CRSI Concrete Reinforcing Steel Institute

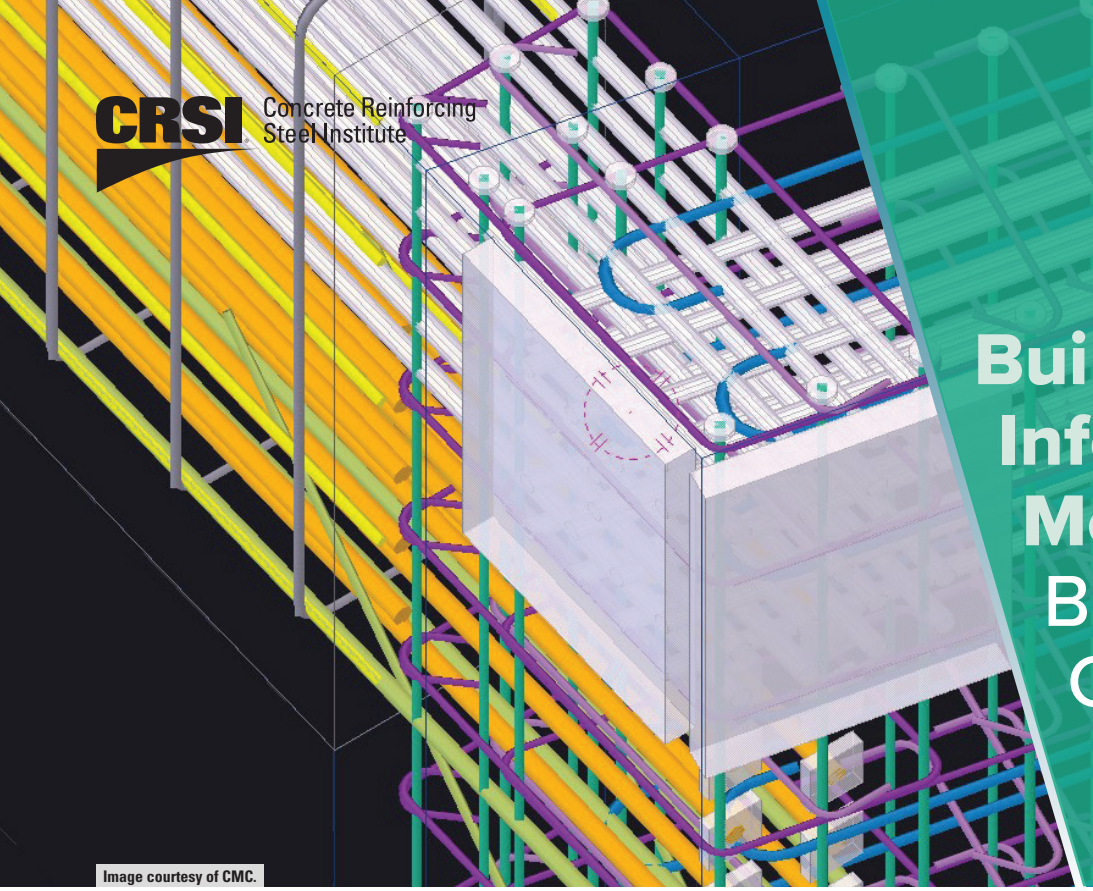


Image courtesy of CMC.

