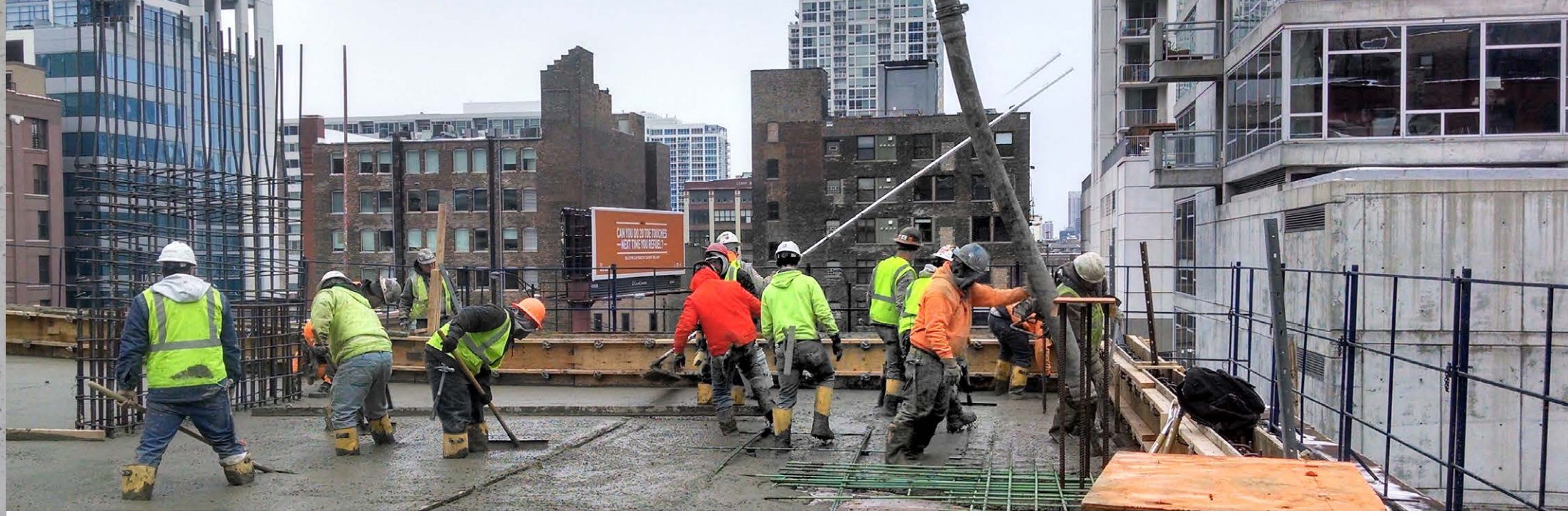
Better performing concrete takeoffs

- Estimator’s guide to modern approach

Trimble



Introduction

Accurate and reliable takeoffs are essential for the construction cost estimating process.

Yet many concrete contractors are still set on using traditional takeoff methods when bidding or when creating budgets for their projects. Typically, takeoffs are still done using drawings, a calculator, on-screen digitization and 2D CAD solutions.

These takeoff methods are not only tedious, time consuming and error-prone, but the information produced often cannot be used for any other purpose, including future estimates. For example, a concrete takeoff used for bidding often cannot be used in the budgeting stage.

Instead of accumulating over time, valuable knowledge of the project is lost at each stage of the process and information must be recreated again and again.

