



Subway Modernisation - progress update

Date of meeting 17 December 2021

Date of report 8 December 2021

Report by Director of Subway

1. Object of report

To provide to the Partnership the latest progress update on the Subway Modernisation programme.

2. Background

The Subway Modernisation programme is the most significant investment and improvement programme to be undertaken in the Subway within the last 40 years.

The programme was scoped for delivery under five principal workstreams, namely:

- Stations and accessibility improvements (complete);
- New Ticketing System (complete);
- Renewal and Upgrade of Existing Infrastructure & Depot Facilities;
- New Rolling Stock, Signalling and Automated Control Systems; and
- Organisational Change and Employee Relations.

This report provides an update on the key areas of progress and emerging issues since the last written report to the Partnership in June 2021.

Since the last report, the COVID-19 pandemic has continued to have an impact on modernisation progress, although this is now easing as restrictions are lifted. COVID measures across UK and Europe have continued to restrict and delay our contractors' and suppliers' progress, and the restrictions on international travel have prevented or prolonged factory testing activity and delivery of key equipment. COVID-safe working arrangements within SPT and contractor premises has continued to allow site works to progress, albeit with delays in some areas. Efforts continue to be made across SPT and its supply chain to manage ongoing and emerging issues and minimise impacts to delivery.

The updates given within this report focus on the achievements and progress made. Given the ongoing and variable restrictions, guidance and requirements in support of public health protection across EU countries, forward forecasting remains challenging.

3. Progress to date

3.1 Existing infrastructure

Works have continued on the infrastructure workstream with the ongoing focus of completing key improvement and modification works across tunnel, track and line assets, in readiness for the new system and mainline train testing. Progress made since the last update is as follows:

- Works have continued to improve structural clearances and gauge infringements within the tunnels as well as adjustments to equipment locations. Further laser surveys have been undertaken and are now being analysed to provide safety assurance prior to the start of tunnel testing. Works also continue to complete improvements to a limited number of conductor rail positions.
- The programme of further tunnel lining improvements awarded to Freyssinet Ltd continue. The prioritisation for void grouting and lining repair works is based upon the exploratory surveys completed earlier in the year.
- Works to confirm the continued health of legacy electrical, telecoms and IT assets has continued with the primary focus of agreeing extensions to the various supply and service contracts that are due to expire in 2022 but are still required to support the existing infrastructure through to the end of life.
- The conceptual design process for improvements and/or upgrades of the Subway substations is now underway. As reported previously, this work will look to assess the possibility of utilising the new trains' regenerative braking system, align with other modernisation needs, improve long-term maintainability, lifecycle costs and upgrade the equipment to comply with modern standards and practice. Efforts will be made during this work to maximise energy efficiency principles for both climate and cost purposes.

3.2 Broomloan Depot facilities

Work activity to ensure the integrity, reliability and longevity of key assets within Broomloan Depot, in conjunction with readiness and new asset introduction, continues. The key areas of progress on this workstream are:

- The required Stabling Shed extension commenced at the start of the year, with head driven piles to support the foundations for the building. The building's superstructure, walls, roof and cladding panels have now been installed marking the completion of the main building structure. Internal building services and cableways are now being installed and are due to complete by the end of the calendar year. Throughout the works, effective stakeholder engagement has been necessary with nearby residents (noise) and monitoring of the tunnels (vibration), as well as engagement with Subway Operations in order to have agreed phased working within isolated possessions at the entrance to the existing stabling shed.
- The new wheel lathe has been fully commissioned and has been handed over for use by SPT. A full check of the legacy fleet wheelsets has been completed to determine the forecast requirements until the end of life and a programme of wheel turning of the legacy vehicle fleet has now commenced. The ability for SPT to carry out this work in-house is a significant achievement and a major benefit as previously wheelsets were sent off-site to external suppliers.
- Plans are now agreed for the installation of the mechanical and electrical fit out for the Automatic Train Inspection (ATI) equipment. Installation, testing and

commissioning of both this and the previously installed train-wash will follow within this calendar year.

