Planning for BIM: Using Construction Schedules to Enhance the Coordination Process

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About the speaker

Nick Dyer

Nick Dyer received his Bachelor’s Degree in Construction Management from Weber State University. He has been using Building Information Modeling (BIM) technology for the last 10 years and has been applying his knowledge in technology to both the design and construction sides of the industry. Currently, Nick works for Okland Construction as an Integrated Construction Manager working to expand and implement technology on the jobsite through the use of models and reality capture. He is also helping to support new talent in the industry as an adjunct professor at Weber State University and working with the local Revit Users Group. Pulling from experience on both sides of the industry, Nick is able to support the BIM process from design to project closeout.
**Introductions**

**OKLAND CONSTRUCTION**

Okland Construction Company was founded in 1918 in Salt Lake City, Utah. We have offices in Salt Lake City, Utah, Tempe, AZ and Boise, ID with current active projects in 19 states. We are a general contractor and have built or are building just about anything you can think of.

**OUR BIM TOOL BAG**

We use a variety of different tools, but in this course, we will be focusing on the use Excel and BIM 360 Plan.
Building your schedule
Why Schedule?
Why Schedule?
The 6 P’s

• Prior
• Proper
• Planning
• Prevents
• Poor
• Performance
Selecting a scheduling software

It really doesn’t matter what scheduling program you choose to use. There are many software options on the market, but I have chosen to focus on using Excel and BIM 360 Plan because they are accessible to lots of people and easy to use.

• What ever you choose to use, make sure it will:
  o Allow you to make updates
  o Allow you to add activities and/or delays
  o Allow you to share your schedule with those who may not have access to the software
The Example Project

2-Story Medical Clinic

Level 1 – Imaging Suite, Family Medicine
Level 2 – Physicians offices, procedure rooms
Mechanical Penthouse
Scheduling Stages

It seems like common sense that each part of the coordination process happens in sequence, but it is important to overcommunicate, this cuts through all of the confusion.

These are the items I usually split my schedules into:

- Equipment Submittals
- Content Modeling
- BIM Coordination
- Shop Drawing Process
- Ready for Construction
- Construction Start
The Scenario

We start by reviewing our master schedule. It shows the anticipated dates for the following activities:

• Level 02 Slab on Deck Pour – 1/4/19
• Penthouse Slab on Deck Pour – 1/11/19
• Roof Slab on Deck Pour – 1/18/19

Since we want coordination complete before we place hangers, we need to have coordination complete 7 calendar days prior to these pour dates so the Trades have time to place their hangers.
**Construction Start Vs. Ready for Construction**

**READY FOR CONSTRUCTION**
This is the date the Trades are ready to begin installation.

**CONSTRUCTION START**
This is the date the master schedule has the activity scheduled.

**TIME BETWEEN THESE ACTIVITIES**
At first glance, it would appear that the time between these activities is just float. But, in our scenario the master schedule did not have time to install hangers, so in this case, it’s the duration your trades need for that activity.

<table>
<thead>
<tr>
<th>Ready for Const. Start</th>
<th>Days</th>
<th>Construction Start</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/28/2018</td>
<td>7</td>
<td>1/4/2019</td>
</tr>
<tr>
<td>1/4/2019</td>
<td>7</td>
<td>1/11/2019</td>
</tr>
<tr>
<td>1/11/2019</td>
<td>7</td>
<td>1/18/2019</td>
</tr>
</tbody>
</table>
Time for Shop Drawings?

Lauris Beinerts "The Expert: Progress Meeting (Short Comedy Sketch)" YouTube, 31 January, 2018. Web. 2 November 2018
The Shop Drawing Process

TIME FOR SHOP DRAWINGS
Lots of people still have the misconception that the moment 3D coordination is complete, shop drawings are ready to be submitted. This is a false

SHOP DRAWING REVIEW TIME
This is the period of time for the shop drawings to be reviewed by the GC and/or the design team. Internal reviews should be accounted for in the creation process.

MATERIAL FAB AND PROCUREMENT
This is the time to fab and procure your parts and pieces for each trade. Anything with an abnormally long lead time should be excluded from this activity and tracked separately.

SHOP DRAWING CREATION
This is the time it takes for the drafter/modeler to complete shop drawings. It’s true that while you are modeling, you’re building the foundation for the shop drawings, but it still takes time to finish everything up.
The Coordination Process

INITIAL MODEL UPLOAD
This date is the last possible date your first upload should be made. This upload should include everything from the Trade’s scope of work required to be modeled by the BIM Execution Plan (BEP)

BIM COORDINATION
This is the amount of time where you are performing clash rounds, holding coordination meetings, and all of the other things commonly associated with BIM coordination.

