

The Scottish Road Works Register *Helping Avoid Disruption*

For many years, the entire community of roads authorities and utilities in Scotland have co-operated in using a joint system, and benefited from a centralised register of road works activities.

The application of the latest GIS technologies has added further benefits, and is opening up the opportunities for a new era in the management and co-ordination of street works.

Not only can this provide improved efficiencies in utility and roads authority operations, but can significantly reduce the disruption impact on the travelling public.

The Centralised Register

There is a statutory duty for authorities to maintain a road works register, and for this to be available for inspection by members of the public as required.

The register has traditionally provided the source of data for roads authorities to fulfil their duties to co-ordinate works, minimise traffic disruption, and monitor the quality of the works that are carried out. In Scotland, the existence of a centralised register has enabled a far wider scope to be considered for the system, including:

- encouraging the development of standards and “best practice”.
- holding records of damage caused to plant and equipment.
- reporting faults that are detected on the network, e.g. defective ironworks.
- offering a conduit for requests for exchange of plant information, in advance of works, to minimise the risk of damage to existing installations; including the public “Dial Before You Dig” service.
- providing a single source of national statistics, including comparative information.

Many of these formed part of the SRWR for years, but a number of factors have caused a re-evaluation of requirements. Perhaps the two most important influences have been:

1. the new Transport (Scotland) Act, which will demand an increased focus on improving the effectiveness of road works and minimising public disruption, under the auspices of the The Scottish Road Works Commissioner.
2. the continuing emergence of technologies which can make possible the achievement of these objectives in ways which were previously not viable.

Tracking & Monitoring Works

The life-cycle of the works is controlled and monitored using a series of notices, which the works promoter issues to enable all affected persons to be fully aware of planned and actual activities.

With volumes of up to 10,000 notices each week, monitoring works is a daunting task, requiring sophisticated exception reporting facilities within the Register to make it viable.

Facilities are available to prompt for when planned activities should start and end, when statutory timeframes are about to be exceeded, and when defects have been detected in the work that is carried out. An automatic monitoring system ensures that each activity is progressed to conclusion.

Smooth Transition to the new SRWR - On Time

During 2005, Symology was awarded a five-year contract for operating the Scottish Road Works Register, including provision of the software functionality to deliver the objectives. The new SRWR system was introduced nationally across Scotland, on time, in April 2006, and included enhanced functionality and full GIS facilities. This has already added many further benefits, and is offering the potential for an even more exciting future.

The entire implementation project went remarkably smoothly; a credit to those involved. The contract was let by Susiephone Ltd, an organisation set up under the control of the Scottish Executive for management of the Register.

The project was monitored by an Implementation Team, comprising the Contracts Manager, selected representatives of Scottish roads authorities and utilities, and the Symology Management team.

The most important factor in the success was the excellent relationship that was established between all team members, based on openness and trust. Robert Scotson, Susiephone Contract Manager, commented after the implementation ***“Our dealings with Symology were like a breath of fresh air. The professionalism with which the project was handled made a complex task so much easier to handle.”***

A Comprehensive National Street Gazetteer

Scotland has achieved a notable success in being the first area of the UK to make full use of a GIS-based gazetteer of the roads for works monitoring and co-ordination purposes.

Every Roads Authority in Scotland has created a gazetteer, to Level III National Street Gazetteer standards, with road centre-lines based largely on data supplied by Ordnance Survey.

This method of linking the road centre-lines on the GIS, with the gazetteer records (and hence all the data associated with the streets) in the Insight database, enables the user to switch from map to database and vice versa, with full locational context. In addition to road centre-lines, the map can show details of areas of traffic sensitivity, engineering difficulties, and other special factors

Each organisation involved in the Register (a total of 33 roads authorities and 26 utility organisations) is able to identify the scope of their interest in the road network, either by an “area of interest” polygon, or by identifying the specific roads within the network. If the organisation is divisionalised, a separate area of interest may be defined for each division. This ensures correct notification of all relevant data, direct to the department concerned.

Software with the Latest Technology

The system is based on Symology's successful Insight system, which provides all the functionality to control the entire life-cycle of works, from pre-planning stage through to completion and post-works-inspection. In accordance with the current legislation and rules embodied within Codes of Practice, the system ensures that all events in the life-cycle are recorded in an accurate and timely fashion. For example, one of the fundamental requirements is to ensure that appropriate notice is given on works in potentially disruptive locations, so that plans can be made to minimise the impact.

