Tekla

A guide to

MIS for steel fabricators

Trimble

Bringing power to steel detailers and fabricators

In this guide, we explore the value that a digital management information system (MIS) can bring to your business, combined with:

3D modelling workflow and cloud-based collaboration tools.

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Are you a steel fabricator? Are you on the hunt for ways you can work more efficiently, more productively and more profitably?

Introduction

It's no secret that steel fabricators are currently facing a very competitive and challenging market, with material shortages and price rises creating a highly volatile landscape to navigate; all while simultaneously protecting that all-important profit margin and continuing to provide customers with a reliable, high-quality service. And that's not all to contend with, with 'sustainability' a topic on everyone's mind too.

Understandably, this can all seem challenging and even overwhelming to successfully manage and control – but digital tools can help. At Trimble, we're here to help you get more from technology, with interconnected solutions that help you work smarter, faster, greener and stay ahead of your competition. We help make connections happen, bringing your people, data, machines and workflows together.

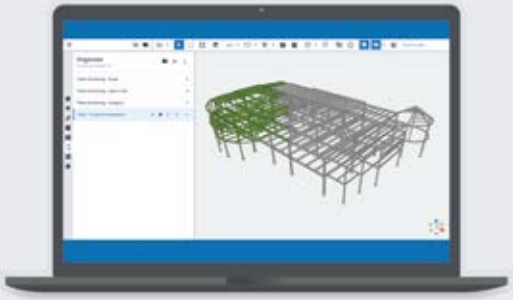
Tendering and estimation

The first stage of a project for any steel fabricator, this is often where the success of a job (from a profit perspective) is determined.

Without accurate information, it can be very easy to either over estimate, leaving you likely to lose out on the tender entirely, or under-bid, leaving your profit margin vulnerable.

Bid with confidence

Delivering an accurate bid and tender becomes even more critical when looking at the current economic landscape – but panic not!



Model-based estimating can provide you with greater accuracy and consistency, as well as enabling you to keep track of and evaluate any cost increases quickly, without damaging your bottom line. All of this can help you to become more agile and able to adapt with the daily challenges.

A key advantage of digital fabrication and construction is the streamlined flow of information-rich data that it facilitates, with your estimation model able to then become the fabrication model. No fear of data silos or lost work and information – instead, it can all be built upon and detail added by the drawing office.

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Once we receive the IFC file from the engineer at the initial tender stage, we're able to import this directly into Tekla PowerFab.

Thanks to the software's emphasis on data integration and automation, we're then able to generate estimates and quantity take-offs directly from the IFC file – overall, a far easier, efficient and more accurate way of working.

– Phil Nattress, Estimator at South Durham Structures

READ case study

Today, we use PowerFab for every job estimate that we do. We've seen real, tangible results, with our ability to produce more estimates each week leading to more work.

It's a logical outcome: the more bids and estimates you can generate, the more work you're going to win. In fact, we now have a full year of orders on the system – an achievement that is in part thanks to Tekla PowerFab.

– Gareth Davies, Managing Director at Steel Fab Wales

Procurement

Having access to live, up-to-date and accurate data is critical when it comes to the purchasing department , preventing you from ordering the incorrect number of raw materials.

This can work both ways, with not enough materials leading to project delays; while too much stock can lead to wastage, both of money and resources.

In order to combat this, it is important that you have control over what you are ordering, at what amounts and for which job – which is where a digital information management system can come into play. Imagine having instant visibility into your stock levels at the touch of a button, knowing what materials are assigned to what job, without having to physically walk down to the warehouse to find out.

With a live inventory, you can:

- Order only what you need, when you need it.
- Allocate material stock to individual jobs.
- Put remnants or offcuts back into the inventory, ready to be reused on another job.
- Link mill certification documents back to the database to give you full traceability on stock, even if it goes back into the inventory.
- Optimise your material usage to reduce waste, contributing to a greener production process.
- Avoid duplication with built-in safeguards.

Easy to use and offering enhanced levels of visibility, we now no longer have to manually and physically check what stock we already have, compared to what stock we need to purchase on every job. Instead, it's all automated, providing us with a far better and more informed way to handle stock. We can simply import files from the drawing office and the digital system will do the rest!

– Keith Corner, Operations Director at South Durham Structures

READ case study

As well as the major materials, we can also better track and trace the ancillary items used everyday, such as paint and bolts. We now have insight into the precise numbers allocated to and used on each job, whereas before it was always an educated guess. This contributes to more informed purchasing and can help us to better predict future expenditure.

