

Upgrading to automated guided vehicles

VDL Containersystemen, Hapert, Netherlands



VDL's AGV Team (left to right): VDL Steelweld's Karel Smits, ECT's Paul Middelburg, and VDL Containersystemen's Frans van Dommelen.

Strength through cooperation

The short development time is realized by the strength through cooperation which is the VDL credo. The synergy between the user ECT and the manufacturer VDL is the first strong cooperation. The second cooperation is the combined forces of three companies within the VDL group, all the required expertise to build a high performance AGV is present.

- VDL Containersystemen with experience in the field of spreaders and the new improved design and production facilities, this branch of VDL can guarantee a product that complies with the highest of standards.
- APTS specializes in engineering electrical controls, power packs and automatic guidance systems, as used in the bus industry. Solutions in the field of hybrid power trains, induction and hydrogen power trains are available within the company.
- VDL Steelweld is the expert in the field of production automation, assembly and engineering services. They design, manufacture and install robotic production systems; one of its strengths is the structured approach in integrating modular solutions.

The unique strength of these companies combined is the ability to share knowledge of the market, technology and organization without boundaries. This together with the cooperation of all parties involved secured the short development time while maintaining a high quality level.

A modern container handling terminal requires more and more use of automated technology. Aspects like efficiency and impact on the environment set difficult targets for engineering a terminal. Two years ago the need arose for a new generation of automatic guided vehicles (AGVs) that could fully meet today's standards and values, with a focus on life cycle cost reduction, improved reliability and less impact on the environment.

VDL was approached with the question whether it was possible for them to develop an AGV, according to the wishes of the customer and which would meet the environmental requirements. By using all available knowledge and production techniques based on existing technologies, sourced from within the VDL Groep, and several key suppliers, VDL succeeded in 12 months to create their first hybrid AGV. In October 2011 this AGV was delivered at the ECT Delta terminal in Rotterdam. Three months of extensive testing, 24 hours a day outside the regular operation to guarantee the quality and reliability targets had to be met, then the VDL AGV was deployed in the operational Port in Rotterdam.

The hybrid AGV is capable of transporting ISO containers of 20 foot, 40 foot, 45 foot or two 20 foot containers at once. It is also able to handle loads up to 70 tons, and can run at speeds of up to 6 meters per second.

VDL developed an electrically driven diesel hybrid AGV to ensure the required performance in combination with reduced fuel and maintenance costs. A small diesel engine drives a generator powering the electric motors and when peak power is required, ultra capacitors provide additional energy. For several months now,

the HybridVDL AGV has been running successfully in operation at the ECT Delta terminal with strongly decreased fuel consumption and the highest MTBF rate of their entire AGV fleet.

The close cooperation with ECT allowed early feedback in the design as well as intensive testing and validation possibilities which helped to improve the design quality.

Quality and cost

The design and construction of an AGV is the first step. For a terminal operator, fuel consumption, maintenance and life cycle is just as important as the initial investment in the vehicle. Because the VDL AGV has a hybrid drive, the diesel consumption (and hence the emission of harmful gases) is significantly reduced. Another cost reduction is achieved by maintaining a friendly design of the vehicle. Examples of such design features include completely replaceable diesel generator power pack units and a liquid cooling unit for all electric drive components. The suspension system that is used in the AGV VDL is capable of absorbing four times more shock than any other AGV. Thanks to the improved damping, less wear and a reduction in maintenance costs is realized. Finally, the VDL AGV is designed with as much as possible standard components to ensure the highest quality and to keep prices for spare parts to a minimum.

Modularity

Characteristic of the AGV VDL is the modular construction of the vehicle. With this flexible design, terminal operators don't need to buy a completely new vehicle, when technical components are defective; only replacing the worn item is sufficient. The VDL AGV is built so that new techniques such as induction and hydrogen drives, or GPS navigation, can be incorporated without major modifications. In addition, with the modular structure of the vehicle the wishes of the customer are easy to apply.



VDL's prototype AGV.

ABOUT THE COMPANY

The **VDL Groep** is an international industrial company focused on the development, production and sale of semi-finished products, buses and coaches and other finished products. It is a conglomerate of flexible, independent companies, each with its own speciality. The strength of the VDL Groep lies in the mutual cooperation between the companies. Since its founding in 1953, the VDL Groep has grown to include 80 operating companies, spread over 17 countries, with approximately 7,400 employees.

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