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THE INFLUENCE OF SOME GEOMETRICAL PARAMETERS OF CYLINDER SIEVES OVER THE VOLUMETRIC RANKING EFFICIENCY

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ABSTRACT
Theoretical,any installation for volumetric ranking is suppose to realise the condition of sifting optimal,this meas the perpandicular movement of the material to the surface.The main factors that have a great influence to realise this cindition are:rotation of the sieve,load flow of material,the grain geometry ,the sieve geometry and the inclination of the sieve. Keeping steady the values of rotation of the sieve,load flow of material, grain geometry and sieve geometry it is made a series of experiments that highlight the influence of the inclination of the sieve over the volumetric ranking efficiency

1. THE MATERIALS USED IN RESEARCH [1],[2]

For this research were used as follows:

- A pilot installation tested in normal operating conditions for volumetric ranking research
- Dredged sand, with average grain size (M50) 0.2, semi-fine grained (experimentally determined).

Figure 1. Pilot plant research

2. THE INFLUENCE OF ROTOR TILT ANGLE ON VOLUMETRIC RANKING EFFICIENCY [1,2]

It is considered ranking efficiency ratio of the quantity of material that passed through the area classification (allowed) and the amount of material that could pass through the area classification (allowed + refused material).

Experimentally it was demonstrated that the rate of material loading has a direct influence on volumetric ranking efficiency. If the values of load flow are increasing , the values of ranking efficiency is lower.

Also, rotor speed has a major influence on volumetric ranking eficiency. As the speed is greatly the ranking efficiency values are increasing until a certain critical speed when centrifugal forces are opposing and block the material on sieve surface. These influences are shown graphically in Fig.2 and Fig.3.

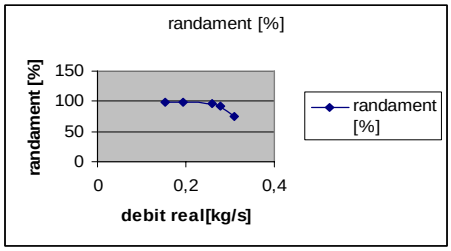

Figure 2. The link between flow and volumetric efficiency of ranking, turned into a graphic

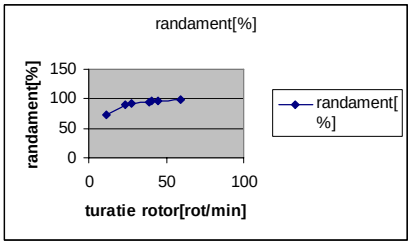

Figure 3. The link between speed and volumetric ranking efficiency, turned into a graphic

An important factor who is directly related to ranking efficiency is rotor tilt angle,or the inclination of rotor surface used for material ranking.

It was made research about it on a pilot plant, with a cylindrical rotor, rotating with a constant speed. Olso the load flow values have constant values.

Table 1. Ranking efficiency variation depending on the angle of inclination of the rotor shaft,rotor rotation and load flow of material

Test data /Inclination of the rotor shaft	UM	0^0	5^0	10^0	15^0
Ranking efficiency (load flow =0.083kg/s;si Rotor speed 24 rot/min)	%	99.98	98.29	95.93	92.73
Ranking efficiency (Load flow =0.259kg/s;si Rotor sped 33 rot/min)	%	86.01	81.05	80.92	80.44
Ranking efficiency (Load flow =0.31kg/s;si Rotor speed 49 rot/min)	%	93.39	83.31	76.25	75.70

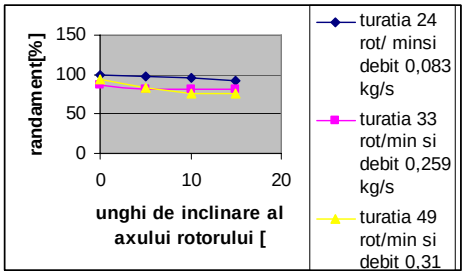

Figure 4. The connection between the angle of inclination of the rotor shaft and bolting volumetric efficiency, transformed into graphics.

In the research it was made a series of determinations for volumetric ranking efficiency who show the influence of inclination angle of the rotor , load flow and rotor speed control. Experiments were done keeping constant load flow of material or rotor speed.

Table 2. Ranking efficiency variation depending on the angle of inclination of the rotor shaft, and rotor rotation , with constant value of load flow=0,295kg/s

Rotor speed[rot/min] /Inclination of the rotor shaft	UM	0^0	5^0	10^0	15^0
31	%	91,78	87,76	84,45	83,77
41	%	95,00	84,85	83,12	82,15
49	%	95,67	94,88	84,71	83,25

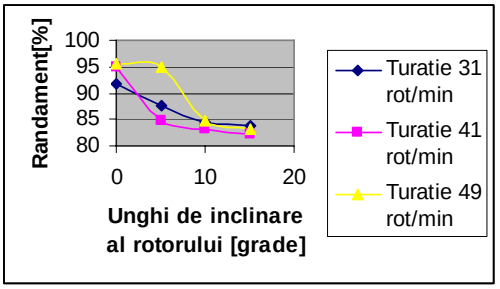

Figure 5. Ranking efficiency variation depending on the angle of inclination of the rotor shaft,and rotor rotation , with constant value of load flow=0,295kg/s,transformed into graphic

Table 3. Ranking efficiency variation depending on the angle of inclination of the rotor shaft, load flow, with constant value of rotor speed=31 rot/min

Load flow [Kg/s]/Inclination of the rotor shaft	UM	0^0	5^0	10^0	15^0
0.083	%	98.85	97.67	95.51	93.45
0.1548	%	98.56	96.32	93.49	90.31
0.1945	%	94.08	92.30	90.33	87.88

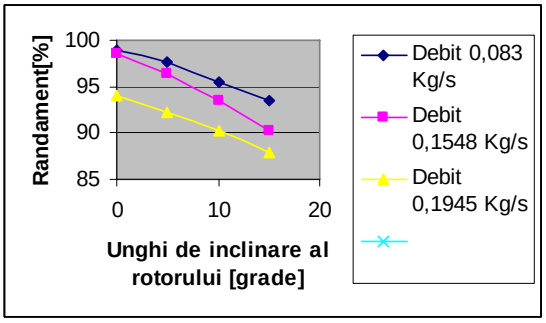

Figure 6. Ranking efficiency variation depending on the angle of inclination of the rotor shaft,load flow, with constant value of rotor speed=31 rot/min,transformed in graphic

Analyzing the experimental data, presented in tabels 1,2,3 the following conclusion emerges: inclination angle of the rotor ranking surface has a direct influence on volumetric ranking efficiency. The results are decreasing with increasing tilt angle of the rotor shaft.

Also it can be seen the connection of ranking efficiency with the rotor speed and load flow of material ,the connection which should be further established.

3. REFERENCES

[1] Constantinescu Al.: "Utilaje pentru turnatorii" Vol I,Universitatea Transilvania din Brasov,1977
[2] Buzila S.: Proiectarea si executarea formelor,Editura Didactica si Pedagogica Bucuresti,1976
[3] Apostu E.D.: Proiectarea, constructia si exploatarea utilajelor pentru clasare.Contributii personale Referat doctorat, Universitatea "Transilvania" Braşov,2009