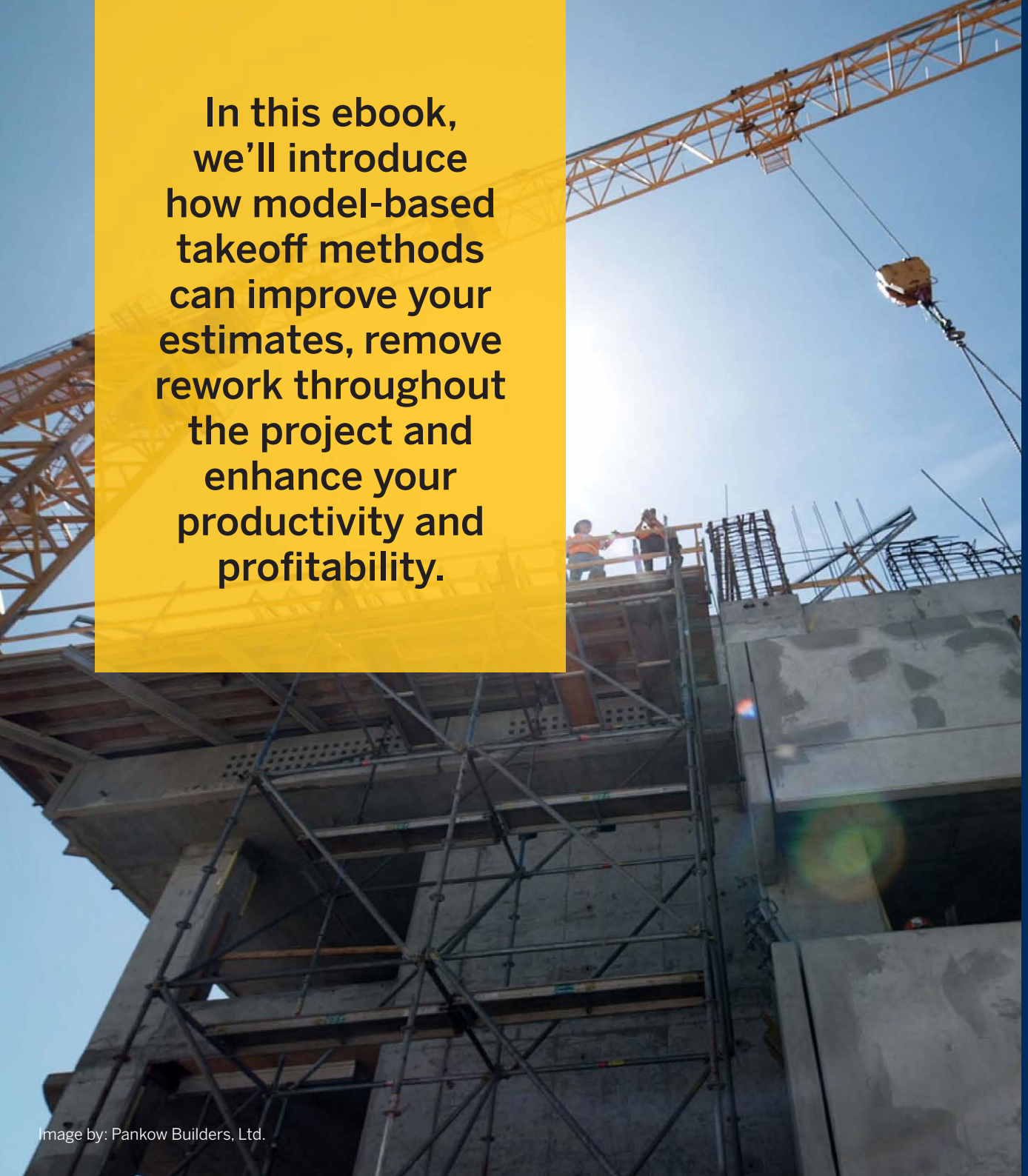


Image by: Pankow Builders, Ltd.

In this ebook, we'll introduce how model-based takeoff methods can improve your estimates, remove rework throughout the project and enhance your productivity and profitability.

We'll examine the problems traditional 2D-based concrete takeoff methods create in pre-construction and how traditional "single-use" data preparation creates unnecessary rework later in the process for estimators, project managers as well as suppliers like formwork providers and rebar detailers.

We will also examine how the use of model-based methods can eliminate wasted time, money and resources in concrete takeoffs.

