### Introduction To Project Reviews Using Navisworks

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AUTODESK UNIVERSITY 2014

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#### Bio



Michael Boyd **BIM Manager (WSP UK)** 

- WSP UK Project Technology Team
- Previously BIM Manager within Structural Discipline
- **Background in Large Healthcare Projects**





#### WE ARE GLOBAL









EMPLOYEES



OFFICES

39

COUNTRIES



#### **Class summary**

This class will help attendees understand how Navisworks and BIM 360 Glue can be used as tools to effectively manage teams and review projects.





## **Key learning objectives**

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

- Set up tests with the clash detective
- Implement effective clash grouping and filtering techniques
- Run effective model coordination meetings
- Use Navisworks efficiently (tips and tricks)





### **Class Analysis**

38665	API Construction	Corporate Quality/Design Director
45015	Dyna Electric	BIM Manager
50962	Arup	Engineering Technician
44816	Turner & Townsend Inc	Senior Consultant
41673	HDR Engineering	Electrical REVIT Designer / Model
43895	Skanska	Operations Director
58628	AssetWorks, LLC	VP of Product Mgmt
41313	Turner Construction	VDC Manager
54255	Lochsa Engineering	chief cook and bottle washer
55450	Hawaiian Dredging Construction Co.	Project Manager
46387	Balfour Beatty Construction	Technology Specialist
<ul><li>46387</li><li>53311</li></ul>	Balfour Beatty Construction Egan Company	Technology Specialist BIM Group Manager
<ul><li>46387</li><li>53311</li><li>43325</li></ul>	Balfour Beatty Construction Egan Company Clark Construction	Technology Specialist BIM Group Manager Project Manager
<ul> <li>46387</li> <li>53311</li> <li>43325</li> <li>44474</li> </ul>	Balfour Beatty Construction Egan Company Clark Construction Jaros Baum & Bolles	Technology Specialist BIM Group Manager Project Manager Engineer
<ul> <li>46387</li> <li>53311</li> <li>43325</li> <li>44474</li> <li>46623</li> </ul>	Balfour Beatty Construction Egan Company Clark Construction Jaros Baum & Bolles TURIS Systems	Technology Specialist BIM Group Manager Project Manager Engineer Innovation Advisor
<ul> <li>46387</li> <li>53311</li> <li>43325</li> <li>44474</li> <li>46623</li> <li>55828</li> </ul>	Balfour Beatty Construction Egan Company Clark Construction Jaros Baum & Bolles TURIS Systems Arkis	Technology Specialist BIM Group Manager Project Manager Engineer Innovation Advisor Constructing architect
<ul> <li>46387</li> <li>53311</li> <li>43325</li> <li>44474</li> <li>46623</li> <li>55828</li> <li>52348</li> </ul>	Balfour Beatty Construction Egan Company Clark Construction Jaros Baum & Bolles TURIS Systems Arkis Filippon Engenharia	Technology Specialist BIM Group Manager Project Manager Engineer Innovation Advisor Constructing architect Director

United States
United States
United Kingdom
United States
United States
United Kingdom
United States
Iceland
Brazil











# "Navisworks does not coordinate construction projects...



# ... People do"



#### What is Navisworks?

- Project review software. Allows us to federate and analyse models to improve coordination and communication of designs
- Models analysed for construction programming, logistic planning and cost surety
- Navisworks does have the ability to link the 3D geometry objects with databases, providing a starting point for asset management





#### What Navisworks is Not

- Navisworks is not a model authoring tool such as Revit, AECOsim or ArchiCAD
- Navisworks cannot modify original authored model files
- Photorealistic immersion navigation tool





### **Navisworks Options**

- Manage (Fully Functional)
- Simulate (Limited)
- Freedom (Free Viewer)







#### Manage only

# Planning

"Plans are of little importance, but planning is essential."





### **Employers Information Requirements**

- Contains WHAT Information is Required
- Technical Requirements
- Management Requirements
- Commercial Requirements