- Fit out of the new control and signalling equipment with the new Operational Control Centre (OCC) building is now largely complete with the focus now on cabling from trackside infrastructure into the OCC.
- Following survey of the retaining walls of the ramp access to the sub-surface tunnels at Broomloan Depot, an improvement works scope has been defined and appropriate repair designs developed. The tendering process to award a works contract is ongoing with a view to commencing works in 2022.
- Significant power cabling installation into the newly installed cable ducts and draw pit chambers through the operational yard area has now commenced.

3.3 New Rolling Stock and Control Systems

All of the following activity is delivered by ANSTA and their sub-contracted supply chain under the Manufacturing & Supply Agreement (MSA) Contract:

- Off-line dynamic testing of the first three trains delivered to Glasgow is now complete following testing on the test track at the Manufacturer Depot and Testing Facility at Edmiston Drive. Remedial works for issues raised by the testing have been undertaken on site as required and will be incorporated into the manufacture of the subsequent vehicles to be manufactured.
- In tunnel 'Mainline Testing' is currently planned to commence throughout the entire Subway system in April 2022. However, the Partnership should note that the first new electrically powered train in over 40 years entered the sub-surface tunnel system on the morning of Sunday 5th December, 2021. This historic train movement was to complete initial exercises to prove newly developed train rescue methodologies, etc. This was fully successful, and was executed as per plan with the full participation of ANSTA JV. The commencement of Mainline Testing will be brought forward if at all possible.
- Stadler has commenced the production run for the remaining 14 trains, with the next five units currently under manufacture.
- The ongoing detailed design work for the various signalling, telecoms and controls systems and software has progressed.
- ANSTA has moved into detailed design and installation work to change the sequence of system migration to allow new trains to run on the existing signalling and control systems, until the new control system commissioning is complete. Additional trackside equipment has now been installed and software changes for the new trains are in the process of being designed following the agreement of revised concept designs earlier in the year.
- Installation of the new signalling and control equipment in station equipment rooms and the OCC has continued, with works now approaching completion in the final two stations.
- Mobilisation of the subcontractor for installation of the new signalling and control equipment in the tunnels is now complete and following successful trials, an extensive programme of works is due to commence at the end of the calendar year.
- Trackside communication beacons (balises) that will be used for precise positioning of the new trains have now been installed at all stations and through both circles.

- Installation of the new CCTV system has continued with platform level camera installation being prioritised in advance of mainline testing.
- SPT continues to challenge and monitor the evidence provided by ANSTA to demonstrate the safety case required under SPT's Safety Verification (SV) Scheme. Based upon the required assurance review carried out earlier in the year, the specific portfolio of evidence required for mainline testing is being collated ready for commencement of tunnel testing.

3.4 Manufacturing & Supply Agreement

Progress on the ANSTA delivery of the Manufacturing & Supply Agreement contract remains subject to significant ongoing delays as previously reported. SPT continues to challenge and negotiate a resolution whilst protecting its contractual position.

Works to change to the integrated system migration sequencing, to assist in minimising passenger service delays has continued as reported previously. The planning exercises for this strategy change are now complete.

SPT also continues to monitor any impacts COVID-19 may have in the contractual delay position following the submission by ANSTA of a 'Force Majeure' claim in March 2020. All ongoing Board level contract performance and claims discussions consider the continued impacts of the pandemic on SPT and ANSTA.

As reported in the last update, ANSTA continues to propose that SPT accepts a change to key contract dates based on their revised forecasting and claims. SPT's position on this and associated claims remains unchanged, and the proposal remains unaccepted. The Partnership will be advised of further progress to agree a workable and realistic forward programme and advise on how delays and mitigations are being dealt with contractually in due course. These issues continue to be subject to discussion at corporate Board level across the contract parties.

Since the last Partnership report, SPT and ANSTA have jointly tendered and commissioned an engineering consultancy, WSP, to examine the Subway Modernisation Project to review all key aspects of the Project to ensure that it continues to be set-up for successful delivery. This includes project management aspects, such as programme structure, appropriate resourcing, risk management focus, and management and project reporting arrangements between all parties. WSP will produce observations and potentially recommendations for the next stages of the Subway Modernisation Project for our joint consideration. In addition to this, WSP will form a view on commercial matters, contract administration, and discussions previously highlighted to Partnership, and again will seek to suggest potential ways forward based on their independent position and experience on the respective positions of SPT and ANSTA.

