Visualization by Animation

3D animation and visual development is the cornerstone for envisioning the future of architecture and construction. The ever rising complexity of architecture calls for specialties from multiple disciplines. As a result, the combination of these elements requires high levels of planning. With new structural systems, services, energies, and technologies, envisioning these details is essential for efficiency, team communication, and prevention of errors. Ultimately, these techniques will be used to illustrate installation sequences, light simulations, and future concept development with precision.

VISUAL PLANNING

Only recently has the emergence of new technology enabled the construction of extremely complex architecture, forcing fabrication methods to be unique. As a result, the means to a solution are infinitely different, opening the door for better tools, fewer workers, and faster processes. With so much customization, planning requires a visual process providing a link of communication and understanding between all members of our team.

Various methods and approaches are taken with specific goals in mind. Some scenarios involve only a vague understanding of the appropriate theoretical solutions to a building installation. Simulating these techniques proves the theory, or in most cases brings up potential problems. This allows for better refined decisions to be made prior to making irreversible mistakes. Other projects call for a more stylized approach, creating realistic final results of future construction projects, enabling Enclos to share its vision with clients.

INSTALLATION SEQUENCE

The development of the installation sequence evolves with the use of different techniques and equipment. Pre-planning can solve some major issues, while many hidden problems begin to surface only after visualizing the process. Difficult decisions become simple, such as the range of a mobile crane versus a tower crane, or the effectiveness of boom lifts over a swing stage. With 3D animation as a necessary step in the process, we can minimize errors and maximize on efficiency.

Previewing the logistics plan is essential for a successful installation. Visual communication of the construction zone resolves potential space and placement problems and prepares all aspects of the job for any power, traffic, and permit issues. Successfully communicating the logistics enables us to predict and prepare for every possible setback.

Figure 1. Jacob Javits Convention Center site glass unit delivery animation.

Figure 2: Jacob Javits Convention Center site management animation excerpt.

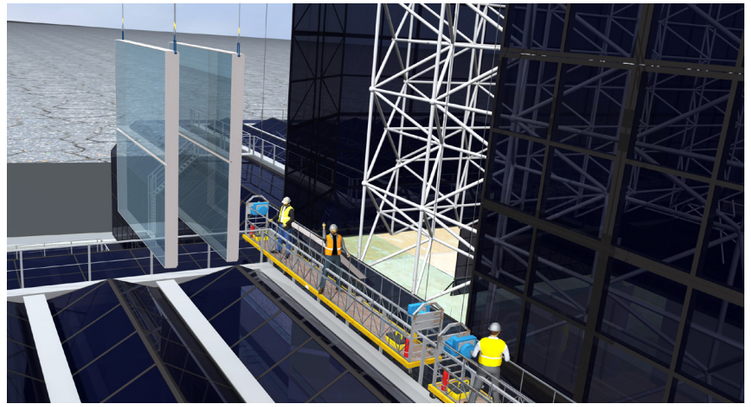

Figure 3: Jacob Javits Convention Center double-pick and installation animation.

Figure 4: Columbia University on-site delivery strategy.

Figure 5: Nashville Music City Center Wall Type A installation animation excerpt.

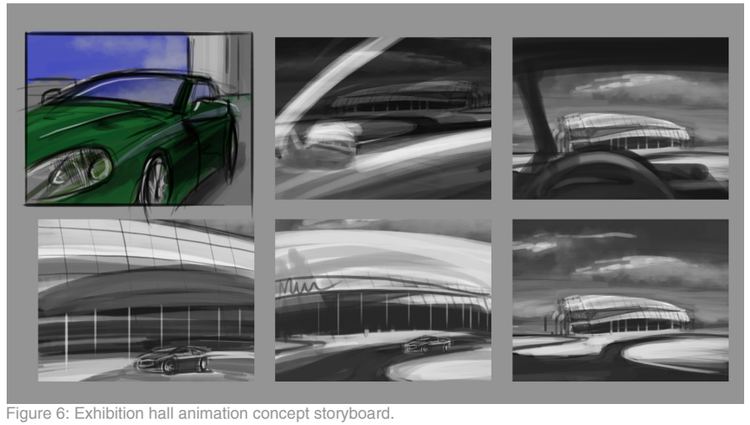

Figure 6: Exhibition hall animation concept storyboard.