### **BIM Execution Plan**

- Contains HOW and WHO
- Overview
- Scope
- Methodology



EXECUTION PLAN **PROJECT NAME** 

05/03/2013





#### Model Element Ownership Matrix

Project:	55-91 KNIGHTSBRIDGE
Reference:	KNI-MEOM
Prepared by:	Frank McLeod

Date:	08/10/2014
Version:	V1.2



Project:	55-91 KNIGHTSBRIDG							Date:			08/1	0/2014						Design Intent Modeller														
Reference:	KNI-MEO					MEOM		Versio	on:			V1.2						ç	Supply	Chain N	Nodelle	er				1	7	i V	Vi		P	
Prepared by:	Frank McLee				IcLeod												Info	ormatio	n Mode	l Mana	iger											
																						<u> </u>			Co	ontact:	mich	nael.boy	/d@wsr	ogroup.	<u>com</u>	
System	e e						Included Attributes									Level of Development relative to RIBA (Pre 2013) Stages																
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< Discipline Filter																																
Building Services																																
Above ground drainage																						L+P	300		400		400					
Acoustical design and treatment in connection with the engineering services			N				M					A				Ø						L+P	300		400		400					
Air conditioning and mechanical ventilation services																						L+P	300		400		400					
Boilers plants and auxiliaries																						L+P	300		400		400					
Calorifier plants																						L+P	300		400		400					
Clock installations or power and containment for clock installations																																
Cooling water services															$\checkmark$							L+P	300		400		400					
Distribution mains for any services																						L+P	300		400		400					
Cold water services																						L+P	300		400		400					
Combined heat and power installations																																
Conveyor installations and equipment																																
Electrical distribution services			$\checkmark$				$\checkmark$					$\checkmark$	$\checkmark$			$\checkmark$						L+P	300		400		400					
Electrical lighting and power installations																						L+P	300		400		400					
Electrical fittings																						L+P	300		400		400					
Electric standby generation plant and systems																						L+P	300		400		400					
Electric sub-stations																						L+P	300		400		400					
Electrical transmission systems																						L+P	300		400		400					
Energy management systems																																

### Process











### **Project Setup – Appending Files**



/		
Append		
Look in:	03 Suppliers N	lodels
9	Name	A 
Recent Places	CST-PLP-00-	-XX-M3-A-00001
	CST-WSP-00	-XX-M3-S-20001
Desktop		
<b>Libraries</b>		
Computer		
Network	•	
	File name:	CST-HLE-00-XX-M3-M-00001
	Files of type:	Navisworks Cache (*.nwc)





#### **Project Setup - Views**









### **Project Setup – Views - Setup**

- Viewpoint Default Options
- Ensure checked to retain changes made to viewpoints



	×
Save Hide/Required Attributes	
Override Material	
Override Linear Speed	
Default Linear Speed (m/sec)	4.00
Default Angular Speed (°/sec)	45.00
Collision	
Settings	
	Defaults
ОК	Cancel Help



#### **Project Setup – Views - Setup**

- Set Views for
  - Home
  - Each Discipline/Supplier
  - Each Level
  - Key Areas (Plantrooms etc.)







Saved Viewpoints 🦉	×
Level Breakdown All Disiplines Front_All Disciplines Arch Struc MEP Ramp @ 00 Ramp @ 10 B2 Plant Room BVIC Intervention 12 - Clashes Walkthrough Coord Issues (Intervention 12)	
Viewpoints	
Save Viewpoint	
New Folder	
Add Animation	
Add Cut	
Sort	
Import Viewpoints	
Export Viewpoints	
Export Viewpoints Report	
Help	



#### **Project Setup – Views – Setup - Video**

https://screencast.autodesk.com/Main/Details/a33f0ce4-6b23-4335-919ff584e2298d43





### **Project Setup - Set Grouping**

Search Sets or Selection Sets?

Selection Sets (Static) —

Search Sets (Dynamic) —







### **Project Setup - Set Grouping – Search Sets**

N, DB·B·B·B·A·A	A 🖓 🚯 🔹 🔻	Manufacture in Prope	Charles Manual Press
Home Viewpoint Revi	iew Animation View	Output Render	BIM 360 iConstruct 2014
Append Refresh Reset File All Options	Select Selection Al	ct Select Selection I Same Tree	Qui       Find Items       Find Items (Shift+F3)         Image: Searches the scene for
Project 👻	9	Select & Search 🔻	Deser Ed former half

Find Items				×
Search in:	Category	Property	Condition	Value
CST-PLP-00-XX-CR-Z-00001.nwd CST-PLP-00-XX-M3-A-00001.rvt CST-WSP-00-XX-M3-S-20001.rvt CST-HLE-00-XX-M3-M-00001.rvt	Item	Name	Contains	Wall