The Partnership should also note that the existing Subway service continues to be maintained daily despite the scale of the work being undertaken each day, and this in itself continues to present challenges. However, SPT is committed to keeping a service running recognising the invaluable role the subway plays in the transport network.

3.5 Technical Support and Spares Supply Agreement (TSSSA)

The TSSSA contract has continued to require close monitoring of their performance; this led to an escalation to Project Board and a request for ANSTA to provide greater leadership and accountability from the TSSSA team. Following this intervention, the key workstreams of Team Collaboration, Spares and Supply Management, Performance Management and Reliability Growth have seen improvement from ANSTA.

3.6 Organisational Change and Employee Relations (including Operational Readiness)

Efforts continue to ensure Subway Modernisation operational readiness plans align with upcoming significant changes to the current operation. Current focus remains on readiness planning for new train testing starting in the tunnels (mainline testing).

Activity to ensure our processes and people are ready to facilitate the safe access and testing of new trains in the tunnels for testing is progressing well. The following summarises key readiness progress since the last update:

- Authorisation & Certification
 - Engagement with the Office of Road and Rail (ORR) has continued on regular basis with quarterly reviews and notification requirements for mainline testing agreed.
- Rules, Regulation & Procedure
 - The new modular Subway operational rule book has now been introduced, which comprises 10 modules. The modular rule book was briefed out to all staff required to follow the rules to undertake their duties. Auditing the efficacy of the briefings with the staff is ongoing.
 - Review of risks associated with testing the new trains in the system whilst undertaking maintenance, facility management and project work has been completed. This has generated a set of mitigation measures which will allow for the introduction of Live Line Possessions (LLP). LLP refers to the status of the Subway when trains are being tested on one circle while on the other circle, we will have people undertaking work during Engineering Hours (night time). This is the biggest single change to staff and contractor working practices since the last modernisation, if not prior to that.
- People, Resources and Structures
 - Part of the successful roll out of the new modular rule book required two new roles to be created within the Subway. The role of Person In Charge Of Possessions (PICOP) and Person In Charge Of Isolations (PICOI) have been introduced following training and briefing. These new roles strengthen the safe system of working which is in place when undertaking work in the system. This is a key change to working practices within the system.
 - New vehicle 'train the trainer' courses have been undertaken and these training courses have provided the SPT training team with a wider understanding of the maintenance activities related to the wheels, bogies and coupler. A number of further courses are planned in the coming months.
 - The Fleet Reliability Action Plan for the legacy fleet is underway and is utilising internal expertise as well as key external contractors to keep the

current rolling stock available for service. The wheel lathe was recently accepted into use and is used as part of the wheel profile management.

- Competence, Development & Engagement
 - The development of breakdown recovery for failed or broken-down test trains has progressed, testing of recovery of the new train utilising the new battery locomotives occurred on Sunday 5th December 2021, prior to mainline testing commencing. Further documentation, equipment and training related to the rerailing of the new fleet is in the process of being finalised with detailed discussions ongoing.
 - Training ahead of immediate project milestones has now been completed by ANSTA and SPT has rolled that training out to all relevant staff. Additionally, SPT continues to push ANSTA for increased clarity related to training course delivery ahead of future project milestones.
 - Two Maintenance personnel remain on full secondment to ANSTA in support of the TSSSA and off-line train testing and commissioning. Discussions continue with ANSTA to achieve similar staff secondments or early access opportunities for the control and signalling systems although there has been limited progress given the ongoing restrictions and delays in the MSA delivery.
 - Five Maintenance apprentices are due to complete their studies in January 2022 and will then become part of the wider workforce, the remaining two apprentices are due to complete in January 2023. At present all apprentices are aligned with specific teams within the roster and are gaining on the job experience.
 - Efforts to reduce the impacts to training from COVID-19 restrictions continued with more in-house training material being moved to online courses. This is being undertaken by SPT trainers after becoming competent on the appropriate software packages. With a loosening of restrictions, it has been possible to re-start some in-person training to maintain competencies but class numbers remain limited and previously reported work-arounds and mitigations remain in place.
 - Employee engagement across Subway continues. Staff newsletters communicating modernisation updates have been issued as part of a regular programme. Staff continue to be actively involved and engaged on the development of new processes and procedures and associated live trials and test exercises. Modernisation remains very visible to staff through ongoing works in the depot and stations. A staged communication plan for the route to mainline line testing 'go live' has been established and is currently being rolled out.
 - Trade Union and Safety representatives continue to be regularly briefed on progress as part of our standing local Information and Consultation of Employees (ICE) meetings and Safety Committee.
 - Routine liaison with the Department for Transport, Transec, British Transport Police and the Fire Service has continued and briefings on upcoming changes from system testing will be delivered over the summer.

