The perfect storm

Bentley Systems delivers StormCAD for the UK, which has been specifically designed to cope with our unique weather system

We always seem to be caught unawares by the weather in this country. We take delight in our mild, temperate climate but then, every so often, when we get a sudden drenching and the rivers overflow, bridges are smashed down, houses demolished and roads and towns flooded, we exhibit a general air of surprise and say 'well its never done that here before!' That's excepting those towns that lie on the banks of the Severn and a couple of other rivers, of course, which are flooded on a regular basis.

And therein probably lies the problem. Ours is a relatively small country and floods are pretty localised. It only needs that dense set of clouds to shift a couple of miles to the East, North or South, and its another valley devastated instead. We can't build flood catchment areas in and along every valley - nor can we in support of every new building project. But we can't just ignore it, either.

We need the best tools available to analyse areas deemed to be most at risk from flooding, and to model the relief systems designed to cope with untoward inclement weather. And, because the needs in this country are different to those in America, or even on the Continent, the software needs to deliver answers to the problems that we have been trying to solve since we built our first reservoir. Hence the recently released, UK flavoured version of Bentley's StormCAD.

STORMCAD FOR THE UK

Bentley Systems is at the forefront when it comes to providing software solutions for the infrastructure that sustains our world. The company's StormCAD V8i (SELECTseries 2) United Kingdom is a localised version of StormCAD, which is employed by thousands of engineers around the world to analyse and design storm sewer networks. It helps designers automate the optimisation of pipe and inlet sizes and invert elevations, and provides a means of calculating the sizes of catchments, gutters, inlets, conduit networks and outfalls. In addition to all of that, its intuitive interface simplifies both design and analysis, and its many time saving features allow project teams to focus more on engineering and decision making.

The hydraulics and hydrology in the new release (actually called StormCAD for UK) complies with all of the stormwater modelling practices and requirements of the UK. These include:

- the Modified Rational Method, recommended in the UK for computing peak stormwater runoff calculations from catchments during a storm event.

This was initially developed by UK-based water specialists, and uses four hydrological constants to determine rainfall intensity, namely SAAR - the Standard Average Annual Rainfall (in mm/yr); M5-60 - The rainfall intensity sixty minutes into a five year storm; r - the ratio between the M5-60 and the M5-2day storm intensity, and Soil - the rainfall acceptance potential of the soil.

If you are in the industry, you probably recognise these, and their source. Specific fixed values have been calculated for locations throughout the UK, and placed on hydrological maps - a database of over 4000 UK locations. I am rather intrigued by M5-60, which suggests that heavy storms occur in a particular location every five years on average, and that one hour after it commences is the time to seek shelter - or the optimal sampling time for the strength of the storm!

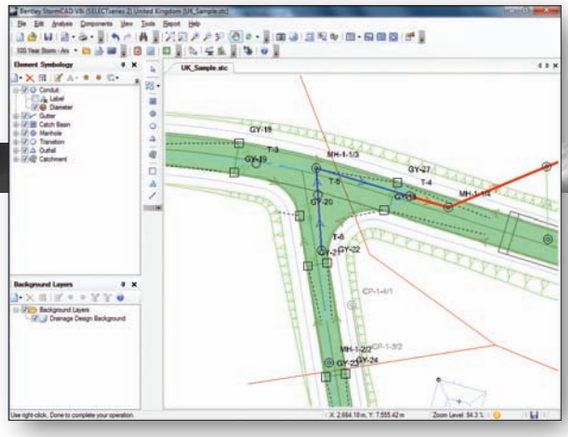
The storm data manager which computes storm intensities for any location in the UK

Other typical rainfall information is also used, combining statistical data from the Met Office, tried and tested calculations, and UK manufactured and sourced storm and rainwater equipment and constructions - more specifically:

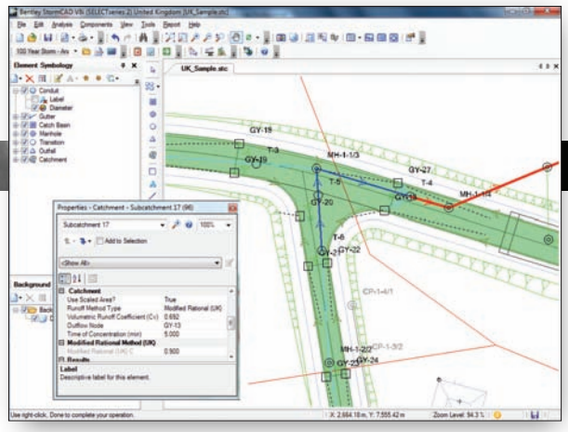
- UK intensity-frequency-duration rainfall information
- UK time-of-concentration and runoff coefficient calculation methods
- inlet capacity calculations based on HA 102/00 - Spacing of Road Gullies
- UK engineering libraries with pipe and inlet catalogues.

Malcolm Sharkey, Bentley product manager for StormCAD, said "Engineers and designers across the United Kingdom have been eagerly awaiting the release of StormCAD for UK. Its wealth of features and renowned ease of use have earned StormCAD its reputation as the ideal application for network analysis of pipe inlets and stormwater inlets. Every model building and management tool in StormCAD is designed to make our users' modeling tasks easier."

Sharkey continued, "StormCAD also uniquely offers users the freedom to work in different platforms, streamlining workflows. They can choose to operate



A sample model open in the StormCAD for UK stand-alone user interface



The Properties pane shows some of the data used in the Modified Rational Method calculations

it as a stand-alone product or within either MicroStation or AutoCAD environments."

The advantage of having a comprehensive but easy-to-use solution is that planners can play around with and manage a wide variety of scenarios, comparing unlimited numbers of what-if situations. These can range from applying different intensity storms to varying design approaches, with system capacity evaluations for multiple storm events capable of being held in a single file.

ModelBuilder, a major component of StormCAD, can be used to leverage data from virtually any source, including shapefile, database, spreadsheet and ODBC bi-directional connections. In addition, StormCAD can import and export MX Drainage or Micro Drainage data. To go with the new UK-focused edition of StormCAD, Modelbuilder has also been improved, with a new GIS-ID property that can be used for maintaining associations between records in a source file and elements in the model.

Other enhancements include:

- Oracle spatial support for ModelBuilder
- The ability to import subsets of data using 'where' queries, allowing users to filter the data to import only the information they need, without having to change the data from its original format
- Automatic creation of selection sets containing model elements that were either added or updated, and the ability to update the currently selected scenario or create a new child scenario during the data import process. Using a child scenario allows you to see the changes that were made by ModelBuilder during the last model -build operation.

Model Management is easier to use, as well, with quick and easy creation of prototypes for new elements by right-clicking any element in the drawing view and selecting the 'Create Prototype' menu option. Another new facility, the Merge Nodes in Close Proximity tool, automatically merges duplicate nodes and reconnects conduits.

More specific technical components include drawing review tools for connectivity consistency, including orphaned node and dead-end pipe queries and automatic topology review. The software can also use data extensions, including formula-based user data fields, and engineering profiles with automatic path selection.

Modelling results are comprehensive, with clear presentations of results using thematic mapping, and can be presented in clear and customisable tabular reports (FlexTables) showing network elements and combined pip/node information. Reports can be globally edited, filtered and exported in a number of formats, and can also cover scaled, schematic and hybrid environments.

StormCAD for UK can be used in conjunction with Bentley's ProjectWise V8i, enabling planners to manage StormCAD files using the ProjectWise project team collaboration system. It also supports Bentley's MicroStation V8i platform, meaning that all of the StormCAD tools are available from within the MicroStation environment. So. for example, users can design and analyse a storm sewer system and review results without leaving MicroStation.

It also comes with support for PowerCivil, a flexible 2D/3D tool, used by civil engineers, for land development and site modelling. If you are an Autodesk user, it will also support AutoCAD 2009 - StormCAD for AutoCAD.

Engineers and designers can lay out a drainage network with InRoads, GEOPAK, or PowerCivil, then import that network into StormCAD for further analysis. If the storm sewer design changes, an updated drainage file can be exported from StormCAD, then used to create sets of plans and profiles.

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