This ebook also explains how the use of digital tools and Building Information Modeling (BIM) software, when purpose-built for concrete contractors' needs, can not only upgrade the estimating process but can add tremendous value throughout the project.

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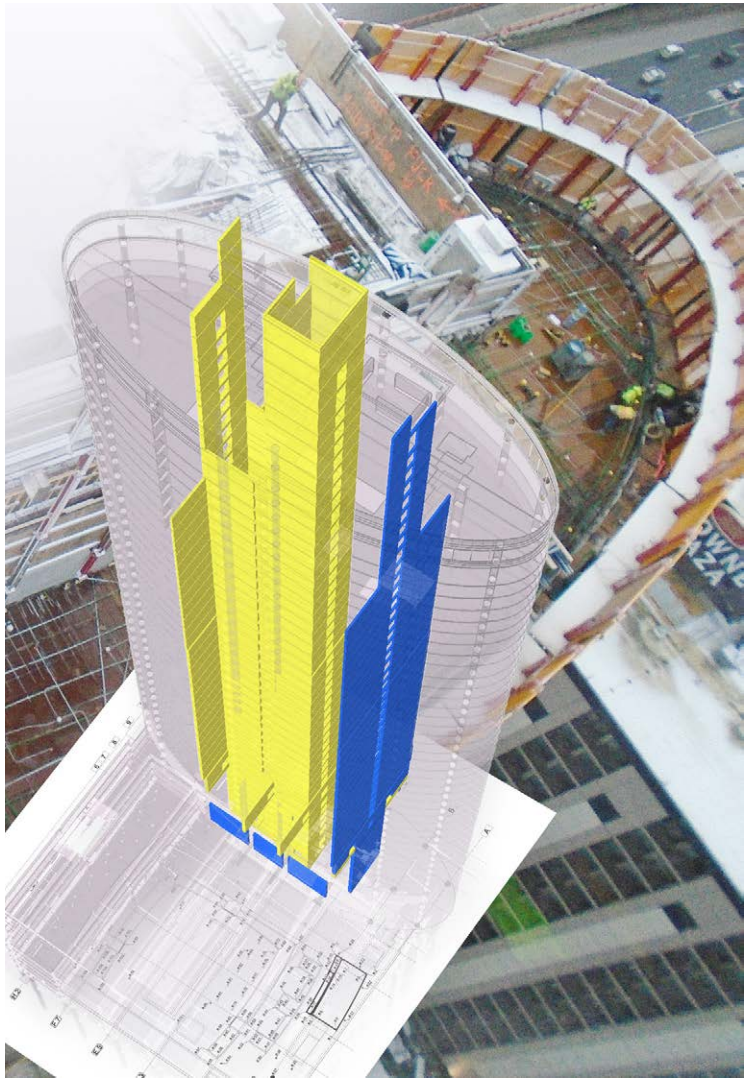
1. Information quality is central to success, and 2D is often not enough



One of the greatest challenges facing the global concrete construction industry is the lack of quality, coordinated and timely information.

The information that's available within 2D drawings often doesn't provide estimators everything they need to create takeoffs accurately or quickly.

Even for the most focused and experienced estimator, the risk of human error is ever-present with traditional methods based on repetitive manual work. This exposes the company to the risk of over- or underbidding.

With the right tools, you can be confident about the result

Whether it is a generator, drill or software, choosing the right tools for the job can make a big difference.

In takeoffs using BIM software for concrete contractors, construction-ready concrete quantities can be created while automating numerous manual tasks. Having the information in 3D also enables estimators to understand the project easily and as a result they can work more quickly with greater confidence in the result.

If you choose your BIM tool wisely, it will not only automatically calculate all quantities from the model but will also make it easier and quicker to react to changes, organize the takeoff and visualize what has been done.

Other information can also be included like cost codes, concrete mix, pour information and more. All information can be easily updated or changed afterwards to suit any stage of the project.

Automation, visualization and intelligence inherent to a purpose-built 3D modeling environment allows estimators to efficiently create structured takeoffs and report required information. Having this information in 3D improves accuracy and makes it easy to see if something is missing.