#### **Project Setup – Views – Setup - Video**

https://screencast.autodesk.com/Main/Details/87d24d77-eb45-4252-b5ccdfe9cd8a5867





#### **Clash Detective**

ash [	Detective							,9 ×
5	SvM 🔔					Last Run: 2	6 November 201	14 11:18:42
						Clashes - Tota	l: 6 (Open: 6	Closed: 0)
	Name	Status	Clashes	New	Active	Reviewed	Approved	Resolu
	Avs	Old	5	5	0	0	0	0
A	SvM	Old	6	6	0	0	0	0
	AvM	Old	4	4	0	0	0	0
	CRLVSTRUC	Old	1	1	0	0	0	0
	CRLVMEP	Old	1	1	0	0	0	0
	CRLVARCH	Old	1	1	0	0	0	0
20								
					11			
	Add lest Rese	et All Compact A	II Delete A	AII US	, Update All			<u></u>
Ru	ules Select Res	ults Report						
×,	Nau Casua [9] [9]				[-	-	പെപ്പം	a mun Tart
. ] '	New Group				0	None •		ke-run Test
Nan	ne	🙆 🖓 Stat	tus Level	Grid Ir	nt Found	Highlig	hting —	
۵ [.	New Group	New	-		20:31:34	2 Item 1	l 📕 🛛 Item 2 📘	
▷ [.	SvM-001	🙆 1 New	- BASEM	E A(3)-4(	(-4) *VARIES*	Use ite	m colors	• ay se
۵ [•	SvM-002	🙆 1 New	•		*VARIES*	High	nlight all clashe	s
▷ [.	SvM-003	1 New	•		*VARIES*	Isolatio	n	
	SvM-004	[6] 1 New	- BASEMI	E X-19(-:	1) *VARIES*	Dim Of	ther Hide Othe	er
P 📑	SvM-005	[0] 1 New	•		*VARIES*	V Tran	sparent dimmin o reveal	ng
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						Auto-lo	oad	-
						Anin	nate transitions	
						Fo	cus on Clash	
•					•			
¥	Items							
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tem	Name: Fabsec	ning Eshcar PE20	450×6025	Item N	Name: Pipe Ins	ulation	sulation: Min-	
nem	HEM WED OED 3	ming: Fabsec: 6520x	4500055		HEM HM CO	77 M2 M 20	01 pwc	
	STI-WSP-USD-2	D)			ST-HM-00	-22-193-191-20	INWC	^
	- A: Structural	Framing			Fine Tr	sulations		*







#### **Clash Detective**

Home Viewpoint Review	Animation	View Output Render BIM 360	iConstruct 201	Autodesk Navisw 4 Add-ins	vorks Manage 2014	CST-IMT-00-XX-	CR-Z-00001.nwd	-
Append Refresh Reset File S All Options	Clash D	etective	tems					
Test Name	<b>^</b> S	struc v Mechanical <u>A</u>					Last Clashes -	Run: 20 - Total: {
		Name	Status	Clashes	New	Active	Reviewed	Appr
		Arch v Struc	Old	5999	0	5999	0	0
		Arch v Struc Floor	Old	6	1	3	0	2
		Arch v Structural Columns	Old	8	7	0	0	1
		Arch v Struc Walls	Old	6	6	0	0	0
		Arch v Struc Framing	Old	10	10	0	0	0
	۲.	 						
Add test	Ru	Add Test Reset All I	Compact All port	Delete Al		Jpdate All		





