FRAUSCHER

Track more with less.

Case Study | CA

Toronto Transit Commission

Requirements

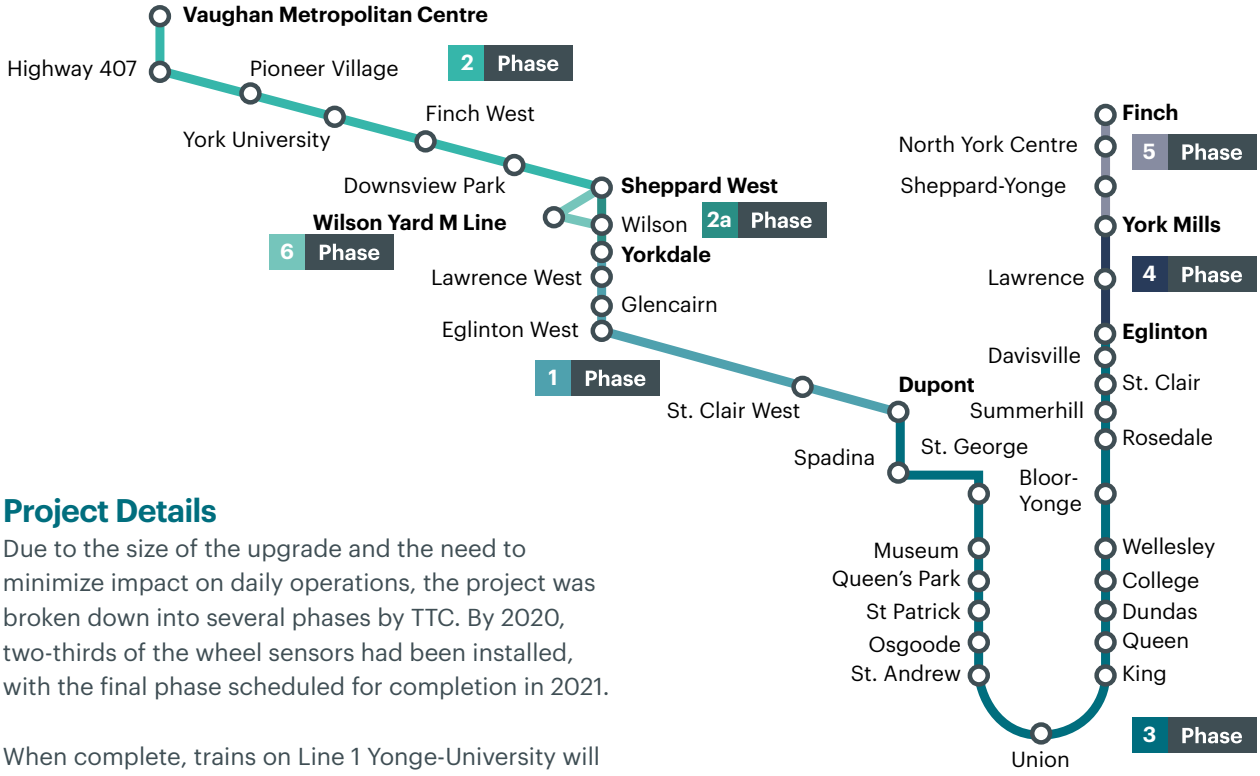
The Toronto Transit Commission (TTC) Line 1 Yonge-University is Toronto's longest subway line, with track circuits utilized for signaling. Over the years, the number of daily passengers has greatly increased, and as the system aged the need for upgrading became readily apparent. A requirement of TTC was that the upgrade activity must not interfere with the operation of this busy commuter line, and that the new signaling system must function independently of the existing system. It would provide CBTC fallback functionalities, and work as an overlay to the current track circuit-based system.

Solution

Frauscher entered into discussions with TTC to consider the benefits of Frauscher axle counters for this application. The transit needed to gain experience and further knowledge as to how the product would perform, so Frauscher offered a test trial for TTC to assess compatibility with their existing system. The trial also allowed them to test performance under conditions typical for the area, such as cold temperatures, ice, snow and road salting. Frauscher installed two RSR180 Wheel Sensors to work with the ACS2000 Axle Counter. Although the scope of the test was small, TTC was able to experience how quickly and easily the system could be installed, answering their requirement that operations not be affected due to installation. During the trial period of more than a year, there were zero miscounts recorded.

Benefits

Per customer requirement, the wheel sensors and axle counters were installed without interfering with the track circuits already in place. Mounting of the wheel sensors was completed quickly, due to the use of the Frauscher rail claw. The rail claw is attached in about five minutes, without drilling the rail. Eliminating drilling accomplishes several things: the rail itself is not weakened, insulated rail joint bonds that are expensive to install and maintain are avoided, and significantly less time is spent on track for installation and required maintenance. All time frames for installing the new system were met, and operation of the line was maintained during installation with minimal restrictions. The new system benefits from additional functionalities of the ACS2000, such as Counting Head Control CHC and the Frauscher Diagnostic System FDS.