3.7 Programme budget

Within the overall Subway Modernisation budget of £288.7m, the 2021/22 budget was set at £17.1m at the Partnership meeting on 12 March 2021. As reported to the most recent Strategy & Programmes Committee, this remains the outturn forecast for 2021/22.

To date, £181.7m has been incurred against the total budget of £288.7m on the programme. As previously noted the remaining programme budget, including contingency, will be required and utilised solely for the delivery of the MSA contract and associated programme support costs.

Overall, the Subway Modernisation capital programme remains within the approved budget, including programme contingency and available funding.

4. Conclusions

In conclusion, progress continues to be made across all Subway Modernisation workstreams although COVID-19 has had, and continues to, have an impact on progress, as detailed in the report.

5. Partnership action

The Partnership is recommended to note:

- the continued progress made on all Subway Modernisation and improvements since the last written update to the Partnership in June 2021, despite the ongoing impacts of the COVID-19 pandemic;
- ongoing progress on the MSA contract;
- continued challenge towards performance improvement on the TSSSA contract;
- impacts and potential further delay and claims to both MSA and TSSSA contracts from COVID-19 as a Force Majeure event;
- the ongoing discussions with ANSTA to press delivery and resolve discussions relating to MSA claims and delays;
- progress made on operational readiness and delay mitigation actions including existing infrastructure and fleet maintenance improvements;
- the modernisation programme remains within overall budget and funding; and
- that a further report on progress will be presented to a Partnership meeting in June 2022.

6. Consequences

Policy consequences	<i>The Subway Modernisation is a key objective of the Regional Transport Strategy.</i>
Legal consequences	<i>Reported delays and any proposed mitigation will be managed in accordance with the MSA contract terms and SPT Governance.</i>
Financial consequences	<i>Overall the proposed works remain within the allocated capital and revenue budgets and Subway Modernisation business case.</i>
Personnel consequences	<i>No significant changes within this report although significant changes are expected in the future system migration stages and as the operational readiness programme continues to develop.</i>

Equalities consequences

None within this report.

Risk consequences

COVID-19 and ANSTA delays impact to forward modernisation delivery, operational service delivery and budgeting. Impacts and risks are under assessment based on available information and mitigations are being continually reviewed and defined as required.

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Strathclyde Partnership for Transport

Subway Modernisation Update



Glasgow Subway

First of all...Happy Birthday to us...

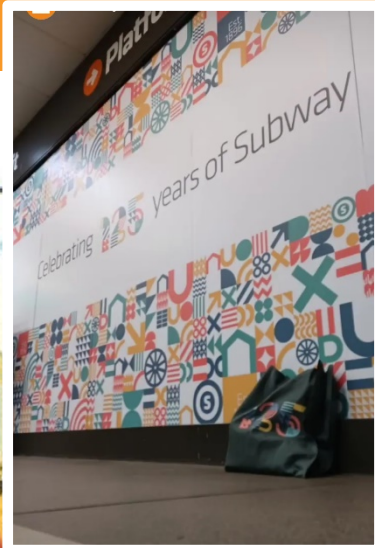


GLASGOW DISTRICT SUBWAY

ROUND THE CITY IN HALF AN HOUR

THE ONLY UNDERGROUND CABLE RAILWAY IN THE WORLD
 NO SMOKE. NO STEAM. PERFECT VENTILATION.
 CABLE SPEED FIFTEEN MILES AN HOUR.
 2½ MINUTES STATION TO STATION.

