

The Siemens logo is displayed in a bold, teal, sans-serif font.

Ingenuity for life

Fill up the tank, please!

Siemens Coriolis mass flowmeters sail the seas

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NSB uses Siemens Coriolis mass flowmeters to control and supervise the bunkering process of HFO on the CMA CGM VELA, saving money with every bunkering

The NSB Niederelbe Schifffahrtsgesellschaft mbH & Co. KG manages more than 70 vessels, container ships, tankers and one offshore ship. On the CMA CGM VELA, Siemens provides a unique and innovative solution to control and supervise the bunkering of heavy fuel oil (HFO). Two DN150 Sitrans F C MC2 Coriolis mass flowmeters are the core of the application. Additionally, Sipart PS2 valve positioners and a Simatic S7-1200 maintain pressure and flow control and receive their signals from Sitrans P DS III pressure transmitters and Sitrans F C MASS 6000 flow transmitters. Operation and monitoring is provided by a Simatic HMI TP 700.

The customer

The NSB started in ship management in 1986 with four vessels and seven employees. Today there are about 1.830 staff members. The vessel capacities range from 1,000 up to 11,000 TEU, with a total TDW of 4.340.538. The CMA CGM VELA is one of the biggest container vessels of the fleet, with a 11,000 TEU capacity and an overall length of 350 meters.

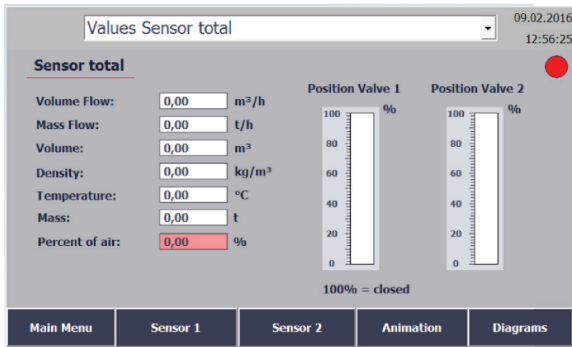
The challenge

Today's global transport business and especially the maritime container business face serious time pressure.

When it comes to bunkering, there is only a short window of time to control the bunkered fuel effectively. After bunkering, the vessel heads out to the next harbor and the crew must sound the vessel's tanks very quickly to verify whether the actual paid amount of HFO was delivered by the barge.

Complicating matters even more, the measurement method of sounding a tank either on land at the barge or on the vessel is error-prone. Furthermore, there is a certain amount of unpumpable fuel in the vessels and barge tanks. As the volume of the inhomogeneous HFO also includes air and gases, the result is a faulty overall volume.





The Simatic TP 700 shows all relevant information and allows continuous monitoring while bunkering.

All of these factors multiply into a deviation that must be checked through sounding.

Siemens offers an easy, calibrated and just-in-time measurement of the bunkered HFO to confirm the accuracy of this process.

The solution

The system engineered by Siemens measures the fuel oil pumped from the bunker barge directly into the vessel's fuel tanks. The Coriolis flowmeters instantly detect the density, mass flow, temperature and quality parameters. The measured volume is outputted simultaneously. To guarantee a highly accurate measurement while bunkering, the system includes a cascade control that ensures the meters run in their optimal operating range for mass flow and process pressure. The Sitrans F C mass meters also monitor any deviations from target density, and an alarm goes off if the fraction of air rises.

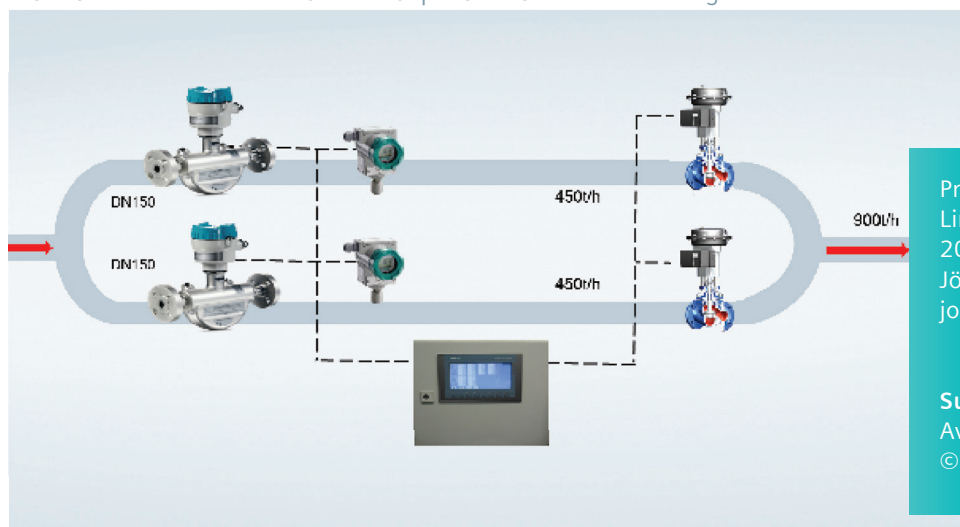
Controlling and data capturing takes place in an enclosed Simatic S7-1200 controller, and data evaluation is provided in non-manipulative CSV format. The chief engineer and the barge's surveyor on the vessel are now able to monitor the complete bunkering process online and can also check the results of sounding the tanks. Throughout bunkering, the system monitors the temperature of the HFO and all relevant quality-related parameters from the mass meters.

Target density and any deviations resulting from entrained air or gases are also detected and largely prevented by the system's control mode. The cascade control ensures that under optimal operating conditions the mass and volume measurements reach the accuracy level equivalent to the factory calibration certificate from Siemens. In an operation test, supervised from independent surveyor in port of Rotterdam, the system could achieve an accuracy of 0,16%. The typical accuracy under process conditions will be better than 0,3 %.

Finally the entire bunkering process is captured and the data is delivered as non-manipulative bunker delivery note (BDN).

If any factual argumentation for qualified bunker claims is ever required, the Siemens system provides all relevant information.

The Sitrans F C MC2 measures the mass flow and enables the chief and the surveyor to monitor the actual bunkered fuel independent of the bunker barge.



Process Industries and Drives
Lindenplatz 2
20099 Hamburg
Jörg-Andre Würfel
joerg-andre.wuerfel@siemens.com

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