

European developments in operator training for on-track machines

Richard Spoor looks at what is being offered in Germany to standardise operator competencies.

When the automation of track maintenance began in Austria in the early 1950s, the necessary training to operate these simple machines was little more than learning to drive a car for the chosen volunteers from the track gang. As the technology developed, it was several years before British Rail decided that the entry skills needed for an operator of tamping machines required specialist training, even though the digital age was a long way off.

The introduction of the operator/maintainer role recognised that the ability to repair minor faults during operation was critical to maintaining reliability as well as producing improvements in track quality. In the mainland of Europe, the recruitment and selection of operators was slightly different. Due to the cold winters, particularly in Austria, Switzerland, southern Germany and northern Italy, track tamping usually terminated at the end of October and recommenced in April of the following year.

During this period, machines (including the larger track renewal ones) were overhauled and prepared for the new working year. Therefore, companies who owned machines tended to employ staff with primary fitting skills in mechanical, electrical and hydraulic engineering. It was these staff that were trained as operators and sent out to work with the machines in the spring and summer months.

The initial training of service technicians and machine operators is normally undertaken during and upon delivery of new machines to customers and is the responsibility of the supplier, together with the publication of associated maintenance and operating manuals. Therefore, the customer does not have an immediate need to train staff or provide training facilities. As companies who carry out trackwork increase the size of their machine fleets, a staff training need develops; however, it may not



Above: The PMC Rail International Academy at Bingen am Rhein in Germany.



Above: Training using the 09-3X simulator.



rise to justify dedicated infrastructure and resources for some years.

British Rail established regional training schools to support a national fleet of approximately 125 plain line and switch and crossing tamping machines that were in use in the mid 1980s. Training would include some classroom theory work including an understanding of track geometry; however, the bulk of training (which might have taken over two years) was spent on machines learning from their experienced colleagues.

Following the establishment of Railtrack in 1994 and subsequent privatisation, new private companies became the owners of BR's tamping machines and had contractual responsibilities for the operation of stoneblowers. Gradually, the new maintenance companies took the plunge

Left: The service technician classroom with machine control systems on the left and right.

and invested in modern machines that promised increased productivity and were more able to work with modern stronger track, particularly switches and crossings with concrete bearers. This new generation of machines were designed with digital technology to determine track geometry outputs increasing the complexity for operators and supervisors.

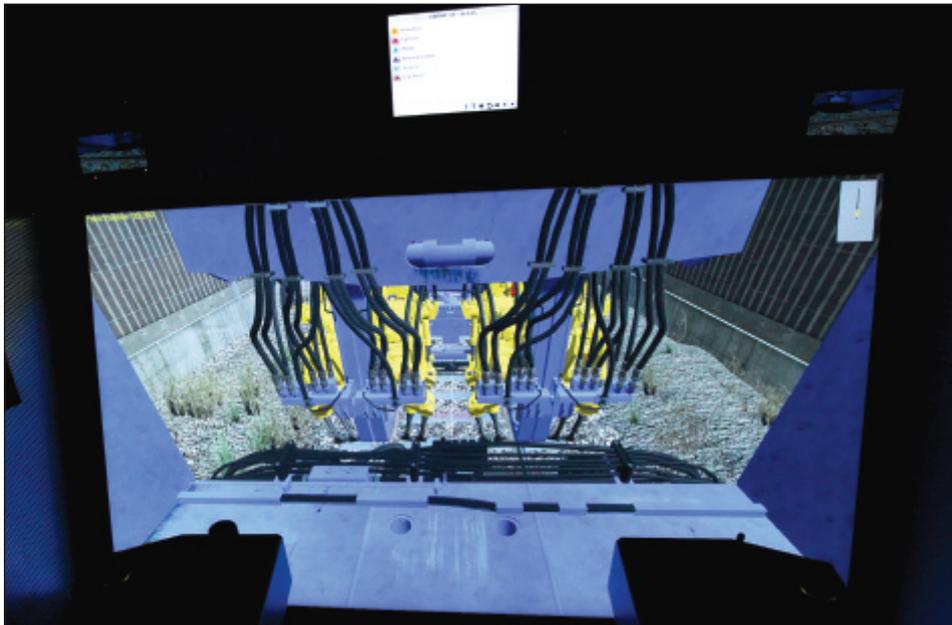
Operation of modern plain line tamping machines requires a minimum of two personnel. At the front of the machine is the front tower operator - there is no 'tower' as such, the name deriving from old machines that had a forward trolley. This role oversees the machine operator who sits at the centre of the machine and operates the tamping banks and delivers the machine's rate of progress (and quality of output). The two work as a team, continually in radio communication, and it will be the front tower operator who observes through instruments the work of the operator and the produced new track geometry through a digital graphical display. Switch and crossing machines are, by virtue of the track layout they work on, more complex and a third central operator is present.

