



BENTLEY SYSTEMS

A SOURCE OF INSPIRATION



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From buildings and bridges to clean energy and clean water, Bentley Systems has been sustaining some of the world's most significant infrastructure projects for close to 30 years

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When we think of infrastructure we tend to think about the hardware involved, be it the materials used or

the equipment and tools to bring structures and buildings to life. What we tend to take for granted are the software solutions involved and how crucial they are to the entire process.

A global leader in its field, Bentley is dedicated to providing architects, engineers, constructors, geospatial professionals and owner-operators with comprehensive solutions for sustaining infrastructure. Founded in 1984, the company has grown to the point where it now employs almost 3000 people in more than 45 countries.

At its core, Bentley's mission is to give its clients the ability to leverage information modelling through integrated projects for high-performing intelligent infrastructure. Since 2003, the company has invested more than \$1 billion in research, development and acquisitions in order to grow both organically and through successful takeovers.

The solutions offered by the company encompass its MicroStation platform for infrastructure design and modelling, its ProjectWise platform for infrastructure project team collaboration and work sharing, and its AssetWise platform for infrastructure asset operations. These platforms support a broad portfolio of interoperable applications and are complemented by global professional services.

Bentley's expertise and capabilities have seen it extend its reach into all manner of industry sectors, from power generation and

Finsch mine project, courtesy of
Petra Diamonds Limited, Lime
Acres, South Africa



Vale Cristalino Project, courtesy of SEI Engenharia Ltda, Canaa dos Carajas, Brazil

rail to utilities and communications. One area of particular significance is the mining and metals industry. It is here that the company has been striving to deliver solutions that will allow its clients to meet the unprecedented level of demand for raw materials from both the manufacturing and construction sectors.

Driven by the high commodity prices that have occurred as a result of this demand, the

industry's priority, at least in the short-term, is to obtain the necessary capacity required to bring as much raw material to market as quickly as possible. While it is doing so the company also incorporates the longer term view of overall sustainability of the industry and the environment as the resources get extracted and assets need decommissioning.

Bentley's mining and metals solution is

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compelling in that it offers both short and long-term benefits to help increase the efficiency of capital projects associated with the design, procurement and construction of mines and processing plants, as well as solutions for supporting the operations and maintenance of the built assets, and their subsequent decommissioning.

Addressing both the areas of mining and transportation, and ore processing and refining, what Bentley has found is key to bringing value is a combination of consistent, accurate and available engineering data across the lifecycle, coupled with the most comprehensive set of interoperable design and analysis tools. With these at a users' disposal they have a far greater chance of

their assets reaching optimum potential.

Bentley's mining and metals products expand across a wide spectrum of disciplines, from plant design, engineering and operation, land development to geospatial information management, water modelling and structural analysis. A major supplier to both owner organisations and EPC companies that serve this industry, Bentley can boast having ten of the top 20 mining companies, as measured by market capitalisation, as customers, including all of the top five.

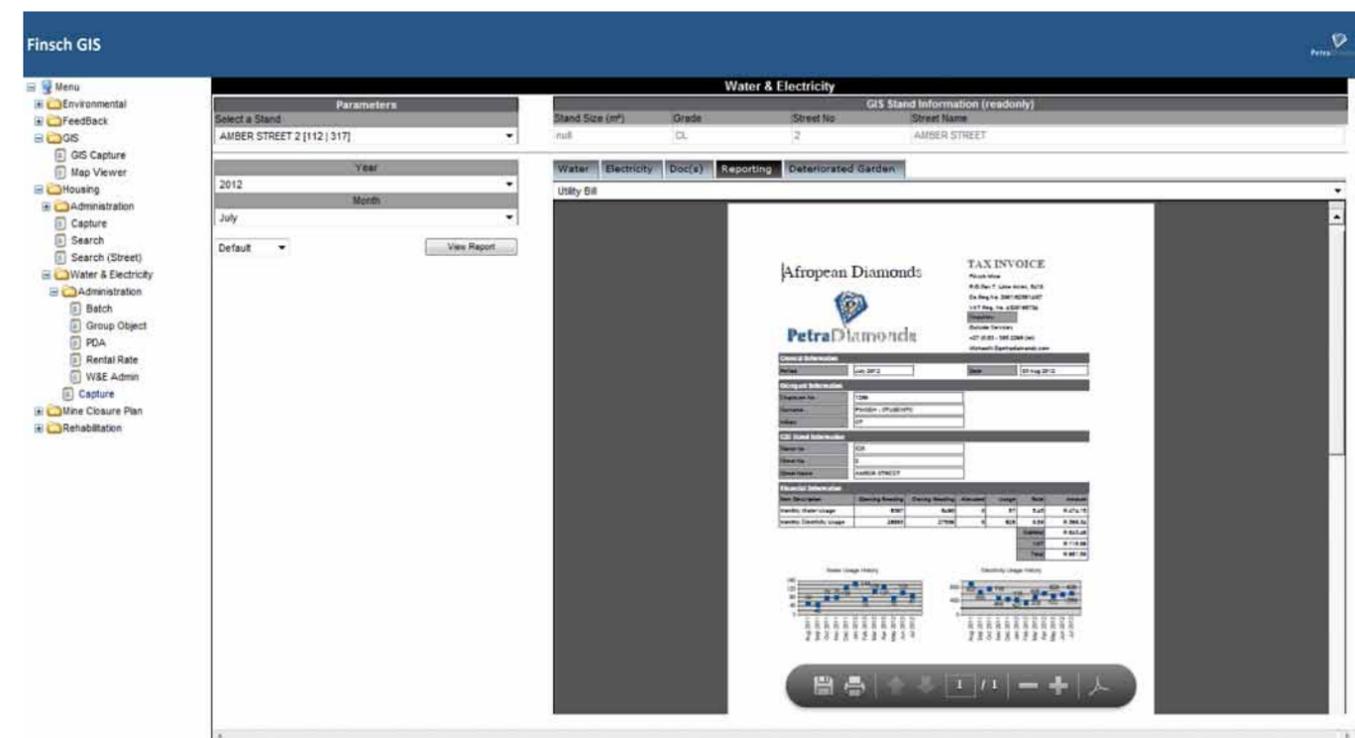
Bentley's success across the mining and metals sector over the last several years has been well documented through the innovative uses of its products by its users submitting to the Be Inspired Awards programme.