With the confidence that quantities are accurate, complete and up-to-date, estimators can be better prepared to face the challenge of ensuring the data quality and generate the required information for the estimates without late nights or Saturdays at the office.

2. Can updates and changes be made easy?

Change is an inevitable part of the construction process.

The seemingly constant barrage of design changes and ever-evolving project information can cause headaches for estimators, who need to adapt to the changes without undermining the accuracy of their takeoffs. With the right tools, however, changes can be effectively managed.

Change doesn't have to mean redoing all your work

When the design team revises drawings, for estimators using traditional takeoff methods it usually means the quantities need to be recalculated, which can be a tedious, error-prone and time-consuming process—especially if you want to have some kind of record of all the changes.

Rework, which could have been avoided in the first place, creates risk for errors and unnecessary waste of time and money.

What if you could use that time for things that truly add value? For example, to optimize your bid, or for value engineering and checking potential constructibility issues, proving to a client that you truly are the best candidate for the job? Or just skipping the overtime at the office and spending quality time with your family, still being confident that your proposal is accurate, up-to-date and delivered on time.

BIM-based workflows enable reorganization without rework

Because the changes to 3D model objects automatically update all information, there's no need to recalculate or redigitize. All it takes is a few clicks of the mouse to make the adjustments.

With software like Tekla Structures, you can also organize quantities however you like at any time and it's easy to reorganize the data structure afterwards without remodeling.

Cost code structures can be made more accurate and new line items can be added in a matter of seconds, and all information in takeoff tables automatically updates accordingly.

This is a **leap forward** compared to traditional methods, which often require the takeoff to be redone from scratch in order to reorganize them.

"One of the biggest benefits we're seeing with modeling for quantity takeoff, is it's a live model that we can update."

Kristen Erickson
Technical Service Manager
at Pepper Construction

3. Traceable information reduces guesswork and loss of data

With traditional takeoff methods, there are risks that extend beyond takeoff accuracy.

Guesswork, unnecessary rework for all of the people involved and the recreation of a vast amount of already-created information are also serious problems.

Guesswork creates rework

Showing the true scope of quantities so that everybody is able to clearly understand **what** and **how much** can be difficult when working with 2D drawings and spreadsheets.

When the changes are pouring in and in takeoff revisions, it's tricky to "show your work" using just spreadsheets, leaving lots of unanswered questions such as **"What's associated with this cost code?" and "How was this quantity calculated?"**

This can be problematic for the estimator and the other stakeholders. For the estimator, it creates repetitive rework to ensure accuracy. And if the source and scope of the quantities are difficult to trace—even if they're accurate—stakeholders downstream might hesitate to use the numbers in their work.

Quantities are then recalculated and the time and information created earlier goes to waste.

Purpose-built BIM creates intelligent models which are connected to the takeoffs

In a model-based process, quantities are generated automatically from the model. It is 3D so it knows its area, its volume, etc. With a purpose-built tool other information like mix design information is also available.

Simply having a 3D model as your information source, however, is not enough on its own. The model must be intelligent and it must be connected to the takeoff in order to trace the origin for your quantities.

Magic needs to happen in both directions—from the model to the takeoffs and from the takeoffs to the model.

BIM software such as Tekla Structures does exactly that. By clicking the material quantity or cost code in a takeoff table, the software automatically highlights it in the 3D model, showing exactly what's associated with that takeoff line.

An intelligent data model lets you create visual representations of your estimates and takeoffs, which is great for **confidence** and **transparency** of information for people downstream. It's easy to get a big picture view, or zero in on specific quantities.

Compared to the traditional way of working with spreadsheets, this is an extremely **powerful way** of ensuring data quality, communicating and delivering information.

IN PRACTICE:

Pankow manages quantities and processes easier than ever

Image by: Pankow Builders, Ltd.

Thanks to a model-based approach, Pankow, a construction company that's been shaping skylines since 1963, has mastered the art of organization.

