

## Robins & Morton

Customer Success Story

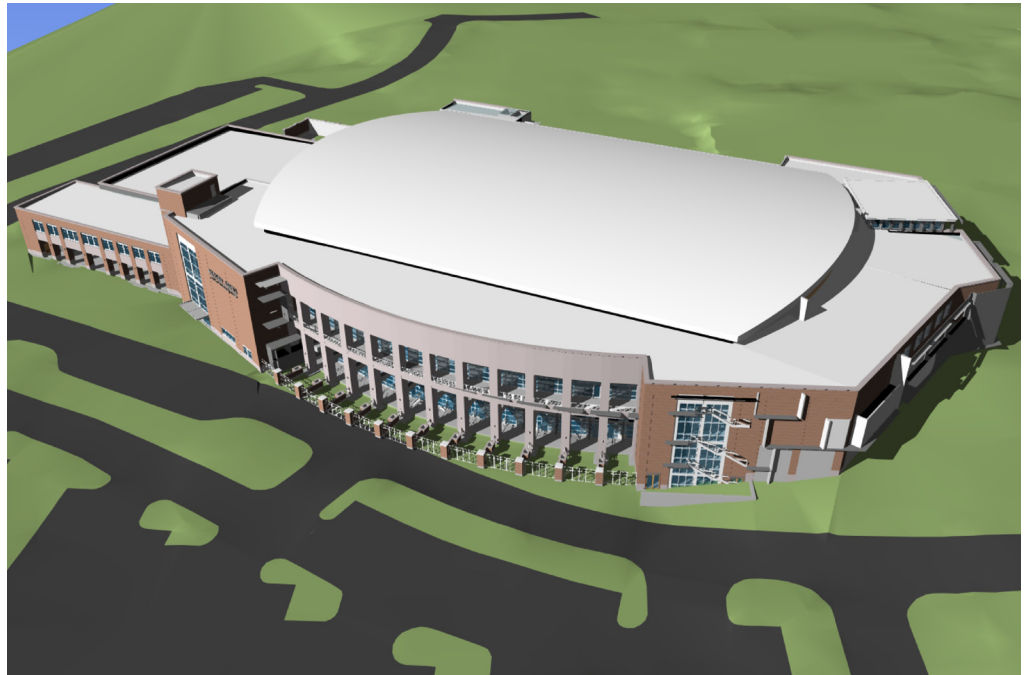
Autodesk® Revit® Architecture  
Autodesk® Revit® Structure  
Autodesk® Navisworks® Manage

BIM helped the entire project team communicate and collaborate more effectively, and ultimately deliver the arena ahead of schedule and under budget.

—Aaron Wright  
BIM Coordinator  
Robins & Morton

# Exceed expectations with BIM.

Autodesk BIM solutions help Robins & Morton build a new basketball arena using leaner and greener practices.



Shaded aerial view of the arena. Image courtesy of Robins & Morton.

### The Firm

Founded in 1946, Robins & Morton has grown from a modest construction operation into one of the top contractors in the United States. Its services include general construction, construction management, program management, preconstruction, and design-build. A progressive leader in sustainable construction, Robins & Morton incorporates green building practices in many of its projects. The company's major divisions—Healthcare, Commercial, Special Projects, Concrete/Industrial, and Government Services—operate from six offices throughout the southeastern United States.

For the past four years, Robins & Morton has used Building Information Modeling (BIM) to foster close collaboration with building owners, designers, and subcontractors from the earliest stages of planning. The company uses Autodesk® BIM solutions to assist in identifying and addressing constructability issues before they happen, helping them exceed customers' expectations with more streamlined schedules and greater cost savings. The firm has successfully constructed more than 35 projects using Autodesk BIM solutions.

### The Challenge

Robins & Morton was the construction manager for the recently completed basketball arena at Auburn University in Auburn, Alabama. The \$92.5 million arena includes a two-court practice facility, student locker rooms with sports medicine facilities, team meeting rooms, a ticket office, a team store, food courts, and many other amenities. The facility also houses a state-of-the-art athletics museum.

"New student housing, a dining hall, and a major campus utility project were being built right next to the arena during most of our construction," explains Aaron Wright, BIM coordinator for Robins & Morton. "These site constraints dictated that the building's roof structure had to be erected from inside the arena—making it essential that space was used efficiently."

