PMP *CLASS* 10

Evaluating Classification Processes with Tromp Curves

Experimental data from classifiers can be evaluated and documented comprehensively by means of PMP *Class 10.* Expressive relations can be established and represented by convincing diagrams. The prediction of the coarse and fine product of a classification is also supported.

PARTITION NUMBERS AND TROMP CURVES

The classification process is described in an operating state by partition numbers regarding an arbitrary subdivision of the particle size range into size classes. These values are determined by means of balancing calculations using analysed particle size distributions and measured mass flow values. Diverse calculated characteristic values can be considered for evaluation (see Fig. 1).

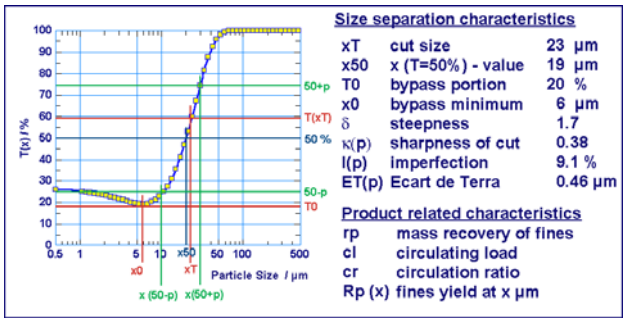

Fig 1: Partition number curve with important characteristic values

CALCULATION FROM EXPERIMENTAL DATA

Tromp curves can be calculated from experimental data using

- the information on the particle size distributions Q(x) of two material flows with known mass proportions (see Fig. 2)
- the Q(x)-Distributions of 3 material flows with unknown mass proportions (see Fig. 3)

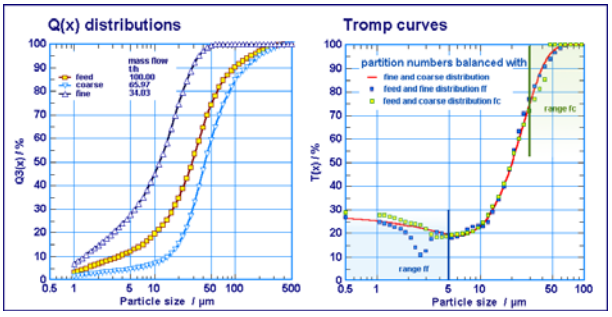

Fig 2: The partition numbers on the right can be determined via 3 combinations with two distributions each, from over-determined investigations (left graphic). The calculated partition numbers from the classifier feed + fines as well as from feed + coarse can lead to an unreal tromp curve. The reason for this is the high sensitivity to small deviations in the lower or upper particle size range. Calculations based on the classifier fines and coarse (red curve) don't cause such problems.

The approximation using a modification of the ***PLITT-Function*** will lead to a smooth course of the tromp curve. This specific approach enables to reflect the fish hook shape of the tromp curve in the lower particle size range.

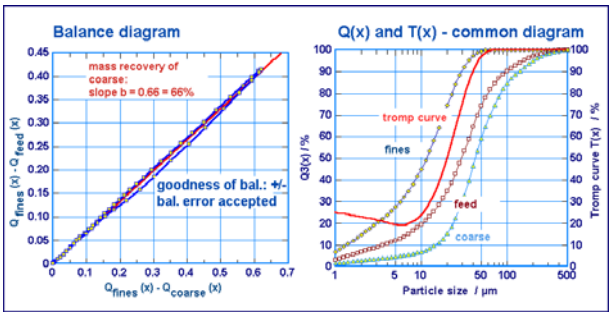

Fig. 3: A balance diagram on the left and the common presentation of the Q(x)-Distributions and tromp curves on the right. The slope of the fitted straight line in the balance diagram determines the mass recovery of the coarse product. The balance quality indicates the contradictions involving in the initial information.

The PMP template concept efficiently supports the application of regular performed investigations and of systematic process analyses as well.

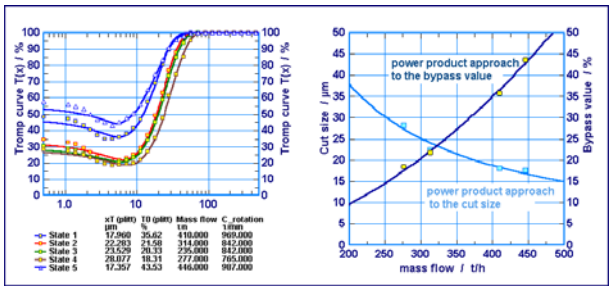

Fig. 4: Evaluation of a systematic process analysis

APPLICATION

Apart from the evaluating experimental data, module **CLASS 10** also supports the utilisation of the tromp curve for predicting separation products. As an example, errors arising through balance calculations and function approximations can be estimated by means of such simulation calculations.

In connection with presetting a tromp curve via the Plitt-Function, process characteristic fields and ideal process states can be easily calculated.

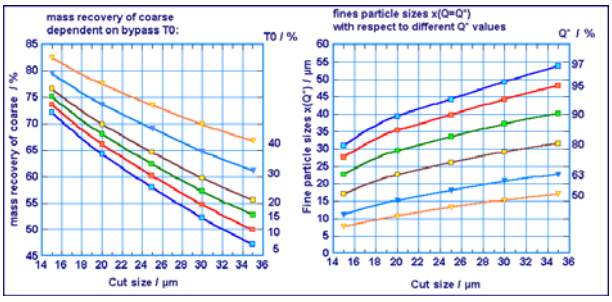

Fig. 5: Characteristic field for the coarse recovery depending on the cut size and the bypass value (left graphic). The right graphic illustrates the course of different characteristic particle sizes of the fine product with a changing cut size of the classifier.

Describing by means of the tromp curve serves as basis for further modelling steps of the classification process (see **CLASS 20** and **CLASS 30**).

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