IbD - Case Study 3 Process Intensification applied at Mineral Beneficiation

Project:
Intensified by Design® for the intensification of processes involving solids handling

The IbD Project has delivered the EU process industry with an affordable and comprehensive devices-and-processes design-platform endeavoured to facilitate process intensification (PI), which specially targets -but is not limited to- solid materials processing. Five PI industry case studies have been implemented in mining, ceramics, pharmaceutical, non-ferrous metals and chemical processes using the IbD approach and to validate the IbD methodologies, tools, PI modules, control and fouling remediation strategies and the ICT Platform itself for the industrial implementation of PI in processes involving solids. The Platform includes design modules for the commonest intensified reactors-Rotating fluidized beds, micro-structured reactor and spinning disk, among others, as well as a generic Module Builder -equipped with a set of both proprietary and third-parties design tools- for designs carried out on the basis of radically novel ideas. The IbD Platform output is basically a data set that comprises the intensified reactor design -ready to be built or assembled-, an optimised whole process design including the upstream/downstream intensified unit operations and their solids handling capability, as well as cleaning methods, etc. and the expected economic and environmental quantitative impacts.

Project website: http://ibd-project.eu/ This project has received funding from the European Union's Horizon 2020 research and Innovation programme under grant agreement No **680565**

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Sector:

Minerals

Summary:

Mineral beneficiation processes chain incorporate several unit operations operated in continuous manner. In the crushing line the solid material (typically ore) is comminuted to the particle size of centimetre scale. In grinding line, water is added and the particles are processed further into micrometer scale using grinding mills. In this stage, the particles are classified and directed to downstream processes. Finally, the valuable material is recovered in flotation line, where chemicals

and physical phenomena are utilized to separate the concentrate from the gangue.

Theme:
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IbD Project

Brief description of PI technology chosen:

The intensification in this case study utilized several PI technologies; a coarse flotation device (or flash flotation), model predictive control (PAT tool), Raman spectrometer, bubble size measurement, particle tracking measurement and electrical resistance tomography (PAT tools), and dynamic modeling and adaptation (PAT tools).

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