#### **Removing False Positives**

Add Test Reset All Compact All Delete All 🕞 Update All	- <table-cell></table-cell>
Rules Select Results Report	
Ignore Clashes Between	
<ul> <li>Items in same layer</li> <li>Items in same group/block/cell</li> <li>Items in same file</li> <li>Items with coincident snap points</li> <li>Items where one item is in selection set 'Struc Model' and the other item is in selection set 'Structural C Items which are both in selection set 'Structure-&gt; Structure'.</li> <li>Items which are both in selection set 'Architecture-&gt; Architecture'.</li> <li>Items where one item is in selection set 'Struc-&gt; Struc' and the other item is in selection set 'Arch-&gt; Arch-PT</li> <li>Items where one item is in selection set 'Struc-&gt; Struc' and the other item is in selection set 'Arch-&gt; Arch-PT</li> <li>Items where one item is in selection set 'Struc-&gt; Struc' and the other item is in selection set 'Arch-&gt; Arch-Struc'</li> </ul>	
Items where one item is in selection set 'Struc->Struc-Walls' and the other item is in selection set 'Arch->A Items where one item is in selection set 'Struc->Struc' and the other item is in selection set 'Arch->Arch-Ce Items where one item is in selection set 'Struc->Struc Structural Columns' and the other item is in selection Items where one item is in selection set 'Arch->Arch Rooms' and the other item is in selection set 'Struc->S	
Items where one item is in selection set 'Struc-> Struc Structural Framing' and the other item is in selection is in selection set 'Struc-> Struc' and the other item is in selection set 'Arch-> Arch Ro Items where one item is in selection set 'Struc-> Struc Structural Columns' and the other item is in selection set 'Struc-> Struc Structural Columns' and the other item is in selection set 'Struc-> Struc Structural Columns' and the other item is in selection set 'Struc-> Struc Structural Columns' and the other item is in selection set 'Struc-> Struc Structural Columns' and the other item is in selection set 'Struc-> Struc Structural Columns' and the other item is in selection set 'Struc-> Struc Structural Columns' and the other item is in selection set 'Struc-> Struc Structural Columns' and the other item is in selection set 'Struc-> Struc Structural Columns' and the other item is in selection set 'Struc-> Struc Structural Columns' and the other item is in selection set 'Struc-> Struc Structural Columns' and the other item is in selection set 'Struc-> Struc Structural Columns' and the other item is in selection set 'Struc-> Struc Structural Columns' and the other item is in selection set 'Struc Structural Columns' and the other item is in selection set 'Struc Structural Columns' and the other item is in selection set 'Struc Structural Columns' and the other item is in selection set 'Struc Structural Columns' and the other item is in selection set 'Struc Structural Columns' and the other item is in selection set 'Struc Structural Columns' and the other item is in selection set 'Struc Structural Columns' and the other item is in selection set 'Struc Structural Columns' and the other item is in selection set 'Struc Structural Columns' and the other item is in selection set 'Struc Structural Columns' and the other item is in selection set 'Struc Structural Columns' and the other item is in selection set 'Struc Stru	
Items where one item is in selection set '2.2m Drive Aisle' and the other item is in selection set 'Struc-> Stru Items where one item is in selection set 'Arch-> Arch-Floor' and the other item is in selection set 'MEP-> Pip Items where one item is in selection set 'Arch-> Arch-Ceilings' and the other item is in selection set 'MEP-> Pip Items where one item is in selection set 'Arch-> Arch-Ceilings' and the other item is in selection set 'MEP-> Pip Items where one item is in selection set 'Arch-> Arch-Ceilings' and the other item is in selection set 'MEP-> N	







#### **Setting Clash Test Parameters**

Reset All Compact All Delete All	🕞 Update All
Rules Select Results Report     Selection A     Standard     CST-IMT-00-XX-CR-Z-00001.nvd     CST-PLP-00-XX-M3-A-00001.rvt     CST-PLP-00-XX-M3-A-00001.rvt     CST-PLP-00-XX-M3-M-00001.rvt     CST-HLE-00-XX-M3-M-00001.rvt     CST-HLE-00-XX-M3-M-00001.rvt	Selection B
Settings Type: Hard Tolerance: 0.001 m Link: None Step (sec): 0.1 Composite Object Clashing	Run Test



#### **Clash Results**

Add Test	Reset All	Comp	act All	Delete All	🕞 Update Al
Rules Select	Results P	eport	]		
[ <sup>*</sup> ] New Group		A	ssign (		
Name	i 🖓 🖓 St	atus	Level	Grid Int	Found
Clash6	Ne	w 🔻	TH 00	G(11)-4(	19:00:24 20-10-
Clash12	Ne	w 🔻	B1 (2)	B(-3)-TH	19:00:24 20-10-
Clash14	Ne	w 🔻	B1 (2)	B(-3)-TH	19:00:24 20-10-
Clash15	Ne	w 🔻	B1 (2)	G(4)-3(4)	19:00:24 20-10-
Clash19	Ne	w 🔻	15 (2)	D-5	19:00:24 20-10-
Clash22	Ne	w 🔻	B1 (2)	F(1)-1(1)	19:00:24 20-10-
Clash39	Ne	w 🔻	TH 00	G(11)-5	19:00:24 20-10-
Clash54	Ne	w 🔻	TH 00	G(14)-4(	19:00:24 20-10-
Clash70	Ne	w 🔻	TH 00	5A(1)-G(9)	19:00:24 20-10-
Clash75	Ne	w 🔻	B1 (2)	C(-3)-TH	19:00:24 20-10-
•					
🗙 Items					
Item 1	🔽 Hi	ghlight	:		Item 2





#### **Clash Results**

	lash D	etective								
	- Struc v MEP 🔔									
						C	lashes - Total:	1188 (Op		
L		Name	Status	Clashes	New	Active	Reviewed	Approv		
	⚠	Struc v MEP	Old	1188	1178	10	0	0		
	⚠	Struc v Mechanical	Old	8	8	0	0	0		
	⚠	Struc v Electrical	Old	3	3	0	0	0		
	⚠	Struc v Piping	Old	1	1	0	0	0		
	⚠	Struc v MEP walls	Old	1	1	0	0	0		
	4				III					
	Add Test Reset All Compact All Delete All 🕞 Update All									
	Rules Select Results Report									
	[ <sup>*</sup> ] New Group [::] [:] [:] [:] [:] [:] [:] [:] [:] [:									



	x								
October 2014 19:00:23									
1188 Closed:	0)								
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0	Ŧ								
- F									
	•								
🤁 Re-run 1	<b>Fest</b>								
	Der 2014 19:00 1188 Closed: Resolved 0 0 0 0 0 0 0 0 0 0 0 0								



#### **Clash Test - Video**

https://screencast.autodesk.com/Main/Details/0fcf1794-d3f5-4c30-bbea-6f25003e9b47





Clash Detective

Struc v MEP A









Step 2: Select element/s by system or proximity and change the 'filter by selection' setting to INCLUSIVE.

