



MALCOLM DOBELL

# Depot Equipment

## TRENDS

**A** train maintenance engineer will be familiar with sending out a train with all its water tanks full, and a day or so later it comes back filthy with other tanks full of...well let's leave that to the imagination!

This is just part of what has to be provided when a depot has to be built or adapted to accommodate new trains, the objective being to provide the required number of trains for service each day in immaculate condition and to be able to carry out maintenance as quickly as possible. Staff have to be able to work safely; in the yard in all weathers, around electrification assets, around pits, at height and well within manual handling rules.

Just thinking about the author's career, much has changed in depots. For a start, they are generally cleaner and warmer, helping to attract staff, and Health and Safety legislation has made a positive contribution to how the job is done. Using a couple of examples, in the 1970s, there would not be a torque wrench in sight, let alone power tools. And lifting techniques were

primitive to say the least. To lift all cars of an eight-car train, first each car would be uncoupled, then all the bogie disconnections were made, followed by each being lifted in turn by an overhead crane, the bogie being rolled out then the car end was lowered onto stands. Compare that with the 21<sup>st</sup> century version where an eight-car S stock is run into the lifting shed, and, provided it is stopped in exactly the right place, the whole train is lifted at the touch of a button. Individual bogies can then be disconnected and lowered individually.

Other depots use bogie drops to allow rapid bogie changes. London Underground has also had to change the

arrangements of its District and Metropolitan line wheel lathes. Formerly they were arranged to accommodate four- or three-car units respectively, but as the new trains are not easily divisible, they have had to be altered to accommodate respectively eight- and seven-car trains.

In electronics, trains often have systems that warn depots of defective equipment and depots can have staff and equipment standing by to deal with the defect as soon as the train rolls in - albeit probably taking a little longer than it takes to change a set of wheels on a Formula 1 car!

To achieve this, of course, needs excellent wireless download and analysis tools -



it's no good having gigabytes of data if no one looks at it! It would be a very strange 21<sup>st</sup> century depot that didn't have excellent mobile phone and Wi-Fi coverage, both for maintainer's devices and for the trains themselves.

Depot construction or alterations involve regular railway and building professions such as civil construction, permanent way, steel framed buildings (generally), power (traction and building) and signalling. In addition, many specialised depot systems are supplied by British companies who have established a reputation for flexibility and delivery of the very many specialist systems required, from safe electrical isolation systems via platforms and staging to cleaning, replenishment of fluids and, well, sucking effluent from those toilet retention tanks.

Apropos CETs, when you include the other fluids used, such as refuelling, train

washing, routine changing of lubricating oil on an increasing number of diesel/diesel bi-mode trains, there's a lot to think about.

These were the main topics of conversation when Rail Engineer recently met Andy Coles from Rail Depot Solutions, whose company specialises in providing solutions for washing, fuelling and CET servicing, an unloved but vitally important aspect of train maintenance. Andy said he has built his career "following new trains around"; his company seeking to provide common-sense solutions by delivering new depot systems, or by adding to or adapting existing systems.

Carriage washing, fuelling and CET servicing is generally carried out in the open, adjacent to places where trains move and where the track is electrified (either third rail or OLE). Personnel safety is therefore paramount and, indeed, subject to research



into automation (RRUKA conference - issue 159, January 2018), although Andy Coles' view was that automation of these activities will take a long time to implement safely and dependably.

First - the basics; Andy said there are around 160 depot sites in the UK where fuelling, washing and/or CET servicing take place. There are a number of different ownership models. Most locations are owned by Network Rail and leased by the train operator (TOC). Depot equipment is

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provided by Network Rail with maintenance shared between TOC (first line) and Network Rail (everything else). In depots owned and/or operated by a train manufacturer, equipment is generally owned by that train supplier. Andy observed that split responsibility for provision and maintenance can lead to what he described, diplomatically, as “difficulties”.

