Queensferry Crossing

traffic signals, management systems and enforcement camera technology

Dynniq recently completed a project to aid in the efficient and safe movement of traffic using the very latest in traffic signals, management systems and enforcement camera technology.

Background

Designed to release the burden of motorised traffic from the Forth Road Bridge, the new 1.7 miles (2.7km) publicly-funded Queensferry Crossing is the biggest infrastructure project in Scotland in a generation and will replace the Forth Road Bridge as the main road route between Edinburgh and Fife, carrying 24 million vehicles a year.

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As the longest three-tower, cable-stayed bridge in the world, the Queensferry Crossing will take the vast bulk of the current traffic load and, unlike the Forth Road Bridge, is expected to remain open in all but the most extreme weathers. The Forth Road Bridge will become a Public Transport Corridor to be used by buses, taxis, some motorcycles, cycles and pedestrians.

Providing a safe and efficient link between the City of Edinburgh and Fife for over 24 million vehicles a year called for technologies which could effectively manage traffic flow, deliver traffic count data and provide enforcement in the locality.

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Traffic signals

Working for Forth Crossing Bridge Constructors (FCBC) between June 2015 and August 2017, Dynniq carried out the installation and commission of 15 ELV Traffic Signal sites for the FRC Principal Contract project.
The sites are situated both North, (Fife Council) and South (City of Edinburgh council) of the New £1.35 Billion Forth Replacement Crossing project consisting of the Queensferry crossing and major trunk roads and high profile locations.

Working to tight timescales to minimise the duration of road closures, some of the signals had to be installed under temporary and full road closures. Also included in works was the installation of over 150 inductive loops which were installed in the base course of road surface.

During the course of the signalling works, Dynniq, through installation of carriageway loops, facilitated 'count sites' at each of the signalling sites. These count sites provide data which tracks peaks and dips in traffic volume by the number of vehicles approaching the signalling sites and gives capability to adjust the signalling sequencing to better suit the traffic conditions. The traffic count data produced also includes average daily traffic volume, current and previous count for type of vehicle, direction of travel and distance between vehicles.

Works included – Installation of Traffic signal poles, signal heads, pedestrian equipment, associated above ground detection, controllers and associated cabling, inductive loops and feeder cables.

Traffic systems

Dynniq's extensive experience in delivering transport systems and understanding of user functionality requirements enables us to provide fit-for-purpose management tools.

In addition to providing the control and management for local assets the system will manage faults on connected equipment, support current and legacy equipment, support 'Multi – Node' SCOOT (Split Cycle Offset Optimisation Technique) and facilitate plan management including strategic plan selection.

Traffic lights running under SCOOT control, will be able to adapt to the traffic flow and maintain it at optimal levels via Dynniq's Urban Traffic Control System (UTC) and their Intelligent PTC-1 Traffic signal Controller.

Modern traffic signal control provides an important tool in the traffic manager's toolbox for managing the highway network and SCOOT is the world's leading adaptive signal control system that responds automatically to fluctuations in traffic flow through the use of vehicle detectors.

Traffic systems (Continued)

Many benefits are obtained from the installation of an effective Urban Traffic Control system utilising SCOOT, both reducing congestion and maximising efficiency which in turn is beneficial to the local environment and economy.

- World leading adaptive control system
- Customised congestion management
- Reductions in delay of over 20%
- Maximise network efficiency
- Flexible communications architecture
- Public transport priority
- Traffic management
- Incident detection
- Vehicle emissions estimation
- Comprehensive traffic information

The installed UTC system will deliver a time tabled operating 24X7 live performance adapting control system, empowering the operator to manage the network via Dynniq's user friendly interfaces.

Traffic enforcement solutions

The Forth Replacement Crossing project in Scotland incorporates intelligent transport systems, including the introduction of variable mandatory speed limits on the M90 and M9.

In order for the network to operate safely, drivers are required to comply with variable mandatory speed limits (and the national speed limit) displayed on overhead signals.

Following a procurement exercise the speed enforcement system chosen by Transport Scotland was the Dynniq HADECS3 system. This was developed with Highways England to support the implementation of mandatory variable speed limits on selected motorways. It combines radar technology for speed detection, cameras for image capture, and data encryption techniques to ensure safe and secure transmission of evidence files.

Traffic enforcement solutions (Continued)

The Dynniq HADECS3 solution provides a digital enforcement camera system capable of enforcing variable mandatory speed limits in single and adjacent multiple lanes. The system comprises **in-station** and **out-station** equipment and has been developed and tested in accordance with the requirements of the UK Home Office Type Approval.

An External Aspect Verification (EAV) system, located upstream of the camera site, uses optical recognition techniques to automatically adapt to changes in the displayed speed limit. The system uses radar technology to track the speed and position of all vehicles passing the camera site. A speeding vehicle will trigger one of the system's lane-based cameras, and an evidential package is created and transmitted in a secure, encrypted format, to the in-station. The evidential package is then de-encrypted at the in-station where, using our innovative non-intrusive method, a secondary speed check is performed, and the offence is then processed.

In developing HADECS3 Dynniq built on its experience with previous versions of the system, to create a system which incorporates a number of technical and architectural advancements including the ability to enforce multiple lanes, the ability to enforce speed limits displayed on advanced motorway indicators.

The removal of the interlock between the camera system and the signals, and the provision of a secondary speed check system which requires no white lining on the road surface. The system also supports a range of remote diagnostics which reduce the requirement for working at height at the roadside during maintenance.

Dynniq has successfully installed and commissioned a HADECS3 system at a pilot site on the M90, together with an in-station at the offices of Police Scotland. The pilot site has been successfully acceptance tested and handed over to Police Scotland, and Dynniq is currently in the process of installing five further sites. Going forward Dynniq will be providing a full maintenance service for the installed systems for Transport Scotland.

The project represents a successful collaboration between Dynniq's national and local teams, local SMEs, and Transport Scotland.

The systems will support the enforcement of variable mandatory speed limits on the FRC scheme, which are designed to keep traffic moving for the benefit of all road users, providing more reliable journey times and reducing congestion.

Images reproduced courtesy of Transport Scotland

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