

A maintenance revolution for the UK - update

Plasser UK's Mark Simmons details the latest on the Robel mobile maintenance trains for Network Rail.

When I wrote the update in *Rail Infrastructure* Issue No: 108 on the Robel Mobile Maintenance Train (MMT) - yes, even I now call it the MMT - MMT No: 3 had arrived in the UK and was due to be handed over to Network Rail shortly before Christmas.

Expect the unexpected

The time since then has shown that, even with the decades of expertise Robel has in the complex MMT system, not every eventuality can be anticipated. While those elements that can be progressing as they should - MMT Nos: 1 to 5 are now in full regular operation; MMT No: 6 has been handed over and is going through route trials and MMT No: 7 is already in the UK - some things catch you by surprise.

During some extensive and unprecedented testing, Robel detected a problem with the safety Programmable Logic Controller (PLC) in use on the MMTs. This PLC is approved specifically for railways and a significant number are in regular use by manufacturers all over the world in scenarios much more complicated than the MMT application. So, how did a Robel test uncover such an issue and how did the German manufacturer find a solution that not only met urgent deadlines but also showed the competence to professionally and profoundly control unforeseen obstacles?

Carried out during the Christmas to New Year break, these were long-term continuous running tests on the MMT, quite unrepresentative of real-world applications. Robel, however, identified a possible situation where this well-proven PLC may unexpectedly reset itself. Due to the intermittent, infrequent occurrence, and even though there had not been an incident during service, there was no guarantee that a reset would not happen. The consequence of a PLC reset would be that the machine would go into a safe state by applying the brakes fully and shutting down the engines, bringing the vehicle to a stop.

Cause and solution

This called for an immediate and pro-active reaction. Robel, strongly supported by Plasser UK, instantly gave the issue top priority and postponed the Christmas holidays for both the MMT team and the PLC manufacturer, a Robel subcontractor, who attended the factory to witness testing and offer advice. A full investigation of the Robel control software revealed that it was in conformance with programming requirements for these PLCs. As a result, the manufacturer of the PLC



Network Rail MMT No: 4 after arrival at Plasser UK, West Ealing (above), and No: 5 (below) prior to leaving Robel's workshops at Freilassing, Germany.



launched an extensive analysis. This involved creating a test bench on which three PLCs could run the Robel programme continuously in parallel, supported by Robel getting three of the MMTs from production into a state where they also ran continuously to provide data.

By constant refinement of the testing they were able to narrow the search area down to the Ethernet communications and, at a joint meeting in the UK with Network Rail, Plasser UK and Robel provided a tight timeline for fully isolating the problem, developing and testing a solution and implementing it. Progress was continuously supported by the Robel technicians and managed by numerous telephone conferences and meetings with Network Rail and Plasser UK to keep the client informed at all times.

The PLC manufacturer managed to solve

the problem within the agreed time plan, which was a great achievement considering that the problem was found not to be in the firmware, but actually in the hardware, requiring in the end the change of a single resistor and an AND gate.

The final result was a simple change-out of all the safety PLCs and further extensive testing before, near the end of February, MMT Nos: 3 and 4 were finally a handed over together. As one of the Robel project managers put it: 'Challenge acknowledged - solution found - performance rebuilt. That is how Robel works.' And that is what also makes a supplier into a competent partner to rely on even in stormy weather.

Back to normal

All that intense effort, while it had to be taken account of in the production programme, could not halt the assembly progress for the remaining MMTs. So, it was back to the plan. This meant delivery on time and in accordance with the contract. MMT No: 5 left Germany in March to head over to the UK and was handed over to Network Rail on 1st April. MMT No: 6 then left on 20th April for its handover on 20th May.

Finally, for those who have not seen the machines in person, MMT No: 7 left Germany early and, even accounting for an unexpected rail strike in France, arrived in the UK ahead of schedule so it can make an appearance at the Rail Live exhibition at Long Marston. I look forward to seeing you there.

MMT No: 6 At Plasser UK, West Ealing.