By adding their own cost codes to objects in their project models, Pankow can easily manage all takeoff information in one visual database. The model enables them to quickly update, sort and filter information just as they like, and allows the company to clearly communicate with different people in their organization.

"We deliver this type of information from pre-construction to operations and to the field. And they know what we bid. There is a tighter connection between what's being budgeted and what's being spent, and a lot less estimation and quantity errors," explains **Lou Varni**, Assistant VDC manager at Pankow.

4. Reducing risk and standing out against competitors

If potential constructibility issues are not caught early, they can turn into expensive challenges during construction, risking project profitability.

Sometimes, the ability to analyze a project's constructibility can also provide the edge it takes to win the bid. By discovering and sharing constructibility issues, contractors can prove they understand the project better than their competitors.

When you assess a structure's constructibility, you're assessing how the existing design drawings can be turned into built reality. It's a way of asking "How can this be built?"

Often the problem with a traditional estimating process is that there is not enough time to show the client a better, more constructible way, even though the contractor would have the required field experience to improve the original design.

A model-based estimation process tackles constructibility issues

In addition to allowing estimators to get to know the project better more quickly, modeling the work in 3D allows the team to visually evaluate constructibility and then make informed decisions about important questions such as **"Can we build this as it is designed" or "Is there a better way to build this?"**

Because the quantities are linked to the model, any adjustments are automatically calculated—and because the quantities exactly match the modeled 3D structure, it's quick and easy to calculate the time and cost effects for proposed changes and communicate your proposal. In addition to reducing your risks, this can greatly benefit clients and prove that you're the clear choice and are up to the task.

IN PRACTICE:

Pankow eliminates risk by controlling concrete modeling

Pankow takes pride in their work, and prefer tools that are purpose-built for their needs as a concrete builder. Tekla Structures helps them to provide superior value to their clients.

Image by: Pankow Builders, Ltd.

"We try to get reference models from the design team to bring into Tekla, but oftentimes they tend to be inaccurate and full of coordination issues. By modeling the concrete ourselves using Tekla, we can catch these issues during the preconstruction phase resulting in more accurate estimates for the owner and fewer RFIs during construction."

Lou Varni, Assistant VDC manager at Pankow

5. Reuse information to reduce rework

Traditionally, the information created for a proposal dies in the bidding stage. It has very little, if any, utility later when you start planning the work in more detail in the budgeting stage.

When using traditional takeoff methods, work that's already been done can't be used in construction planning in pre-construction, and it's normal that material quantities are recalculated again and again during construction.

Eliminate rework and add value for the whole team

Information collected during the bidding stage doesn't have to have an expiration date.

It should be put to work to benefit stakeholders throughout the current project and even future projects.

If you've used a 3D model-based approach in the bidding stage, when moving to more detailed planning for construction, you'll now have a completely **free BIM model in use**. You can further develop this single source of visual and reliable information by simply adjusting previously created concrete geometry, by adding pour breaks, re-organizing the data and adding new and more detailed information to your model.

