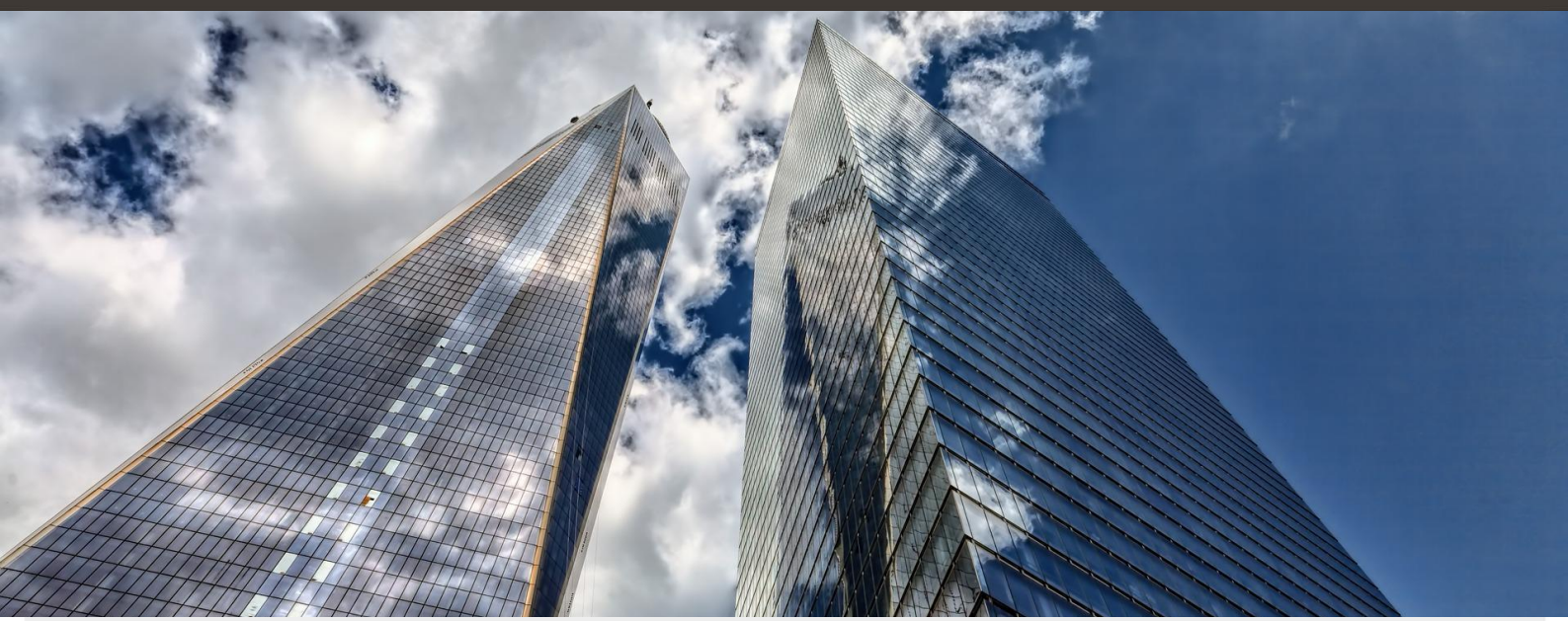
WHITE PAPER

TIPS FOR ARCHITECTURE, ENGINEERING & CONSTRUCTION (AEC)

This paper addresses the current hindrances that civil engineers are facing in the architecture, engineering and construction industry today, and gives insightful tips to help overcome them. Topics covered include repurposing content and collaboration, keeping industry standards in the forefront of one's mind, and increasing design iterations through online simulation.



SIMSCALE

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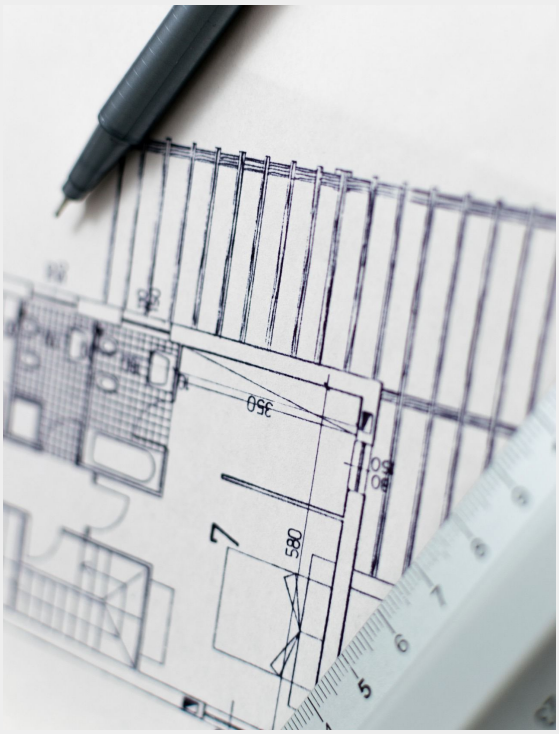
Introduction