With 900 registered users of the system, and up to 10,000 works events being recorded every week, the task of co-ordination is daunting. However, the latest technology aids this process significantly, with inbuilt mapping in particular making a major contribution. The GIS functionality is provided by:

- embedded mapping within the Insight system, using ArcGIS Engine supplied by ESRI
- latest Ordnance Survey mapping products
- Local Street Gazetteers

The Ordnance Survey products include both Raster maps and the latest MasterMap range. MasterMap is the underpinning dataset and is displayed at the lowest level of detail, whilst three different levels of Raster map are introduced automatically to replace the MasterMap background when viewing on a larger scale. There are plans to develop the system using the OS MasterMap ITN link TOID, referenced to the road name as an ASD record, to deliver a topologically structured roads network.

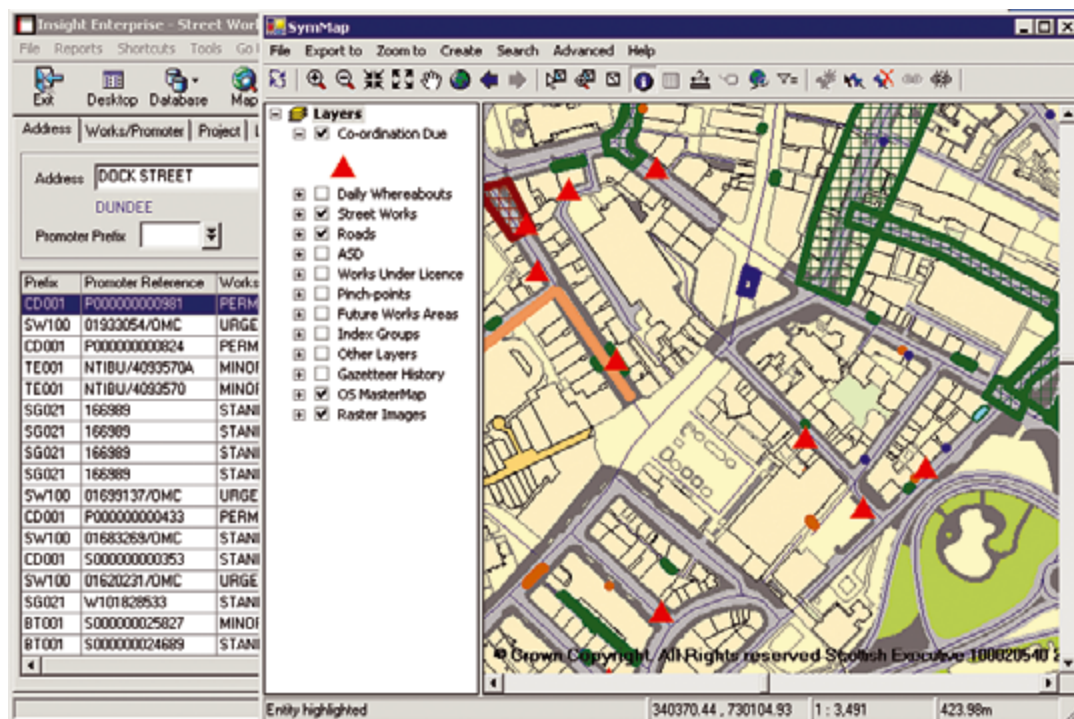
GIS based Co-ordination

The first major benefit of the GIS-based Register is in improved co-ordination. Works and other potentially disruptive events and activities (such as scaffolding, cranes, carnivals, marathons) may be plotted on the map, using a point, line or polygon to represent the extent of their impact.

Simply, being able to view these on the GIS, in itself, provides an aid to understanding their likely impact; however, much more is provided. As each new record is created or plotted on the GIS, the Insight system automatically checks the location against other records that already exist. For any with overlapping start/end dates, it generates a "map conflict", if one of the following criteria is fulfilled:

- The works are on the same NSG street.
- The works are within a user-defined distance of each other e.g. 100 metres.
- The works are both on streets within the same user-defined street group e.g. groups of streets representing one-way systems, priority bus routes, diversionary routes etc.