– Gareth Davies, Managing Director at Steel Fab Wales

Drawing office

The benefits of a 3D modelling environment are well known by all, providing assurances of accuracy and high levels of detail – two things that can result in the creation of fabrication-ready models, drawings and schedules without fear of rework or errors.

But are you making the most of your 3D detailing software?

Interoperability

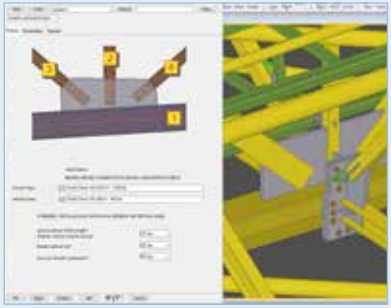
Does your software offer an open BIM environment? The ability to bring IFC files and point cloud surveys into the 3D digital environment can be hugely advantageous, with added data and information for you to coordinate with and consider alongside your detailed model, whether it's coordinating with an existing structure or the construction site constraints.

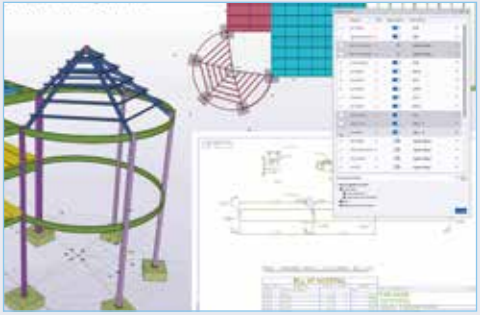
Software interoperability can also help to facilitate effective collaboration with other parties on a project, working together as one; helping to prevent coordination issues further down the line once the project has reached site. Bringing other parties' models and data into your 3D model can enable all data to be considered side-by-side as one, rather than in isolation, with clash-checking capabilities able to take into account not just your own detailed model but other parties too, such as the MEP contractor.

Parametric

Does your detailing software possess inherent parametric capabilities?

This means that all data contained within the model is inherently interconnected, with any change in the model automatically being reflected in the associated drawings and production schedules. Meaning you don't have to worry about any last-minute design changes being missed or not being passed onto the team on the fab shop floor.





Smart drawing tools

As with all technology, BIM is in a constant stage of development, with new design tools and features constantly being launched to help offer further productivity and efficiency improvements.

These can range from custom components, ideal for reducing repetitive tasks and helping to better use time and resources, to smart drawing tools. Taking inspiration from a basic form of artificial intelligence (AI), smart drawing tools note when you are making edits to one drawing and automatically find similar objects within the model and make editing suggestions.

Fabrication and production

The fabrication shop floor is where the magic really happens!

Transforming individual steel sections into structural columns, beams, complex curved roof canopies, rollercoaster tracks and more.

Streamlined data thread

A digital MIS can give you unparalleled control of your fabrication production, with paperless shop floor operations and efficient project management on the go.

Perhaps the main value though is data: data that you may have never had access to before; digital data that is available instantly at the touch of a button, rather than hidden within mountains of paper files. Imagine, a coordinated and streamlined thread of data, running right from the beginning of your fabrication business (estimation and procurement), through the drawing office, into your production facility and even beyond?

After all, why should the value of digital technology stop at the drawing office doors?

Through the use of cloud-based collaboration tools, such as Trimble Connect, and mobile devices or tablets, you can bring digital data into the factory, putting the 3D model, PDF drawing files and manufacturing files directly into the fabricator, welder or machine operators' hands. Tekla PowerFab Go is also easily available on any internet-ready device as a web page, for enhanced accessibility. With this level of detail and constructible information at their fingertips, fabricators can easily answer any design queries themselves, rather than having to pause and take the issue to the drawing office for clarification.

Having access to this level of data can also give you greater visibility and control over your operations, with enhanced production tracking capabilities. Imagine a customer calling up for an update on their job. With a digital MIS, all it takes is a few clicks and you can see exactly where each individual piece of steel for that job is up to: if it's been fabricated, welded, painted and by whom. The days of unnecessary footprints being spent walking around the factory or warehouse to find a specific piece of steel are gone.

As well as the productivity benefits, such visibility can enable you to communicate more effectively with customers, offering transparent, to-the-minute updates.

