The S&T Delivery Challenge

The railway signal and telecommunications sector is now more diverse than it has ever been. Operating on an international scale, a multitude of organisations have to cooperate in the business of delivering new schemes that requires a comprehensive and mutual understanding by all players as to roles and responsibilities.

It doesn't always go smoothly, and there are too many examples of projects being delayed or overspent, thus giving the profession a tarnished name. So how is it supposed to work and where are the pitfalls that can cause things to go wrong?

One person well placed to answer this question is Mark James, now the managing director (rail) at Linbrooke Services but latterly head of signal engineering for Network Rail's Infrastructure Projects business. He has also had previous delivery experience at Atkins, other supply chain companies and Railtrack, and thus has a host of experience on many sides of the industry.

The Linbrooke profile

As with many companies that have entered the rail business since privatisation, Linbrooke was engaged in a completely different area of technology before seeing rail as an opportunity for expansion. Started in 2002, it began life in the sub-sea cables and jointing business, a sometimes-hazardous operation and one of only three companies in the UK offering that service. Headed up by Lee Hallam, with a background in the Royal Marines and the Police, the company ethos is to manage its activities in a controlled and well planned way where mission criticality, as would be expected in the defence industry, is all important.

The opportunity for Linbrooke to use its cable jointing expertise in another discipline came about in 2003 when Thales, engaged to roll out the FTN (Fixed Telecom Network) for Network Rail in some areas, was stretched in meeting its fibre jointing commitments. Thus a company with cable expertise in danger prone locations was welcomed in as a sub-contractor.

From this small beginning, Linbrooke has built up its expertise in the rail sector, whilst continuing its presence in sub-sea cable activities but also expanding into power distribution networks and engineering training. With a headquarters in Sheffield, it now has regional premises in Swindon, Birmingham, Manchester, York and Glasgow. Staff now number around 350 of which 150 are in telecommunications, 50 on signalling and 150 associated with LV/HV power distribution.

Delivering S&T projects

Since rail privatisation, getting new signalling systems designed, built and delivered has been something of a challenge. Some projects have gone well but many haven't. There are many reasons for this:

- Major changes and rationalisation within the major supplier organisations;
- Difficulties in understanding the rapid changes to the technology;
- Getting the right balance between in house and external resources;
- Finding the right organisational structure within firstly Railtrack and now Network Rail;
- The emergence of a formalised safety approvals regime that at times has been less than pragmatic;
- The failure to recruit and train new staff into the engineering profession and the retirement and often enforced redundancy of older skilled knowledgeable staff.

Many of these factors are now being put right but there is a lot of catching up to do. Companies such as Linbrooke have recognised the weak points and have used their own initiative to gain expertise in areas where gaps are all too apparent, and to then provide services that can help projects get back on track.

CLIVE KESSELL

Focussing on telecommunications initially, the ongoing rollout of the fibre-based FTN network needed an urgent boost to ensure delivery targets were met. Linbrooke undertook the laying, jointing and termination of fibre cables. This, in itself, was a steep learning curve as the tasks were essentially trackside with all the safety disciplines that go with that. Getting to grips with the PTS, COSS and Engineering Supervisor roles, plus developing a full understanding of the taking of possessions and when work can or cannot be carried out whilst trains are running, was something that Linbrooke recognised as vital. From this, the company has built up an exemplary safety and delivery record.

Putting the cable infrastructure in place is one thing, but then there comes the challenge of migrating circuits from the old to the new systems. The main telecom suppliers will have provided the transmission racks at the main telecom centres but access to bandwidth has now to be provided at trackside locations. Very often records of circuit allocations can be old and out of date with surveys needing to be carried out to establish exactly what is what. It is a boring, thankless task but has to be done.

Linbrooke, seeing the opportunity, undertook to do this work for some sections of the FTN, working with others to ensure an effective changeover. In 2011, Network Rail awarded the York IECC telephone concentrator contract to Linbrooke which resulted in the company needing to build new FTN nodes, one of the first contractors to be tasked with this type of work.

From there, it was a small step to entrust Linbrooke with a major telecom project. The result was a contract to manage circuit provision including the massive changeover of SPTs on the core section of Thameslink when the London Bridge and New Cross Gate control areas were transferred from London Bridge power box to Three Bridges ROC. The project will extend eventually to Cricklewood and St Albans on the Midland Main Line with similar transfer of control to Three Bridges

The NRT project to upgrade FTN to FTNx (the IP based network) is progressing well and, in partnership with Cisco, which is providing the main switch and router equipment, Linbrooke is carrying out all the cable and power supply work for the Bromsgrove Ring, south west of Birmingham. To implement digital devices such as VoIP phones (Voice over IP), copper cables are needed to connect to the lineside 'point of presence', and this involves providing Cat 5 structured cabling. Digital device connections are distance-limited to 100 metres which demonstrates just one of the design constraints that have to be considered.

The provision of power supplies at the trackside and elsewhere is often an after-thought and, recognising this, Linbrooke has its own Rail Power team which was featured in issue 128 (June 2015).