Recognising the world's most outstanding infrastructure projects, submissions are judged by a jury of independent experts who determine which examples best exemplify innovation, superior vision and a commitment to quality and productivity.

In the category of Mining and Metals, projects in Australia included, in 2011, the \$630 million crushing plant at Fortescue in Western Australia where modeling in

3D resulted in 30 percent time savings and overall cost savings of 20 percent. In 2012, AMEC fast-tracked project delivery at FMG's Cloudbreak ore-handling plant in Western Australia with rapid deployment of MicroStation, Structural Modeler, and Bentley PlantSpace to reduce steelwork drafting time by 31 percent. In 2009, the award went to the Hatch Africa, QMM Ilmenite Project in Fort Dauphin, Madagascar. The primary goal

“BENTLEY USERS HAVE ACHIEVED BOTH SHORT AND LONG-TERM BENEFITS THAT IMPROVE THE PERFORMANCE OF ENGINEERING AND CONSTRUCTION CAPITAL PROJECTS”



Finsch mine project, courtesy of Petra Diamonds Limited, Lime Acres, South Africa



Vale Cristalino Project, courtesy of SEI Engenharia Ltda, Canaa dos Carajas, Brazil

of this project involved the development of a productive ilmenite mine consisting of a mining extraction pond, dredger, wet plant and a mineral separation plant.

In order to improve workflows and reduce costs, Hatch deployed 3D plant design using MicroStation as the CAD platform and software including Bentley Structural, TriForma, PlantSpace and Bentley Navigator. The 3D models used reduced the number of 2D drawing deliverables and streamlined the steel fabrication and construction processes. This enabled the steel fabrication contract to be placed earlier than anticipated, improving the critical path of the construction schedule.

The winning project in 2011 was from SEI Engenharia, working on Vale's Cristalino

\$1 BILLION
 Invested in research, development and acquisitions since 2003

Project in Canaa dos Carajas, Brazil. The goal of this project is to build a \$2.6 billion copper plant that will produce 16 million tonnes per annum with average annual production of 340,000 tonnes of copper concentrate. As part of this undertaking, Vale contracted SEI Engenharia to perform front-end loading and deliver a 3D model.

This 3D model was used to advance the concept studies during the detailed design phase, which helped achieve the goal of accelerating project execution. In order to do this, SEI trained its design team to use Bentley software such as MicroStation, Bentley Architecture and Bentley Navigator to carry out the modelling of infrastructure, concrete and steel structures, substations and industrial

QMM Ilmenite Mine,
Fort Dauphin, Madagascar,
courtesy of Hatch Africa



installations. Ultimately, the integrated workflow that Bentley's solutions helped create saved approximately 5100 man hours and reduced front-end loading costs by \$400,000.

In 2012, Petra Diamonds Limited, Finsch GIS, in Lime Acres, South Africa won the Be Inspired Award for Mining and Metals. Located in the Northern Cape province of South Africa, the Finsch mine is operated by majority owner Petra Diamonds, which developed a 700,000 South African rand integrated spatial data management system to manage geospatial data for five departments that were functioning in isolation. The company also co-manages the mining town of Lime Acres, for which the GIS-based system captures data and bills residents for water and electricity usage. Survey and plan data are captured and digitized in MicroStation, with Bentley Map links features representing the mining lifecycle, town layout, and residential setup, and Bentley Geo Web Publisher makes the geospatial mining and town information accessible to the whole mining group.

Engineering professionals strive to shorten project schedules and lower operating costs through improved access to mission-critical information. Bentley users have achieved both short-term and long-term benefits that not only improve the performance of engineering and construction capital projects, but also increase the efficiency of operations for mines and metals processing and refining plants. **BE**

For more information about
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