Some basic factors affecting screen performance in horizontal vibrating screens

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Abstract

- The objective of the work was the study of some basic factors affecting the performance of the horizontal vibrating screens.
- The main objective was the determination of the optimum operational conditions for the horizontal vibrating screens.
- The study was focused on the basic factors that affect screening efficiency E (cumulative undersize recovery), under constant feed rate for each screen aperture.

The factors examined were:

- The intensity of vibration ($2\varepsilon v$)
- The percentages of the characteristic size-fractions (critical size, critical undersize and oversize, half-size and oversize material) in the feed
- The screen length **L**
- The size of the screen aperture **a** in conjunction with the above mentioned factors.

Results and Conclusions

- The screening efficiency E increases asymptotically with the screen length L and the relationship between them was found to be:

$$E = 1 - \exp(-L/AL+B) \qquad (0 < E < 1)$$

  - where, A and B parameters (B > 0), depending on the screen aperture **a** and the intensity of vibration **(2εv)**
- **Increasing** the intensity of vibration, **increases** the screening **efficiency E** for screen length less than L/2
- For screen apertures 2.0 mm (feed size -4.0 mm), 1.0 mm (feed size -2.36 mm) and 0.6 mm (feed size -1.4 mm) the **most important factor** determining the efficiency E is the vibration frequency **v**, while for the screen aperture of 4.0 mm (feed size -9.5 mm), are the frequency and also the amplitude (**2ε**)
- The percentage of the critical oversize (particles of size **a** < d < 1.41**a**) in the feed is **more important** for the **efficiency E** than that of the **critical undersize** (0.71**a** <d< **a**)
- **Reduction** of the critical size material in the feed **improves** the **efficiency E** more drastically with coarse screen apertures than with fine ones
- For coarse screen apertures the **reduction** of the critical oversize of the feed **improves** significantly the **efficiency E**, while for fine apertures the improvement is negligible.