្វី New Group 🔯 🖏 🖏	Z Assign	Ř L+		ſ	당 None ▼ [57] 🔂 🔁 Re-run Test
Name	🔞 🖵 Status	Level	Grid Int	Found	None Shows all clashes
🕻 🔝 New Group	New 🔻	Townho	G(11)-5	11:36:4	Exclusive
Clash1	New 🔻	Townho	G(11)-5	11:36:4	shows clashes where both clashing items are selected
Clash2	New 🔻	Townho	G(14)-4(	11:36	Inclusive
Clash3	New 🔻	Townho	5A(1)-G(9)	11:36	Shows clashes where at least one clashing item
Clash4	New 🔻	Townho	G(6)-6	11:36 <mark>:4</mark>	Dim Other   Hide Other
Clash5	New 🔻	Level B1	A(1)-7(-2)	11:36:4	Transparent dimming
— Clashб	New 👻	Townho	E(1)-7	11:36:4	Auto reveal
Clash7	New 🔻	Level B1	B(-3)-7(-2)	11:36:4	Viewpoint
Clash8	New 🔻	Level B1	A-7(-2)	11:36:4	Auto-load
Clash9	New 🔻	Level 11	2A-B	11:36:4	Animate transitions
Clash10	New 👻	Level 12	2A-B	11:36:4	Focus on Clash

#### Select elements using selection tool or 'Sets'





- Step 3:
  - Select the filtered clashes and re-group
  - Set the 'filter by selection' back to 'None'
  - Repeat for all clashes in the test

Rules Select Results	Report									
[ * New Group [ 아이 [ 아이 [ 아이 ] [ 아이 ] [ 아이 [ 아이 ] [ 아이 [ 아이										
Name	🔞 🖵 Status Level	Grid Int Found	- Highlighting —							
4 🔝 New Group	New 🔻 Townho	G(11)-5 11:36:48 2	Item 1 📕 Item 2 📒 🙀							
Clash1	New 🔻 Townho	G(11)-5 11:36:48 2	Use item colors 🔹							
Clash2	New 🔻 Townho	G(14)-4( 11:36:48 2	Highlight all clashes							
└● Clash3	New 🔽 Townho	5A(1)-G(9) 11:36:48 2	Isolation =							
Clash4	New 💌 Townho	G(6)-6 11:36:48 2	Dim Other Hide Other							
			Transparent dimming							
			Viewpoint							
			Auto-load 🔻							
			Animate transitions							
			Focus on Clash							
< III		Þ	Simulation							







# Navisworks 2014 is more functional using this method than 2015!

• Step 4:

Rename groups, add a viewpoint, add comments

Rules Select Resu	Ilts Report						
[ ို New Group ြလ္ပါ ြန္ပါ				ڪچ ا	None 🔻 🖾 🖶 🔁 Re-ru	un Test	
Name	🔞 🖵 Status	Level	Grid Int	Found	Highlighting	<u>^</u> 3	
▷ [♣] SvM_Mech-043	O New	<ul> <li>15 (2)</li> </ul>	D-5	19:01:02 20-1	Item 1 📕 Item 2 📒	lispi	
▷ [] SvM_Mech-044	io New	<ul> <li>TH 03</li> </ul>	G(-1)-2	19:01:02 20-1	Use item colors 🔹	ay o	
▷ [] SvM_Mech-045	🙆 New	▼ TH 00	G(11)-5	19:01:02 20-1	Highlight all clashes		
▷ [♣] SvM_Mech-046	New	▼ TH 00	E-7(-2)	19:01:02 20-1	-Isolation		
▷ [♣] SvM_Mech-047	New	▪ B1 (2)	B(-3)-TH	19:01:02 20-1	Dim Other Hide Other	=	
▷ [♣] SvM_Mech-048	O New	▼ TH B1	C(-1)-7(1)	19:01:02 20-1	Transparent dimming		
▷ [♣] SvM_Mech-049	ii New	• 16	B-3(-1)	19:01:02 20-1	Auto reveal		
▷ [♣] SvM_Mech-050	io New	▼ B1 (2)	F(-2)-1(9)	19:01:02 20-1	Viewpoint	ו ו	
					Auto-Ioad   Auto-Ioad		
					Eorus on Clash		
					Simulation	1	
<				•		•	
					-View in Contact		







### **Clash Grouping – Video**

https://screencast.autodesk.com/Main/Details/c9d0964f-c93c-4435-bf9f-9d84f76b5302





### **Clash Grouping – Other Uses**

#### Spatial coordination









### **Walkthrough Design Issues**

What about things that don't physically clash?