Project Details

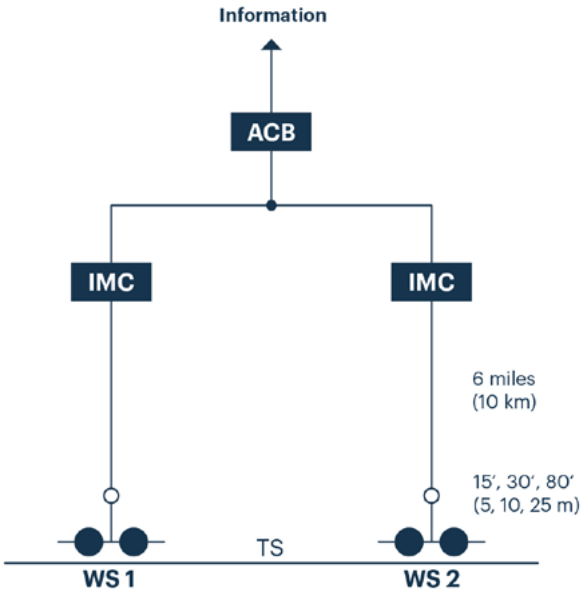
Due to the size of the upgrade and the need to minimize impact on daily operations, the project was broken down into several phases by TTC. By 2020, two-thirds of the wheel sensors had been installed, with the final phase scheduled for completion in 2021.

When complete, trains on Line 1 Yonge-University will be detected by 603 wheel sensors, which will form 469 track sections. The indoor equipment of the ACS2000 will evaluate the data in 31 cubicles located along the line.

Increasing system availability

The ACS2000's cost effective operation is further enhanced by use of optional add-on functionalities that increase reliability and uptime of the entire network. The Counting Head Control CHC functionality was developed to manage specific situations that frequently occur on urban and mass transit lines, such as metallic debris that can interfere with the system due to the wheel sensor's inductive working principle.

CHC was integrated on Line 1 to avoid false counts due to unexpected damping. If adjacent track sections are clear, the counting head is switched to standby mode. In this state, a configurable number of false presence detections can be suppressed.
As a result, no faults or occupied indications are generated from short-term damping like floating metallic debris or a steel-toe boot. If a train approaches the adjacent track section, the stand-by mode will be deactivated, resulting in normal train detection and occupancy status. This maintains the fail-safe operation of the system.

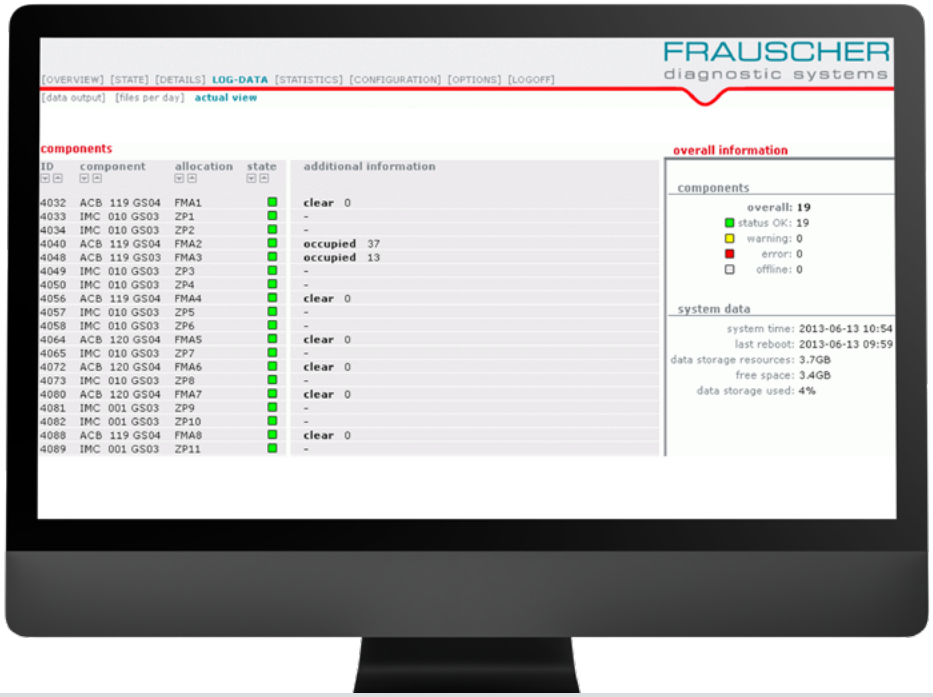


ACB	Axle counting board	**TS**	Track section
IMC	Evaluation board	**WS**	Wheel sensor

Smart maintenance system

The Frauscher Diagnostic System FDS supports operators in planning and conducting maintenance tasks. Via remote connection, the status of the entire axle counter system can be displayed in real time.

The FDS provides the operator with the tools needed to conduct focused preventive maintenance activities, for example the ability to pinpoint specific fault areas that require operator attention. It gathers information locally from the ACB and IMC with network access to the FDS, allowing remote access diagnostics and maintenance. The information provided by the FDS ensures that maintenance work is focused on areas of need, leading to a reduction in maintenance costs and worker time on track. FDS was initially implemented at one location along Line 1. From this single cubicle, information is distributed to various devices within the TTC network providing maintenance staff with a real time view of the system's health.



Operator	TTC	**Wheel Detection**	RSR180
Partner:	Alstom	**Country:**	Canada
Scope of Supply:	Delivery of pre-mounted and pre-wired cubicles Delivery of pre-mounted wheel sensors Trial system	**Segment**	Urban & Mass Transit
Scope of project	603 Wheel Sensors 469 track sections 31 cubicles	**Application**	CBTC secondary system
Axle Counting	ACS2000	**Project start**	2015