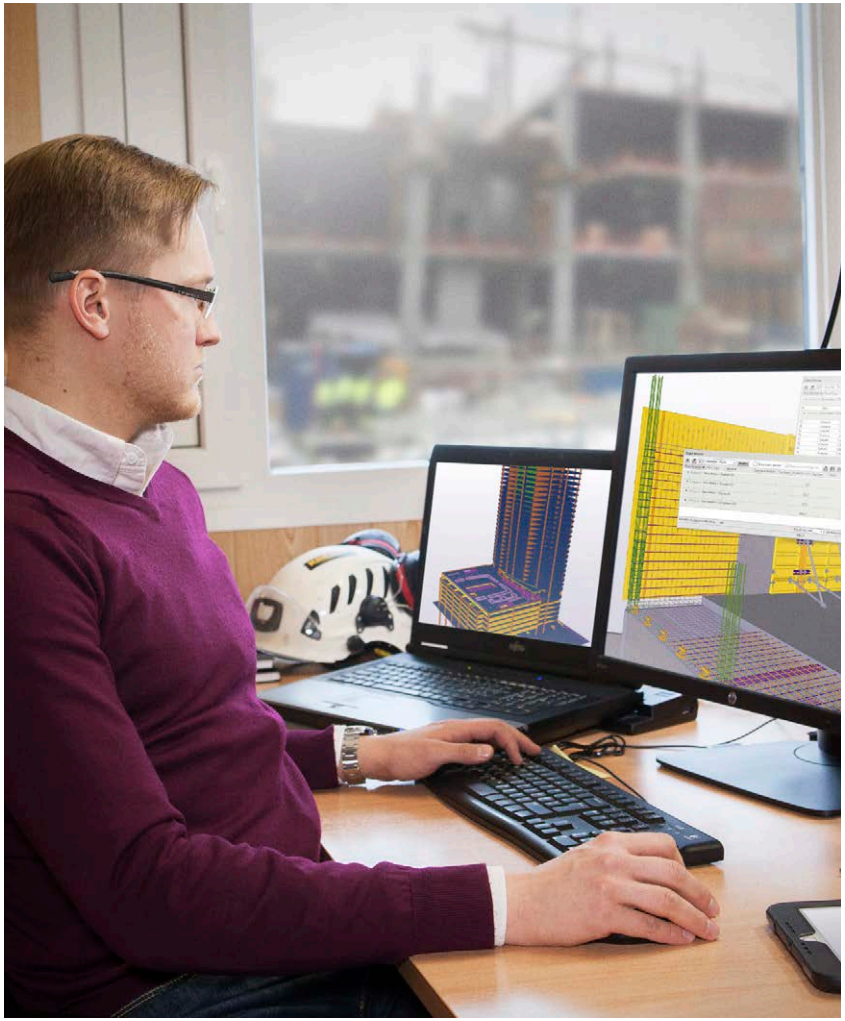
A coordinated concrete model also offers you a reliable geometry and information which you can confidently utilize for model-based formwork planning and coordinating and detailing your reinforcing.

6. Moving beyond design BIM to truly digitize concrete construction

BIM software has evolved from mere design tools to truly constructible solutions transforming construction processes and offering purpose-built functionalities for those responsible for estimating, planning and managing concrete works.

For **concrete contractors**, this means reduced risks and rework throughout the life of the project and the possibility to greatly improve productivity at the office and in the field with better quality, coordinated and timely information.

For **estimators**, this means the ability to more quickly generate, update and modify accurate and easily traceable organized quantities. Data that is in an easily manageable form and can be clearly communicated to other people downstream, and effectively taken into use at any time later in the process.