In addition, the original contract documents contained designated space for a future build-out of the university's existing sports museum. "But midway through construction, the university wanted to take advantage of the fact that the project was coming in under budget and accelerate the schedule for the museum," says Dustin Ranger, a Robins & Morton superintendent. "But only if it didn't impact the overall schedule for the arena or increase the cost of the museum."

Autodesk®

# Combine project models and schedules for construction planning and simulation.

## The Solution

The integrated project team—including Robins & Morton, 360 Architecture, Davis Architects, structural engineering firm Walter P Moore, and general contractor B.L. Harbert International—used Autodesk BIM solutions for collaboration, coordination, visualization and virtual walk-throughs, 4D construction planning and scheduling, and as-built tracking. “BIM helped the entire project team communicate and collaborate more effectively, and ultimately deliver the arena ahead of schedule and under budget,” says Wright.

## Increase Coordination

During preconstruction, Robins & Morton used Autodesk® Revit® software to help develop construction models of the arena, enhancing the design team’s Autodesk® Revit® Architecture and Autodesk® Revit® Structure models and using original 2D design data. The company then aggregated those models using Autodesk® Navisworks® Manage software to help improve cross-discipline design and preconstruction coordination.

## Avoid Waste

During construction, Robins & Morton required BIM submittals from its subcontractors and combined their fabrication models with the design models using Navisworks Manage software for field coordination. “By using BIM to facilitate preconstruction and construction coordination, we are inherently reducing waste,” says Ranger. “BIM is essential for our sustainable construction practices.”

## Simulate Construction

Throughout the project, Robins & Morton relied on Navisworks Manage software for 4D construction planning, linking the consolidated Autodesk Navisworks model to the project schedule to simulate construction. Due to the site’s space constraints, this was especially crucial for the large cranes that hoisted the long-span roof trusses from within the bowl of the arena.

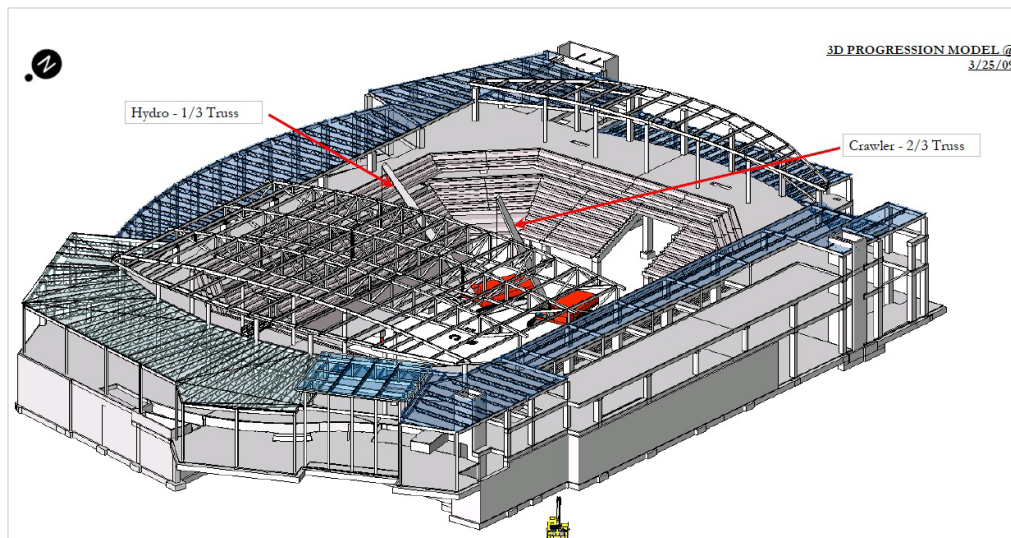
Robins & Morton used Revit Architecture software to help create models of the actual construction cranes used on the project, and then imported those crane models into the consolidated Navisworks model. “By visualizing the lift and swing radii for each crane, the team coordinated the crane’s entry, exit, and travel paths with the erection activities of the precast seating and roof trusses,” says Ranger. “This preplanning helped save us valuable time, especially as we got closer to dry-in—when the space above the cranes was limited, but the cranes still needed clearance to move and exit.”