"As a business, it aids improved levels of communication and coordination between teams, for everyone in the company can access the system and immediately see at what stage a particular job is at or view a department's work schedule for the week. Through the direct link with Tekla Structures, we can even move around a project's 3D BIM model, click on any steel section and be provided with an up-to-date job status. All of our teams have access to Tekla PowerFab through a smart device, meaning that they can simply log once they have completed a job and the component's status is then automatically updated.

"By comparison, before we introduced Tekla PowerFab into the business, if we needed to know the current status of a job, it would involve us having to physically walk around our site and speak to each team individually. Understandably, this could take up a significant portion of our day, time that could be better spent elsewhere."

Matt Hastwell,
Innovation Consultant
& Steel Detailer at
Wareing Buildings.

READ case study

The use of tablets on the shop floor has benefitted our fabrication team, providing them with easy access to the information they need, when they need it. In the case of a particularly complex connection or weld, team members would often have come to the drawing office to query it or request to view the 3D drawings. Now, through Tekla PowerFab, they can instantly access the model and drawings on their tablet, as well as interact with it.

It's all about aiding more effective communication. Having this greater level of visibility ourselves enables us to, in turn, be more transparent to the customer, facilitating a positive customer relationship.

– Chris Martin,
Contracts Manager
at Steel Fab Wales

Traceability, reporting and recording

These themes of visibility and traceability carry through to quality control and recording. With such technology available,

why would you still use a paper-based means of record-keeping?

Digestible, accessible and visible data

A digital MIS, along with the use of tablets or other similar smart devices, can help to facilitate comprehensive and streamlined quality control and quality assurance checks, with - perhaps most importantly - the results instantly recorded for future auditing and reference.

Digital records make for easily digestible, accessible and visible data, all available as a quick and user-friendly dashboard. This level of digitisation also makes the handover to the client at the end of a project far more efficient and thorough. Passing on this digital golden thread of data is key considering the increased pressure for the construction industry

to brush up on passing data and records from the bottom of the supply chain up to the top.

As well as aiding the digital golden thread, this idea of traceable data also relates to the wider theme of sustainability, with building owners, clients and contractors able to trace a building or structural product back to its original raw state.

It enables us to use the data already stored within the central system to **automatically generate** reports that would otherwise take up a significant portion of our time to produce manually.

For example, an automatic **accountancy report** scheduled weekly details every item that's come in that week, what it costs, the status of the job and what needs to be paid. Our accounts department no longer have to manually sort through invoices and material order lists.

We also have a weekly **forecast report,** which automatically provides us with a status of every current job and even generates a view of the following week's **production schedule,** enabling us to plan accordingly and ensure continued high levels of efficiency.

– Matt Hastwell,
Innovation Consultant & Steel Detailer
at Wareing Buildings

On-site delivery

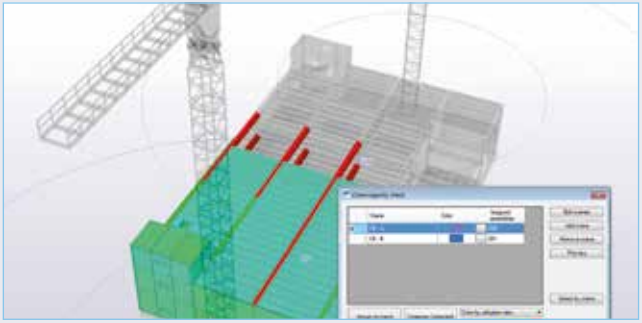
Think the value of 3D modelling, digital technology and data ends once a project reaches the site?

Wrong.

Just-in-time manufacturing

Through the use of sequencing tools available within digital management systems, you and your client can benefit from just-in-time manufacturing, with the ability to plan and schedule production and deliveries to site in accordance with the construction schedule.

This can be down to the finest level of detail, including the careful planning of lorry loads and delivery schedules, ensuring that the components required first on site are loaded on last.
Go back further and you can even bring the construction site into the 3D modelling



environment as early as the detailing stage, before fabrication has begun. As well as generating the centre of gravity of components to plan the on-site assembly, the development of crane lifting tools available in 3D modelling software means that draughtspeople can even detail and fabricate components in accordance with the crane's known capacity.

Tekla PowerFab

So, you've been using 3D model technology – but how is your production management and estimation game?

Tekla PowerFab is a comprehensive software suite that provides a systematic and collaborative approach for managing your fabrication. Developed specifically for steel fabricators, it delivers a smooth, continuous and real-time flow of information on projects from start to finish.