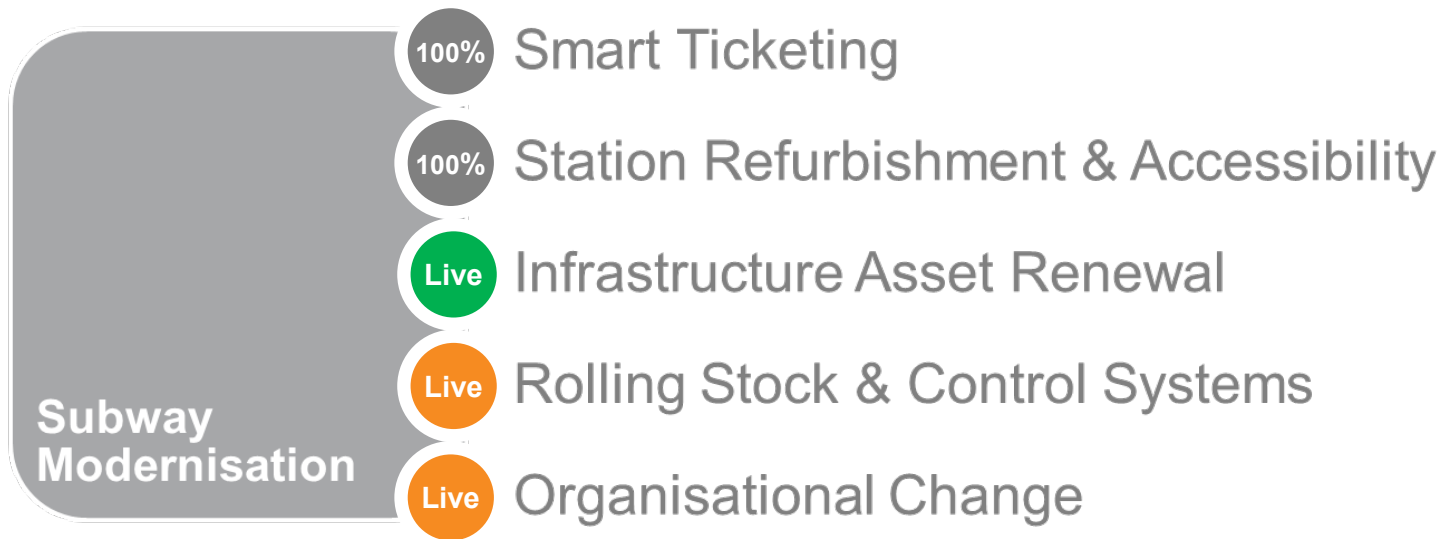
FARE, 1d. AND 2d., ACCORDING TO DISTANCE.
 NO NEED FOR TIME TABLES, TRAINS EVERY FEW MINUTES, WITH PERFECT REGULARITY.
 ↕ ROOMY AND COMMODIOUS CARS. ↕