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—Dustin Ranger  
Supervisor  
Robins & Morton

## Streamline Design-Build

To help the university and project team better understand the ramifications of accelerating the schedule for the sports museum, Robins & Morton used Revit Architecture software to model the museum exhibit space based on initial 2D design drawings from the specialty contractor. They then imported the model into Navisworks Manage to visualize the design in the context of the overall arena, helping all teams to make more informed design decisions.



Navisworks model demonstrating crane access. Image courtesy of Robins & Morton.

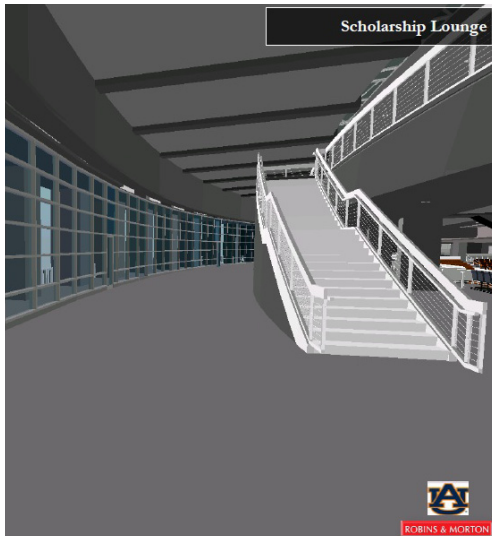
“Although the arena itself was new construction, the museum was more like a renovation project,” says Wright. “The university and the museum designers could study the museum design model to help them see if it met the university’s needs and expectations.”

In addition, Robins & Morton used Navisworks Manage software to better understand the museum’s construction implications and to help make sure it did not jeopardize the overall project schedule. “With Navisworks we could visualize the whole area—including the buildings systems and structural elements—and we quickly discovered a major problem,” says Ranger. “There was no easy way to provide the many steel, electrical, data, fire protection, and HVAC feeds to the free-standing museum walls and exhibits components once the structure was completed.”

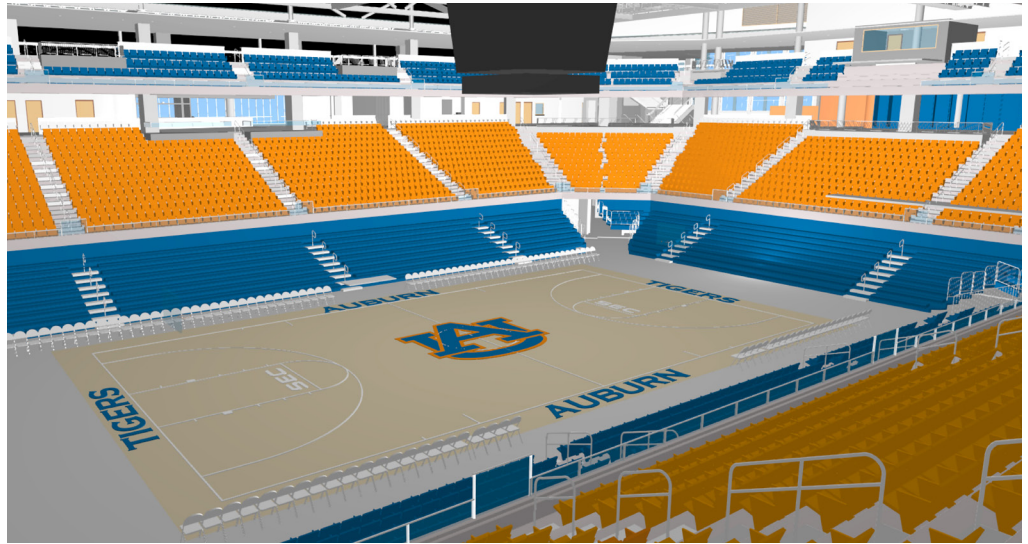
With help from Navisworks Manage software, the team identified alternate methods for routing the necessary systems to the interior exhibit space. “By finding and fixing these issues digitally, we successfully demonstrated that the museum construction could move forward without impacting the schedule of the base contract or the cost of the museum,” says Ranger.

#### Document As-Built Construction

Robins & Morton used Revit Structure software as its primary documentation tool for concrete placement during construction. The team started with the Revit structural concrete design model and modified the model elements (dividing multistory



Visualizations used during construction review meetings.  
Image courtesy of Robins & Morton.



