

Going underground

London Underground is like any plant – but on a very large physical and engineering scale.

Brian Tinham talks to its head of operations engineering about the issues that matter

What keeps London Underground's head of operational engineering awake at night? Top of Maurice Poole's list is the competence of project and maintenance engineering people – across all the professional sectors. That's not just in his own organisation, but throughout the infrastructure companies (Tubelines and Metronet, the latter now in administration), currently upgrading the network, and main contractors, such as Balfour Beatty.

Why? It's not that Poole, himself a time-served signalling engineer, doubts their commitment. The problem is the sheer spread of technologies these organisations have to contend with, in order to ensure safe, efficient and cost-effective running in this vast undertaking. Maintaining the know-how on everything from modern computer systems, to the legacy of much older equipment still in use across the key areas of rolling stock, signals, power and track, is a serious challenge.

Young and old

"We work with the service delivery units, which are the operations arm of London Underground. So my job is to make sure that properly qualified people are available in these units and that our suppliers, which are supposed to be self-regulating, are generating adequate reliability and contingency plans for the assets for which they're responsible – and executing on them," explains Poole.

"So I've got three engineers that work, through me, with the service delivery units, looking at issues on a daily basis. They'll be making sure that engineering work is carried out in a timely fashion and that the quality is there, as well as understanding lessons for the future around incidents – for example, delays due to asset problems. They'll also be co-operating with asset engineers in our Engineering Directorate, who have legal responsibility for train and station systems."

Which brings us to those plant assets. "We have assets dating back to Victorian times," says Poole. "Some of the signalling is more than 40 years old – mechanical interlocks, electrical interlocks and some of the earliest computer-based equipment. Under upgrades with the PPP, all that will go, and we're already well on the way to fully automated, 'intelligent' systems. But for now, and until 2019,

the point is the skill sets we need are very diverse. We don't want to rely solely on the original equipment manufacturers for support."

Therein lies the problem. "There is a general lack of skills in the market," explains Poole. "What's more, it's a regulated industry, so our suppliers' employees have to be licensed – we have engineering competence standards they must comply with. And we need qualified engineers here too: we can't influence our suppliers unless we understand how the technologies work, the installation and maintenance implications and so on. Also, we need to understand what's coming next, so we can organise education and training."

He's referring to intelligent devices, plant and equipment, such as the track profiling and recording vehicles, and rolling stock from the likes of Bombardier and Siemens – bringing in technologies that result in less requirement for line-side attention and more automated diagnostics. He's also referring to the computerised maintenance management systems (CMMS) currently being rolled out – for example, Tubelines' Excalibur system, with its integrated Maximo and Oracle systems, aimed at improving operational efficiency network-wide.

"The more you control by technology, the safer and more efficient the railway becomes. So part of that is automated predictive maintenance," says

Poole. But, again, it all has to be done in the context of a network with a lot of history. Change on this scale doesn't happen overnight.

"It always comes back to people and their engineering skills. We need more of them." **PE**



Technical pointers

- Any engineering change cannot be considered in isolation. "We can take rolling stock into a workshop for maintenance, for example, but track, signals and power – old and new – are also part of the network," says Maurice Poole, London Underground's head of operational engineering. "So we have to think of it as a total system – and that means knowing about the interactions, because each part of the network can affect the others. For example, a signalling asset can fail because track isn't working properly."
- From a maintenance perspective, prevention is better than cure with any equipment, so engineers have to be on the front foot. "Part of that is being able to guide predictive maintenance to prevent incidents, and part is automatic monitoring, so we can drive better service," observes Poole.