This provides the works promoter with automatic warnings at the time of planning the works. Similar warnings occur where there are planned resurfacing or re-construction works, to ensure that the excavations are all completed before the new road surface is laid. If the promoter does not heed the warnings, prompts are automatically raised within the appropriate roads authority. In the near future, the "potential conflict" concept will be extended further to take account of network routing information, and the impact on spatially-referenced pinch-points, such as focal points of congestion, major interchanges, etc.

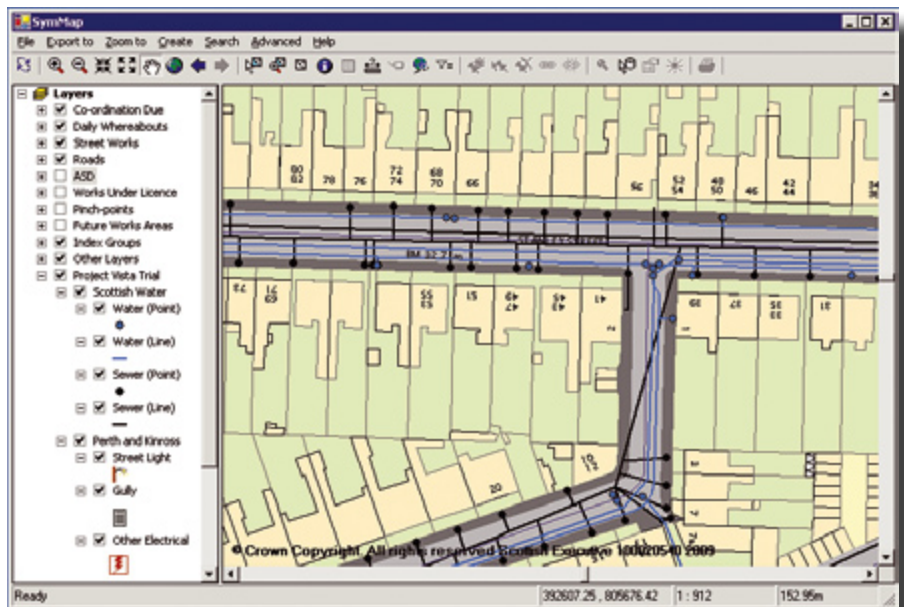


Current/Planned works are shown in green.
Potential Conflicts are highlighted as red triangles.
Historical works are colour coded by Works Promoter.

The Potential for Plant Protection

Following publication of the updated "Code of Practice for Recording of Underground Apparatus in Streets", most Statutory Undertakers now have detailed records of their apparatus and the majority of this is in spatial form, accessible from a GIS.

With the central GIS datastore at the heart of the SRWR system, this digitised plant information could be made available directly to all other users. The maps could be checked at the earliest stages of work planning, to find nearby plant. As a result, the risk of damage to other organisations' existing installations could be minimised. If the apparatus data contains depth information there is even the prospect of users being able to view 3D maps!



Example display of underground plant showing water mains, service connections, valves and stopcocks, together with sewers and inspection chambers.

The technology is available to fully meet this objective. There may be issues of commercial and political sensitivity related to sharing this data, and a clear need for the data providers to clearly state the level of accuracy and currency of the data they are supplying. However, it is confidently predicted that these issues can be addressed and it will be possible to provide the plant protection benefits in the near future.



Public Information System

New Codes of Practice highlighted the requirement for Street Works Register information to be published on the internet. The central approach of the SRWR provides an ideal opportunity to provide this as an information system for the whole of Scotland.

Symology developed a GIS-based Internet front-end for Street Works information, which provided the potential to be used for the SRWR. This system allows members of the public to view the current activities layer to see all current and planned activities that may cause disruption. Access to full historical works are also available to users by changing the date filters provided.

A future development path could be to provide a Web Feature Service (WFS) that allows the Street Works spatial content to be retrieved by third parties along with the related attribute information. This would really unlock the potential and make the data of benefit to a very wide range of consumers. For example, the Police, Ambulance and Fire Services could use the data in planning their routes to incidents to avoid major road works. There are many other potential users, including roadside recovery services, Transport & Haulage firms, Logistics and Delivery firms.

Symology Ltd
Head Office

Vanguard House, Cotswold Park, Millfield Lane, Caddington, Bedfordshire, LU1 4AJ, United Kingdom

Tel: +44 (0)1582 842626
E-mail: sales@symology.co.uk
<http://www.symology.co.uk>