



iSAM AG
Gesellschaft
für angewandte
Kybernetik

we deliver solutions...

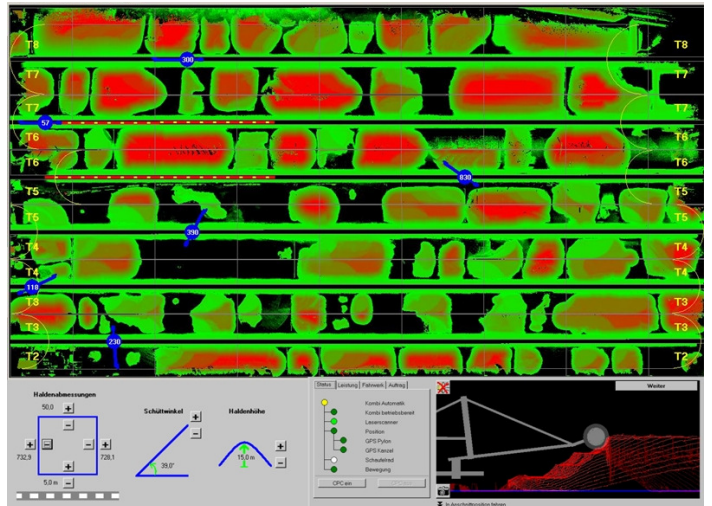


Application Report

Automation of Stacker/Reclaimers for Bulk Materials

New Construction of Stacker/Reclaimer 6

- ✓ Manless 24/7 operation under virtually any weather conditions
- ✓ Uniform high degree of output – no performance loss compared to manual operation
- ✓ Higher profitability of investments - increased ROI
- ✓ Very plane stockpiles with an almost perfect layout
- ✓ Automatic stacking and reclaiming even for difficult stockpile geometries – also after manual processing
- ✓ Operation of 6 stackers/reclaimers and 2 train loaders by one person from a central control station



for
Europees Massagoed-Overslagbedrijf
(EMO) bv, Rotterdam



The Customer

In the port of Rotterdam, Netherlands, Europees Massagoed-Overslagbedrijf (EMO) B.V. operates the Maasvlakte stockyard for coal and iron ore. Since its commissioning in 1973, capacities have been continuously increased. Today, Maasvlakte is the largest stockyard for bulk materials in Europe with a capacity of 42 million tons per year. In 2006 /2007, the storage capacity should be extended and a new stacker/reclaimer (unit 6) was constructed.

The Task

The bulk material is stacked onto piles by the stacker/reclaimer with its tilting boom. For reclaiming, the material is picked up by a bucket wheel and transported by a belt system for loading into ships or railway wagons. Stacking and reclaiming are to be handled in a fully automatic fashion without operator on the equipment.

Characteristic data of the stacker/reclaimer:

Output	6,000 t/h in stacking mode 4,500 t/h in reclaiming mode
Length of boom	60 m
Installed electric power	1,600 kVA

The Solution

In the years before, EMO had the five existing stackers/reclaimers upgraded for a fully automatic operation based on the patented system developed by iSAM AG. The iSAM S/R Automation System is able to communicate without any problem with different control systems (PLCs) on the stackers/reclaimers. The successful operation under practical conditions was the determining factor for the decision to equip stacker/reclaimer 6 with the iSAM S/R Automation System. In this case, supply and installation of the complete electro-technical equipment was also awarded to iSAM.



The use of state-of-the-art scanner technology combined with a link to fast GPS receivers allows generating a terrain model with a high degree of accuracy in real time.

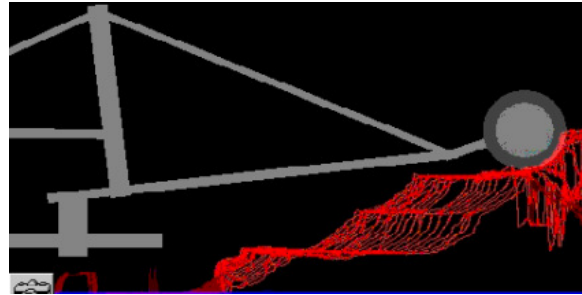
The terrain model is the basis for calculating moving commands given to the three moving axes of the stacker/reclaimer. Algorithms stored in the system lead to the optical generation of stockpiles and ensure a strategic reclaiming of the material.

The result: high and constant outputs without overloading the stacker/reclaimer. The real-time terrain model makes sure that even stockpiles that have been changed manually or trimmed by wheel loaders may be reclaimed automatically. The 3D scanner detects bulk materials from a distance of 200 m. Therefore, it is possible to mount the scanner on a pylon - away from the zone of dust emissions and vibrations around the bucket wheel.

For defining a job, the operator in the central control station just needs to enter the storage location, the amount of material as well as the desired strategy for stacking or reclaiming. After release of operation, the stacker/reclaimer automatically moves to the calculated starting position and handles the job. During reclaiming, first cuts and changes of cut are carried in a completely automatic manner.

Competitive Advantages

- Real-time terrain model of the whole stockyard
- No scanning runs, so no loss of production
- No restrictions in terms of storage capacity
- Real full automation instead of remote control



Stockpile profile in real time

Performance Data

- Automatic 24/7 operation under virtually any weather conditions
- Automatic operation > 90 % of production time
- Output comparable to values that can be achieved in manual mode
- No loss of time due to additional scanning runs, permanent update of the terrain model
- Operation of all stackers/reclaimers from a central control station, minimum strain for the operator in the control station thanks to a high degree of automation
- Neat representation of the overall stockyard with color coding for stockpile heights; support for a simple terrain and job planning

Benefit for the Customer

The use of fully automated stackers/reclaimers results in a significant reduction of **personnel requirements**. One operator in the central control stations handles **six stackers/reclaimers** and two train loading stations.

The representation of the overall stockyard including an up-to-date view of the stockpiles and color-coded stockpile heights supports job planning and provides an overview of the stockyard utilization.

Further Advantages:

- Very uniform stockpile construction with a smooth surface and a trapezoidal form
- Less wear and tear because mechanical performance limits are respected in automatic mode
- Reduced environmental burden by a minimized distance between boom and stockpile
- Improved working conditions

Facts:

Customer:	Europees Massagoed-Overslagbedrijf (EMO) bv, Rotterdam, Netherlands
Industry:	Loading and unloading of bulk materials
Hardware:	19" industrial PC PLC control system
Software:	iSAM S/R Automation iSAM Stockyard Visualization System
Sensor Equipment:	1 3D laser scanner for stockpile detection 2 RTK GPS receivers for positioning 2 sonar sensors for stockpile detection 2 microwave barriers for anti-collision protection of the boom
Completion:	August 2007