

Summary

This report gives an extensive description of the first phase of the development of a calculation tool for the design of troughed belt conveyors. The belt conveyor system is restricted to a three equal length idler configuration, which is either horizontal or inclining. Furthermore, the system has a single drive pulley which is positioned at the tail of the conveyor system.

With minor required input, the calculation tool gives the user information about the key parameters of a belt conveyor system. The required input is limited to the capacity, the bulk material, the trough angle, the length and the lift of the system. There is possibility to give either the belt speed or the belt width as input parameter. This calculation tool is designed in Delphi, and is operable for any user. The output parameters of the tool are the belt width, the belt speed, the required power and the maximum belt tension. Also, a suggestion for the belt and possible required motor power is given.

An overview of methods for the design of belt conveyor systems is given in this report, including norms and standards that are currently used. Out of these methods, the most suitable calculation methods are chosen and selected for implementation in the tool. Currently available calculation tools are discussed, so improvements can be made to the developed tool.

On the basis of the selected methods, requirements are set up for the model and the tool itself. With these requirements, the model is composed and described. This model is the basis for the calculation tool, and its programming. The developed tool is compared to the currently available tools, from which conclusions are drawn.

The result is a user-friendly calculation tool, which is able to provide the user with a clear overview of results. The tool needs a minimum amount of information, to calculate the key output parameters. This does have the consequence that certain values had to be considered constant. Also, belt width and capacity are limited in the tool. For future development it is recommended that the balance between accuracy and complexity is retained.