Today, the market is saturated with groundbreaking design projects and competition from around the world. A high quality of service represents a competitive advantage for civil engineers that can gain client fidelity and more, but this is becoming harder to accomplish with modern design expectations. While advancements in technology have opened a plethora of opportunities available to professionals, challenges to meet the demand for taller buildings, longer bridges, safer highways, and greener homes are becoming increasingly common for engineers. Along with more elaborate design and development processes, there is a growing need for larger teams of engineers working collaboratively in order to complete projects. The following guide provides essential tips for civil engineers.

Tip 1: Don't Start From Scratch

As civil engineers can carry out design projects with a wide variety of clients, it is necessary to have certain industry standard designs at their fingertips.

With online communities like GrabCAD making it easier than ever to find, reuse, and repurpose designs for virtually any project or application, there is a decreasing need to reinvent the wheel in the initial design stage.



In the same respect, failure to communicate and collaborate in the planning and design process is another common pitfall that can be avoided with the incorporation of innovative technology. Traditional telecommunication tools, from phones to emails, often lack complete functionality, because they miss traceability and can be cumbersome and confusing. Do you remember the last time you dropped a call or lost an attachment? Other alternative channels must be in place for full accessibility between teams. Collaboration tools include features such as chat, document sharing and hosting, task management, progress tracking, and traceability. These unified communication systems also boost security and protection for your business. Some popular services in this area to try are Microsoft Teams, Slack, and Trello for team management as well as cloud-based apps such as Google Docs or Microsoft Office Online.

Tip 2: Keep Industry Standards in Mind

When it comes to civil engineering, being aware of and complying with industry standards can help to validate and speed up the design process.

ASCE 7

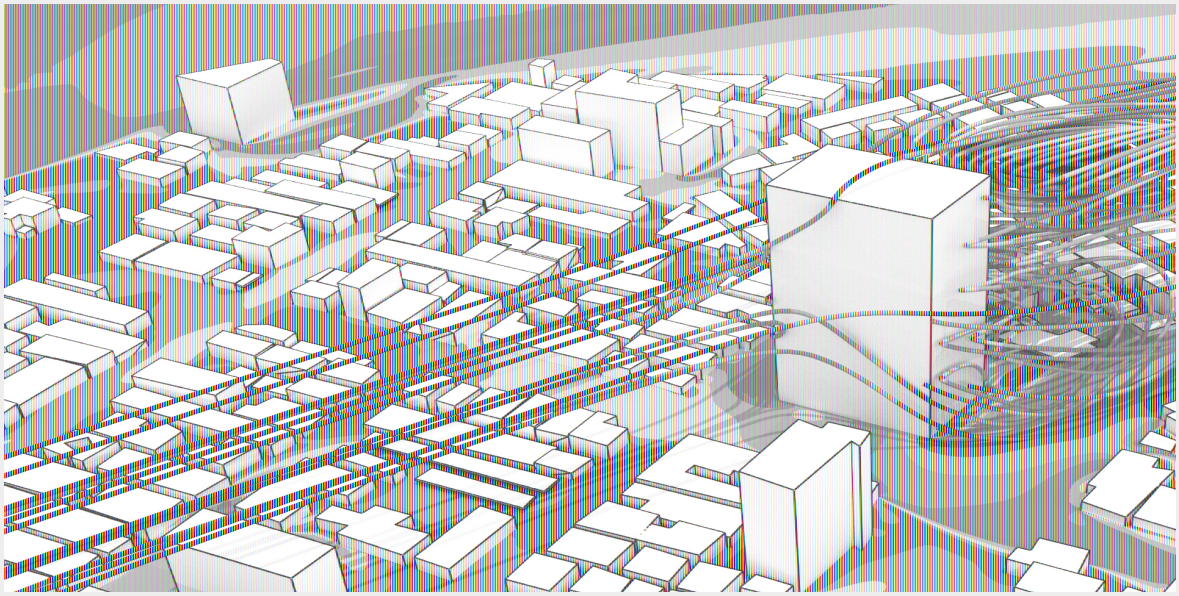
Developed by the American Society of Civil Engineers, ASCE 7 is an engineering code that provides a set of minimum requirements for the structural resistance of a building. The code is expressed in terms of the minimum loads that structural components must be able to withstand in a safe and reliable manner, setting standards for both principal (e.g., beams, columns) and secondary (e.g., cladding) members. While the code covers loads from a variety of sources (including gravity and natural disasters), one of the primary concerns for building developers looking to meet this standard are wind loads. This an especially important consideration for high-rise buildings or bridges, where wind loads can have a considerable influence on the design process.

