On Track to Safer and More Reliable Metros
by ST Engineering

Millions of people rely on rail for their daily commute as urban metro systems are the backbone of public transport systems around the world. As a transport means, they are efficient, fast and cost-effective. Yet it is also essential that rail transport remains safe and reliable.

With safety consistently regarded as the most important aspect of transport systems, prioritising the well-being of passengers and staff is key to safe and sustainable metros. This is followed by transport efficiency, for which a reliable and dependable mode of transport is expected of operators and transport authorities.

Rail reliability is another challenge that global rail operators have to deal with, particularly for those with ageing rail systems. To overcome this, the digitalisation of rail systems and solutions by leveraging artificial intelligence, Internet of Things, big data and advanced analytics is vital.

ST Engineering's Smart Metro systems offer cutting-edge solutions that make rail networks safer and more reliable. Here's how they work:

Platform Screen Doors
In 2019, more than half (61%) of 802 railway fatalities across the EU involved unauthorised persons on train tracks. There are many reasons these people ended up on the tracks. Without a physical barrier to separate commuters from the tracks, commuters remain unprotected from the hazards of oncoming trains and electrified tracks.

With Platform Screen Doors (PSDs) which are important passenger safety devices that are increasingly installed along train platforms to serve as barriers, unauthorised and accidental track intrusions are minimised. However, traditional fixed PSDs work well only in stations where trains have similar distances between doors. They do not work for metro lines that serve multiple train types with different door pitches.

ST Engineering's Variable Pitch Platform Screen Door (VP-PSD) which can dynamically shift its doors to fit different train door configurations across a diverse fleet of trains operating on a single line, may just be the solution. The first such design in the world, the VP-PSD can be incorporated into both existing and new platforms, enabling rail operators to improve commuter safety and comfort.

Variable Pitch Platform Screen Door

Passenger Information System

Smooth passenger flow is critical to the operational efficiency of any metro network while fast information dissemination is important to ensure safe routing especially during metro incidents. An information system that displays real-time train schedules and directions can help to provide commuters a less stressful experience as they navigate the metro stations and rail networks.

Passenger Information Systems (PIS) provide useful train journey information and announcements to commuters. Within the trains, useful trip information such as route progress and next-stop information can be displayed, while commuters can view train arrival timings, passenger crowd data and advertisements at the station platforms.

During emergencies or situations such as a major train system fault, the PIS serve as critical communication tools that relay important information to facilitate the safe evacuation of passengers and guide them to alternative transport.

Passenger Information System

Redefining Asset Maintenance Intelligence

Thousands of components go into a train system and component failures could result in glitches, ranging from minor incidents to major breakdowns. While keeping track of every component is an onerous task, it is vital to ensure that no aspect of rail maintenance is overlooked so that metro systems continue to be safe to operate with minimal downtime and disruptions.

To prevent such occurrences and enhance the reliability of rail services, the Enterprise Asset Management System (EAMS) offers a one-stop solution for the complete life cycle management of rail assets across the entire network.

Leveraging artificial intelligence and data analytics, the system enables performance tracking for optimal asset maintenance – eliminating operational downtime and reducing cost of maintenance and operations. It offers full visibility of fault analysis so that rail operators are able to detect and prevent faults even before they occur. Rail operators are also able to conduct predictive maintenance based on availability, utilisation and performance measurements. This helps to extend the life cycle of rail equipment and assets, while minimising disruption to train operations, resulting in safer and more reliable rides for commuters.

Enterprise Asset Management System

Command, Control and Communications System

Tying these solutions together is the Command, Control and Communications (C3) system, which provides complete visibility and situational awareness of the entire metro line. The heart of a smart metro system, the C3 system ensures that every aspect of the rail system's safety and operations is visible to the controllers so that swift and informed decisions can be executed seamlessly and conveyed down the command chain.

By connecting multiple control systems together, the C3 system enables seamless integration of modern metro operations using a powerful suite of modular software and interface systems. This yields the synergies of combining interoperable systems for enhanced operations and insights across operations control centres, depot control centres, stations and plant management systems, and more. With cybersecurity at its core, critical systems are also actively protected from advanced cyberattacks.

Command, Control and Communications System

A safe and reliable rail transport network is the cornerstone of the future of urban mobility. Ensuring its seamless and uninterrupted operations will greatly contribute to a more efficient, connected and sustainable public transport ecosystem.

Learn more about ST Engineering's suite of AGIL Smart Metro Solutions.