

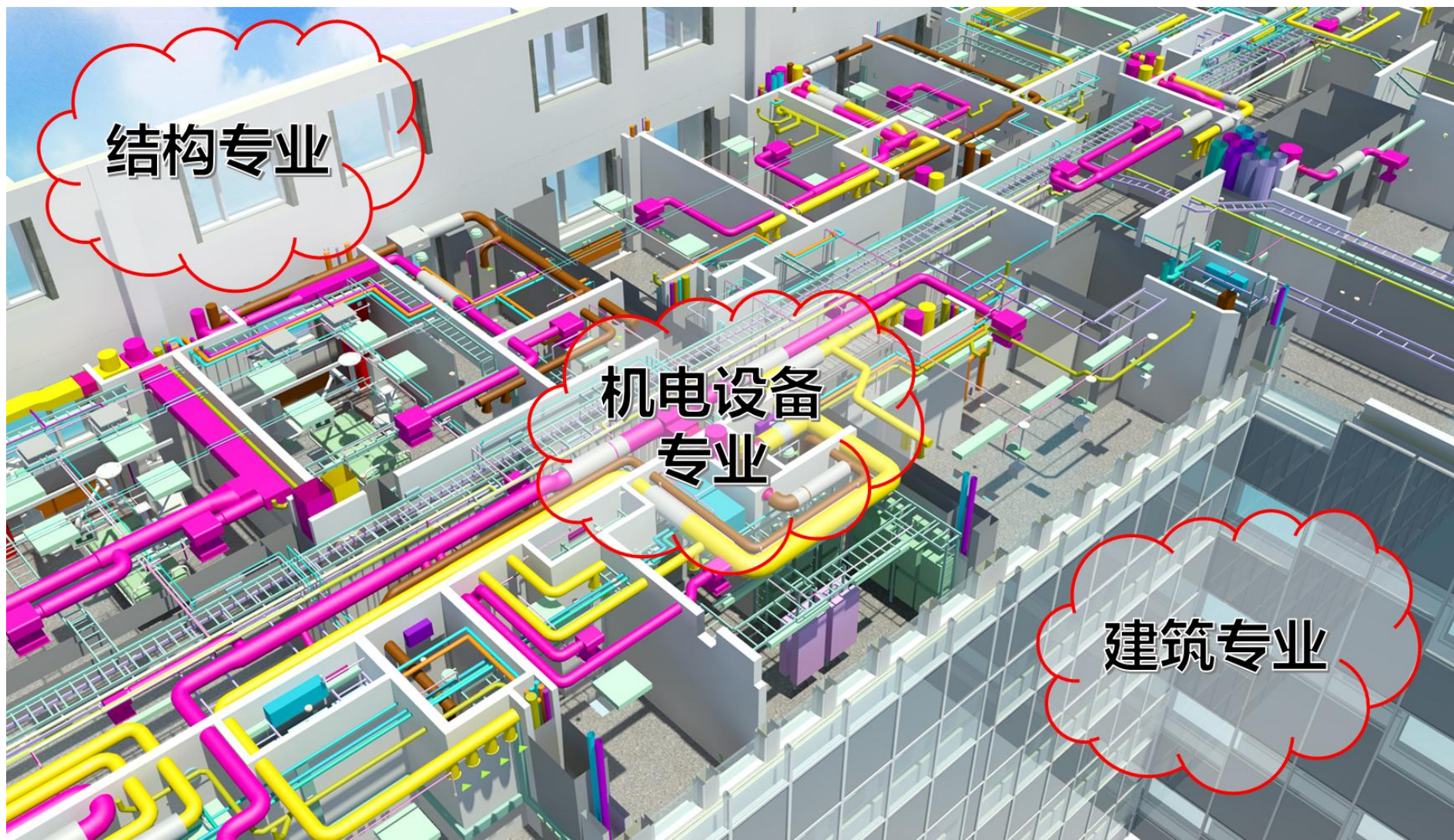
# 联合模型及碰撞检查

周炜 博士



