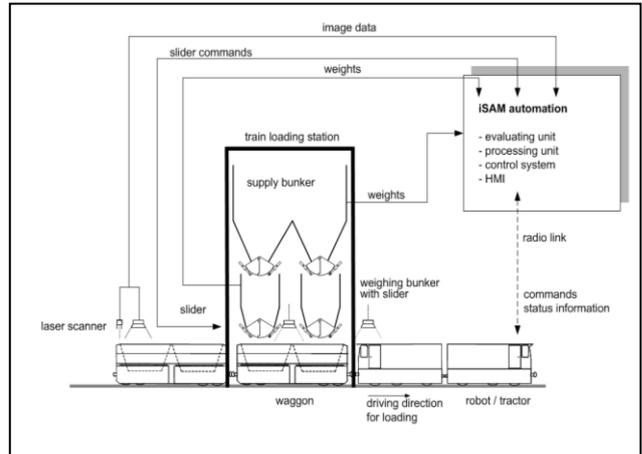


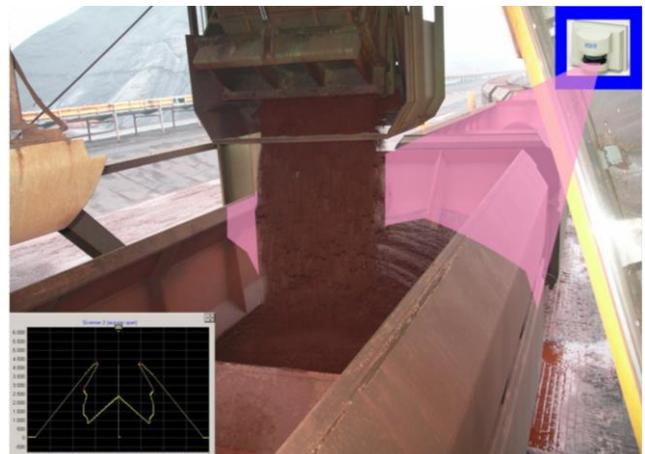


Application Report

Fully Automated Wagon Loading Station for Bulk Goods, in Particular Coal and Iron Ore



**for
Europees Massagoed-Overslagbedrijf
(EMO) bv, Rotterdam**



The Customer

Europees Massagoed-Overslagbedrijf (EMO) bv is the most important terminal for bulk goods in Europe and has had its place of residence since 1973 on the Maasvlakte in Rotterdam. EMO is specialised on trans-shipment as well as storage of coal and iron ore. Due to a direct access to the Northern Sea and a draw of 23 m, EMO is able to handle both Panamax ships and the largest dry bulk good ships of any kind. With a total volume of about 40 million tons per year, EMO contributes to ensuring reliable supply of iron ore and coal to the European steel and power industries.

The Task

iSAM AG in Mülheim an der Ruhr got a contract to automate wagon loading 1. That project involved the replacement of the entire electrical equipment including all accessories. From a central control station, loading orders for a complete train are started so that the loading process then takes place fully automatically. The train is pulled through by a remote controllable tractor (robot) beneath the loading bunkers. The speed of the train is to be adapted according to the loading operation.

The Solution

The proven automation concept for fully automated wagon loading developed by iSAM is used. The highlight of this concept is scanning of wagons by means of laser scanners for:

- Tracking of wagons
- Localisation of the loading door and detection of residual quantities
- Monitoring of the loading profile

The loading order is transferred from the EMO production database to the iSAM system. When the loading is finished, a loading report including actual values for the weight loaded per wagon is generated and transmitted to the production database.

Loading of wagons was changed to discharge weighing. This approach allowed filling of weighing bunkers by means of shell valves on the storage bunker instead of plate conveyors. Thus loading time per train could be significantly reduced.

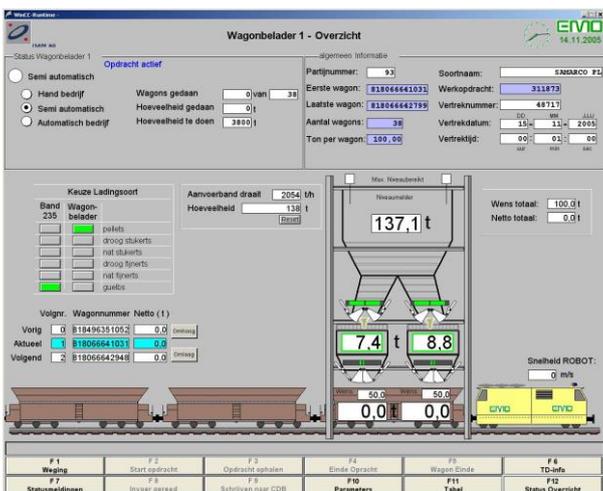


Figure: HMI Software WinCC - intuitive operating level

Performance Data

- Fully automated operation from the first up to the last wagon
- Utilisation of load limit for high density bulk goods > 98 %
- Utilisation of volume limit for low density bulk goods > 95 %

- Automatic detection of residual quantities and dented wagons
- Even loading by using wagon-specific loading profiles
- Monitoring and control of unloading flaps



Figure: iSAM Loading Automatics – based on data of the laser scanner system and wagon-specific loading profiles

The Benefit

A **2D laser scanner system** ensures effective control of the dumping operation by means of hydraulically operated and position-controlled shell valves.

Loading of each wagon is **optimised in terms of quantity** according to its specific loading profile (load and volume limit). By influencing the moving speed of the train, loading is **optimised in terms of time**.

Directly after commissioning, EMO gave the „go-ahead“ for modernisation of a further two-track wagon loading.

Further Advantages

- Shorter loading times per wagon due to optimised filling of weighing bunkers
- Lower transport cost due to optimised utilisation of wagon capacity
- Minimised maintenance due to use of robust heavy-duty components
- High flexibility in configuration due to numerous standard interfaces to other hardware and software components
- Remote maintenance functionality of the whole system

Facts:

Customer/Location: Europees Massagoed-Overslagbedrijf (EMO) bv, Rotterdam

Industry: Trans-shipment of bulk goods

Software: iSAM Loading Automatics
SIMATIC WinCC V6.0 in server/multi-client configuration
SIMATIC Step 7

Hardware Configuration: 4 industrial computers 19”
1 S7-400 including position control
4 laser scanners 2D
Siwarex weighing system, capable of official calibration

Network / Bus System: Ethernet TCP/IP and Profibus

Database: ODBC coupling and data traffic to the customer's own Oracle database

Visualisation: ~ 20 screens
Operator pop-up dialogue boxes
Message system, graph system
Export and import functions for order data

Finished: January 2006