WATCH video

- **Estimate -** Use our accurate and reliable estimation program to bid on more projects and with more confidence.

- **Manage projects -** Bring your schedules, job progress, drawing control and change management together in one easy system.

- **Nesting -** Reduce waste and only spend money on the materials that you need, with a built-in material optimisation engine.

- **Purchasing -** Make purchasing material for your jobs easier with our digital requisitions and purchase ordering system.

- **Inventory control -** Regain control of your yard and maximise material usage with automated inventory management.

- **Production control -** Plan, manage and track your entire fabrication with our user-friendly and comprehensive interface.

- **Shop floor -** Record your fabrication progress in real-time and with full traceability through every step of your workshop.

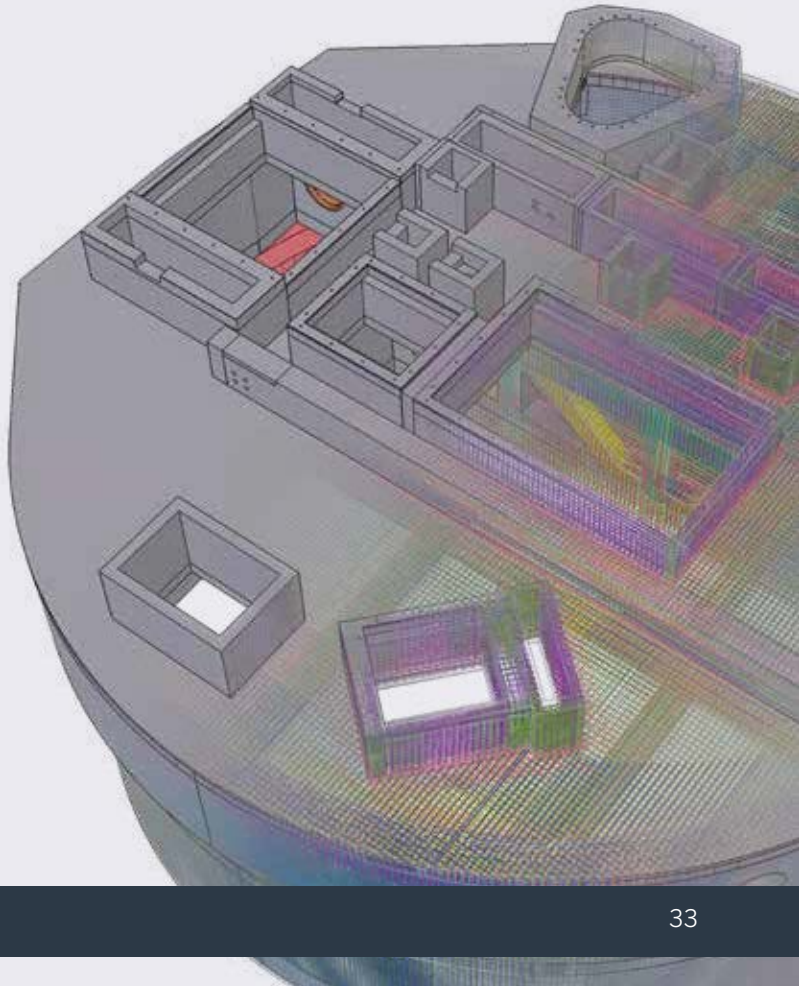
- **Shipping -** Ensure materials are delivered to the site on time with shipping planning and tracking tools.

Beyond steel

However, all of that said, Tekla software is not exclusively for structural steel fabrication only.

If we were to consider the software from a detailing and manufacturing perspective, we can add multiple different materials into Tekla. What's more, with different roles within the software itself and the ability to add on applications, tools and components from Tekla Warehouse, it's never been easier to look outside of the traditional scope of works.

Tekla software is used extensively for precast detailing and cast-in-place concrete and rebar detailing. We are also seeing increasing popularity in users adopting a hybrid approach to modelling, where multiple materials can be detailed in a single model providing a one source of truth for manufacturing. This is particularly the case with precast or timber hybrid, where the main structures are manufactured from materials other than steel, but items such as connectors and embeds are still fabricated from steel.