# 联合模型创建

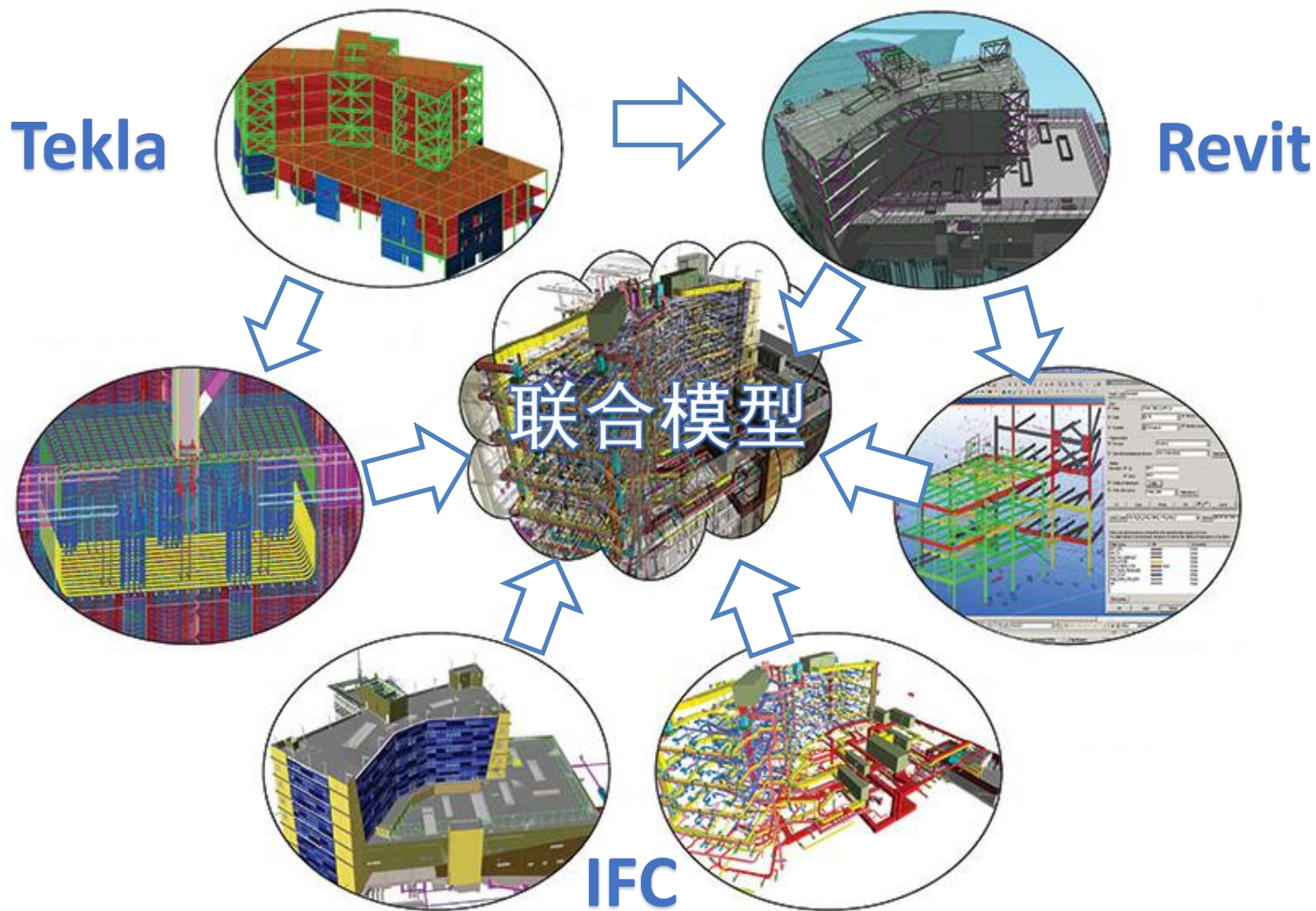
► 建筑是多学科专业汇集的领域：土建、机电、给排水.....