MODEL SIGN-OFF
This is the last date of BIM coordination for that respective level. It is also the date where you are signifying that coordination for this level is complete and you are moving on to the next phase of the work.
DESIGN MODELS VS. TRADE MODELS

Architects and their subconsultants have different goals and expectations for models vs. General contractors and their trade contractors.

TRADE MODELS

Trades know their systems and their internal processes for fabrication and procurement better than anyone else. As such, they should own and manage their own models for the coordination process.

DESIGN MODELS

Because design models are meant to be used to create construction drawings and obtain building permits, they do not include everything that would be needed for fabrication.

SPECIALTY TRADE MODELS

Unless a building is really simple, it will require at least some specialty trades to create models from almost nothing. Especially if that trade was not needed for the building permit process.
Equipment submittals

WHY PLACE THIS ACTIVITY BEFORE THE OTHER ACTIVITIES?
We need the most accurate information possible when we are generating coordination models. Some submittals will take longer to gather, and that’s fine. The point behind this activity is to create a sense of urgency and to gather as much information as possible as fast as possible.

WHAT EQUIPMENT DO WE NEED?
Anything that may affect the coordination team; no matter how big or small it is perceived to be.

WHAT ABOUT OWNER PROVIDED EQUIPMENT?
These are particularly important as they are sometimes the biggest unknown.
WHY ARE WE GROUPING ALL TRADES INTO A SINGLE ACTIVITY?
The coordination effort is all for one and one for all, if the plumber falls behind, it hurts everyone.

NO TWO PROJECTS ARE THE SAME, WHAT ABOUT JOB SPECIFIC ACTIVITIES?
If you need trade or job specific activities, add them. The point is that if time is required, it needs to be accounted for.

GET ON THE MASTER SCHEDULE!
I cannot stress this enough. No matter how much detail you put into your schedule, the master schedule needs to track everything in the same amount of detail as your coordination schedule. A blanket 6 weeks in the master schedule is not enough detail.

PHASED WORK
If you have a project that requires you to phase your trades into the space, then all you need to do is track each trade separately through the schedule.
Collaborating with Stakeholders
The Scheduling Struggle
The Pre-Kick-Off Meeting
The Pre-Kickoff Meeting

The pre-kickoff meeting is held with each trade individually. Usually they are pretty quick, lasting only 30-45 minutes most of the time. The key to a solid pre-kick-off meeting is the agenda:

• Proposed schedule
  o Talk about what you have come up with

• Submittals
  o What is complete?
  o What are the long leads?

• RFIs
  o Have they already submitted some?
    ▪ Are the answers complete?
  o Are there any RFIs the trade or their suppliers need submitted?
Everyone who can attend the kickoff in person, should
The Kickoff Meeting

The kickoff meeting is held with all trades and the design team. This meeting needs to be face to face, I usually don’t even provide a gotomeeting link unless there is some geographic reason a person cannot attend this meeting. While I could spend a bunch of time talking about kickoff meetings, the formula for a good kickoff meeting is 6 parts planning and 1 part agenda. In addition to all the other kickoff meeting agenda items, we need to hit these 3 again:

- Proposed schedule
  - Since you have talked with everyone before hand, this will now show everything locked in.

- Submittals
  - What is complete?
  - What are the long leads?

- RFIs
  - Are all current RFIs submitted?
    - Are the answers complete?
  - Make sure everyone has seen everyone else’s RFI responses. one single move usually has a domino effect.
The Coordination Meeting

The coordination meeting are the meetings that take place during the BIM coordination phase of the schedule. While these meetings look entirely different from a kick-off meeting, we again needs these agenda items:

- Current schedule
  - Where we are?
  - Where we have been?
- Submittals
  - What is complete?
  - What are the long leads?
- RFIs
  - Are they all submitted?
    - Are the answers complete?
  - Make sure everyone has seen everyone’s else RFI responses. one single move usually has a domino effect.
No Hope for Progress
Hold stakeholders accountable using the schedule
Assume Nothing
Accountability Vs. Transparency

Often in the VDC world, we hear transparency and accountability used interchangeably. Aside from the two very different English definitions of the words, they are two different things and are not mutually exclusive. You really can’t have one without the other, but you could choose to ignore one.

- Accountability through the schedule:
  - Because we have a schedule, and the trades participated in the creation of that schedule they don’t have any excuses for not meeting the schedule unless circumstances have changed.

- Transparency through the schedule
  - The schedule is reviewed in every meeting, no-one is able to claim they didn’t know when model sign-off was. Or that they didn’t know when to upload their models.

- Example:
  - You have a subcontractor who is falling behind for the 2nd week in a row.
Incorporating a delay or roadblock into your schedule

This is just a hypothetical scenario, I am not trying to pick on design teams.

