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Amsterdam Coal Processing BV (ACP) is a coal import terminal located at the Westhaven in Amsterdam (West port of Amsterdam). The ACP had the last year a throughput of about 1.2 million ton. It is expected that the throughput will expand this year with approximately 30%.

The ACP operates on a site of 8,8 hectares with a quay length of 300 meter. Due to the relatively small area of the terminal and the growing flow of coal the ACP-terminal is dealing with storage capacity problems. These problems are also caused by the relative long storage time of different qualities of coal.

According to the size of the terminal, wheel loaders are used for transporting and stacking coal in the terminal. For ship unloading, floating cranes with 36 ton grabs are used. These cranes store the discharged coal in a buffer space along the quay. From this space the discharged coal is transported and stored in open stockpiles on the storage spaces in the terminal. Barges are loaded at the ACP using wheel loaders in combination with a mobile crane moving on crawlers.

Transporting coal to or from storage spaces located back in the terminal affects negatively the transportation capacity of the wheel loaders and causes high operational costs.

In order to increase the storage capacity of the terminal, improve the performance of the internal transportation system and reduce the operational costs this research project is started.

The storage capacity of the terminal can be increased by:

- decreasing the number of the stored qualities coal
- using trapezium stockpiles formed on square spaces
- using walled storage to decrease the effects of the angle of repose of coal on the storage capacity.

Decreasing the number of qualities of coal has the most effect in increasing the storage capacity of the terminal. Using walled storage increases the storage capacity with approximately 5 to 20%. This increasing of storage is dependent on the height, the thickness of the used walls and the storage circumstances.

Because of the relative big number of handled qualities and the unexpected flow of coal the flexibility of storing and handling coal will be affected negatively. Therefore it is advised to make appointments with the potential customers to decrease the number of coal qualities in order to gradually introduce walled storage systems on the terminal.

To improve the performance of the internal transportation system, a variety of transportation and handling equipment is possible. Fixed conveyor belts combined with mobile feeder- and stacker- conveyors improves the performance of the current system and decreases the effect of the distance on the transportation capacity. Big equipment such as stackers and reclaimers are not an alternative because of the high investment costs and the relative small size of the terminal.

The possibilities to improve the storage capacity of the terminal are regarded and different assumptions about coal flows are made to design a principal layout of the terminal. Based on these global layout different layouts with alternative transportation systems are developed and described. The operational costs of the different layout-solutions are calculated by different throughput values. The investment in the internal transport solutions and the walled storage are estimated. Also the internal rate of return and the pay-out time of the different investments are calculated.

After a comparison based on the operational characteristics and cost calculations of the different concepts, a certain concept is chosen. In this concept, a fixed conveyor and two mobile feeder-/stacker conveyors combined with wheel loaders are used for the handling and internal transportation. The fixed conveyor is placed through the middle of the terminal connecting the quayside with the storage spaces situated at the back of the terminal. The feeder-/stacker conveyors are used for feeding the fixed conveyor, stacking coal and loading barges.

Using this conveyor system, a reduction of the internal transportation costs of up to 40% could be realized, compared to a system with only wheel loaders. Considering this cost savings and other assumptions, a pay-out period of 4 year is calculated.