White Paper

4D Construction Scheduling Software

Part I: Why Is 4D Becoming the New Standard?
Part II: What to Know Before You Buy It

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PART I

Why Is the Construction Industry Transitioning to 4D Scheduling & Project Management?

According to the CIOB (Chartered Institute of Building), the construction industry's ability to deliver projects on time fell from 45% in 2014 to 40% this year. That's dismal. We hear these disappointing stats regularly and yet little seems to change, year after year. Is the problem a lack of leadership, poor technology or a faulty process? My opinion, some of all of these, but I will save that discussion for another article. I am more interested in how to create change.   How do we move the industry to a position of leadership in both innovation and performance? The good news is, the change has already begun- if you haven't noticed you need to wake up and seize the opportunity- the future is bright and truly exciting!

Follow the Light

Thank you to the courageous leaders who have stepped up and who have challenged decades of conventional thinking- because of you, a new day has dawned in construction. Attend an industry event, listen and look at all the new technology emerging. Construction is at least a $5 trillion dollar industry, significantly higher depending on how you define "construction"- smart tech companies see the problems and they understand the opportunity- the potential to make a positive contribution to an important industry, as well as the opportunity to make a bit of money.   The result is a mind boggling amount of new tech tools: virtual reality, augmented reality, drones, laser scanning, dashboards, data analysis, sensors, wearables…. The geeks have arrived and just in time! Some of their new technologies work, some still need work…some have begun to revolutionize the industry. One thing is certain; the days of general purpose technology are over, the construction industry is finally getting purpose built tools and the ones that work are creating excitement and they are attracting some of the best and brightest to the industry. Yes the industry is slow to change, it will take time, but the leaders among us have fueled the train, it is moving forward and it is gaining speed. Once it crosses the crest you best be prepared because there won't be time later.

A strategy for the 21st century

Technology alone will not solve the challenges faced by the construction industry so don't wait for that day to arrive- it won't. Success will be driven by smart people, working in a highly cooperative process with technology that is purpose built for the complexities of construction.   One technology that has outstanding results on projects around the world is 4D Scheduling and Project Management. If you don't know about yet, find out- the stories will light a spark.

STATUS QUO   4D PROJECT MANAGEMENT

Here is a 10 point checklist to determine if 4D is right for you:

1) Do you believe a validated and reliable schedule provides a foundation for successful project delivery?
   On most projects today, schedules often follow rather than lead the project. "With the tools currently employed on most projects, project participants see more work than benefit from the schedule, they take a more passive role; doing the minimum to keep the scheduler off their backs. They end up doing what makes sense in their own limited view, regardless of the wellbeing of the overall project. "   Clearly this needs to be fixed.

2) Does your schedule clearly identify safety issues, congestion, and no work zones to minimize risks and hazardous conditions? Does the safety team understand and participate in early review of the plan?

3) Are temporary works, resources and equipment included and optimized in your schedule? There are significant potential savings here.

4) Can you easily identify space/time conflicts early in the planning stage so they can be resolved when costs are at their lowest?

5) Does the project delivery team engage and share knowledge to optimize the plan for the overall project rather than protecting their silos?

6) Are your subcontractors and specialty suppliers receiving up to date progress reports to ensure maximum productivity and cost efficiency on site?

7) Do you communicate clearly and efficiently ensuring the entire delivery team has a shared understanding of the project approach?

8) Are you confident that you can deliver every project on time?

9) Have you reviewed "what if" scenarios to enable informed and proactive decisions if things don't go as planned?

10) Are you innovating at every stage to ensure peak performance?

If you answered "Yes" to question 1 and "No" to any of questions 2-10, you should start a pilot project using 4D Scheduling and Project Management. Don't wait, just get started.

4D does one thing that revolutionizes planning and scheduling- it brings the visibility of CAD into the planning process so now, rather than interpreting Gantt charts and reviewing stacks of 2D drawings- the 3D model and the schedule are combined to simulate a project in real time in whatever level of detail is necessary- move forward- move back- review and edit your plan with your supply chain- optimize the schedule for the entire project not one phase or one subcontractor, rehearse your plan until you have confidence that the team clearly understands your approach and is ready for construction. For the first time, the industry literally has a low risk, low cost practice field on which to review, optimize and rehearse a project before ever starting work on the site.

In the early phase of a project, 4D is used to demonstrate your approach and to win work. Once the project is awarded, the 4D model is used to review the approach, identify out of sequence or missing tasks, to run what if scenarios, to perform clash detection on space and time rather than just design clash detection and to validate and optimize the plan. Later, 4D is used for look ahead meetings, monitoring progress and reporting planned vs actual, resource utilitization, and finally, the 4D model can be used for commissioning, operations, and maintenance.