- The design team placed an entire bathroom group over the top of your main electrical room. During coordination, it was determined that adding drip pans under all pipes would be acceptable. A confirming RFI was sent out after the meeting to account for the decision. However, when the owner sees the decision, they respond that it will not be acceptable and that all plumbing needs to be outside of the electrical room. This response creates a roadblock; we can’t continue to coordinate the space because either the level above will be re-designed, or the level below will be re-designed. Either way, it is too many unknowns to responsibly continue coordination in this area until we have a clear path forward.

- Does this need to be accounted for?
  - Yes
    - Through a handshake
    - In the meeting minutes – Probably should be accounted for here as well, but it can’t be the only place.
    - IN THE SCHEDULE!!
Incorporating a delay or roadblock into your schedule

This is just a hypothetical scenario, I am not trying to pick on design teams.

- The design team placed an entire bathroom group over the top of your main electrical room. During coordination, it was determined that just adding drip pans under all pipes would be acceptable. A confirming RFI was sent in after the meeting to account for the decision. However, when the owner sees the decision they respond that it will not be acceptable and that all plumbing needs to be outside of the electrical room. This response creates a roadblock because we can’t continue to coordinate the space because either the level above will be re-designed, or the level below will be re-designed. Either way, it’s too many unknowns to responsibly continue coordination in this area till we have a clear path forward.

- Our baseline schedule shows we have 21 days in our schedule. This RFI response was received on day 9 of our coordination phase. The design team thinks they will have the design portion of this issue complete within 21 days, the trades then need 7 days to incorporate the changes into the coordination model.

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21 \text{ days baseline} - 9 \text{ days into coordination} + 21 \text{ days for design} + 7 \text{ days for trades} = 40 \text{ days.}
\]

\[
40 \text{ days} - 21 \text{ days baseline} = 19 \text{ days of delay}
\]
RFIs, PRs, CCDs, ASIs, Bulletins, Etc.

SMALL RFIS
Sometime small RFIs don’t effect the schedule in the same way as the example. But let’s say an RFI is returned and only takes 1 day for the design team and 1 day for the trades. For 2 days, that is time they are not doing normally scheduled clash assignments and such

DROP DEAD DATES
No matter how small an RFI is, always include a date that will have the least amount of impact on the coordination schedule. Sometimes this might be just 24 hours after submitting it, the point is to be transparent about it so no-one is surprised.

FLOODS OF RFIS
While 1 small RFI may not create a delay, what if there are 12 small RFIs taking 2 days each to resolve.

OWNER CHANGES
Owner changes are sometimes the hardest. Because we know they are most likely to be approved, people move forward without vetting out all the issues first vs. a GC driven change where you need to sell the owner on the idea.
Implementing Scheduling Strategies
GET ON YOUR PROJECT MASTER SCHEDULE

• Something is always better than nothing, especially in the early stages.
• In the same amount of detail as you have created your own schedule
Review your historical data

- How much time has it taken you to coordinate a certain kind of building in the past?
- Can I trim that up a little bit?
Insist on being part of your project’s scheduling meeting

• Most of the time, it only takes 5-10 minutes of the meeting time to update your activities.
• Keep your own schedule so you can be brief, but also get everything you need.
• While sometimes this might feel like over communicating, don’t assume your scheduler is on the same page as you. You are the only person who cares about your schedule, the Trades, design team, and owner only look at the mast schedule.
Hold a training with your scheduling department

• This can be a quick 15 minute presentation with some time for Q/A
• It just needs to be really basic, schedulers are already experts in their sphere, you don’t need them to be experts in yours as well
• All you need is 2 simple goals:
  o They need to understand to come talk to you before they lock any durations into the schedule for BIM
  o If they are in early stages of a schedule, they know how to use a worksheet or something like that to schedule your BIM durations.
Hold a training with your scheduling department
Summary

HOW TO CREATE A COORDINATION SCHEDULE IN BIM 360 PLAN OR EXCEL
We have looked at some basics of how to build a coordination schedule. Ultimately, it doesn’t matter what software you use, as long as it can generate the amount of detail you need.

HOW TO COLLABORATE WITH STAKEHOLDERS TO BUILD YOUR SCHEDULE
By holding pre-kickoff meetings with stakeholders, you are able to get real durations and input from the people who will be performing the work.

HOW TO HOLD STAKEHOLDERS ACCOUNTABLE USING THE SCHEDULE
Because stakeholders have already given their feedback, and you are reviewing the schedule in every single meeting, it’s easy to maintain accountability to meet or beat dates. The reverse is also true for tracking and justifying schedule delays.

HOW TO START IMPLEMENTING SCHEDULING STRATEGIES WITHIN YOUR ORGANIZATION
Get on the master schedule. That is the most important thing for implementing strategies. After that, it just becomes filling in the gaps between what you know in detail and making sure that is covered in the master schedule.
Questions