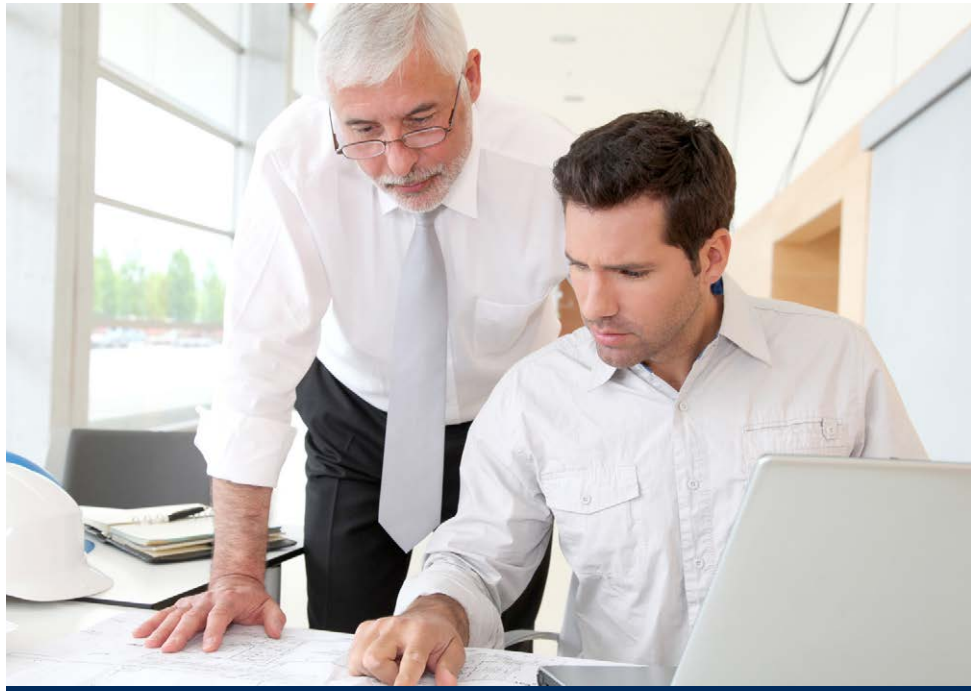


Immediate value and enormous scalability

Understandably, some people are intimidated by new tools.

However, those who have already made the move confirm that you can complete model-based estimating takeoffs as quickly and easily as with digital 2D takeoff tools and it brings you tons of added value right from the first click.

What's more, because the information you create doesn't die in the early pre-construction phase, but can be easily utilized to support more effective work later in the process, the single point takeoff tool transforms into an information management solution that adds value for the whole company.



- **Better accuracy and reduced risks**
- **Unmatched traceability**
- **Incomparable speed to manage changes**
- **Greater confidence in the result**
- **Completely new way to communicate your proposal**

7. Transform the way you work

For concrete contractors, improved estimates and a constructible plan, connected to action in the field, enable success.

Trimble's BIM software **Tekla Structures** offers the most constructible, collaborative and complete information management solution for concrete contractors in the market.

With its unique capabilities to model pours and formwork, and manage pour-related information effectively, Tekla Structures is an essential tool for contractors to better estimate, plan and manage concrete construction.

“At Barton Malow, our mantra is “plan the work, work the plan.” Tekla is definitely a construction BIM solution that’s geared toward the contractor and the company prides themselves on understanding what we do.”

Matt Hedke
Barton Malow

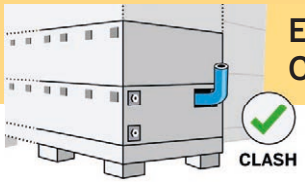
Trimble

From bid to pour, Tekla transforms concrete construction

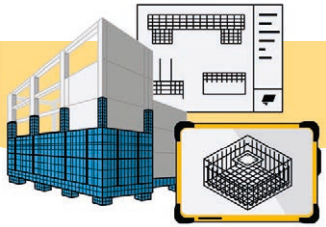
Estimate Quanties
- Bidding

Estimate Quantities
- Budgeting

Pour
Planning

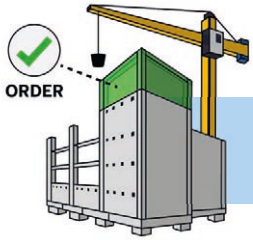


Embeds &
Coordination

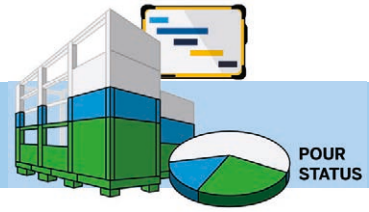


Rebar
Detailing

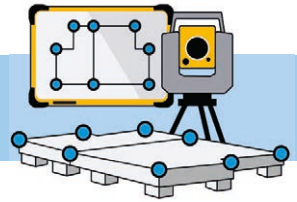
Formwork
Planning



Constructible
Quantities



Status
Management



Layout Data
& 3D Scanning

So, if you're ready to eliminate rework, maximize efficiency and minimize risks, get in touch with us today.

TRULY CONSTRUCTIBLE. Tekla®

Learn more today