

Healthy Workplaces Good Practice Awards 2023–2025

CASE STUDY



Digital solutions for safety and health in precision farming in vineyard work



ORGANISATION/COMPANY

Perla del Garda (Morenica Società Agricola a Responsabilità Limitata)

COUNTRY

Italy

SECTOR

Agriculture (viticulture, viniculture)

TASKS

Cultivation, field maintenance and harvesting of grapevines using tools mounted on tractors

Introduction to the case study

Cultivating vineyards requires the use of tools mounted on tractors, which operators must navigate along narrow lanes, while simultaneously monitoring the tools. This demands precision and constant attention to avoid accidents and injuries. To ensure the safety and health of its operators, the Perla del Garda winery has adopted a digital solution enabling the tractor to ‘drive itself.’ This alleviates stress and allows operators to focus on the tools. Meanwhile, the automated system instantly alerts them of potential obstacles and hazards.

Background

The vineyard of the Perla del Garda winery of the Morenica agricultural company is located in the municipality of Lonato del Garda, Italy. The family farm employs 22 workers, of which 13 work in the winery.

The company produces wines with three protected designations of origin: Lugana Doc, Garda Doc, Riviera del Garda Classico Valtènesi Doc. Since 2022, its vineyards have been organically cultivated (Sidel certified) and are deemed sustainable according to national quality protocols: SQNPI and MAKE IT SUSTAINABLE. In 2024, the winery was also awarded the Equalitas certification, recognising its commitment to sustainable environmental practices and an ethical-social approach to the safety and health of workers. In 2025, Perla del Garda has achieved a new certification: VIVA Viticoltura Sostenibile.

Work in the vineyards is carried out in the narrow lanes between rows of grapevines by human-driven tractors equipped with specific rear and/or front tools depending on the processes required.

Driving the tractor in the narrow lanes requires precision, accuracy and experience. Hazardous situations can occur while driving the tractor, such as collisions with vines, transverse overturning or running

into workers, animals or obstacles in the lanes. The operators must carry out activities that require the utmost attention, while keeping control over both the progress of the tractor in motion and the work carried out by the tool in use.

For example, a rear mulcher is used during the maintenance phase of the row lanes. The operator must steer the tractor in such a way as to keep it in the centre of the row, check for obstructions and, at the same time, watch over the work done by the tool. Operators must constantly rotate their gaze from the front to the rear of the tractor where the tool is mounted. If not properly managed, workers’ effort, stress and tension can have adverse effects both on production (damage to the rows) and on workers’ safety and health.

Aims

The aim is to install automated driving technology with safety features on the vineyard’s existing fleet of tractors. This will not only improve safety and productivity in the vineyard, but also reduce the stress on operators by allowing them to better concentrate on other equipment and tasks.

What was done and how?

- Perla del Garda and COBO Spa collaborated to assess the need to modernise equipment, with a view to sustainability and the wellbeing of workers.
- Extensive surveying and mapping of the vineyard was performed, providing the data necessary to establish the critical thresholds beyond which the Vision Lane Navigation (VLN) kit could generate automatic alerts through AI to prevent risks. The VLN kit included the following safety features: automatic navigation, object detection, automatic tilt alert, and automatic data logger for the scheduling of equipment maintenance.
- The first tractor was selected for the kit installation. This was followed by experimentation, calibration and development of the technology.
- Operators were given both theoretical and practical training on how to use the VLN system.
- Once in use, operators were consulted for suggestions on how to improve the technology and its functionality. This resulted in updating the existing technology and installing sensors on some implements. Lastly, a more advanced VLN kit was installed on a second tractor.

What was achieved?

- Workers feel safe and supported by the automatic navigation system because they trust the smooth running of the tractor, which issues an alert in case of danger.
- Data provided by the technology indicates that operators rarely use their hands on the steering wheel, thus allowing them to concentrate on other tasks, such as monitoring the tools mounted on the tractor.
- This has made the operators' work less tiring and stressful, which has a positive impact on risk prevention, in general. No accidents occurred during the use of the installed technology in connection with the tractor.
- From data analysis provided by the technology, it is possible to obtain important information for work organisation and worker employment.
- The sensor technology informs when scheduled maintenance should take place. This provides considerable savings as the equipment does not wear out because it is properly maintained, respecting the life cycle of the tool itself.

Success factors

- The VLN system does not require a GPS signal and related corrections to maintain precision. Nor does it require LiDAR, radar or ultrasound sensors to allow navigation within the narrow lanes. This is essential to ensure the technology's efficiency even in regions where satellite coverage is poor, particularly in the hilly areas where the vineyards are located.
- Digitisation has enhanced the company's existing fleet of tractors and tools, without the need to purchase new tractors.
- The developers of the digitisation project constantly update the installed technology based on the evidence that the system returns. This enables an increase in and expansion of work opportunities where the installed technology supports operators' health and wellbeing. Updating workers on the use of equipment features is also continuous.



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Transferability

The VLN system is easy-to-use, non-invasive in installation and very efficient. It can be installed on any type of tractor, grape harvester or other vehicle designed to operate on farms with row crops or defined lanes, with the aim of transferring greater automation to the vehicle already in service or on the market.

Costs and benefits

Costs – Costs included the purchase, installation and maintenance of the VLN technology. Additional costs were incurred to train and consult personnel in support of the technology's development.

Benefits – The VLN system was installed on the company's two existing tractors, making them more precise, efficient and safe. Making the tractors efficient in fuel consumption and safe in the work areas brought immediate benefits to the company in terms of savings, as well as maintenance and wear of the tools. The

psycho-physical wellbeing of the staff has increased, as they are aware that they belong to an organisation that considers safety and the digitisation of work as fundamental values. Furthermore, operators were reskilled and acquired specific digital skills, which are fundamental in agriculture and precision farming.



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Key features of good practice example

- The VLN technology installed on the company's tractors allows real-time operation on land by exploiting automatic driving and safety at work through the alerts provided to the operator.

- The technology is not linked to a GPS signal.
- The technology monitors the times and consumption of each operating machine (tractor and equipment), making it useful for maintenance management.
- The technology can be improved continuously according to the feedback of the system and by involving the operators and technicians.
- The technology supports workers' wellbeing and OSH.
- The approach relies on workers' participation and involves their reskilling.
- The technology and implementation method, which directly involves workers, solves the problem of visibility and reduces the risk of interference and collision, in accordance with the latest advancements in artificial vision technologies and AI methods.

Further information

Further information can be found at

<https://www.perladelgarda.it>

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