# 联合模型创建

- 完整的BIM模型需要集成不同专业及标准的模型进行工作协调



AUTODESK  
REVIT

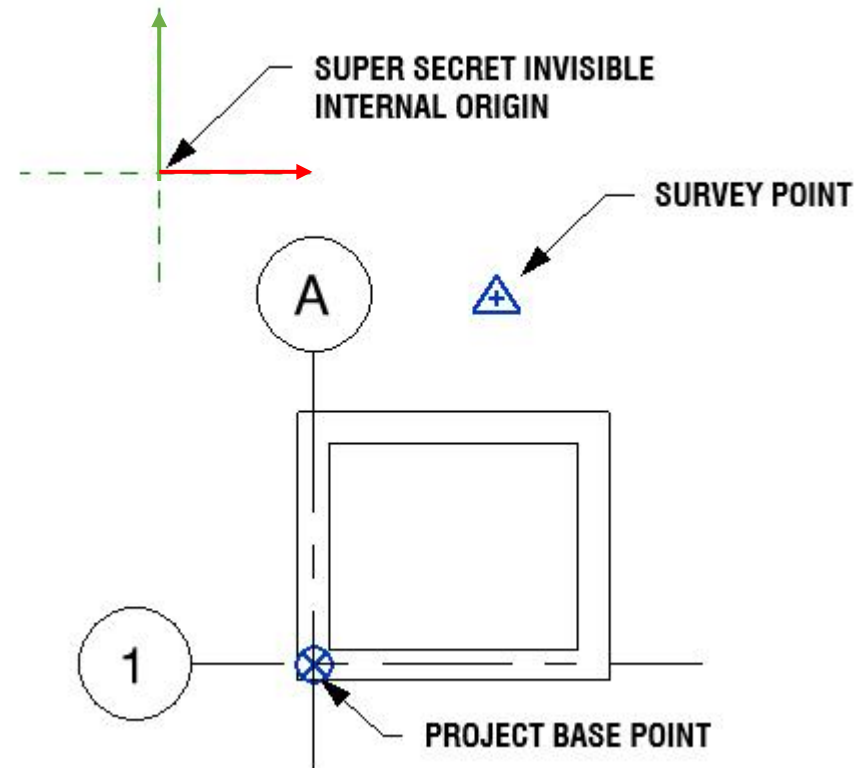
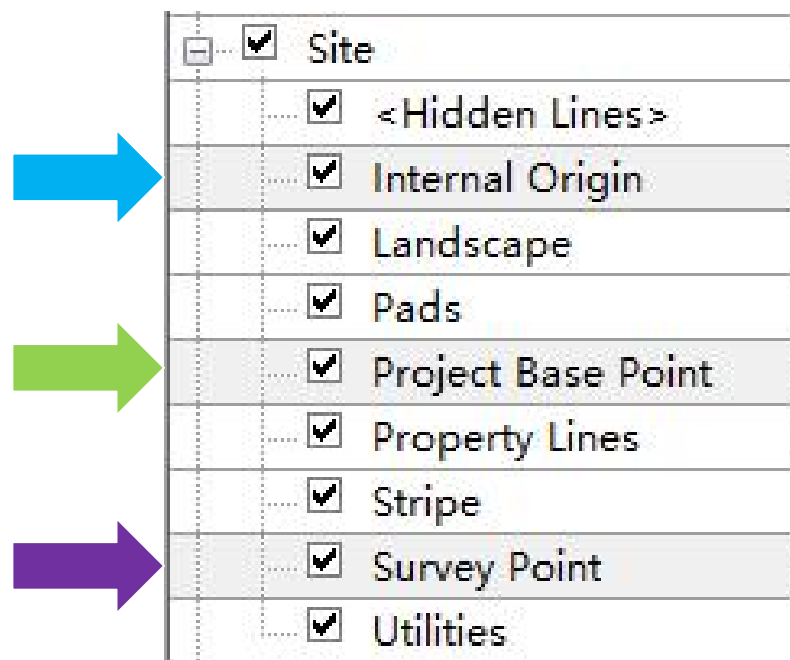