LEED Certification

LEED (Leadership in Energy and Environmental Design) is a rating system developed by the U.S. Green Building Council, regulating the design, construction, and maintenance of green buildings. It is the most widely used green building rating system in the world. The LEED certification is credit-based, allowing projects to earn points across several categories.

ASHRAE 189.1

Another standard that is helpful to keep in mind is the ASHRAE 189.1, which is the “standard for the design of high-performance green buildings”. It provides architects and engineers with a standardized approach towards designing and operating green buildings, filling the gaps of evolving building codes.



Tip 3: Increase Iterations Number in Your Design Cycle

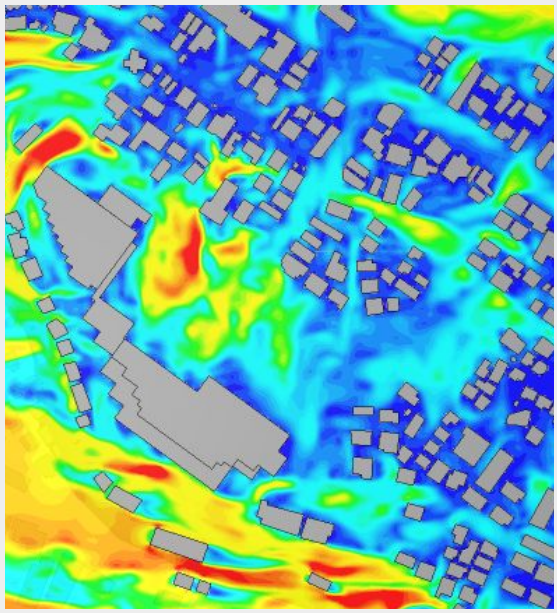
Now more than ever, iterations in the design cycle are necessary for shorter, less expensive, and more agile planning and design processes. Using readily available online technology, an increased number of iterations is possible . The democratization of simulation technology has marked a new era in the industry that was previously dominated by rules of thumb and unreliable hand calculations. Civil engineers have begun to change their approach to their projects, favoring realistic virtual testing that takes precise geometry and material properties into account in a cost-friendly and resource-saving manner. This approach allows them to reliably predict the behavior of the planned structure.

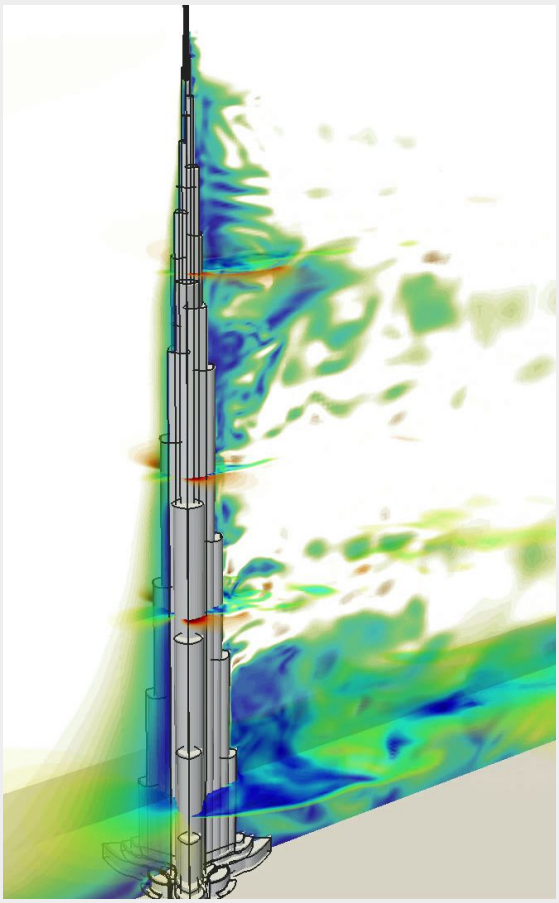
The performance of buildings and other structures needs to be predicted accurately in order to achieve and maintain structural safety, reliability, and utility, as well as occupant and pedestrian comfort. When the flaws are discovered, amendments or design comparison studies need to be completed quickly and accurately. Any mistakes or poor decisions at this early stage of the design process can have significant time and cost implications on the final outcome. Large civil engineering projects in particular often exhibit cost overruns and delays due to unforeseen events or design changes during construction. This commonplace and resource consuming pitfall can be solved with online simulation.