DETAILED VISUAL COMMUNICATION

While animation can reveal a building process at a macro scale, it can also be used to zoom in on corner details and intersections. High resolution 3D images illustrate the way our technology works better than any 2D drawing can. It is necessary for clients to understand how our systems work and to be able to visualize our solid design and building process.

LIGHT SIMULATIONS

Accurate sunlight can be calculated using 3D technology. Shadow simulation can define the usage of one shading technology over another as well as provide proof of concept for different building scenarios with different lighting scenarios. The technology uses the correct longitude and latitude of any given location and calculates the exact angle of sunlight at a specified time of day and year. Real mock-up studies showing the shadow effects compared with 3D tests verify the accuracy and success of this method. Light and shadow predictions can be calculated for a modeled building throughout the entire year.

CONCEPT DEVELOPMENT

Innovation is a crucial part to the growth of architecture as well as the company. We are leaders at the front of the pack with the ability and experience to revolutionize the building industry. Developing new and improved building concepts is part of our mission and the industrial design and engineering co-op will allow us to develop advanced, lightweight units and efficient toolsets with robotic solutions.

SOFTWARE TECHNOLOGY

With the development and combination of software, the animation process is steadily increasing in efficiency and quality. Research of new texturing and compositing programs can vastly reduce the amount of rendering time while still raising the visual quality of the animation sequences. The improvement of this process will eventually lead to visually stunning interior and exterior environments, characters, vehicles, and equipment with the ultimate goal of raising the quality level to be on par with the gaming and movie industry. Eventually, 3D animation can be used to represent our work so realistically, that any new method of planning can be calculated with enormous accuracy and success.

Other software research opens doors to new developments that will allow clients to interact with the digital environment. Virtual tours, user-controlled sequence installations, and customizable 3D rendered environments will become a part of Enclos' capabilities in the near future. This will reflect on our flexibility as well as our aptitude for completing jobs regardless of their complexity and difficulty.

CONCLUSION

Enclos integrates 3D animation into its core processes enabling a developed workflow focused on quality and efficiency. Thorough visual communication of the design, fabrication, and installation phases facilitates a smooth transition from 2D to 3D to the real world. 3D visualization used in a variety of ways will help shape a new design process for the future evolution of architecture.

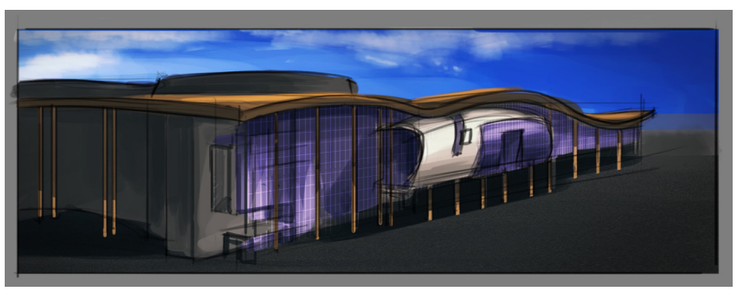

Figure 7: Nashville Music City Center concept sketch.

Figure 8: Exhibition hall rendered views (animation excerpts).

Figure 9: Unit installation animation excerpts.

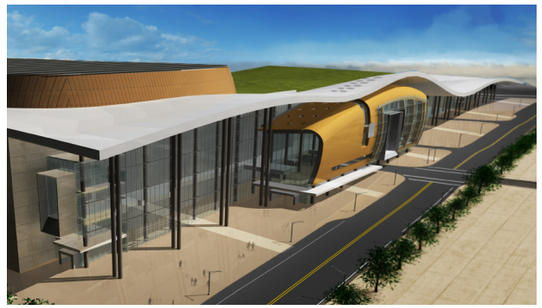

Figure 10: Music City Center daytime view.

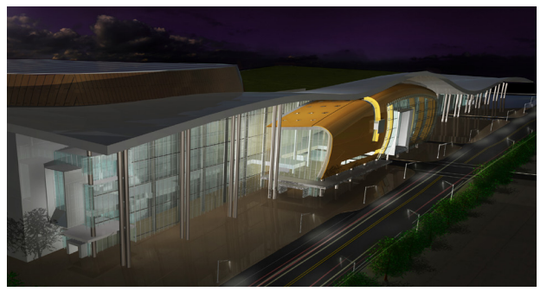

Figure 11: Nashville Music City Center nighttime view.

