



Safe and affordable...

...thanks to an original and successful upgrading project

A Siemens safety solution helps to upgrade a second-hand ladder truck according to the current standards and regulations.

The user and the environment

The volunteer fire brigade corps of Berlare turned sixty in 2007. Nowadays there is close cooperation with the corps in Zele and Dendermonde. The barracks and fleet of vehicles are modern but constant updates to meet current standards and regulations take a lot of effort – and even more money. Christophe Vanpé is a volunteer fire fighter with the corps and professionally he has his own company, VCA, which specializes in automation projects. He is the man behind this success story.

The corps bought a second-hand ladder truck for a very reasonable price and rebuilt it with great success. The old ladder truck's operating mechanisms were unreliable and used old fashioned relay technology. In the event of an intervention this resulted in situations where the extension of the ladder did not occur accurately or even got stuck all together.

Vanpé was not in the least deterred by the fact that the ladder truck had been condemned by an inspection body and he presented a few of his ideas to the chief and municipal authorities. As costs go, he was able to offer a solution that would leave the corps with an operational and safe ladder truck for about a fifth of the cost of a new truck.

The challenge

One can only imagine the complexity of this project considering that this large ladder truck has four stabilizing legs that need to be operated. Each stabilizer can be extended by 15,50 or 100 cm, depending on the circumstances in which the truck is being used. Operation is carried out from the vehicle's chassis. Telescoping and operating the ladder is not child's play either: raising and bringing it down again, extending and retracting, turning and keeping it level all have to be done safely.

Additional safety measures also have to be employed such as for the contacts on the drive, the position of the ladder in relation to the cab, the position of the ladder rungs and the use of the safety basket the firemen need to stand in to work at heights.

Conceptual environment

Built-in safety measures and reliability are key factors in this instance. At the core of this solution VCA built in lies a programmable Siemens safety control (PLC, type S7 315-F; Fig. 1) with a decentralized I/O station (ET 200M; Fig. 2) linked to it for communicating with the stabilizers of the ladder truck. This is linked to the

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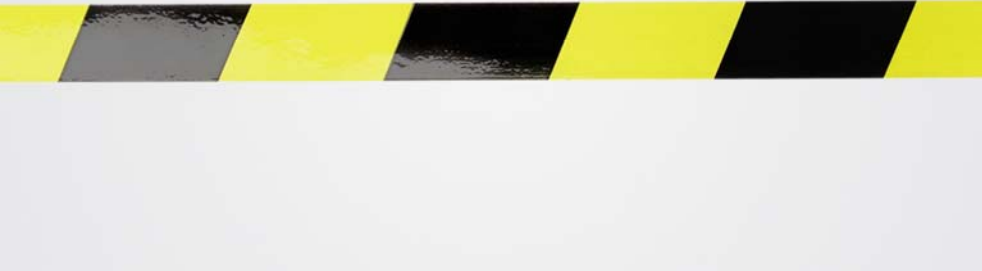


Fig 1: All movements of the ladder truck are being controlled by the PLC

safety PLC via an industrial communication bus (PROFIBUS DP). There is a touch panel in the cab for visually managing positions and movements (Fig. 2). In practical terms the PLC guarantees the stability of the ladder truck irrespective of the physical location of the stabilizers. The turning mechanism as well as ladder and safety basket movements are controlled by using joysticks which are linked to the PLC, which in turn determines maximum maneuverability. The PLC then controls the valve modules for the actual movements.



Fig. 2: Communication with the stabilizers of the ladder truck is achieved through a decentralized I/O station

In addition to meeting the applicable standards, there are special built-in safety requirements as well. There are emergency stop buttons on the chassis and in the basket, a release button and a dead man's pedal too. It is also possible to override the emergency button from below and take over control. The truck uses power takeoff (PTO) for supplying power to the subsystems (electrics and hydraulics).

The control system is housed in two cabinets and both of them as well as the PLC are mounted on rubber scuff blocks. This ensures proper functionality even if there are strong vibrations.

Technical advantages for the user

- Easy and reliable to use in trying circumstances
- Complete overhaul of the original ladder truck
- Powerful safety control mechanisms
- Fully adapted to meet specific requirements and standards
- Major cost savings for the Berlare corps
- Interventions with this truck can be carried out quickly and reliably
- Exceptionally advantageous cost situation: The rebuild cost only one fifth of the price of a new truck!
- Dramatically increased usefulness and safety in a critical application

- Fire fighters feel much safer
- Speed, reliability and safety are combined
- A satisfied fire fighting corps and municipal authority...

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Fig. 3: Positions and movements can visually be managed with the touch panel

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