Advancing Airport Infrastructure through Better Project Design, Handover, and Construction

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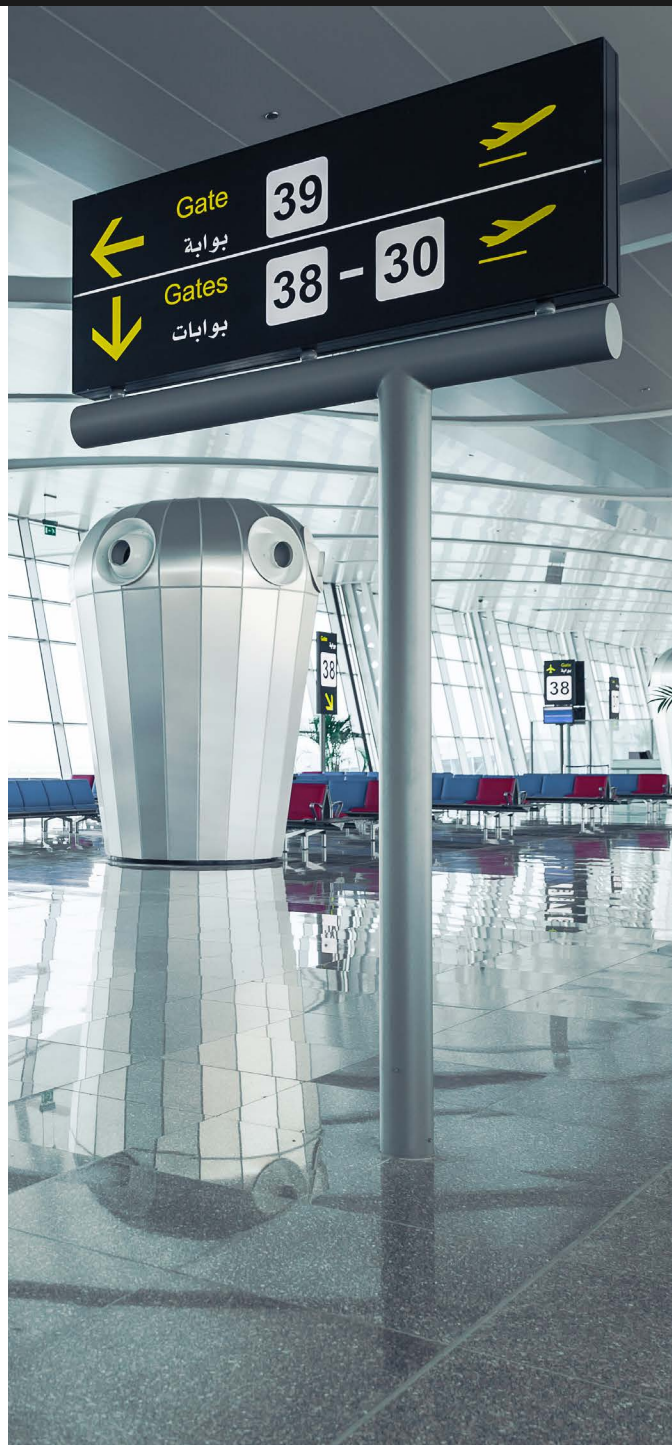
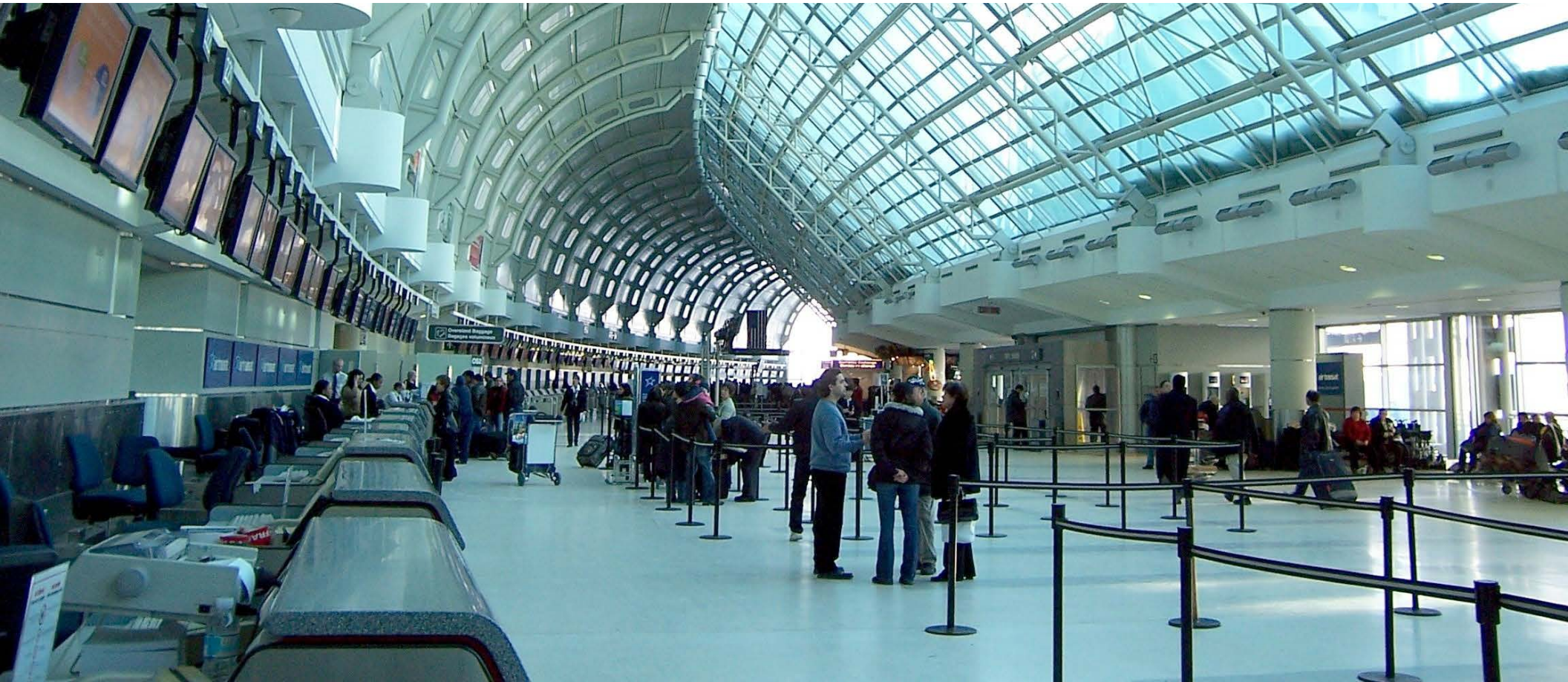