## **Clash AVOIDANCE**

- BIM 360 Glue
- Push models from Revit
- Does not replace Navisworks
- Used in-between meetings for clash avoidance







# Reporting

"If it cannot be measured, it cannot be improved"





### **Clash Report Production**

- Content
- Clash option
- Status to be included
- Select report type
- Select report format
- Write Report

Rules Select Results Report	
<ul> <li>Contents</li> <li>Summary</li> <li>Clash Point</li> <li>Date Found</li> <li>Assigned To</li> <li>Date Approved</li> <li>Approved By</li> <li>Layer Name</li> <li>Item Path</li> <li>Item ID</li> <li>Status</li> <li>Distance</li> <li>Description</li> <li>Comments</li> <li>Quick Properties</li> <li>Image</li> <li>Simulation Dates</li> <li>Simulation Event</li> <li>Clash Group</li> <li>Grid Location</li> </ul>	Include Clashes For Clash Groups, include: Group Headers Only Include only filtered results Include these statuses: New Active Reviewed Approved Resolved
- Output Settings Report Type All tests (combined)	ormat abular) The result highlighting



### **Clash Report – HTML Tabular**

Struc v Electrical	0.0010m 19	13	6	0 Hard Old											
							item 1					lten	2		
Image	Clash Name	Status		Clash Point	ltem ID	Layer	Path	Item Name	Item Type	ltem ID	Layer	Path	Item Name	ltem Type	Comments
<b>^</b>	SvM_Elec-011	Active	C-7 : Site	x:528083.6706, y:181757.6390, z:25.7588	<i>Element ID</i> : 1621259	LE¥EL 00	File > File > CST-VSP-00-XX M3-S-20001.rvt > LEVEL 00 > Floors > Floor > 1000THK SLAB > Floor	- Floor	Floors: Floor: 1000THK SLAB	<i>Element ID</i> : 3522464	B1	File > File > CST-HLE-00-XX- M3-M-00001.rvt > B1 > Cable Tray Fittings > M_Channel Vertical Outside Bend > Standard > M Channel	Standard	Cable Tray Fittings	#197 - ukmxb055 - 2014/3/11 12:08:21 00, MEP cable tray fittings clashing with STRUC floor.
7	SvM_Elec-014	Active	E-4 : S				<u>F" F" OAT LOD AN UU</u>		Valls: Basic Vall: 250 RC VALL	<i>Element ID</i> : 3767214	Level 14	File > File > CST-HLE-00-XX- M3-M-00001.rvt > Level 14 > Cable Trays > Cable Tray with Fittings > Default > Cable Tray with Fittings	Cable Tray with Fittings	Cable Trays: Cable Tray <del>v</del> ith Fittings: Default	#211 - ukmsb055 - 2014/3/24 12:30.48 Multiple levels, STRUC walls clashing with MEP cable tray fittings.
	SvM_Elec-015	New	D-4 : \$						Valls: Basic Vall: 250 RC VALL	<i>Element ID</i> : 4542099	Level 14	File > File > CST-HLE-00-XX- M3-M-00001.rvt > Level 14 > Cable Trays > Cable Tray with Fittings > Default > Cable Tray with Fittings	Cable Tray with Fittings	Cable Trays: Cable Tray <del>v</del> ith Fittings: Default	\$225 - ukmzb055 - 2014/4/24 10:21.35 Multiple Levels, Tolerance lovered to 1mm, Additional Clashes.
	SvM_Elec-016	Active	E-1 : S	1					Floors: Floor: 200THK PT FLAT SLAB	<i>Element ID</i> : 4426870	<no level=""></no>	File > File > CST-HLE-00-XX- M3-M-00001.rvt > <no level=""> &gt; Lighting Fixtures &gt; HL_Recessed LED luminaire A1 &gt; A1&gt;</no>	A1	Composite Part	<i>\$231 - ukmsb055 - 2014/5/14 03:03,55</i> 03, MEP lighting clashing with STRUC slab
	SvM_Elec-017	New	E-4 : S						Structural Framing	<i>Element ID</i> : 2713758	B1	File > File > CST-HLE-00-XX- M3-M-00001.rvt > B1 > Lighting Fixtures > HL_Generic Linear Surface Mounted Luminaire > 1200	Casing	Solid	#267 - ukmzb055 - 2014/6/11 12:03.35 03, MEP lighting fizture clashing with STRUC framing.
