



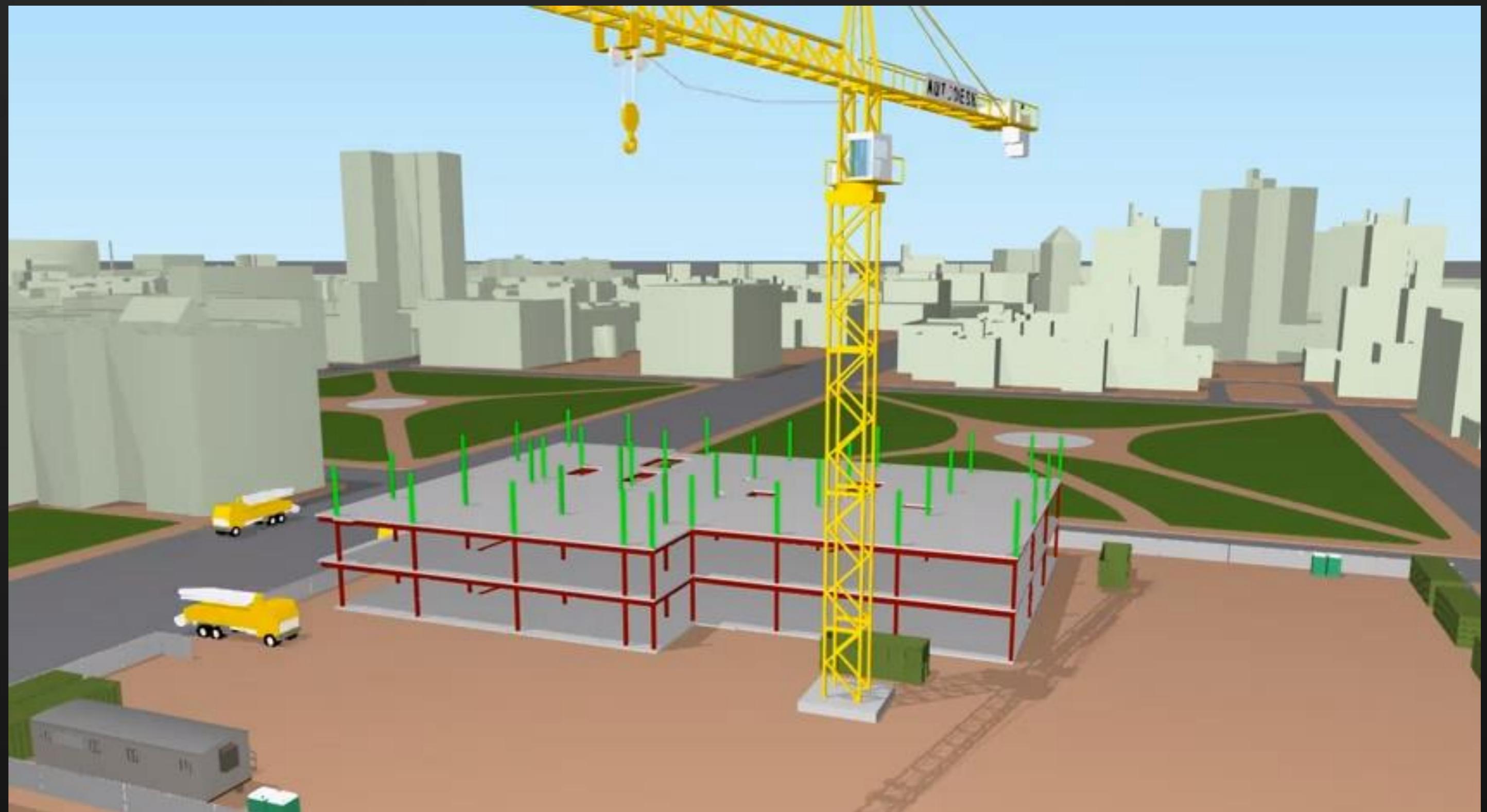
Building the Death Star: The Autodesk® Way!

