

Pavement Management Solutions

## Decision Support

Insight provides an extremely powerful and comprehensive decision support system to assist in formulating optimum strategic maintenance plans for pavement and structural assets. All aspects of the system, from the definition and processing of condition survey data, through to the evaluation of cost/benefit ratios and determination of optimum plans, provide the flexibility to allow for national standards, accepted international models, and individual local requirements.

Self-learning concepts are embodied, to ensure that the rules and techniques are automatically reviewed and optimised in the light of experience. The longer the system is used, the more data becomes available, and the more valuable the resulting conclusions are.

## Highway Referencing and Asset Register

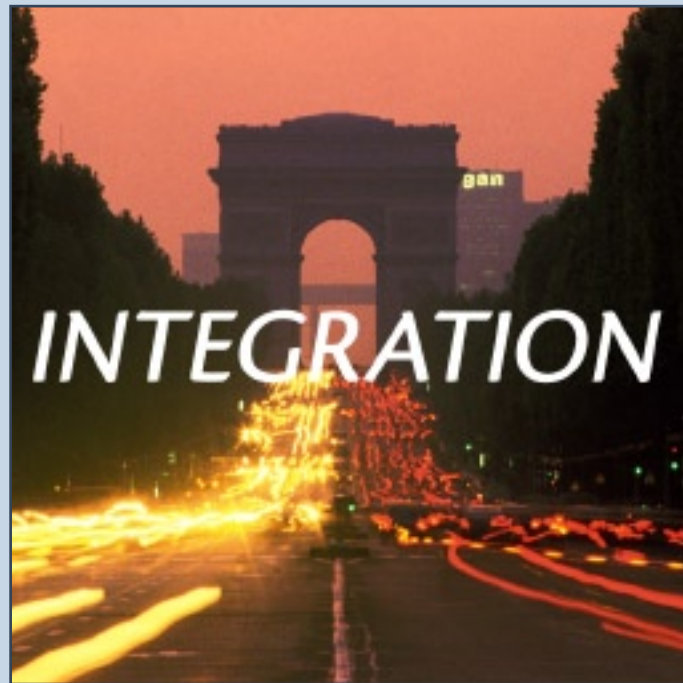
The unique design offers a single integrated system which will accommodate the full scope of highway management functions. This system allows integration of a basic street gazetteer with multiple overlaid alternative referencing models, and automatic translation from one to another. Thus, the most appropriate referencing methodology may be used for each requirement, whilst still retaining all the benefits of full integration. A comprehensive, user-definable, asset inventory is matched by powerful extraction and data manipulation tools for quantification and valuation purposes.

Another unique feature is the ability to specify "area of interest" zones, street-based routes, and "asset groups", on an ad-hoc basis. These groupings are entirely dynamic, and may be varied to meet new requirements as they evolve, such as the routes for planned surveys. This facility also makes it the simplest of tasks to compare the performance between asset types, or provide area by area and route-based analyses.

## Condition Evaluation

Condition data is generally loaded electronically, often based on measured distances along a defined route. There are many standard survey types, both visual and machine-based. In addition, the system allows user definition of individual surveys, together with associated interpretation and processing rules. Survey data collected over a long time period may be used in association with life deterioration models, an approach which smooths out errors in surveys and results in the most accurate assessments of current condition.

Condition is usually expressed as a set of individual measures, or indices, each reflecting one aspect of the pavement, such as surface, structure, and edging. Accurately interpreted and analysed condition data can, on its own, provide valuable information. Displays in strip-line form, or superimposed on a route-map, can provide a substantial aid to understanding and decision-making. Summarised results can be used for monitoring progress and ongoing performance, and form the basis of targets for the future.



## Treatment Recommendation & Selection

Automatic facilities are incorporated to evaluate the various indices of condition, and where necessary select treatments which are appropriate for the type of pavement. Estimating facilities, based on quantified inventory data, enable costs to be ascertained, and overall budget needs established. If Insight work management facilities are used, the estimates may be even more accurate as a result of being based on actual cost rates. Other factors, such as traffic management, disruption, and accident costs may also be built into the calculations.