AUTODESK®  
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# 联合模型创建

## ► Revit 项目中3种不同的坐标原点

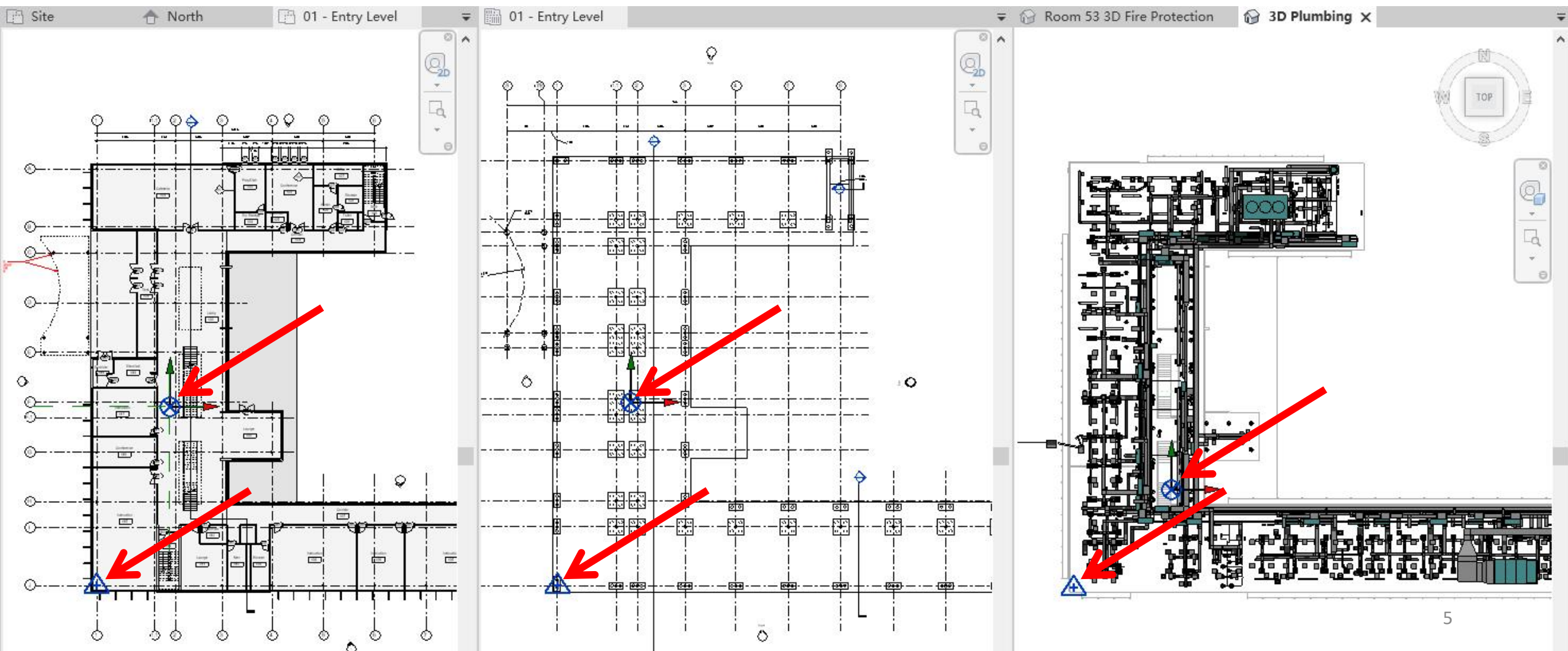
- 项目基准点, 可输入输出的测绘点和内部原点 (最理想的是三点合一)
- 在平面视图中的首层平面图里开启3个原点: 快捷键 VVV