Lee Mullin
Premium Support Specialist

LOTS OF STAR WARS
SURPRISES ON THE DAY!!
Register for [CR2165-P](#)

About Me – Lee Mullin

- Autodesk support for over 7 years



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- Beyond Design blogger

SilverCross Hospital
Courtesy of Mortenson Construction & RTKL Associates Inc

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09/28/2012

Managing Multiple Clash Tests

In this, the next of our series of blog posts about making the most of Clash Detective, we're going to cover the use of multiple clash tests. Now that we have shown you how to [use rules to minimize false positives](#) and use [grouping, filtering and sorting to manage the results](#) of each individual test, we're going to talk about how you would want to scale this up to a project level and use and manage multiple tests.

Clash Detective

Things I made vs things other people made

Name	Status	Clashes							
Stuff vs more Stuff	Done	19	19	0	0	0	0	0	0
Things vs stuff	Done	189	189	0	0	0	0	0	0
Bits vs Bits	Done	92	92	0	0	0	0	0	0
Wingdings vs things	Done	138	138	0	0	0	0	0	0
Wobbits vs Stuff	Done	6	6	0	0	0	0	0	0
Red things vs Blue things	Done	231	231	0	0	0	0	0	0
Stuff that smells good vs stuff that smells bad	Done	55	55	0	0	0	0	0	0
Things I made vs things other people made	Done	1332	1332	0	0	0	0	0	0
Wobbits vs Wingdings	Done	2	2	0	0	0	0	0	0
Everything else vs Red Things	Done	15	15	0	0	0	0	0	0

Depending on your role and industry you may have different schools of thought on the best way to do things. There is no correct way, just what works best for your needs.

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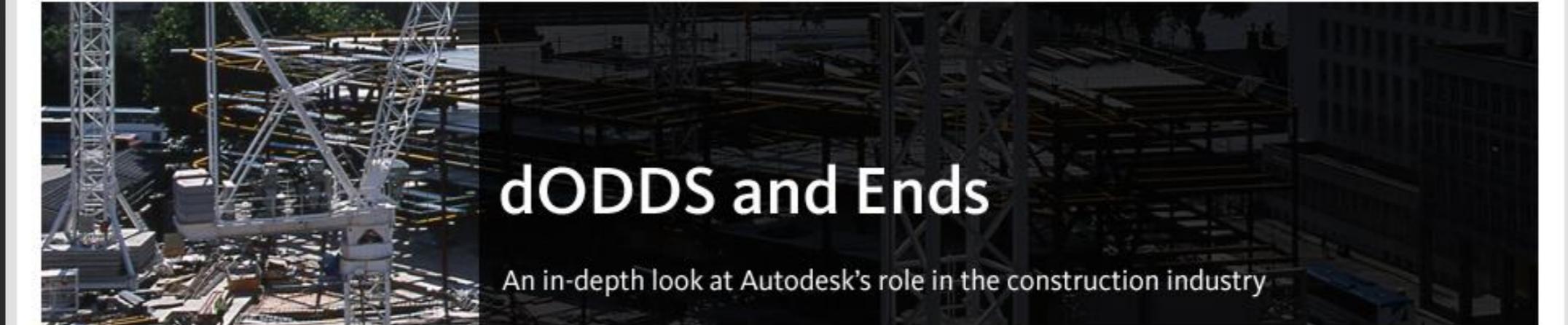
Learning Objectives

At the end of this class, you will be able to:

- Using Revit Construction Parts to build an accurate schedule
- Contingency plan using Navisworks and Microsoft Project
- Create Time Based Clashes for temporary works
- Link Animations to Timeliner for powerful presentations

The Project

- Inspired by Dodds and Ends blog
- [http://doddsandends.typepad.com
/blog/2009/08/the-deathstar-and-
navisworks.html](http://doddsandends.typepad.com/blog/2009/08/the-deathstar-and-navisworks.html)



dODDS and Ends
An in-depth look at Autodesk's role in the construction industry

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August 04, 2009

The Deathstar and Navisworks

A Long time ago in a galaxy far far away... I got to thinking: could the constructors of the "Star Wars" Death Star have discovered the coordination problems that lead to their undoing? If they would have used a program like Navisworks to do Clash Detection could they have discovered the fatal flaw in the vent? What if they used Timeliner to 4D sequence a fighter attack down the "trench", could lives have been saved?

Fast forward to modern times, this star system, and to a recent conversation while I was attending an event for Sub Contractors in New York City. The topic: How to Reduce Risk and Save Lives on a Project. We discussed lots of angles but everything kept pointing back to Navisworks as the central tool to visually reduce risk and increase awareness with safety.