A validated and optimized plan is the foundation of successful project delivery- it identifies the approach that the entire delivery team will use to achieve their objective, so it is important that the plan be clearly understood, validated and even rehearsed. Consider this- construction is a lot like a football game- each game is unique- there are many participants with different expertise and knowledge.   The only way a team will win is if they practice hard, trust their plan and work together, play by play, to achieve their goal- to win the game. Similarly- each construction project is unique- the team changes every project- to win requires the highest levels of coordination, trust and informed decision making. That takes practice- but until recently- construction never had a low risk, low cost environment in which to practice - and the result has been decades of poor performance. Don't accept poor performance as a given- there are better ways- be a leader, champion improvement!

4D Lifecycle Infographic
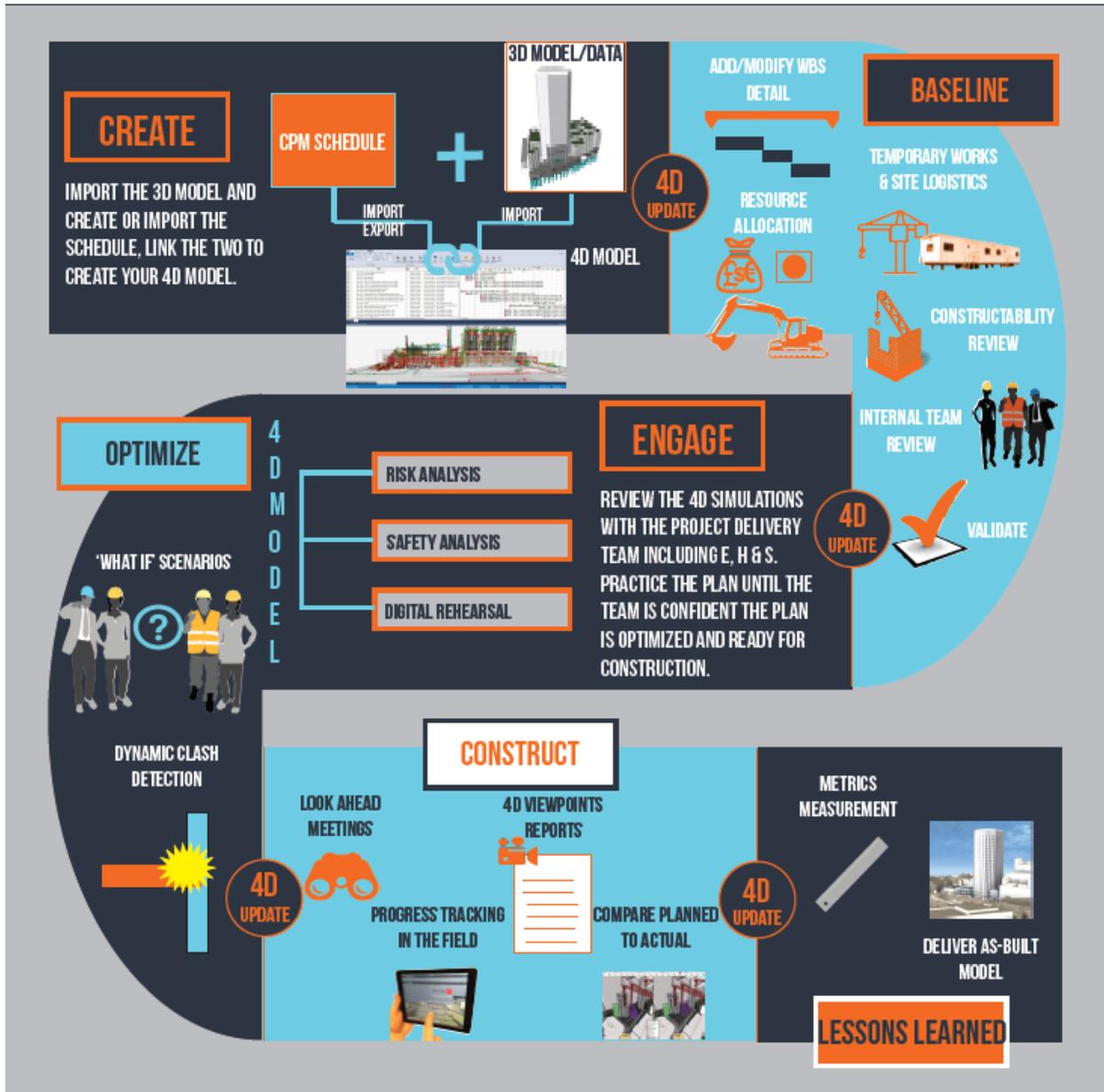
The earlier 4D is started, the greater the value created.©

PART II

What You Need to Know When Evaluating 4D Software

Not ALL 4D is created equal.

