Accelerating approvals

Reach consensus earlier and faster with BIM for Infrastructure

AUTODESK.

THE PROBLEM

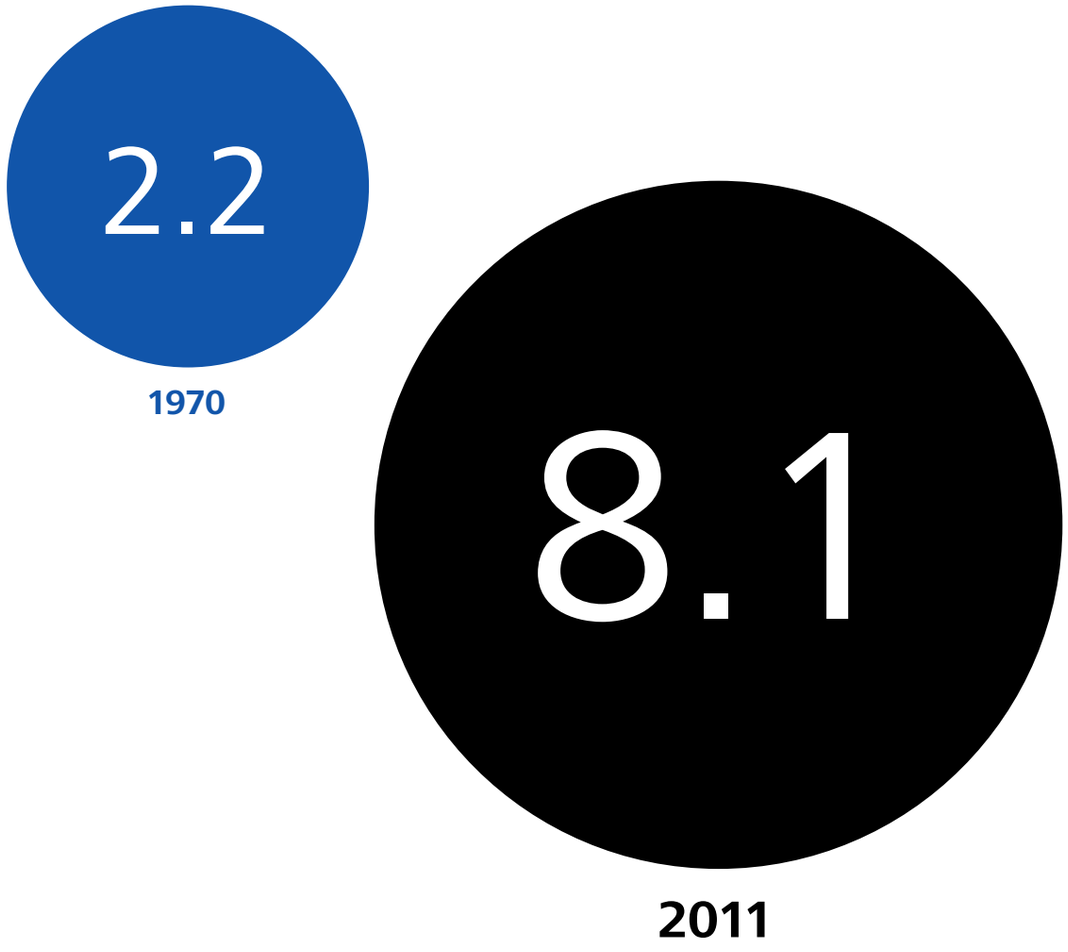
Large transportation projects are often contentious and costly, and therefore subject to regulatory and public scrutiny. Any sizeable project usually raises a myriad of concerns about safety, congestion, access, property values, and environmental impacts, to name just a few. Carefully balancing the needs of people and planet has become business as usual for government and industry, but the ever-increasing complexity of the approvals process is impeding our ability to meet critical infrastructure needs for a growing population.

Many transportation projects are required by law to inform the public about the project and (more importantly) engage them in the planning process itself. By soliciting the public's ideas and listening to their concerns in early planning stages, project teams can make better decisions and deliver designs that satisfy both transportation and community needs.

The bigger a project is, the more attention it attracts from community groups, civic leaders, impacted residents and businesses, and the general public. This increases the complexity of public outreach, makes public engagement more difficult, and lengthens the approval process. Furthermore, the size and complexity of many transportation programs make it difficult to fully convey early design proposals to a non-technical public.

Growing complexities

Years to complete environmental impact statement (EIS) for an average highway project:



DOT. 2012. Estimated Time Required to Complete the NEPA Process. FHWA. http://bit.ly/xX5JBE

Drowning in paperwork

Federal environmental regulations state that in most cases EISs should be less than 150 pages long and less than 300 pages even for complex projects. However, in response to the threat of litigation, every minutia of environmental impact is evaluated, leading to EISs that are often thousands of pages long with volumes of technical appendices.

Source: Code of Federal Regulations. Title 40: Protection of E

Tap into new technologies to improve project communication and promote interactive, collaborative dialogs with the public

THE SOLUTION

For the last decade, BIM and the use of intelligent 3D models has been helping industry professionals execute building and infrastructure projects more efficiently and reliably. Now a staple in the architecture, engineering, and construction industry, reliance on BIM for infrastructure projects is quickly growing. A 2012 industry study by McGraw-Hill Construction reported that almost half of the surveyed firms were using BIM on their infrastructure projects.