AEC and Online Simulation

While simulation technology is already widely used in automotive, aerospace, and multiple other industries, its adoption in architecture and construction has been limited by a number of factors.

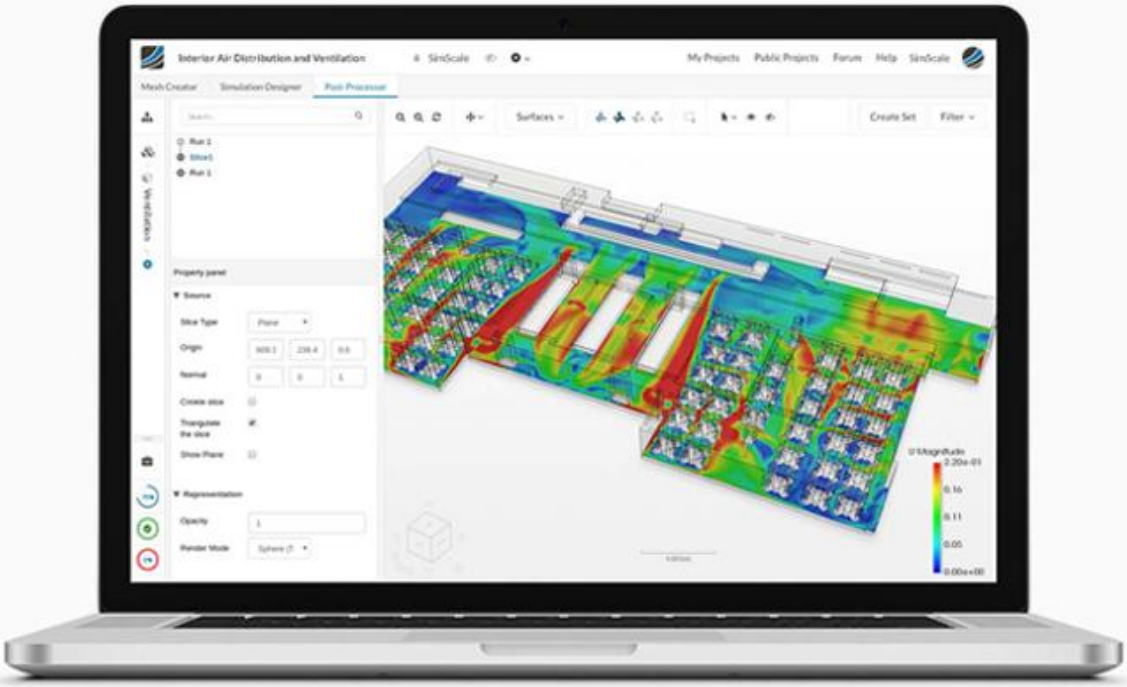
The primary obstacles are the lack of affordable tools, as well as the specialized knowledge required to successfully use them.





Nonetheless, fluid flow simulation holds great promise for the AEC industry, giving architects and engineers the ability to optimize the performance and predict the impact of buildings, bridges and urban areas in the early stages of the design process.

And with the recent efforts to democratize computational fluid dynamics (CFD) technology through the emergence of user-friendly,, cloud-based tools with flexible pricing, tapping into its full potential is nowadays much easier.



About SimScale

SimScale is a cloud-based CAE platform that gives instant access to **FEA**, **CFD**, and **thermal simulation** technology for quick and reliable testing and optimization of electronics designs.

By harnessing the power of the cloud, SimScale is revolutionizing the simulation industry, allowing every engineer and designer to virtually test and optimize their designs online.

With SimScale, you can run complex fluid dynamics, solid mechanics, and thermostructural simulations in parallel, without leaving the web browser.

Why SimScale?

Collaborative : Get instant access to a premium cloud-based simulation platform that enables you to virtually work in collaboration with others to test and optimize electronic designs end-to-end in a web browser—from anywhere, anytime.

Cost-efficient: As a SaaS application, SimScale requires zero investment in high-performance hardware, licenses or maintenance. The yearly subscription is a fraction of the cost of on-premises CAE software.

For everyone: Having access to dedicated support, learning resources, and consulting services, you get reliable simulation results fast, with no need to hire an expert.



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