Summary

Over the last four decades total seaborne trade estimates have quadrupled. The part of bulk material continuing to account for the largest share (66%) of the total trade. This growing global trade of bulk material is reflected in the sector for bulk handling equipment by steep rises in incoming orders.

Selection of bulk handling equipment depends largely on bulk material properties (particle size, size distribution, shape, etc), capacity demand (TPH) and investment versus operational costs (maintenance, energy demand, etc.).

Five major working fields (bulk material handling industries) are formulated; mining industry, building industry, chemical industry, agricultural industry and waste material industry. Furthermore, different types of bulk handling equipment (equipment groups), based on the nature of handling; *transportation*, *processing* and *transferring & storing* or environmental issues, have been formed.

Within each equipment group the most used, remarkable or ' state of the art' pieces of equipment have been described in terms of working principle, working field, energy consumption and advantages and disadvantages. For the equipment groups *transportation equipment*, *processing equipment* and *transferring & storing equipment* a comparison, between the different pieces of equipment in a group, has been presented in tabular form based on (at least) the next points:

1. Bulk material type;
2. Used in industry;
3. Capacity;
4. Functional features;
5. Energy consumption;
6. Environmental protection and safety;
7. Maintenance.

One of the main fields of interest of this study is the energy demand of different pieces of equipment. The energy consumption of several bulk material handling equipment in each group is summarized below.

The energy consumption of *transport equipment* as an aeromechanical, a vibratory conveyor and a pneumatic conveyor is in comparison to other types of conveyors relatively low. The energy consumption of an en masse conveyor is even very high.

The energy consumption of *transfer and storage equipment* as a chain bridge stacker reclaimer, a bucket excavator and a portal or side scrapper range more or less between 0.20 and 0.30 kWh per tonne. The energy demand of a circular blending system and a thrower lies somewhat lower; between 0.15 and 0.25 kWh/t and 0.10 and 0.20 kWh/t, respectively. A grab bucket (including crane) consumes the most energy; 0.45 to 0.50 kWh/t.

The energy consumption of horizontal tumbling mills, gyratory crushers, horizontal cylinder crushers and shaft shredders is regarded as low in comparison to hammermills, jaw crushers, shaft impact crushers and cone crushers. The energy consumption of horizontal drum mixers, ribbon mixers and paddle mixers is indicated as moderate and for cone mixers, rotating cube mixers, v-mixers and conical screw mixers low.

Dust can be hazardous for health, the environment as well as industry. Solutions to prevent dust are collection systems, suppression systems, water spray systems, dilution-ventilation systems and dilution-isolation systems.

This report can be used to gain general insight in the types of bulk material handling equipment in different field and can help to make a first selection of a piece of equipment for a particular task.