

Industries: Building and Construction

Products: AECOsim Building Designer, Bentley Navigator, Bentley Raceway and Cable Management, gINT, MicroStation, ProjectWise, ProStructures, ProConcrete, and STAAD, as well as ProjectWise WorkSite, Navigator Mobile, and ProjectWise Explorer Mobile.

User: Hatch Ltd

Country: Canada

November 2, 2015

Hatch Uses Bentley Technology to Solve Complex Designs on Keeyask Dam

Through a collaborative effort with Hatch Ltd, Bentley created new technology to quickly and accurately quantify design options of the Keeyask Dam, a CAN\$ 6.5 billion challenging and innovative project in Manitoba, Canada. The Keeyask Generating Station at the dam will be a source of renewable energy providing approximately 695 megawatts of capacity and producing an average of 4,400 gigawatt hours of electricity each year. The renewable hydroelectric energy produced will be integrated into Manitoba Hydro's electrical system for use in Manitoba and for export. As a concrete structure, design and placement of reinforcing steel is critical.

Collaborating with Bentley on new enhancements to MicroStation, Hatch was able to model the inside face of the draft tube and the centerlines of the rebar along B-spline curves. Each B-spline curve was composed of a complex chain of constant radius arcs and line segments. Furthermore, calculations split the bars automatically at 60-foot increments, inserting a lap-splice at every split. Once the B-spline curves were converted into centerlines that could be fabricated, ProConcrete was easily able to add rebar along the path.

ProConcrete has built-in information for each bar diameter which includes the maximum bending radius possible. Any bars that have a larger radius are flagged automatically as "ship-as-straight" bars with instructions to the installer to drape the bars in place. Hatch used ProConcrete to create these bar schedules for the fabricator, 2D drawings for placement, and i-models for construction team.

Charles McGowan, at Hatch, noted, "The complex shapes and sheer complexity of rebar placement in hydro projects made the design process more labor intensive with significant manual design and checking required. ProConcrete handled parametric standard rebar requirements quite well and automated this process considerably."

In addition to ProConcrete and MicroStation, Hatch used a full range of Bentley software including AECOsim Building Designer, Bentley Navigator, Bentley Raceway and Cable



Management, gINT, ProjectWise, ProStructures, and STAAD, as well as mobile apps such as ProjectWise WorkSite, Navigator Mobile, and ProjectWise Explorer Mobile.

Using 3D modeling on this project enabled the team to easily manage the design changes necessary during the construction phase. Accurate 3D models were provided to contractors early in the project, and then updated on a regular basis. This enabled the contractor to increase the quality of planning and estimating. Using ProConcrete and involving the contractors early in the project also reduced the traditional turn-around time for approval of detail drawings.

Image Link: <https://www.hightail.com/download/bXBaZ28rdzg4Q1JESjIVag>

Caption: Hatch, Ltd.- Keeyask Dam