Building Information Modeling (BIM) Benefiting Contractors

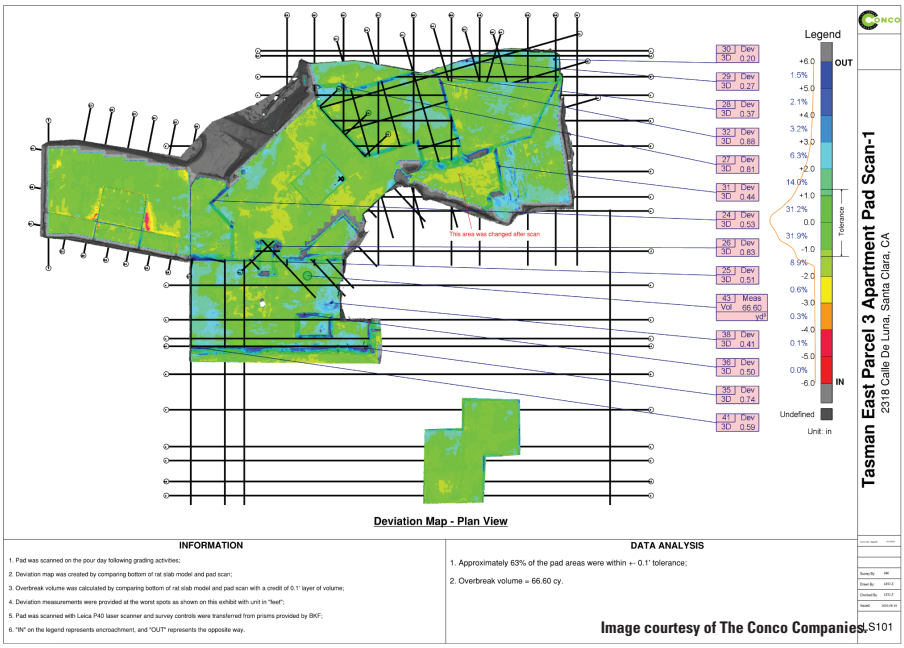
Benefits of BIM

Field layout is a time-intensive process, and errors can lead to costly consequences. Leveraging BIM Technology, cutting-edge robotic total stations can drastically reduce field operation time and enhance accuracy. Upon request, layout specifications can include Edge of Slab, Column and Wall locations, along with the start points, end points, and spacing for rebar. Integration of 3D laser scanners allows for model-based deviation reports, facilitating pad elevation checks prior to mobilization and overlays for as-builts.

BIM Models

BIM models contain extreme amounts of information. The contractor, detailers, and estimators may have an understanding of the total volume of concrete and rebar weight pending a properly completed model (with a minimum LOD of 400 that defines members as modeled completely and are "fabrication ready" including specific quantities, sizes, shapes, and orientation of the element, as well as all required reinforcing data to be supplied by the rebar fabricator), eliminating the need for manual calculations.

Change orders pose challenges in terms of acceptance. Owners and General Contractors often scrutinize Change Order Request (COR) estimates for accuracy and cost implications. BIM systems provide a powerful visual tool that expedites the project team's understanding of changes. Utilizing BIM's comparison tools, the model showcases a 3D overlay, allowing for detailed reports on volume and weight changes. This enhances transparency and facilitates a more streamlined evaluation of change-related aspects.



Deviation Map - Plan View

Image courtesy of The Conco Companies.

A design model is used by multiple disciplines, encompassing elements like concrete outlines and members. When a singular model is used from design conception phase, the construction team can share and coordinate between trades with less confusion and a better understanding of the structure. With a shared structural concrete model, the rebar detailer's task is simplified as they can check elevations

and verify the extent or range of a concrete member without having to lay out all elevations based solely on architectural drawings. The model outline can also incorporate openings, and through further coordination, especially with MEP, this provides clear insights for the rebar detailer to coordinate locations that might otherwise go unnoticed.

Preconstruction – Estimating

Innovative workflows enable the use of the design model outline to construct an estimate model, facilitating accurate quantities for bidding and a visual plan to promote customer understanding during the bidding phase. If awarded the project, utilizing the same model post-award improves Level of Development (LOD) value and allows the construction team to address Valued Engineering (VE) and logistics, enhancing projected project schedules.

