Summary

Long distance continuous transport of bulk commodities is achieved by belt conveyor systems. Such systems can reach lengths of up to 100 kilometers. The harsh conditions in which belt conveyors operate strain the components of the system. The bearings of a belt conveyor are especially critical components of the system because their failure can lead to expensive unexpected shutdowns.

The global trends that influence the world of bulk handling dictate the need for more reliability, continuous operation and cost control. The extents to which these can be influenced depend greatly on the maintenance strategy of the bearings in the belt conveyor system. To optimize this strategy continuous reliable monitoring of the conditions of the bearings is vital. The current method of monitoring bearing health in such a system has drawbacks and gives opportunities for the introduction of a new system. A technically feasible alternative is automated monitoring of bearing health monitoring.

The main criterion for the appraisal of a project that implements automated monitoring for belt conveyor bearings is the cost of the system. The goal of this report is to assess the financial feasibility of such an automated system.

The costs associated with the current monitoring system are quantified in this report. Combined with standard financial tools for financial appraisal of such projects the budget for an automated system is determined. Subsequently two design alternatives are derived for an automated monitoring system, one based on temperature monitoring and one based on vibration monitoring. Both designs incorporate a wireless communication system. The costs associated with these designs can then be compared to the costs of the current monitoring method. Finally, the effect of the reliability of an automated system on the financial feasibility is explored.

As a result of the high cost of unexpected shutdowns the indirect costs associated with the current monitoring method are large. This leads to a relatively high budget for an automated system, assuming that the automated system eliminates unexpected downtimes. Both design alternatives for an automated monitoring system can be realized within this budget. For a new system that is to be deployed for the first time it is, however, very optimistic to assume a total elimination of downtime. Therefore it has been determined that based on the costs associated with the two design alternatives the systems are financially feasible if the unexpected downtime is reduced by 22.0% or 28.8% respectively.

The subject of this report is very current. Belt conveyor systems all over the world can benefit from an automated monitoring system if it is shown that the required reliability improvements can be realized. Experiments to determine if this reliability can be realized should commence as soon as possible.