

Tecnofer's New Technology Improves Weed Control



The need to keep track formations clear of vegetation has been a key maintenance requirement since the birth of the railways. New technology from Italy promises to transform the efficiency and effectiveness of vegetation management.

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VEGETATION control is fundamental to railways in every country in the world. In order to keep the ground free from weeds, maintenance teams must fight a perennial battle against the forces of nature.

In Italy, vegetation control has undergone numerous changes since the 1980s. The most fundamental change is that management and delivery of vegetation control has been outsourced. More modern distribution technology has also had a role to play in providing more environmentally friendly herbicides.

While in the past vegetation control was a fairly straightforward process, in recent years, the strategy has been refined to allow chemical, mechanical, and agricultural methods to be used as part of a coherent strategy; from vegetation control to vegetation management.

The objective of this new approach is to cut costs, and improve both the results and the environmental impact. The process now is to use chemical weeding on ballast and cess, chemical and mechanical clearing for 2m either side of the track, and vegetation clearance as far as the railway's boundary where necessary.

Selective weedkilling and seeding are also part of a holistic strategy. It is possible to make the vegetation control last for a long time by eliminating weeds, and by planting and maintaining stable vegetation which is



*Top: The locomotive on the TDC evolution has good visibility forward for spraying the ballast
Middle: Spraying equipment is extremely flexible, with varying combinations of herbicide able to be sprayed simultaneously, all controlled from a single panel.
Bottom: It doesn't take long for a formation to become completely overgrown. This is the result of just four years without vegetation management.*



able to prevent weeds taking over.

In the past, weedkilling used a train hauled by a locomotive from Italian Railways (FS), and wagons owned by contractors. While it worked effectively, the system was limited by the fact that spraying staff could only see to the sides of the train.

This meant that it was impossible to allow for varying degrees of infestation across the whole formation. All the operators could do was vary the intensity of the lateral sprays. Furthermore, this method of working was not allowed at night for obvious safety reasons.

TDC 500

This was why Tecnofer developed in the mid-1990s a computerised weeding train called the TDC 500. The prototype started working on 4000km of the Italian network in 1995, and offers a very different approach from the norm. It consists of a twin-cab locomotive that hauls the tank wagons. The central section of the locomotive includes a high-tech proportional blending system, herbicide storage, a generator, and output control system for the herbicide mixture.

The cabs are equipped with wide front and side windows to optimise spraying operations. These are carried out at low pressure by two bars split into three sections. Each section is shielded to minimise the drift effect caused by the train.

Under each cab, two spraying nozzles are installed to cover the area between the rails, while on each side of the train there are three stirring and anti-drift nozzles, all visible to the operators.

On both sides of the cabs, there are two control panels able to regulate each nozzle in order to stir and control the flow according to the area to be weeded.

Close Control

The control panels have two control systems from which it is possible to allocate different spraying intensities to each section. There is also a video camera for recording the line during the treatment process.

High-intensity lights are fitted so the train can be used at night, and monitoring equipment includes a roof-mounted hygrometer, a thermometer, and a wind meter.

A computer controls the train speed and herbicide mixture. It receives data from spraying bar litre counters, a general litre counter, and other instruments. It is then able to output



Spraying heads can be adjusted for angle and intensity remotely from the locomotive's cab.

data including train speed, volume sprayed, wind direction and force, temperature, relative humidity, and the herbicide concentration sprayed on a kilometre-by-kilometre basis.

This data can be linked to footage from the video camera, to enable analysts to produce a database and monitor the efficiency and effectiveness of the treatment over an extended period.

Special valves control the spraying strength, while the nozzle's angle can be varied to generate the best possible results. It means the train can spray seven separate sections of track simultaneously.

During 4000km of tests, Tecnofer has proved the viability of having frontal and lateral spraying capabilities, meaning that less herbicide has to be used. Safety for staff has been improved, and the risk of off-site contamination reduced.

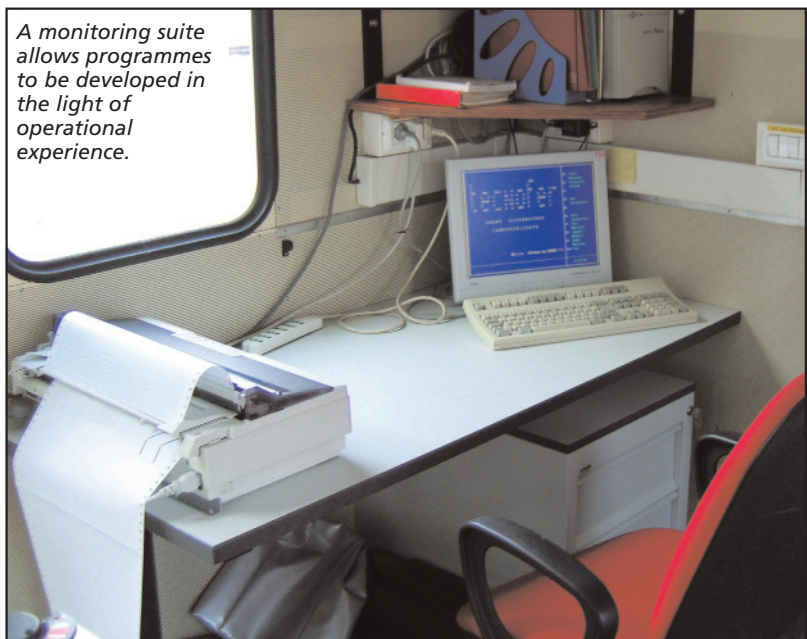
Its ability to operate at night means that availability is massively increased, with productivity improving 50% over conventional methods.

The latest model improves the design

further, with the ability to distribute two different types or concentrations of herbicide simultaneously: a useful capability where different types of vegetation exist on a formation.

Tecnofer is also examining integration with geographical information systems to identify areas where it is forbidden to use herbicides for environmental reasons, enhancing the effectiveness of vegetation management regimes further.

As maintenance windows become progressively shorter, it's clear that improving vegetation management is vital for the safe operation of the railway: Tecnofer's innovations are set to take root in the hearts and minds of infrastructure engineers right across Europe. ■



A monitoring suite allows programmes to be developed in the light of operational experience.