Machine manufacturers, who as explained earlier, train their customers' staff when new machines are delivered, make use of various components and modules from the machine in their training centre for this purpose. This is particularly the case, for example, with track geometry guidance systems and fault diagnosis displays. When subsequent training needs arise, machine owners who do not have these pieces of equipment are faced with using their machines, which results in a loss of production.

The present situation

One company, Deutsche Plasser, saw a need in 2008 to establish a dedicated training facility and, in 2009, opened a small two-room centre in the old station buildings at Bingen am Rhein in Germany. Primarily established to train its own staff, the company was soon overwhelmed by demand from its German customers, particularly in the winter months.

Deutsche Plasser, with support from its parent company Plasser & Theurer, responded with two initiatives. Firstly, it increased the size of its facility at Bingen to nearly 400 square metres and, secondly, it developed the first tamping machine simulator, replicating both the front tower controls and the



Inside the 09-4x4/4S simulator at Bingen set up for switch and crossing training. The first operator's position is pictured above with the second operator's position shown below.



operator's cabin of a 09-3X machine.

Today, there is a second simulator at Bingen, which replicates a Unimat switch and crossing machine, the 09-4x4/4S. Both machines use 3D technology in the display screens, making an extremely realistic view for the operator under training.

In the last 12 months, 400 trainees have passed through Bingen of which 75% attended for operator training. The balance was made

up of service technicians who learn both in the classroom and in the adjacent workshops the necessary skills to keep their companies' machines at peak performance. Not all trainees are from Germany.

Twelve countries have sent their staff to Bingen - from places as far afield as Malaysia and Pakistan - and talks are currently being held to offer training for operators from Brazil, Mexico and the USA.

The operator training course runs for five weeks and includes the following:

- Tamping theory.
- Tamping units and the tamping circuit.
- Physical obstacles met whilst tamping (and how to manage them).
- Managing machine measuring systems.
- Track geometry theory and machine parameters on main lines.
- Using the tamping simulator for maintenance and renewals.

At the end of the week, an independently set three-part examination is taken, leading to the award of a certificate of competence entitled 'Operator of Track Maintenance Machines', which is valid for five years.

The most impressive aspect of the training that is offered at Bingen is the benefit of the classroom simulators. These include a



Left: The machine hydraulics simulator.



Above: The front tower simulator.

Below: The geometry recording classroom.



hydraulic simulator, multi-channel recording equipment, digital recording systems and Plasser Intelligent Control 2.0. The stars of the show, however, are the two machine simulators. The newest, the Unimat-3D, utilises five computers to simulate the operations of the two central operator workstations and the front tower workstation. A variety of operating scenarios are available including the most difficult - track renewal tamping when the ballast covers all of the sleepers! The benefits compared to the traditional two-year 'on the machine' training are clear and include one-on-one feedback sessions with the student aided by a video screening of the session. By the end of the course, the student will have progressed from an initial one-and-a-half hour to a full eight-hour shift.

The future

The training facility at Bingen was relaunched earlier this year under the brand name, 'PMC Rail International Academy' with ownership transferring to a new and independent foundation. As such, it will relocate to Leverkusen, just north of Cologne, into a brand new, bespoke two-floor training centre of 3,000m², which is due to open in September 2018.

In order to satisfy a request from

Right: Illustration of the new training centre currently under construction in Leverkusen.

Deutsche Bahn, and also because it is the vision of the directors, the new academy is independent of any one manufacturer. It is hoped, therefore, to train staff who operate and maintain machines from companies such as Harsco, Linsinger, Matisa, Plasser & Theurer, Robel, Speno and Windhoff. Furthermore, the curriculum will be broadened to include track technology, machine technology, railway operations, railway law and economics and management skills.

The railway administrations of Austria, Germany and Switzerland are currently giving consideration to a requirement that, from 2020, all tamping machines being operated on their infrastructure shall have a front tower operator who holds an independently



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assessed certificate of competence. They are aware that such a decision carries a risk of cost escalation (a five-week course with PMC Rail costs around £6,000 plus subsistence and time away from the workplace), but believe that the benefits of enhanced track quality and improved machine reliability would make this a justified decision. Might Network Rail give this initiative similar consideration?

At a time when railway engineering skills are seen to be in short supply across Europe, the initiative taken by PMC Rail International Academy is exciting and can be seen in parallel with similar initiatives here in the UK such as NTAR at Northampton and the National College for High Speed Rail in Birmingham and Doncaster. Perhaps in the future, Network Rail and its suppliers might consider exploring the benefits of the high quality specialist training available in Leverkusen. After all, it is only a short train ride away.

Thanks

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