Rail Engineer has reported extensively about the large number of new rail vehicles being purchased and the opportunities and challenges they bring. There is a further opportunity/challenge in that most of the rolling stock companies (ROSCOS - the train owners who then lease them to the operators) have chosen to add provision of CETs to the modifications being carried out to existing trains to comply with the Technical Specification for Interoperability for persons of Reduced Mobility.

It was fascinating to hear about these major challenges from the point of view of the depot equipment. For example, South Western Railway has committed to providing toilets on all its trains.  implies providing CET facilities at locations such as Wimbledon depot, which has never had them before.

When it comes to servicing all the toilets on a train, do you position the train and have

multiple servicing points or do you have one servicing point and move the train? The latter is usually frowned upon; the location has to be roughly twice as long as the longest train, and there needs to be excellent communication between the ground staff and the driver. It is much more satisfactory to have multiple servicing points.

A servicing point needs to have a vacuum facility to pump the effluent from the tank, water to rinse the tank and a separate water feed for the flushing and washing water. The operator attaches the hoses to the first toilet and sets the system running, and moves onto the next, and so on. At the end, the operator removes the hoses and seals the pipes. This can be accomplished in about 20 minutes. It is usual for

trains to have connectors for water and CETs on both sides of the train, so that the depot facilities need only be on one side, whereas filling facilities are needed on both sides of the trains for sand used for adhesion improvement.

Changing from one fleet to another can bring its own challenges. Firstly, to comply with the current legislative regime, the connectors for water and toilets have to comply with TSIs/Euronorms. These connectors are not necessarily those currently in use. Thus, during changeover from one fleet to another, both connectors have to be provided, increasing the number of hoses that might become a tripping hazard. The legacy filling connection is a taper fitting onto which a hose is pushed. The new style is a claw fitting that turns anti clockwise to seal (anti clockwise being counter intuitive). Depots also have to cope with an increased volume of trains during the changeover from one fleet to another.

The temporary “bulge” in fleet numbers can result in trains being stabled in unusual locations and Andy Coles described how, with a little notice (perhaps three to four months), temporary facilities can be provided such as a temporary, extra narrow wash plant provided at Gidea Park.





### Fuel Systems - the growth of bi-mode

As a self-confessed fan of electric trains, your author has a prejudiced view that diesel engines leak oil and coolant and that diesel fuel gets spilled everywhere when the tanks are filled. Of course, none of this would be acceptable today!

The requirement has increased, however, with the increasing number of diesel engines to be dealt with due to the proliferation of bi-mode trains. Trains with three or five 560kW or 700kW underfloor diesel engines need to be dealt with in a number of depots, including facilities for draining and replenishing lubricating oil, refuelling, maintaining cooling systems and replenishing the AdBlue tanks for the selective catalytic reduction systems.

### What to do with the waste?

Much to your author's surprise Andy mentioned that the waste from the CETs can be discharged into the sewers as domestic waste, whereas the water from the train washers is regarded as trade waste and TOCs have to pay a fee for its disposal. This led to a conversation about the challenges of train washers.

Andy said that roundly 250 litres of water is used per car, per wash, or 3,000 litres for a 12 car train - enough to fill nearly 70 baths! Therefore, recycling of the water is useful. He

cautioned not to heat recycled water, despite the beneficial effects on cleaning, as heating recycled water causes harmful bacteria to multiply.

In any event, there are times of the year when cleaning has to be suspended - when the temperature is too low or in times of drought. That led Andy to mention that "train washes keep clean trains clean", highlighting that other techniques need to be used if a train has become significantly dirty. We talked about the challenge of keeping train fronts clean, which led to a discussion about automation versus bucket and mop with suitable staging to protect the cleaner.

### People

And lastly, but, probably most importantly, it should be obvious that new trains require their maintainers to acquire new skills to maintain them. The same is true of those who operate and maintain depot plant, something that, in Andy's view, is often overlooked.

With low unemployment and a general problem of recruiting people to work in STEM work, depots will continue to have to work hard to provide the culture and working conditions that will attract good people and then to train them. This is particularly important as a great deal of train maintenance work takes place at night and during other unsocial hours.

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