In addition to the costs of treatment, it is also possible to evaluate the costs of non-treatment. Current condition data, together with historical deterioration rates, are used to project into the future, and determine likely costs as the condition deteriorates further. By also including the costs for routine safety maintenance until treatments are carried out, and allowing for cash-flow and inflationary effects, a benefit analysis ratio can be derived for each possible treatment. In this way, the treatment of different parts of the asset base can be compared, not only in terms of severity of current deterioration, but also in terms of "best value" allocation of funds.

## Budget Strategy

It is crucial not only to be able to justify budget requirements, but also to understand the precise future implications of any proposed strategy. Insight achieves this with sophisticated budget modelling functionality, enabling any number of alternative approaches to be considered quickly and easily. For each option, budget heads can be defined to represent different types of work, geographic areas, asset types, etc., and a planned distribution of total funds established over the required period of years.

Each asset treatment is automatically allocated to the appropriate budget head, and prioritised in accordance with condition or "best value" rules. Available funds are allocated in priority sequence until exhausted, and a year-on year projection carried out. These powerful options can be used to highlight the future effects of any given budget level. Performance measures, such as overall condition indicators, may be used to assess trends, ascertain whether the network will improve or deteriorate with the given budget model, and determine what level of funding is required to meet Transport Plan objectives

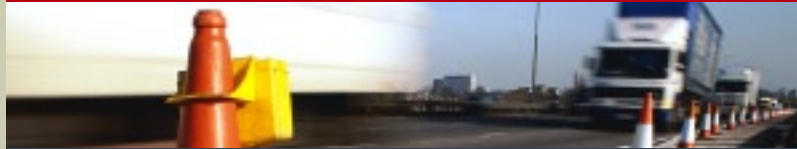
## Work Programmes & Scheme Definition

Once an optimum budget strategy is selected, interactive facilities are available for reviewing and adjusting the draft plans, based on engineering or political judgements as required. As each adjustment is made, its effects are automatically re-calculated, resulting in a finalised programme.

With the fully integrated Insight for Highways solution, elements of the work programme may be extracted, when required, into the Works Management system. The proposed works is transformed into a full scheme design, progressed through to completion and fed back into the Pavement Management system to register the effects of the scheme - a truly integrated system.

Insight for Pavement Management is designed specifically to provide best value solutions for the management of highways and associated assets. The power of the decision support functions provides the means of achieving maximum asset value at minimum cost.

Further modules of the Insight for Highways Solutions may be added to increase the benefits still further, and corresponding offerings from the Insight range are equally effective for other infrastructure assets, including Property, Grounds, and Street Lighting.



## Insight into Advanced Technologies

The Insight product range harnesses the best of leading-edge technology - not for its own sake, but to provide powerful, easy-to-use solutions which meet organisational objectives.

The sophisticated application of flexible data storage, and multiple network referencing technologies, is crucial in ensuring that all required data can be combined for determining optimum pavement management strategies. This provides the fundamental requirement to use alternative network definitions for different types of surveys, but it also enables data related to routine maintenance, utility works, customer service issues, accident records, and many other sources, to be considered as part of overall strategic planning. Multimedia files such as video footage, digital photographs, and scanned documents may be stored.

Advanced Windows ActiveX technology is used to provide sophisticated embedded mapping functionality, including the ability to plot inventory, works, accident records, and many other items. Transfer from the database and the map, in context, is instantaneous, and without the costs and overhead of providing a full GIS system on each user's computer. The ability to view a wide range of data, in map-based form, is invaluable in the planning process.

Insight is not only the most advanced system for optimising strategies; it provides powerful, effortless, ways of presenting information such as budget needs, objectives and asset management plans in a way which can be assimilated and understood easily by senior management. For example, current asset condition or capacity, and projected effects into the future of different expenditure models, can be brought to life by display in map-based form.