1896
14 Dec

3rd
in the
World

Mitigate
Bridge &
City Road
Congestion

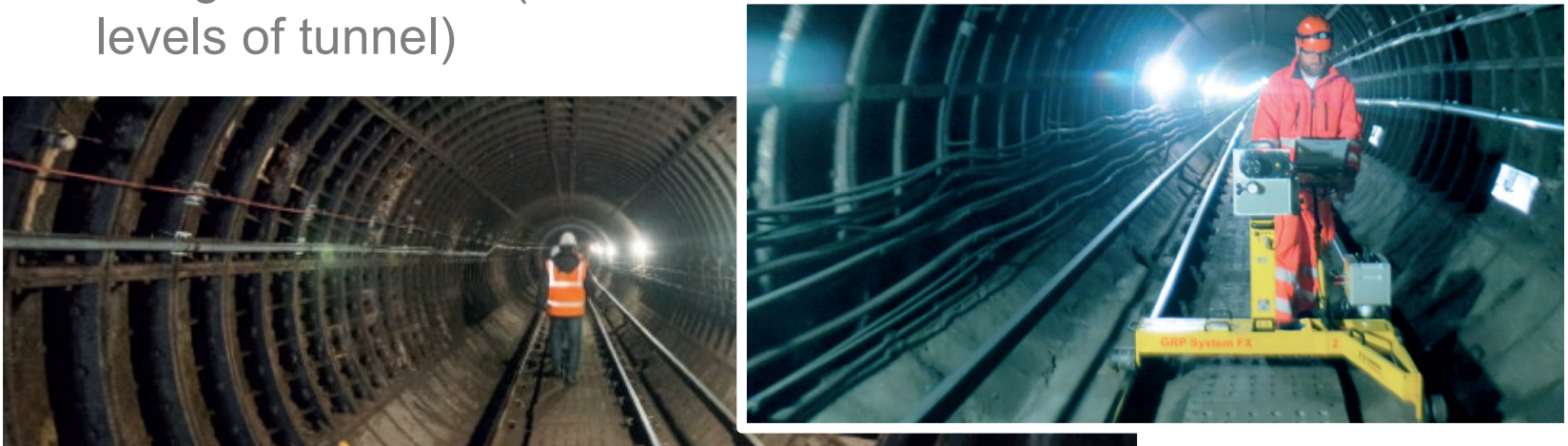


- ❖ Lots of progress despite the Covid-19 challenges with the ongoing design and implementation of the required changes
- ❖ No operational closures, at all, due to Covid-19
- ❖ Ideally, a site visit would've been arranged, but images will do...

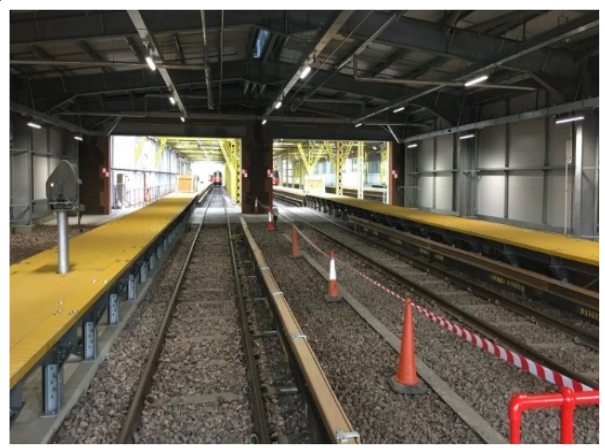
❖ Tunnel Lining Improvements



❖ Gauge Clearance (lower levels of tunnel)



❖ Stabling Shed extension



- ❖ Train Wash and Automatic Train Inspection
- ❖ Ramp Retaining Walls remedial work



❖ Underfloor Wheel Lathe



Glasgow Subway

Rolling Stock and Control Systems



- ❖ Off line dynamic testing of first three trains complete
- ❖ Pre-Mainline Testing – Tunnel entry exercises 5th December 2021



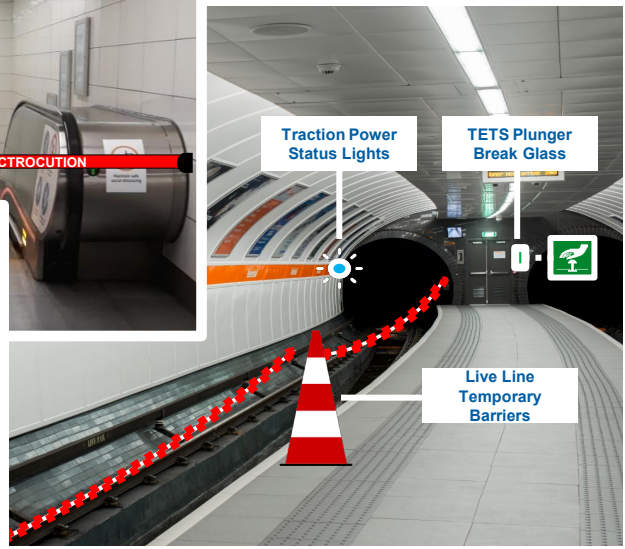
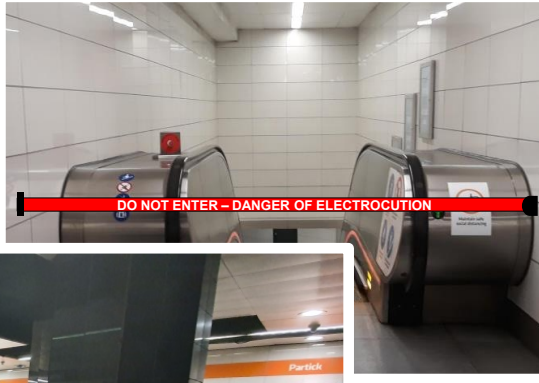
Glasgow Subway Rolling Stock and Control Systems



❖ Train Manufacture recommenced



❖ Live Line Possessions – process and training / briefings



❖ Modular Subway Operational Rulebook complete (x10)



❖ Other activity...

