

## Summary

Over more than 150 years, belt conveyors have been used to transport bulk solid materials. The concept of conveying or transporting the materials by a conventional troughed belt, however, has not really changed.

On the other hand, in the last decade there has been an increasing interest in the application of pipe or pouch conveyors in stead of conventional conveyors, particularly for environmental reasons, for handling very fine and dusty materials and in some cases for economic reasons when the conveyor route layout is complex due to terrain or infrastructure obstructions.

This report is a study on the advantages, disadvantages and differences of closed belt conveyor systems versus open systems. Besides this the study focuses on the influence of ambient conditions on the quality of the belt and system and the differences in wear and maintenance needed for open and closed conveyor systems. The report ends with a SWOT analysis of the conventional, pipe and pouch conveyor and their field of application.

In general, it can be stated that none of the three individual belt conveyor systems will be applicable for every situation.

The conventional troughed belt conveyor is the most straightforward. It uses the cheapest, most widely available belts. It uses commonly available components and can handle high capacities of indifferent materials. Vertical and horizontal curves are large. They are not dust tight unless covers are added.

Pipe conveyors can negotiate tighter vertical and horizontal curves than conventional systems. The main advantage of the pipe conveyor is that it is dust tight along its length. It makes the pipe conveyor safer and more environment friendly than conventional conveyors.

There are two types of pouch conveyors available: the Enerka Becker-System and the SICON system. Both have special pouch shaped belts. Their capacities are more restricted, but very tight curve radii are possible. Due to multiple drive systems there are virtually no restrictions to the belt length.

All literature on the design of conveyor belt systems mention the importance of taking in to account the influence of the environment and ambient condition in which the conveyor should operate. During his study, however, no literature is found that specifies these influences on belt and system quality. A reason could be that the influence is negligible to other factors that influence the quality of the belt and system (i.e. the characteristics of transported material, the loading conditions and the general design).

There is too little literature available on (belt) wear and maintenance of pipe and pouch conveyors to make a sound comparison between the wear and maintenance of open and closed systems. A reason for this lack of literature could be that experience and research of wear in closed conveyor systems is not yet on the level that is reached for the conventional conveyor systems. On both subjects further research is needed to validate the reasons suggested.