~	SvM_Elec-018	New	E-4 : S						Structural Framing	<i>Element ID</i> : 2716610	B1	File > File > CST-HLE-00-XX- M3-M-00001.rvt > B1 > Lighting Fixtures > HL_Generic Linear Surface Mounted Luminaire > 1200	Casing	Solid	#268 - ukmzb055 - 2014/6/11 12:04.05 10, MEP lighting fizture clashing with STRUC framing.
<del>4</del>	SvM_Elec-019	New	E-4 : S						Structural Framing	<i>Element ID</i> : 2716800	B1	File > File > CST-HLE-00-XX- M3-M-00001.rvt > B1 > Lighting Fixtures > HL_Generic Linear Surface Mounted Luminaire > 1200	Casing	Solid	#268 - ukmzb055 - 2014/6/11 12:04.15 14, MEP lighting fizture clashing with STRUC framing.
1	SvM_Elec-020	New	D-4 : \$						Structural Framing	<i>Element ID</i> : 4542018	Level 14	File > File > CST-HLE-00-XX- M3-M-00001.rvt > Level 14 > Cable Trays > Cable Tray with Fittings > Default > Cable Tray with Fittings	Cable Tray with Fittings	Cable Trays: Cable Tray <del>v</del> ith Fittings: Default	#270 - ukmzb055 - 2014/6/11 12:04.40 15, MEP cable trags clashing with STRUC framing.
•	SvM_Elec-021	New	F-4 : S						Floors: Floor: 1400 RC SLAB	<i>Element ID</i> : 2593184	Level B2	File > File > CST-HLE-00-XX- M3-M-00001.rvt > Level B2 > Electrical Fixtures > HL_ 2 Gang Switched Socket Outlet > HL_2 Gang Switched	HL_ 2 Gang Switched Socket Outlet	Composite Part	#256 - ukmzb055 - 2014/6/11 11:51.37 B2, MEP electrical fixture clashing with STRUC slab
•	SvM_Elec-022	Nev	G-1 : S				FLAT SLAB > Floor		Floors: Floor: 200THK PT FLAT SLAB	<i>Element ID</i> : 4793424	Level 2	File > File > CST-HLE-00-XX- M3-M-00001.rvt > Level 2 > Security Devices > HL_S_CCT¥ Camera - Ceiling Mounted > CCT¥	CCT¥ Camera	Security Devices	#257 - ukmzb055 - 2014/6/11 11:52.11 02, MEP CCTV clashing with STRUC slab.
	SvM_Elec-023	Nev	E-7 : Site	<b>x:528091.8616, y:181755.9183,</b> z:23.2090	<i>Element ID</i> : 3341590	LE <b>V</b> EL B1 SSL	File > File > CST-VSP-00-XX- M3-S-20001.rvt > LEVEL B1 SSL > Valls > Basic Vall > 200 RC VALL > Basic Vall	Basic Vall	Valls: Basic Vall: 200 RC VALL	<i>Element ID</i> : 4533925	BI	File > File > CST-HLE-00-XX- M3-M-00001.rvt > B1 > Electrical Fixtures > HL_1 Gang 13A Unswitched Socket Outlet Ceiling Mounted >	HL_1 Gang 13A Unswitched Socket Outlet Ceiling Mounted	Electrical Fixtures	#255 - ukmzb055 - 2014/6/11 11:54.12 B1, MEP electrical fixtures clashing with STRUC wall.





### **Clash Report – Viewpoints**

Designers have no access to Navisworks Manage?









#### **Clash Trending**





7	Federation 8	Federation 9	Federation 10		
	40794	42105	47228		
	7622	8079	7907		



# Meeting





### **Meeting Planning**

## Kick-off Meetings

## BIM Strategy Meeting

# Model Coordination Meetings





### **Meeting Planning**

Week 1	Monday	Tuesday	Wednesday	Thursday	Friday
Model	Clash	Clash	Clash	Clash	Clash
Suppliers	Resolution	Resolution	Resolution	Resolution	Resolution Model Upload
Information					
Manager					
Week 2	Monday	Tuesday	Wednesday	Thursday	Friday
Design Team	Clash	Clash	<b>Co-ordination</b>	Clash	Clash
	Resolution	Resolution	Workshop	Resolution	Resolution
Information	Model Review	Model Review	<b>Co-ordination</b>	Clash Report	
Manager	Clash Grouping	Clash Grouping	Workshop	Meeting Report Minutes and actions	