Top Five things to know:

1) **Can you import all your design file types and is there a limit to file size?**

   There is no 4D without a design- either in 2D or 3D. For maximum flexibility, it is important that your 4D software interoperates with your CAD software so you can efficiently import your design and design data to create your 4D model. Understand file type compatibility and what data transfers with the 3D model on import. The more data the better.

2) **Does the 4D software have full scheduling capabilities?**

   Very few 4D software includes a scheduling functionality but it is critical. Without a full scheduling capability, you are only viewing one scenario, there is no ability to add tasks, make changes, or to optimize your plan. There is 4D to VIEW and 4D to DO- know the difference. If your only goal is to create an animation, then software without a scheduling capability is fine- just know what you are getting. The big value of 4D comes from its ability to review, re-sequence, run "what if" scenarios, optimize, rehearse, and track your project. Trying to plan inside a 4D viewer will leave you with no hair and no satisfaction, it often leads to bigger problems downstream so beware- know what you want 4D VIEW OR 4D DO. 4D DO delivers integrity in the data. "There is a real danger in "speedy over-automation" in that it assumes the data coming in (especially from the schedule) is correct, which it almost always is not. 4D is really about PLANNING, and effective planning requires a high involvement of collaboration. When automation is overused frequently the process of engagement is reduced, and that can be quite dangerous when problems are discovered too far down the line."
   If you want 4D DO- understand what method of scheduling is used and the software's interoperability with other scheduling software if you plan to import or export your schedules.

3) **Does the 4D software offer dynamic clash detection for space and time**?

   Design clashes can be identified with a number of products including Navisworks and Solibiri. It is important to run design clash detection but it is equally, if not more important, to run clash detection for the hundreds or thousands of activities that may overlap in space or time which are not identified by design clash detection. True 4D software can identify clashes in

a particular space over time including all resources: human, material, equipment or temporary works. This can be a source of significant savings.

4) Can you track progress in the 4D model?

Can progress be monitored and reported, can you view planned versus actual progress side by side in a viewpoint AND a simulation? A 4D schedule delivers value throughout the project lifecycle. Use a simulation to conduct project meetings, look aheads, safety briefings, training and more.

5) How will you be supported if you buy the software?

Anyone in this business knows there is a big issue with software support. For the most part, there is little construction expertise at the big software companies so there is a lack of understanding about how to best overcome day to day problems. Know where the company derives the bulk of its revenue- that is where it will focus both its support and its R&D. If construction doesn't have a seat at the strategy table then don't expect much. Some companies offer little to no support when you run into difficulty, others have built their reputation on highly responsive one on one support- know what you will get before you need it!

Once you narrow it down: here are the finer points:

- How long does it take to import a file, once imported how long does it take to open a file? (It will depend on file size so test your own file)
- Can you federate multiple models of different file types into one master model?
- Can you create path movements for equipment and people easily and efficiently?
- Can you cut or slice design objects inside of the 3D model so you don't have to go back to the architect or designer. If you plan as you will construct, your 3D model should be designed as it will be constructed- this isn't usually the case so know what ability you have to make your own changes- in some cases this is literally a few clicks of the mouse.
- Can you track costs and report on earned value?
- If you have a contract requirement to provide a project schedule in a certain format such as P6, can you export and sync schedule updates back to P6 to meet your contract requirements?
- How easy is it to learn? What training options are available?
- Does the scheduling functionality provide for production planning?
- Can you track resource utilization?
- What is the company's history of updates for the product- is there a record of continuous innovation or is the product low priority for the company?
- Is there a FREE viewer for project stakeholders to access the project, does it offer controlled access?
- Is there a corporate licensing pricing plan?

The pace of change and new technology in construction is continuing to increase. It's important for companies to have a technology strategy. 4D is one platform on which many companies have chosen to build their strategy but whatever strategy you choose, the best advice is "Just get started", waiting is only putting you farther back in the pack.

For information on Synchro Software 4D Scheduling and Project Management visit: www.synchroltd.com

 http://www.construction-manager.co.uk/news/clie7nt-satisfact4ion-dips-60-constru4ction/