We talked about modeling things like temporary railing and harness tie-off points with Revit or AutoCAD and, including them in the schedule, then bringing that into Navisworks. Then holding coordination meetings around safety using Navisworks to make sure everyone on the team is fully aware of issues and that the railing and other safety measures (including tie-off points) have been put in place according to the schedule. The overall goal of course was to find better was to get everyone on the same page, reduce potential hazards and make the job site a safer place for everyone involved.

The conclusion that I have come to is that yes, Navisworks could have saved lives on the Death Star by exposing potential safety hazards and failing in the computer long before failing in the field. Just like Navisworks can help increase awareness with safety on job sites today.

If only they would have held digital coordination meetings...

Posted at 03:30 PM in [Navisworks](#) | [Permalink](#)

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The Project

- Death Star the original BIM model
- We all know what happened
- Didn't have to be like that
- Suitable construction planning



Using Revit Construction Parts to build an accurate schedule

Using Revit Construction Parts to build an accurate schedule

Why?

- The Mustafar steel works plant doesn't produce 10km girders
 - Never mind the problems transporting them on Star Destroyers
- Different suppliers for wall panels
- Taking advantage of smaller ships
- More realistic scheduling

Using Revit Construction Parts to build an accurate schedule

How?

- Export Navisworks file from Revit and create NWF
- Create a basic schedule
- Create Construction Parts
- Create Search Sets to find items on each level
- Create Timeliner Schedule based on Construction Parts

Contingency plan using Navisworks and Microsoft Project

Contingency plan using Navisworks and Microsoft Project

Why?

- Problems with cowboy builders
- Killed half the workforce
- Suppliers aren't always reliable
- Unreliable deliveries
- Quickly build a schedule from the real model

Contingency plan using Navisworks and Microsoft Project

- Create Revit model
- AutoAdd Tasks
- Export Microsoft Project XML
- Add start end dates and dependencies
- Add link to MPP
- Use rules to link to levels
- Rebuild Task Hierarchy

Create Time Based Clashes for temporary works

Create Time Based Clashes for temporary works

- Why?
- Coordination is great, but these aren't the clashes we're looking for
- Site planning
- Decide on No-go areas
- Plant Machine selection

Create Time Based Clashes for temporary works

- Use Revit to create conceptual masses
- Use Inventor to create temporary works or zones
 - Or machinery
- Create an animation linked to machinery

Create Time Based Clashes for temporary works

- Create a path for the vehicle in Animator
- Clash detect path against surrounding building
- Create Task Types in Timeliner
- Create Tasks and attach selections
- Create a time based clash

Create Time Based Clashes for temporary works

- Why link to Timeliner?
- Add complicated scenarios, ship leaving, new one arriving
- Provides dates and times of problem

Link Animations to Timeliner for powerful presentations

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Why?

- At bid stage to win the project
- Client doesn't need details, just an overview
- Can concentrate on detailed areas

Link Animations to Timeliner for powerful presentations

How?

- How long do you want your Timeline to be?
- Showing the full schedule? Or just a portion?
- Create a start keyframe and end keyframe
- Select key works to focus on
- Where are they in the schedule
- Add keyframes to smooth the animation
- Link to animation

Link Animations to Timeliner for powerful presentations

- How long will it take?
- Render a single image of the most complex part
- Multiply by FPS (frames per second)
- Multiply by number of seconds

- Reduce frames
- Reduce complexity (materials, shadows, reflectance)
- Export to images and then process to video
- Split into smaller parts

Other ways to improve project

- Do a simple design review
- Password on a published NWD
- Use BIM 360 Glue Mobile app on site to view the model
- Clash detection between multiple contractor
 - Everyone checks their work
- Use the models in FM

Could it happen?

- 140km in diameter
- 1.08×10^{15} tonnes of steel
- 833,315 years to produce enough steel (at 2012 Earth rates)
- Steel alone \$852,000,000,000,000.
- Roughly 13,000 times the world's GDP
- <http://www.centives.net/S/2012/how-much-would-it-cost-to-build-the-death-star/> *Lehigh University in Pennsylvania*

Thank you

- Darth Vader model used for the avatar - http://artist-3d.com/free_3d_models/dnm/model_disp.php?uid=814
- George Lucas and Twentieth Century Fox for lots of lovely screen grabs
- John Williams for his fantastic soundtracks
- You guys and gals!
- Everyone who helped build bits, advise and promote this session

Me!



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