Project

Klamath Falls Airport/Kingsley Field
Runway Improvements

Clients

The City of Klamath Falls
The Oregon Air National Guard

AutoCAD® Civil 3D®

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—Dan Dankert
  CAD/BIM Manager
  Mead & Hunt

Speed for takeoff.

Mead & Hunt engineers a $21 million runway and aircraft arresting system rehabilitation in three months with help from AutoCAD® Civil 3D® software.

Temporary Runway 32L and closed Runway 14-32.

Project Summary

The City of Klamath Falls owns and operates the runway, taxiways, and other facilities at Klamath Falls Airport/Kingsley Field, with the Oregon Air National Guard 173rd Fighter Wing as the largest tenant. Faced with growing military, private, and commercial air traffic on an aging runway, the City and the Oregon Air National Guard decided to initiate a $21 million project to rehabilitate and reconstruct the airport's main runway, taxiways, overruns, and arresting system. The Oregon Air National Guard requested that the project be designed on an extremely aggressive schedule in order to meet a tight timeframe for temporarily shifting its operations to another airport.

Mead & Hunt, the project engineer, used AutoCAD® Civil 3D® software, Autodesk's building information modeling (BIM) solution for civil engineering, to help meet Klamath Falls' and the Oregon Air National Guard's needs. "On a project of this size, 18 months would be typical, and nine months would be fast," says Dan Dankert, CAD/BIM manager for Mead & Hunt. "AutoCAD Civil 3D software was instrumental in our ability to complete the design in only three months and to help coordinate our dispersed project team effectively."

The Firm

Established in 1901, Mead & Hunt is an employee-owned engineering firm with 15 offices across North America. The firm is one of the top 20 airport design firms in North America, and ZweigWhite ranks it as one of the 150 fastest growing architectural and engineering firms in the country. In addition to relying on AutoCAD Civil 3D software for civil engineering, Mead & Hunt uses Autodesk® Revit® Architecture software, Autodesk® Revit® MEP software, and Autodesk® Revit® Structure software when projects call for a BIM approach to building design.

The Challenge

When Klamath Falls and the Oregon Air National Guard laid out the schedule for the runway rehabilitation, Mead & Hunt's engineers knew that it would require an unprecedented firm-wide effort to design the project within the three months the clients required.

To tackle the project, Mead & Hunt tapped engineering expertise at three separate offices and relied on the dynamic modeling capabilities of AutoCAD Civil 3D software. Andy Knauf, Mead & Hunt's director of information technology, explains the firm's strategy: "It was a huge project for such

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Dynamic, 3D model makes managing changes easier—and faster—on runway rehabilitation project.

a tight schedule, so we formed a large design team separated into disciplines. Coordinating the evolving design across our teams would have been extremely difficult with traditional 2D methods. We developed a project plan that relied heavily on AutoCAD Civil 3D software to help incorporate and coordinate changes from diverse teams into a single model of the entire project."

The Solution

The tight schedule on the project required that Mead & Hunt set up its initial model quickly by uploading less than optimally detailed survey data of the airport into AutoCAD Civil 3D software. Leveraging styles and standards the firm had already established within the software, the team began to design quickly.

When additional survey data became available, adding it did not slow Mead & Hunt down because AutoCAD Civil 3D software allowed for dynamic updates of the entire model. "Adjusting the design to accommodate new topographic data was quite straightforward," says Doug Smith, senior project designer for Mead & Hunt. "We loaded the data into the Civil 3D model. Our software updated the surfaces and corridors automatically. If the team would have had to use traditional tools, each person would have spent several hours modifying their work to account for the new data."

Given the tight schedule on the project, the time saved managing changes was especially valuable, but Smith notes that the benefits of a dynamic model impacted other aspects of the project as well. "Balancing earthwork calculations on a 10,300-foot runway is quite complex, especially on a project where different aspects of the design are progressing rapidly," he explains. "In Civil 3D software, you can more easily change the vertical profile to calculate new volumes more quickly, making it easier to reduce the amount of material that needs to be

hauled off to execute the design. We did not need to haul off any material on the project, which has both cost and time advantages during construction."

Working as a Team

Three Mead & Hunt offices—in Santa Rosa, California; Vancouver, Washington; and Madison, Wisconsin—collaborated on the project, and to better coordinate their work, the firm placed the 3D project model onto a secure, centralized enterprise drive. The three teams divided the work and designed the project simultaneously by accessing the same data. While one team worked on drainage, another team completed grading work on the taxiways and runway. At the same time, the teams developed plans to allow the airport to use an existing taxiway as a runway during construction.

"Geographically, we were spread out, but each team could incorporate changes from other teams dynamically through Civil 3D software," says Dankert. "The software's Sheet Set Manager kept track of changes automatically, but making even a minor grading change across hundreds of drawings takes hours with manual processes. So many people were involved and the designs evolved so quickly, it would have been extremely difficult to coordinate the project without our dynamic Civil 3D model."

Protecting Plants Dynamically

Klamath Falls and the Oregon Air National Guard wanted to protect the environment as much as possible throughout the project. Most critically, the clients needed the work to avoid harming an endangered plant growing at the airport.

"Having a 3D model of the airport definitely made it easier to design around environmentally sensitive areas, and Civil 3D software helped us to calculate the amount of old material that would be available as sub-base," says Smith. "When you're pressed for time, every bit of automation helps."
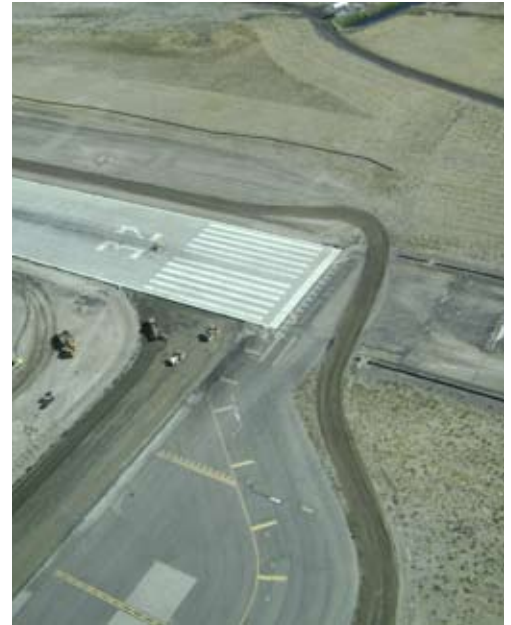
Taxiway G reconstruction.

The Result

As the runway rehabilitation was nearing completion, the engineers at Mead & Hunt were finally able to stop and reflect on the project. "We completed the design in three months, allowing us to support our clients' operational goals," says Dankert. "I don't know how we would have done it without AutoCAD Civil 3D software. When some people think of BIM, they think of structures, but the benefits of BIM extend to civil engineering, and BIM with Civil 3D software has definitely enhanced our ability to deliver airport projects faster and more efficiently."

Learn More

Help your airport projects get off the ground faster with AutoCAD Civil 3D software. Visit **www.autodesk.com/bim** and **www.autodesk.com/gov** to find out how.

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 Senior Project Designer
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New Taxiway K under construction.

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