The status quo for airport infrastructure projects

Global air travel continues to rise, with the International Air Transport Association noting 10.4% growth between 2023 and 2024 alone. As a result, airports are expanding and modernizing at an unprecedented pace, with many major airports managing a multitude of simultaneous infrastructure projects across their campuses. At the same time, the airport sector is experiencing a wave of innovation and is undergoing significant transformation driven by technological advancements. To thrive, owner-operators and their engineering and construction partners are leveraging digital technologies, including digital twins, AI and the Internet of Things (IoT), to advance their automation, improve safety, streamline operations, personalize passenger experiences, and optimize resource utilization and cost-effectiveness.



Design

For engineering teams and firms, the increased volume of projects with huge amounts of data and shorter duration requirements, coupled with a limited engineering workforce capacity, makes improving design efficiency and productivity essential to deliver projects effectively. Each airport project comes with its own complications and challenges, as well as the aim to create innovative spaces for both passengers and personnel, all with short timetables and the increasing urgency to keep up with the rise in air travel globally.

Project handover

Once a project is ready to move from design to construction, it has generated a large volume of data that may not be easily accessible to various stakeholders, and the management of construction processes and deliverables are rarely up to date. Project delays and cost overruns are typical, leading to coordination challenges, operational downtime, and even safety and quality concerns. This situation can stem from lack of collaboration, misalignment between the design and construction processes, poor accessibility to accurate data and drawings, or a number of other causes, but the result is the same: inefficient and ineffective project handover and a delayed project.

Construction

When construction teams are ready to execute a project, things don't always go smoothly. Airport construction projects can be plagued by inefficiencies, whether it is scheduling challenges, unforeseen conflicts and clashes, assets being down or needing maintenance, or other issues. Each of these inefficiencies lead to costly setbacks and extended timelines.

