# rescale

# Obayashi Pioneers Digital Transformation for the Global Construction Industry with Rescale

Automated computational engineering is helping one of the world's largest construction firms use advanced physics simulations to accelerate projects while ensuring building performance and safety

**Case Study**

**Headquarters:**
Tokyo, Japan

**Industry:** Construction, Engineering, and Design

**Founded:** 1892

**175x Increase in Design Simulation Speeds**

**Improved Engineering and Design Efficiency**

**Simplified User Experience with Integrated Toolset**

The Obayashi Corporation is one of the leading construction companies in the world. Now it wants to lead the industry in digitally transforming its design processes to more efficiently build increasingly complex structures. For help with this ambitious initiative, Obayashi turned to Rescale.

A Nikkei 225 company, Obayashi ranks 15 on the list of the world's largest contractors. Obayashi has 86 subsidiaries and 26 affiliated companies across the globe. Established in 1892, Obayashi has designed and built many of Japan's national landmarks including the Akashi-Kaikyo Bridge, the Tokyo Wan Aqua-Line, and the Tokyo Skytree.

But for Obayashi and much of the construction industry, traditional design processes have depended on the expertise of experienced architects and engineers to assess performance factors (strength, rigidity, energy, etc.) through manual processes and physical documentation. Overall, construction companies have trailed behind many other industries in their adoption of computer-aided engineering (CAE), an approach for creating digital models and running simulations to understand the performance of buildings and other structures.

"The construction industry has lagged in the use of IT," says Hirotsugu Ueda, who leads a team in Obayashi's Technical Research Institute. "We would like to ride the wave of digital transformation to work on the cutting edge of IT."

## TECHNOLOGY CHALLENGES

Like many companies in other industries looking to digitally transform their R&D operations, Obayashi needs ready access to supercomputing resources. It is the essential technology for running highly complex digital models and simulations to test how a structure will perform under various weather, occupancy, and geological conditions.

Historically, CAE simulations have been conducted in limited parts of the building design process and often involved additional testing on actual construction materials and structures to verify the simulations. As a result, design issues were often not discovered until after construction began, requiring costly design modifications and rework.

CAE for building simulation conducted early in the design process can significantly reduce these late-stage discoveries of design problems. And with modern construction becoming more complex, greater sophistication in design assessments and engineering validation is essential.

Beyond the economics of construction, the industry is also facing increasing pressure to create more energy-efficient buildings, along with more sustainable construction practices. These growing requirements have made it critical for Obayashi to find new ways to bring greater agility, speed, and insights to how it designs buildings and other structures.

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— *Hirotsugu Ueda, Team Leader, Technical Research Institute, Obayashi Corp.*

The company recognized that it needed to quickly and efficiently create detailed digital models that it could then rapidly test under various conditions to accurately predict building performance.

By running these models through complex physics simulations of real-world conditions, it can confirm building performance for an array of parameters and multidisciplinary physics, including energy, acoustics, heat, wind, materials, and structural analysis.

## HOW RESCALE HELPED

A core part of Obayashi's digital transformation efforts have been focused on digitizing designs and enriching those models with contextual specification and performance data.

But once those high-fidelity 3D digital models are built using CAD and building information management (BIM) tools, Obayashi then needs to explore how the structures will perform. Such building simulation work requires supercomputing power to carry out large-scale parallel computations quickly. This is why Obayashi turned to Rescale.

Obayashi is using Rescale to automate management of a multi-cloud HPC infrastructure. With Rescale, Obayashi has on-demand access to virtually unlimited computing capacity from leading cloud services providers. The intelligence of the Rescale platform makes it easy for Ueda's team to pick the best HPC hardware for running its compute-intensive simulation applications.

With the various integrations created by Ueda's team (taking advantage of Rescale's API), architects and engineers only need to enter a basic set of conditions and design parameters to generate models, which can then be automatically sent for analysis to simulation applications running on Rescale.

## BENEFITS

With Rescale in place, Obayashi's engineers and architects can easily and quickly test building models through a wide range of simulations, helping shorten design cycles while ensuring performance and safety.

"Simulations that used to take several days or even weeks to finalize can now be done in 10 minutes to an hour," Ueda says.

Performance is not the only benefit from Rescale, Ueda says. Rescale's intuitive management console has also been a great boost for Obayashi. Before Rescale, Ueda's team found it hard to manage basic public cloud computing services for running complex simulations.

Rescale's centralized project management capabilities also bring greater control and visibility to Obayashi's managers and executives.

"Rescale provides a rich set of project and cost-control tools, as well as supporting the development of automated processing tools through APIs," Ueda says.

And, critically, Ueda's team was able to run open-source simulation applications on Rescale.

"Using open-source software on Rescale allows us to take advantage of the abundant computing resources in the cloud without having to worry about licensing costs," Ueda says.

But most of all, Ueda appreciates that Rescale helps Obayashi's architects and engineers do what they do best: create groundbreaking buildings and structures.

"We appreciate the fact that we do not need to manage software and servers, helping us focus on our simulation work to find the best designs," Ueda says.

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**About Rescale**

Rescale provides high performance computing built for the cloud to empower engineers while giving IT security and control. The Rescale platform makes it simple for engineers and scientists to harness the most advanced software and computing architectures for cutting-edge, simulation, and AI-driven innovation. For IT, the Rescale platform provides full-stack security and support, and delivers policy-based financial and architectural controls to maximize performance and efficiency. Rescale powers the world's leading companies to accelerate innovation across industries including life sciences, automotive, energy, semiconductor, aerospace, and manufacturing.

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