## **Meeting Planning**

Week 1	Monday	Tuesday	Wednesday	Thurs
Model Suppliers	360 GLUE	360 GLUE	360 GLUE	
Information				
Manager				
Week 2	Monday	Tuesdav	Wednesdav	Thurs
Design Team	360 GLUE	360 GLUE	M	







### **Meeting Agenda**

- 1. Previous actions
- 2. Overview of model, stats
- 3. Model review findings (Major only)
- 4. Walkthrough coordination issues
- **5.** Discipline specific issues
- 6. Clash coordination





**Golden Rules** 

- Meetings should NEVER be longer than 2 hours
- Everyone should benefit from attending
- Attendees must have authority to make decisions on the spot





#### **In Person vs Virtual**





### **Meeting Prep**

- Send an Outlook appointment for model upload
- Have latest drawings to hand
- Catch-up with disciplines beforehand
- Stats on model change since previous meeting
- Review models against validation sheet





### **Follow Up**

- Send out minutes from the meeting with actions
- Issue clash report and federated model
- Start every meeting with the previous actions list
- Include previous action list on the outlook invite to the next meeting

# g with actions hodel bus actions list butlook invite



# **Tips and Tricks**



#### See the class handout for more



### **Short Cuts**

• CTRL + F2

- CTRL + 1 Turns on Select mode.
- CTRL + 2 Turns on Walk mode.
- CTRL + 3 Turns on Look Around mode.
- CTRL + 7 Turns on Orbit mode.
- CTRL + A Displays the Append dialog box.
- CTRL + D Toggles Collision mode.
- CTRL + F Displays the Quick Find dialog box
- Toggles Hidden mode for selected items. CTRL + H
  - Launch Clash Detective



### **Speed walking**

 Holding Shift while using the 'Walk' navigation increases linear speed by 2x.



t Viewpoint - Vie	:w		×	J
Camera	v	v	7	
			<u> </u>	
Position (m):	8113.25	181771.3	70.00	
Look At (m):	528096.4	181770.5	73.55	
Vertical Field Of Vie	ew (°):		58.39	
Horizontal Field Of	View (°):		73.29	
Roll (°);			0.00	
Vertical Offset (%)	:		0.00	
Horizontal Offset (	%):		0.00	
Lens Squeeze Rati	<b>b</b> :		1.00	
Motion				
Linear Speed (m/se	ec):		4.42	
Angular Speed (°/s	ec):		45.00	
Saved Attributes		Collision	_	
📝 Override Materi	ial	Settings		
ОК	Ca	ncel	Help	

Ed











#### **Hidden Elements Folder**

#### Hidden elements folder







### **Third Person For Space Checking**



#### Avatar changes











- Navisworks is a tool, nothing more
- Plan your work then work your plan
- Filter, Group and Prioritise issues prior to the meeting
- The ultimate goal is clash avoidance









ash Detective						,⊛ ×
<ul> <li>Introduction to Project Reviews</li> </ul>				Last Run: 2	8 November 20	14 18:51:26
-				Clashes - Tota	l: 1 (Open: 1	Closed: 0)
Name Statu	s Clashes	New	Active	Reviewed	Approved	Resolv
Introduction to Project Reviews Done	1	1	0	U	0	0
•						×.
Reset All Compact All	Delete All	🔩 Update	e All			<b>•</b>
Rules Select Results Report						
[ <sup>*</sup> New Group [원 등] [양 오유 Assign 으	× ·			Bone ▼ [t	9 🐁 😥	Re-run Test
Name 👩 🖵 Status	Found	Ap	proved A	ppro. High	nlighting —	>
First question please i New	18:51:26 28-11	-2014		Ite	m 1 📕 🛛 Item	2 Disp
	-			Use	item colors	• lay Se
				F	lighlight all cla	shes
				Isola	tion	
					ransparent din	ming
					uto reveal	
				View	/point	
					nimate transiti	ions
					Focus on Clas	h
				Simu	lation —	
				🔽 S	how simulatio	n
				View	in Context —	
						<u> </u>
					View	
✓ Items						
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ltem Name: Model Text Item Type: Generic Models: Model Text: Model Te	ext 1	Item Name Item Type:	e: Model Text Generic Mod	dels: Model Tex	t: Model Text 1	
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#### **Session Feedback**

- Via the Survey Stations, email or mobile device
- AU 2015 passes given out each day!
- Best to do it right after the session
- Instructors see results in real-time







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