As BIM brings new efficiencies to the design and construction of infrastructure, it is also changing how owners and project teams engage the public. Furthermore, advancements in technology for collaboration and communication—and the prevalence of social, mobile, and cloud technologies—is changing the very nature of the public outreach. In response, transportation project teams are increasingly using the project models stemming from BIM processes and tapping into new technologies to improve project communication and promote interactive, collaborative dialogs with the public.

DOWNLOAD THE MCGRAW-HILL CONSTRUCTION STUDY >

The solution in view

Better Market Street

Market Street is the central artery and civic backbone of San Francisco. Anyone who has walked, cycled, driven or ridden public transportation down the street knows both how vital it is to the city -- and how choked with traffic it can be. The city government, many merchants and residents believe it needs to be more than just a transportation route. It needs to be the city's most vibrant public space.

READ MORE

BETTER COMMUNICATION...

Historically, project teams have used traditional maps and engineering drawings to present transportation projects to the public. The obvious drawback of this approach is that most people in public forums do not have a technical background and therefore find it difficult to visualize design proposals based on engineering plans, profiles, and cross-sections. Furthermore, the presentation material is often graphically divorced from its setting, making it even more difficult to understand a project and gauge its impact. Even when visually compelling artist renderings or scaled physical models are used, the creditability of the data behind these visualizations can be called into question.

With the increasing use of BIM and model-based design, the use of 3D design models can be extended to create 3D visualizations (such as still renderings and live-action animations) that help project teams present early planning alternatives to the public. Teams can also combine existing GIS, civil/survey, CAD, and BIM data from different coordinate systems and formats to build digital 3D models of the existing environment surrounding a project site. For example, proposed rail alignments cutting through a city or a new interchange connecting an existing highway and surface roads. Because these models realistically depict proposals in the context of the natural and built environment, the public can better understand the project from their own perspective: how it will change the view from their yard, for example, or how it will impact their commute. This helps public constituencies gain a more comprehensive understanding of the proposal and its impacts, which can allay concerns about the project and shorten the approval process.

…AND BETTER DATA

In addition, the models are more than just 3D representations of the project. The models contain real data about the surrounding environment, such as right-of-way limits, traffic data, flood plain overlays, or property values; combined with real design data such as alignment centerlines and profiles, line of sight distances, or cut/fill quantities. Project stakeholders can access this information in an immersive 3D environment, akin to virtual reality gaming systems, in order to better mimic real-life conditions and add more reality to the presentation.

By seeing all this information, the public can better understand project impacts and feel more confident in the decision making that led to the various design proposals under consideration. They may not like certain aspects of the project or the design, but the public outreach becomes fact-based, with emotions and misgivings assuaged by hard data.

PUBLIC OUTREACH IN THE 21ST CENTURY

For the last several decades, there have had dedicated websites for large transportation programs that keep the public up-to-date on the project. Indeed, a large portion of today's ongoing public outreach is web-based. Although that information may include the types of visually compelling visualizations mentioned earlier, the communication is still one-way.

Social media is changing that. The websites of prominent transportation programs now include Twitter feeds, and links to Facebook pages or YouTube channels. Platforms for blogs, social networks, and image sharing are being used to both communicate project information to the public, and engage with the public in a two-day dialog to capture public preferences and concerns more effectively.

BIM-based project models and information frame the discussion while new technologies for social media, mobile communication, and cloud-computing support the discussion—providing the ability to share project information in an interactive way. Interested citizens don't have to rely solely on public meetings to get information and provide input. Owners, design teams, project stakeholders, and the general public can join together in a virtual network to exchange project information and ideas. Cloud-based servers can host massive 3D models and data that the public can peruse at their own convenience. Mobile devices with cameras enable people to use 'augmented reality' to view those models from the project's real location, using the screen to see the surroundings around them as part of with the design proposal(s). By using social media in parallel with traditional public meetings, project teams can reach more people and achieve project consensus faster.

Social media for public outreach in Bamberg

A project example is the construction of a new high-speed railway through the City of Bamberg, Germany. The Bavarian city is a UNESCO world heritage site, and its citizens want to ensure that any new construction preserves that distinction. City officials worked with the German railway company and its engineering consultants to develop a model of the proposed rail improvements in Bamberg. That model was available to its citizens for public outreach on a project website and for downloading to augmented reality apps. City officials report a marked increase in public involvement in the planning process due to their ability to view project plans using this new technology.

See how Bamberg city officials increased public involvement in the planning process using new outreach technology.

SUMMARY

BIM is the foundation of data driven, bidirectional communication between the project team, stakeholders, and the public. Intelligent 3D models guide planning and design decisions of the project team. Visualizing design ideas in the context of actual surroundings helps the public better understand and evaluate proposed projects. As projects take advantage of the cloud and social platforms, BIM for Infrastructure provides the ability to more accurately convey design intent and engage the public early in the design process, helping project teams reach consensus earlier and faster.