A multiple material model is invaluable

With the ongoing push for offsite construction, we have also seen an increase in multi-material projects, such as either light metal framing or volumetric modular developments, which would feature both hot rolled and cold rolled steel. Again, we see Tekla being used extensively here. The same can be said for having features such as integrated staircases built within the structure, required as a part of the deliverables to site, often being either secondary steelwork or precast. Once more, this demonstrates how a multiple material model is invaluable when it comes to coordination and just in time offsite construction.

There are several ways in which Tekla lends itself to this type of detailing. One is that you can produce the manufacturing files for all of the elements quickly and in a native file format to send for manufacturing. For example DSTV for steel, CSV for light metal framing, BVBS for rebar, XML files for precast and BVX/BVN for timber.

While we have only considered the structural elements so far, there is even more that you can do outside of that scope when it comes to Tekla Structures. We see Tekla used extensively on both standard and feature staircases, with a mixture of steel/stainless steel, timber or glass to name a few materials.

We also see Tekla Structures being used by manufacturers and installers of composite metal decking, not just for quantifying sheets and studs but also for planning sheet packs and set out points. It is a similar story for cladding too: a great example of Tekla Structures for cladding is the partnership we have developed with Kingspan and their suite of KingCADD cladding detailing tools that sit on top of Tekla for the building envelope. And it's not just sheeting that we see being carried out in Tekla Structures - we also see facade and rainscreen detailing, and there are several precast manufacturers of architectural facades who use Tekla Structures to support their operation, where every single brick can be detailed, quantified and planned out into a mold.

So, where do we go from here?

There are some very interesting new partnerships emerging in 2023 that will see Tekla Structures becoming a platform for markets such as scaffolding, enabling users to quickly design, detail and report materials for scaffolding structures. There are also some new tools for piping detailing, eliminating the need to have two separate models for structures and MEP piping. Both partnerships offer something new and innovative to the market, and are great examples of what can be achieved through Trimble's Partner Programme.

Trimble signs cooperation agreements with Tekla Structures product-platform partners to advance new specialised construction applications.

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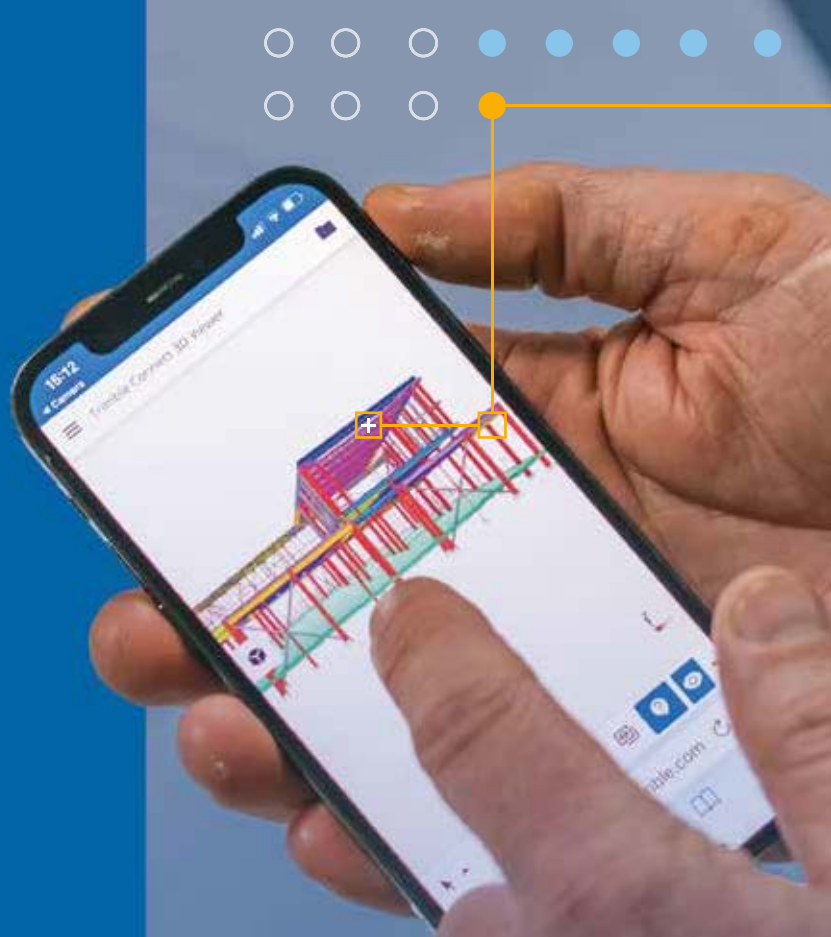

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