

Pit and the Pendolino

When depot plant and equipment firm Harmill Systems took on a small project for Metronet a couple of years ago, its plant engineering managing director didn't dream of the repercussions. Brian Tingham reports

Two years ago, Leighton Buzzard-based Harmill Systems won an unusual project – a rail-mounted seat for the London Underground Waterloo and City depot inspection pit. Within months, that turned into a plant lifting and manipulator project for maintenance crews. Then Taiwan's high-speed rail got wind of it – and ordered motorised versions to hugely accelerate inspection of the underside of its trains in service.

That chain of events transformed what had been a depot plant and equipment engineering firm. "Our work had always been plant engineering," says unassuming managing director Patrick Hughes, himself formerly a plant engineer at Kemsley paper mill, near Sittingbourne, and an IPlantE member since 1966. "Now we have 15 staff and we're looking to double that over the next few years."

Clean beginnings

Harmill's first rail engineering contract was in 1990 with London Underground – building equipment to speed up carriage cleaning. The company built 45kW dust extraction plant into one of the depot sheds, equipped with 32 drop-down pipes, one for each door set, for cleaners to plug into. A two-hour job was reduced to 15 minutes.

That work led to contracts for tanks and loading arms for rail de-icing, and then dust and fume extraction plant for cleaning the trains' drive motors. "We built a steel tunnel with a six-foot fan blade and a 110kW motor to pull dust and air safely at 80,000 cu metres per hour," says Hughes – noting that one third of the dust removed is human skin.


And then came what turned out to be Harmill's big break. "Two years ago, one of Metronet's engineers asked me if we could help solve a

problem with maintenance engineers working in pits. People were regularly going off sick with back problems, and when I saw what they were doing – working in a pit about as deep as your chest for hours at a time – I could see why," explains Hughes.

"So we built a seat on a bogie and installed rails in the pit to overcome its changes in level, allowing the technician to sit in comfort and move easily to where he's needed... But that one idea changed our business completely, because then we realised we could put other things on those pit rails – like lifting equipment for heavy plant."

Hughes had seen four technicians struggling to lower or lift, for example, compressors under the trains. So Harmill built a rail-mounted, electro-hydraulic inspection pit lifting arm with manipulators and tools. "I can now take our manipulator with a fully loaded compressor and push it with one finger," he says. "That means one man can now change a compressor in safety – and the same applies to brake actuators, reversers, big fans, whatever."

And from that grew the idea for rail-mounted side pit lifting arms and manipulators, aimed at handling heavy RPAs (rotary pneumatic actuators), line breakers etc, accessed from the train side.

Which brings us to the Taiwan high-speed train. "They have a 1,000ft train," says Hughes, "and they needed a vehicle to help them get the full length of the underside inspected within a 15-minute turnaround. So we adapted our original design, and built in a motor and motorcycle style throttle. Now, all the technician has to do in Taiwan is select the direction and turn the throttle to go from bogie set to bogie set. When he or she lets go, there's regenerative braking and it's fully automatic. He could cover the whole train in four minutes!" 

Award-winning engineering design for train inspection and maintenance pits brought Harmill Systems to the attention of Taiwan high speed rail, pictured below

