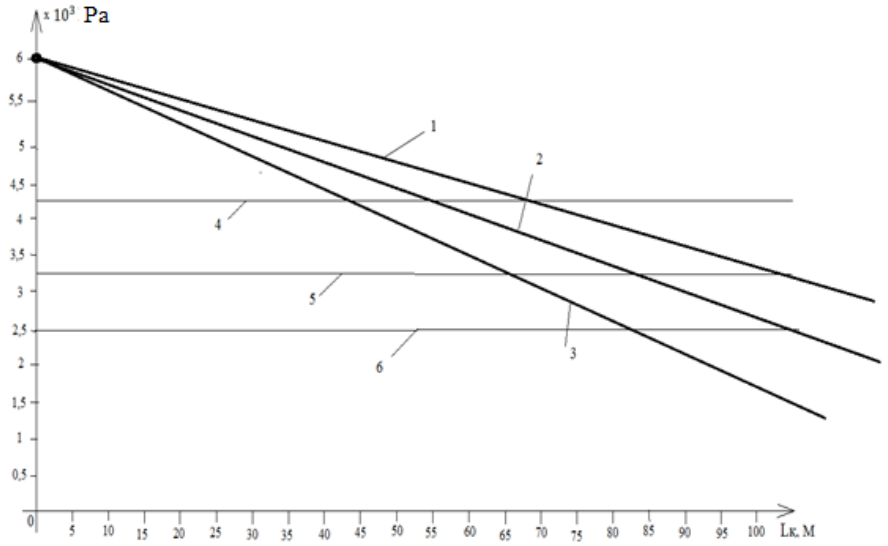

Figure 2. Distribution of dynamic and static pressure along the pipe length (in the case of the VS-12 M fan)

Furthermore, a high-power fan creates greater dynamic pressure than a low-power one, which is also logical. The static pressure in front of the fan is equal to its nominal pressure, decreases with lower intensity at large values of the coefficient of transverse forces, and increases with higher intensity at small values from the front of the fan towards the pipe head. Similar to dynamic pressure, high-powered fans produce high static pressure, and low-powered fans produce low static pressure. During our practical studies, we also observed this situation in accordance with laws of aerodynamics. Also, the aerodynamic force generated in the pipe changes according to the same laws. When we consider the equation of change of this force, it changes depending on the values of dynamic and static pressure in the pipe. When this force is greater, then the equipment is more capable of transporting material via pneumatic transport. The greater the force, the better the equipment works.

Conclusion. Temperature or changes in air density caused by moisture or other external influences cause changes in air pressure. To facilitate process analysis in theoretical works, the concept of air tension coefficient was proposed and it represents the ratio of real air density to the nominal density of atmospheric air in that area. Based on the analysis of the influence of the fan parameters on the air pressure and consumption indicators, alternative forms of dynamic and static pressure and air consumption expressions have been developed that give results closer to the actual values, and according to them, it is possible to observe that the

dynamic pressure does not change along the length of the pipe.The static pressure in front of the fan is equal to its nominal pressure and decreases with different intensities from the front of the fan to the pipe head.

References

[1]Sarimsakov O. , Isaev Sh., Sultanov O., Goybnazarov E. Theoretical Features of the Process Cleaning Zone between Sections of Raw Cotton from Weed Impurities // Engineering, 2020, 12, 739-747 (Web of Science),

[2]Sharipjanovich, S. O. Yo'ldashev Xasanboy Sulaymon O'gli. Sharipov Xayrullo Numonjonovich, Madumarov Sanjarbek Rustamjonovich, INVESTIGATION OF SEPARATION OF USABLE FIBERS ADDED TO CONTAMINANTS DURING CLEANING COTTON "O 'ZBEKISTONDA FANLARARO INNOVATSIYALAR VA ILMIY TADQIQOTLAR" JURNALI.

[3]Sharifjanovich, S. O., & Khamidovich, K. A. M. (2023). Increasing the efficiency of fiber cleaning by improving the process of removing cotton fiber from the teeth of the saw. *Multidisciplinary Journal of Science and Technology*, *3*(5), 346-349.

[4]Xasanboy, Y., & Azamjon, D. Theoretical Analysis of storing, cleaning, processing of seed cotton. *Scientific Journal Impact Factor*.

[5]Йўлдашев, Ҳ. С., Инамова, М. Д., Саримсаков, О. Ш (2023) АРРА ТИШЛАРИДАН ПАХТА ТОЛАСИНИ ЕЧИБ ОЛИШ ЖАРАЁНИ ПАРАМЕТРЛАРИНИ ИЛМИЙ АСОСЛАШ. "ILM-FAN VA INNOVATSION RIVOJLANISH" xalqaro ilmiy-texnikaviy jurnal, 6(6) 84-95

[6]Numonjonovich, S. X., Rustamjonovich, M. S., & Sharipjanovich, S. O. (2022). INVESTIGATION OF SEPARATION OF USABLE FIBERS ADDED TO CONTAMINANTS DURING CLEANING COTTON. *O'ZBEKISTONDA FANLARARO INNOVATSIYALAR VA ILMIY TADQIQOTLAR JURNALI*, *1*(8), 488-493.

[7]Abdukarimovich, Najmitdinov Shuxrat, and Yuldashev Khasanboy Sulayman o'g'li. "Тола ажратиш жараёнида хомашё валиги зичлиги ва тезлигининг аҳамияти ўрганиш ва таққослаш." *TECHNICAL SCIENCE RESEARCH IN UZBEKISTAN* 1.5 (2023): 250-256.

[8]Jurayev, Y., Yuldashev, K., & Tuhktaev, S. (2022). Investigation of fiber loss in impurities from the ss-15a separator. *Евразийский журнал академических исследований*, *2*(11), 425-431.

[9]Sarimsakov, O., Yuldashev, K., Tuxtaev, S., Urinboyev, B., & Xoshimov, U. (2023, June). Methodology for performing aerodynamic measurements in cleaning seed cotton. In *AIP Conference Proceedings* (Vol. 2789, No. 1). AIP Publishing.

[10]Ibrohim, M., & Xasanboy, Y. (2021). Theoretical analysis of the motion of raw cotton with uniform feeder in a cotton cleaner. *The American Journal of Engineering and Technology*, *3*(01), 13-20.

[11]Yuldashev, K. S., Abduraximov, K. A., Inamova, M. D., & Mirgulshanov, K. A. (2021). DEVELOPMENT OF THE DESIGN OF A FEEDER OF VIBRATION ACTION FOR SUPPLYING COTTON SEEDS TO LINTER MACHINES. *SCIENCE, EDUCATION, INNOVATION IN THE MODERN WORLD, USA*.

[12]Sharipjanovich, S. O., & Maripjanovich, K. D. Yo'ldashev Xasanboy Sulaymon O'gli, Jurayev Yo'ldashxon Yunusxon O'g'li, INVESTIGATION OF LOSING FIBER DURING CLEANING COTTON.«Zamonaviy dunyoda amaliy fanlar: muammolar va yechimlar» nomli ilmiy, masofaviy, onlayn konferensiya, May 18, 2022.

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