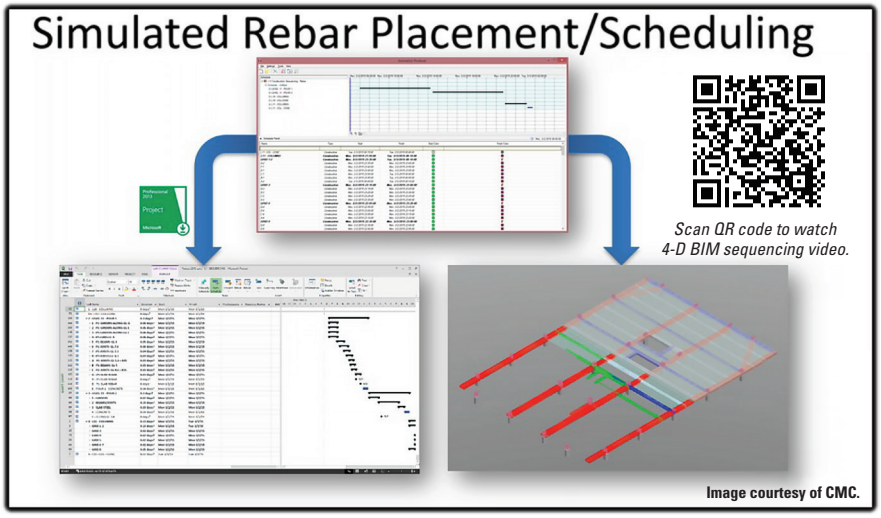
Coordination among the various trades involved is vastly improved through the integration of individual trade models into a unified platform. This streamlined sharing of BIM data helps ensure that vital information is readily available.

Safety

Safety can be improved by "seeing" possible danger spots or hazards through earlier collaboration by trades, visualization, and planning.

- Viewing a model in 3D can help identify potential safety issues, validate compliance with safety standards and company safety policies.

- BIM minimizes on-site rework, which has historically correlated to increase recordable jobsite injuries. Additional time required for rework places workers under increased pressure to meet project deadlines, causing them to accelerate their pace and/or possibly shortcut safety measures.



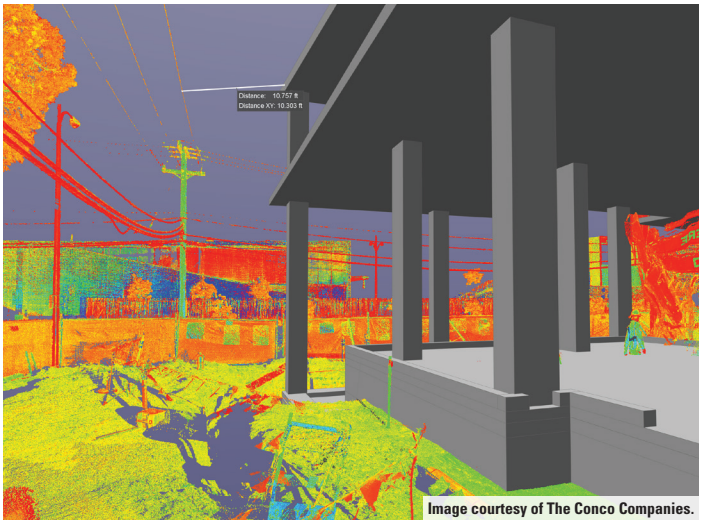


Image courtesy of The Conco Companies.

Scheduling

Scheduling for all trades becomes readily available at a moment's notice, enabling better coordination of work, organization of field labor crews, and material delivery to the jobsite.

The use of 3D models proves invaluable in identifying clashes and problematic areas before construction begins. This proactive approach allows for effective problem-solving, preventing disruption to project schedules. For builders and contractors, this is a significant advantage, particularly in avoiding issues such as congestion of the reinforcing steel with other critical embedded items like steel structural embeds, piping and ductwork clashes. Rebar congestion leading to concrete consolidation problems has the potential to bring a project's schedule to a standstill. Early detection of these issues will allow timely intervention before reaching the critical path. In such cases, submitting a Request for Information (RFI) to the Architect/Engineer of Record (A/EOR) for approval to relocate embedded items or pipes becomes crucial, ensuring problems are addressed and resolved before they happen. This approach not only saves a substantial amount of time but also proves cost-effective.

Post-Construction

BIM facilitates the production of accurate "as-builts" by depicting changes in real-time. This enhanced documentation contributes to easier remodels, rebuilds and additions. Improved management of the building lifecycle is achieved using BIM, serving as a comprehensive database for all the buildings systems and components, ensuring integrated processes throughout the building's entire lifecycle. ■

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