Shaded interior view. Image courtesy of Robins & Morton.

concrete columns, for instance) to more accurately and graphically represent construction activities.

“In one instance, we used the software to plan and document construction activities for more than 200 foundation caissons, tracking date poured, volume of concrete, and depth at refusal,” recalls Wright. “This helped us compare and visually monitor design depth quantities versus actual depths—resulting in a credit of more than \$300,000 for our client.”

As construction proceeded, Robins & Morton updated the Revit Structure model with installed dates and regularly exported it to the Navisworks model. “Using the Navisworks 4D simulation functionality, we watched side-by-side comparisons of planned versus as-built schedules, which helped give us valuable insight for our future scheduling efforts,” says Wright.

#### Enhance Project Understanding

Throughout the project, Robins & Morton used the Revit and Navisworks models to help generate visualizations and virtual walk-throughs of the arena. These project visualizations proved instrumental in many ways.

For their monthly progress meetings, the team created visualizations in the form of renderings or shaded views. These “project snapshots” were often combined with photographs of the construction in order to document scheduled versus actual prog-

ress. “This helped give all the meeting participants a better understanding of the project’s status,” says Ranger. “In addition, these snapshots helped enable quicker turnaround times by the owner on the contractors’ applications for payment.”

Project visualizations were also valuable for sponsor recruitment. “We imported the logos of key potential sponsors into the Revit model to create high-end renderings of the arena, to help show them the impact of their sponsorship,” says Wright. And throughout the project the university used Navisworks walk-throughs and animations to help give player recruits and donors a virtual tour of the arena and its amenities.

Finally, Robins & Morton used the Navisworks model and virtual walk-throughs in a variety of public outreach efforts to help explain and promote both the arena and the use of BIM to local organizations, Auburn University students and alumni, and industry groups.



# Use BIM to help streamline design-to-fabrication workflows and minimize on-site rework.

## Coordinate As-Built Conditions

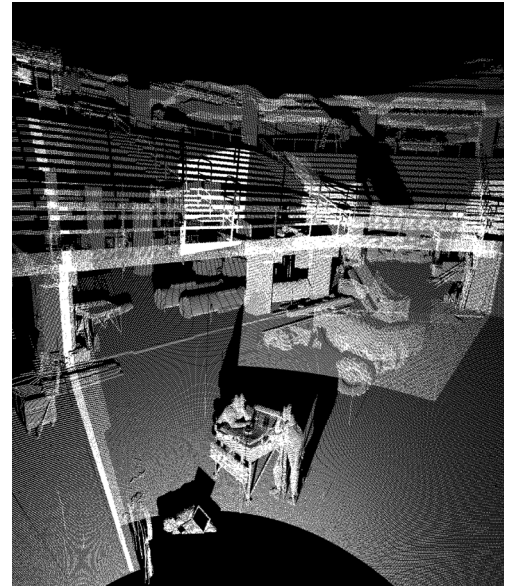
Robins & Morton used laser scanning to generate as-builts of the stadium in order to coordinate the fabrication and installation of the stadium seating. "There are a lot of potential code issues with precast versus cast-in-place concrete construction, as was the case with the arena's precast stadia and its cast-in-place stair treads," explains Ranger. "So we scanned the entire bowl in less than two hours and then imported the point cloud data into Navisworks. By overlaying the point cloud and the design model, we were better able to identify where the spacing from tread to tread was out of tolerance and where the as-built stadia would not accommodate the as-designed seating count."

With help from Navisworks Manage and laser scanning, Robins & Morton detected and dealt with the issues before the delivery of the seating, saving their client both time and money during installation.

## The Results

Auburn University's new basketball arena—along with its newly relocated sports museum—opened in the fall of 2010. The project was completed under budget, ahead of schedule, and the museum was actually finished prior to the completion of the main arena. "Autodesk BIM solutions were essential for the success of this project," says Wright. "On complex projects like this, BIM enables us to more efficiently manage the phases of preconstruction and construction, and it helps drive our lean construction practices."

For more information about Autodesk BIM solutions, visit [www.autodesk.com/BIM](http://www.autodesk.com/BIM).



Point cloud from laser scan of precast stadia overlaid in Navisworks. Image courtesy of Robins & Morton.



Entrance to the new Auburn University basketball arena. Image courtesy of Robins & Morton.

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