

Tighter design teams sharpen project supply

With 3D model-based design delivery to detailers gaining momentum in the local steel construction market, the Australian Institute of Steel Detailers (AISD) in Queensland changed the focus of its annual awards to primarily recognise design team integration rather than individual entities, in an approach similar to the ASI's bi-annual steel awards.

In recent years, the AISD awards program has recognised consultants who invest strongly in documentation quality, bestowing one award to a consulting engineer and another to an architect.

Chairman of AISD (Qld), **Clayton Roxborough** said that the new program recognises that the delivery of design information to detailers using 3D Building Information Models (BIM) is a process option that is certainly gaining momentum in the local steel construction market.

"The AISD has been a vocal supporter of this process for quite some time so it's exciting to witness the growing awareness by designers and builders of the merits of early engagement and the advantages that Australian steel detailers have to offer," he said.

"By integrating the delivery of workshop drawings early in the project, steel detailers are adding significant value to the whole supply chain, thereby making structural steel a more sought after material of choice."

This focus is well in keeping with the more collaborative approach, known appropriately as Integrated Project Delivery (IPD) as design and construct providers assume an increased share of the building market creating opportunities for all parts of the supply chain to innovate and become more efficient and cost effective.

IPD refers to the collaborative efforts of all project participants optimised by closely linking the design, steel detailing, construction management and commissioning activities.

Speaking at the ASI's annual convention in September, the Managing Director of ASI detailer PDC, **Martyn Weir** described IPD as a collaborative alliance of people, systems, business structures and practices that harnesses the talents and insights of all participants to optimise results, increase value, reduce waste and maximise efficiency through all phases of design, fabrication and construction.

The award judges were particularly interested in:

- Communication improvements and ready Requests for Further Information (RFI) resolution
- The extent detailers were included in the design process
- The level of technology integration and the accuracy of modelling
- Time saved during documentation in advancing construction schedules.

JUDGING PANEL

Joe Biggs (JBD Group)

Peter Hemsall (Hemsall Steel Detailing)

The three shortlisted entries demonstrate just what IPD can involve and the associated gains.

Woolworths Shopping Centre, Meadowbrook

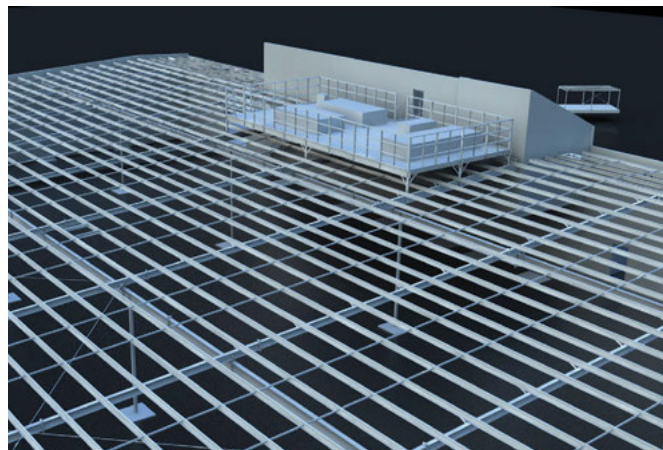
Steel Detailer: Steelcad Drafting

Design Consultants: McVeigh Consulting

Project Builder: ADCO Constructions

The detailer scope included the steel detailing and pre-cast concrete tilt panels on this medium-sized retail development. The design was complete on the first stage when the detailer was engaged and preliminary design was underway on the subsequent stages. Attributes in the design model were used to identify which areas were complete and ready for detailing and to visually identify with various colours what was approved for modelling at that revision stage. Connection details, rafter presets, design status and approval comments were all included in the design model as attributes to readily provide design-specific information such as steel grade, paint finish and general approval comments from the engineer. About half of written RFIs on this project were answered the same or next day. Minor questions were dealt with by verbal phone calls to the engineer. One of the main benefits of the detailer working directly from the engineer's design model was that it did not require interpreting the geometry and design intent from 2D drawings.

"Our solution saw the team produce steel detailed shop drawings during the engineering phase rather than the conventional method of production during construction, creating greater certainty, steel supply chain efficiency, project site safety, and overall value for both Woolworths and ADCO with much less risk," said Senior Associate Structural Engineer at McVeigh Consultants, **John Gilley**.



3D Studio Max generated image from the Tekla model.

"This involved creating an entirely new process for transferring all information between engineer, detailer, architect, fabricator, builder, and client which worked well to bring the documentation together in a highly collaborative manner to ensure the design intent was properly developed in a streamlined method."

Judges commented:

"This project demonstrated good early involvement of the detailers at the 50 percent design stage and revisions were handled within the model using IFC technology. The design consultants built the base model accurately and 'fit for use' for the detailer and allowed a good deal of associated construction information to be transferred within the 3D model. Considering this was a retail design and construct type project, RFIs were minimal by industry standards."