With all of this expertise, Linbrooke is now a Tier 1 contractor for rail telecom systems.

Provision support

As main line signalling system equipment design and manufacture is now concentrated in only a handful of companies - Siemens, Alstom, Hitachi/Ansaldo and, to a lesser extent in the UK, Bombardier - it again is dependent on smaller companies to provide the cabling and power supplies that are essential for a successful project.

Linbrooke is one such company that has expanded into this arena and has a partnership in place with Siemens. A significant delivery under this arrangement has been the GN/GE line. The Siemens modular signalling system was chosen for this important secondary route but the supporting trackside infrastructure was in need of considerable expansion. The FTN was an obvious choice for information distribution but needed to be adapted for the distribution of data to signals, points and level crossings. With its telecom expertise, Linbrooke was well placed to take on this role and, before long, was entrusted with the majority of the system's power supply provision as well. The project has since been commissioned - see issue 128 (June 2015) for the overall scope - with the tasks of cabling and power barely getting a mention. Such is life.

Signalling support contracts are likely to be a ready source of income for the likes of Linbrooke in the months and years ahead. Neither the big signal suppliers, nor the in-house resource within Network Rail, have the capability to undertake such work in the volumes predicted for the roll out of ERTMS and secondary line upgrades.

Linbrooke has gone on to develop a turnkey small to medium scale signalling renewals capability in the last three years in parallel with their support to others. Whilst relying previously upon supply chain partners to achieve the full portfolio of activities, Linbrooke has, in the last year, taken the opportunity to create both a UK signalling design office and a testing and commissioning capability.

The design office operates as an independent IRSE licensed signalling 'design house' consultant with its own client base but also providing an integrated design capability to the existing Linbrooke power and telecommunications design and engineering teams. By building a testing and commissioning resource, the company is able to offer a 'turnkey' service for its own project activities but is also able to collaborate efficiently with other resource suppliers, including Network Rail's own internal resources, so as to deliver the appropriate staffing level needed for both Linbrooke's and Network Rail's project portfolio.

Other expansions foreseen by Linbrooke as necessary for turnkey offerings are training and resourcing (see below) and obtaining a partner relationship with an OEM (Original Equipment Manufacturer) technology partner so as to achieve a full design, supply and implementation service for future renewals projects. An initial project offering to Network Rail is currently being assessed. With all this in place, resources from all parts of the signalling renewal market, both within the UK and overseas, can benefit from a co-ordinated approach to deliver projects into the future.

Training and resources

The S&T industry as a whole has a shortage of engineers and technicians. Much talk goes on about how this can be rectified and some signs of activity are emerging. The work of NSARE (the National Skills Academy for Railway Engineering) and the taking on of apprentices by Network Rail and others is to be applauded but, even now, it may not be enough to support the ongoing demand.

Linbrooke, proactive as ever, has grabbed the bull by the horns and established a National Training Academy at its Sheffield site. This is a facility to be used by all parts of the industry (including Linbrooke's clients and even, in some cases, competitors) which are developing the skills of their workforce. Its origins stem from the need to provide resettlement for personnel leaving the armed forces and it gained MoD approval for this back in 2005. Since then, a desire has emerged to recruit and train young people from the Sheffield area, often from truant backgrounds, and offer them a worthwhile role in a profession that needs all the skilled staff it can get.

The training focuses on telecoms, power and signalling and all trainees have sessions in all the engineering disciplines so as to become 'rounded' engineers in the future. Many people who previously served in the military arrive with skills that are akin to railway S&T, so it is more of a conversion exercise rather than starting from square one. School leavers and other youngsters generally have no engineering knowledge so have to learn the trade from first principles. The learning portfolio is thus organised to whatever level is required.

Behavioural training is part of the package and this is based on military lines. Once in active service, success criteria are measured every week by means of a briefing / debriefing process.

The new signalling design office set up in Swindon is also being used to provide learning opportunities for people from other companies. One such take up has been some of Network Rail's recently employed testing staff who, in the course of their jobs, are seen to need design experience and understanding.

Future predictions

Whilst this article unashamedly features Linbrooke, the intention has been to draw out the many facets of delivering S&T (and power provision) projects to the present day UK railway structure. This requires companies to have imagination in what they can deliver, to be realistic in what can be achieved and to understand the complexity of the supply chain in which they would have to function. Co-operation and partnership with others is essential.

For Linbrooke, the business expansion has been controlled and logical. They have noticed the areas of expertise where shortfalls were evident and taken logical and careful steps to fill the gaps. For the future, the company intends to quadruple its capability in signalling whilst retaining its expertise in telecoms.

The company's familiarity with LV/HV power systems for the Distribution Network Operators (as an accredited independent connections provider) may well lead to an entry into the 25kV overhead line electrification area, which is another discipline where expertise is in short supply.

As to the industry's capability to deliver projects successfully, the recent pausing of some high-profile schemes by government must be a lesson to all - that unless one has the right organisation and skill base in place, failure will occur all too frequently.

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