Improving the design process

For engineers and engineering firms, the rising demand for global air travel means designs for upgrades and additions are needed faster than ever before. What's more, many of these projects come with stipulations for complying with new regulations, including meeting safety and sustainability goals. That pressure, coupled with a limited workforce, presents new challenges for which conventional tools and processes are ill-suited.

How Bentley helps

With Bentley's Airport Design Solution, engineers and engineering firms alike can leverage tried and tested design tools to design, collaborate, and deliver projects more efficiently and effectively. With our robust solutions, you can work collaboratively on any size project without size restrictions, crashes, or complications, knowing your system will always be active. With our user-friendly interface, your team can analyze and perform data visualizations on models based on their geometry or underlying attributes, then design with accurate real-world context using geospatial information automatically added from thousands of systems. These capabilities and more are developed specifically to equip you and your teams to design and deliver better than ever before.

Streamlining project handover

Project delivery has never been more complex. The process is riddled with inefficiencies and challenges, from ensuring everyone is working with the most accurate and updated materials to managing dispersed teams and projects. And when every delay or rework costs time and money for all parties, the status quo can be a costly process. Empowering your people to access the right information at the right time can be the difference between delivering a project efficiently and on-time or stalling the project and increasing expenses.

How Bentley helps

With the Airport Construction Management Solution, transitioning projects from design to construction becomes efficient and painless for all stakeholders. By using Bentley's digital twins and infrastructure schemas, you can leverage data across projects to maximize your insights and learnings, drawing both from current and previous projects to ensure the process is as data-backed as possible. And with an accessible platform for sharing updated and accurate data, you can ensure that all teams are collaborating and working with the most current data available, eliminating disruptions and delays.

Optimizing airport construction

Airports, both large and small, are planning and executing more projects than ever, from updating existing infrastructure to expanding terminals and runways. Not only do these projects face rising standards, stricter regulations, ambitious sustainability goals, and tight timelines, but they also need to be executed with minimal disruption to the daily operations of the airport. Maximizing the efficiency of construction while minimizing the impact to the passenger experience is a juggling act that every airport and construction firm can relate to on airport projects.

How Bentley helps

Bentley's Airport Construction Management Solution empowers airport owners and construction firms to view all their construction projects at once, monitoring progress, conducting carbon analysis, or reviewing other relevant project details. With greater transparency into ongoing infrastructure projects, airports and construction firms are equipped to make decisions faster and more effectively, improving their time, money, and other resource savings, ensuring that projects continue to proceed as expected or more efficiently. This solution helps you mitigate surprises, eliminate rework, save resources, and minimize disruptions to operations and the passenger experience. When a project is complete, the digital models can be easily handed over to operations for accurate, updated asset information in a visually immersive environment.

A real-world example of Bentley solutions in action

Guangzhou Baiyun International Airport

The Guangdong Airport Authority is expanding the Guangzhou Baiyun International Airport to include a new terminal, two new runways, and a transportation center that has subway, intercity, and high-speed rail access. Once the project is completed, the airport will have a 50% increase in passenger volume capacity and a 52% increase in cargo and mail volume. With such a large project, the airport authority knew they needed to find a way to execute the project with minimal disruption to ongoing airport operations, improve the collaboration between teams and stakeholders, and increase the overall efficiency of the project to meet a tight project timeline.

By using Bentley's design and construction management solutions together, the Guangdong Airport Authority shaved months off the project schedule and saved millions of dollars. With optimized drawings, reduced construction changes, and new forward design methods, the Airport Design solution helped the engineering teams improve design production efficiency by 15% and reduce traditional design errors by 2%.

With Bentley's Airport Construction Management Solution, the Guangdong Airport Authority provided a single portal for sharing accurate and updated information, equipping more than 35 on-site units to communicate and collaborate in a timely manner. Digital twins were used to guide on-site construction works, improving construction efficiency by more than 35% to reduce the construction schedule. By executing the project with no demolition, modification, or rework needed, they not only saved time and money, they also minimized resource waste and the environmental impact dramatically, making the project a benchmark for efficiency and sustainability in airport infrastructure.

Image courtesy of Guangzhou Baiyun International Airport

Questions?

If you would like to discover more about Bentley's engineering solutions

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