Bundaberg Multi-sports Complex

Steel Detailer: Jackson Roxborough Consulting

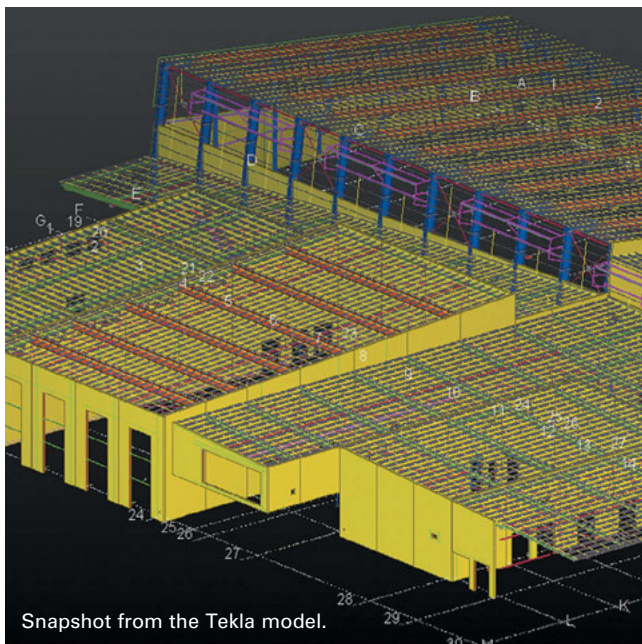
Design Consultants: GHD

Project Principal: Bundaberg Regional Council

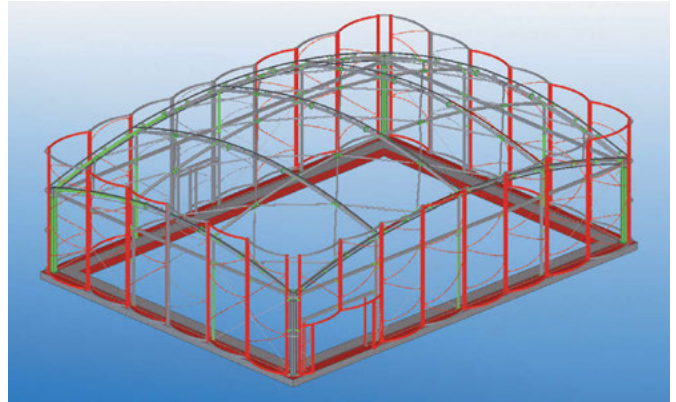
The detailer scope of work for this indoor sports and administration facility included the structural steelwork, pre-cast concrete tilt panels, temporary works and structural timber. At the time it started on this project, the design model was at 'Issued for Construction' status. The model was delivered as the primary design source and all steelwork and panels were accurately sized and located. There were attributes in the design model for design status (approved for detailing), material grades, project stage and paint specification. Sketches of connections were provided for each area which made for easy identification of all elements and allowed the engineer to skip going to full blown 2D documentation. The design model incorporated services, concrete extents and other interface items such as timber trusses. This allowed for clear design intent and set-out to be communicated clearly. The detailing model was used by the engineer for the approval process.

Judges commented:

"The design model was complete before detailing commenced and the consultants built their base model accurately and fit for use by detailers. The Design revisions were communicated within the model using IFC technology, and the base model included many interfacing trades, giving greater confidence during the detailing phase."



Snapshot from the Tekla model.



Snapshot from the Tekla model.

Southport Sales Centre

Steel Detailer: BDS Vircon

Design Consultants: 'S' Squared

Project Principal: Anthony John Group

The membrane-clad skeletal structure of this apartment sales venue lent itself to the use of curved, steel pipe as the predominant section. Due to previous similar projects between the detailer and engineer, the fundamentals of the structure were already understood. Additional design specifics were provided as hand drawn concept sketches. Required material type and geometry changes were workshoped daily by the engineer and detailer via the web. The process was very fluid and dynamic. With no design models provided, the detailer drew from prior knowledge and models for previous similar projects which proved very accurate and useful as a starting point. As such, this project didn't need or impose a formal RFI process as basically approval was happening as the model developed. BIMSight models were regularly provided to the engineer for coordination with the owner to obtain a full understanding and picture of the project. This eliminated the need for the engineer to develop formal design drawings, saving time and money for the client.

Judges commented:

"This project highlighted good involvement from all parties in the IPD team, in particular, the early engagement of the detailer at design development stage that allowed the design model and documentation to be initiated by the detailer. Overall this was a great time efficient project result delivered utilising IPD, and a good example of using technology and 3D models to interactively solve design issues."

Integrated Project Delivery

- A collaborative alliance of people, systems, business structures and practices
- Harnesses the talents and insights of all participants
- Optimises results, increases value, reduces waste and maximises efficiency
- Encompasses all phases of design, fabrication and construction.

Pre-Design Phase – Entire team meets at earliest stage, improving accuracy of decisions. Structural design and construction input discussed.

Design Phase – Collaboration between engineer, contractor and trades helps to improve quality, accelerate the schedule and mitigate risks.

Construction Documentation Phase – Complete and accurate Building Information Model (BIM) reduces uncertainty and facilitates 3D communication during Construction.

Construction Phase – Early planning and collaboration increases efficiency in construction, greatly reducing the number of RFIs, change orders and drawing submittals. Projects have a better chance of completing on-time and on-budget