On-line enquiry results may be displayed in grids, with dynamic user selection of the precise information columns required. Data may be exported to office products for further processing, or in XML format. Using a generated XML style sheet, the embedded report layout designer provides seamless access to further filter the grid results, format the display, introduce graphics, produce totals and sub-totals, and collate/sort the data in any way required.



# INSIGHT FOR PAVEMENT MANAGEMENT

## Functional Overview

### Network Referencing

- Central Street Gazetteer
- Multiple overlaid sectioning
- Map co-ordinate referencing
- Route-based surveys
- Cross-Sectional Positions

### Condition Surveys

- Survey programme planning
- Visual and machine surveys
- Defect/Observation recording
- Standard and user-defined surveys

### Mobile Devices

- Latest technologies
- Multi-function devices
- Map-based functions
- Satellite positioning
- Digital photography
- Remote Web Services connection
- Symology-developed software
- Automatic server compatibility

### Strategic Maintenance Planning

- Service Level Targets
- Condition assessment
- Treatment selection
- Condition projection
- Life deterioration modelling
- Service level prediction
- Budget needs assessment
- Budget effects forecasting
- Alternative budget strategies
- "What-if" modelling
- Cost/Benefit evaluation
- Treatment prioritisation
- Best Value funds allocation
- Performance/Target monitoring
- Multiple rule-set options

### Maintenance Programme

- Interactive programme optimisation
- Programme effects forecast
- Interactive Scheme Design
- Works completion records

### Graphical Output and G.I.S.

- Gazetteer and Inventory maintenance
- "Area of Interest" definition
- Viewing/Plotting facilities
- Inventory, Defects
- Condition, Treatments
- Presentation of options/plans
- Seamless "in context" interface
- Graphical Stripline Display option

### Integrated Information

- Comprehensive Asset Register
- Pavement layer attributes
- Complete life history
- No duplication of data
- Condition Analysis data
- Treatment options
- Predictive modelling
- Structural Maintenance costs
- Planned Maintenance costs
- Ad-hoc/Routine Maintenance costs
- Customer Service issues
- Risk Management

### Universal Facilities

- Interactive map links
- Spatial Analysis
- Full module integration
- Inbuilt customisation options
- Intuitive user dialogue
- Customisable data display
- Office Products interface
- Access security
- Historical audit trails
- Performance Indicators

### Inventory of Assets

- Carriageway/Footway
- Pavement Types/Construction Layers
- Street Lighting and Furniture
- Safety Barriers & Guardrails
- Kerbing and Gullies
- Grassed Areas & Verges
- Bridges and Structures
- User-defined entities/attributes
- Comprehensive analysis tools
- Bulk updating facilities
- Accident records

### Areas of Interest

- Polygon plotting on the map
- Geographic view/update security
- Budget and work allocation areas
- Political boundaries
- Survey routes
- Divisional Office areas

### Optional Linked modules Works Management

- Estimating based on actual rates
- Bills of Quantity
- Resource requirement estimating
- Scheme Tendering processes
- Tender response evaluation
- Contract Terms Definition
- Schedules of Rates
- Works Ordering
- Activity Completion recording
- Contractor monitoring
- Actual/Estimated variances
- Control of variations
- Interim work measurement
- Post-work quality inspections
- Expenditure budgeting and control
- Completion feedback to PMS

### Ad-hoc and Cyclic Works

- Routine Safety Inspections
- Contract/Contractor Selection
- Contract Terms/Rates applied
- Works ordering & variations
- Bulk ordering for minor works
- Cyclic order generation
- Electronic orders/claims
- Completion monitoring
- Asset-based life history
- Routine Maintenance costs
- Service Utility works

### Customer Service

- Automated public information
- Public consultation process
- Telephone/Letter/Web interfaces
- Action-tracking and monitoring
- Dynamic escalation process
- Direct Inspections interface
- Service/Action scheduling
- History of public issues

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### Symology Ltd

Head Office

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

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