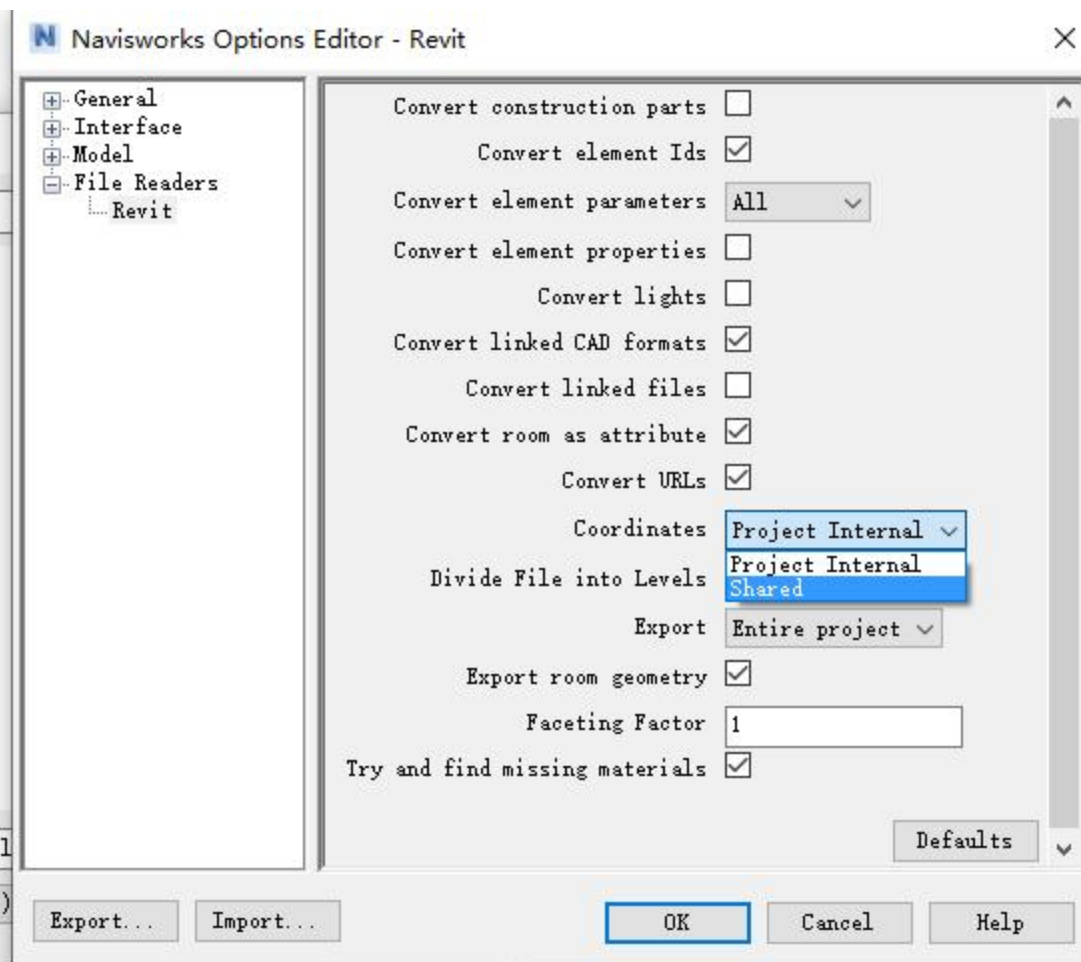
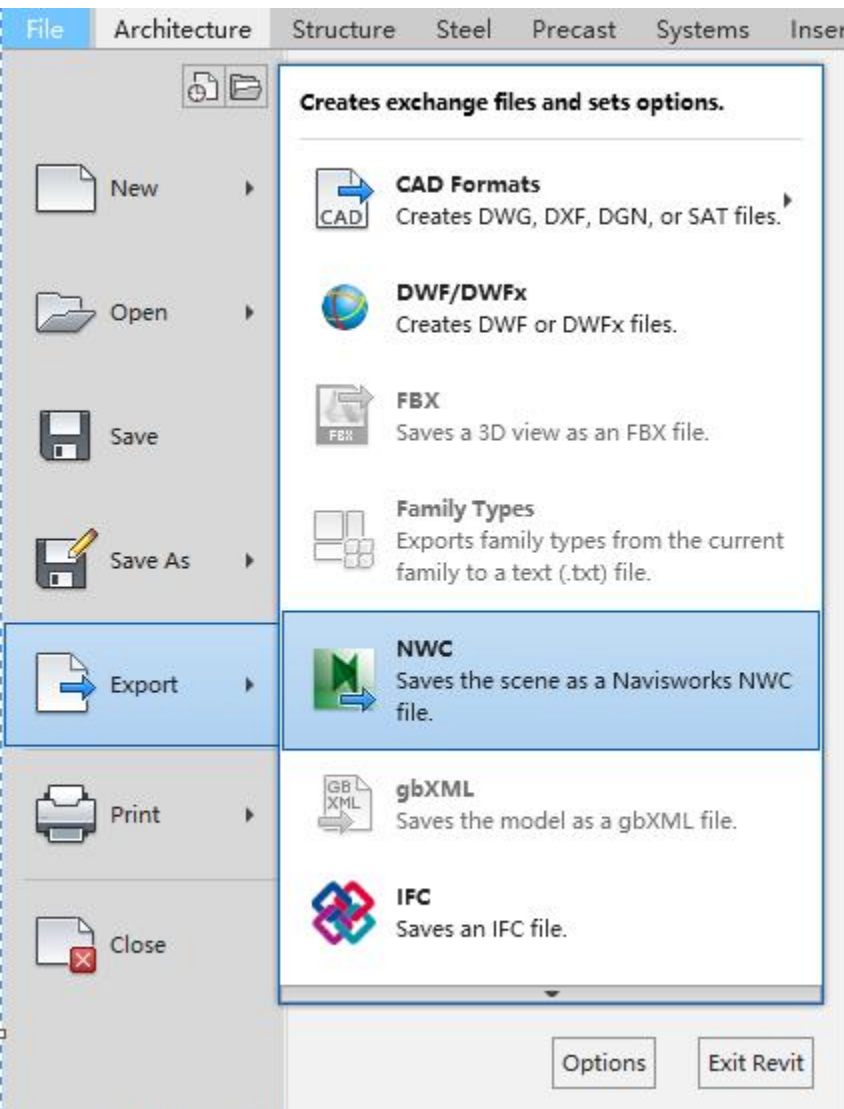
# 联合模型创建

## ► 在2D视图中检查原点



# 联合模型创建

## ► 输出模型 .RVT→.NWC

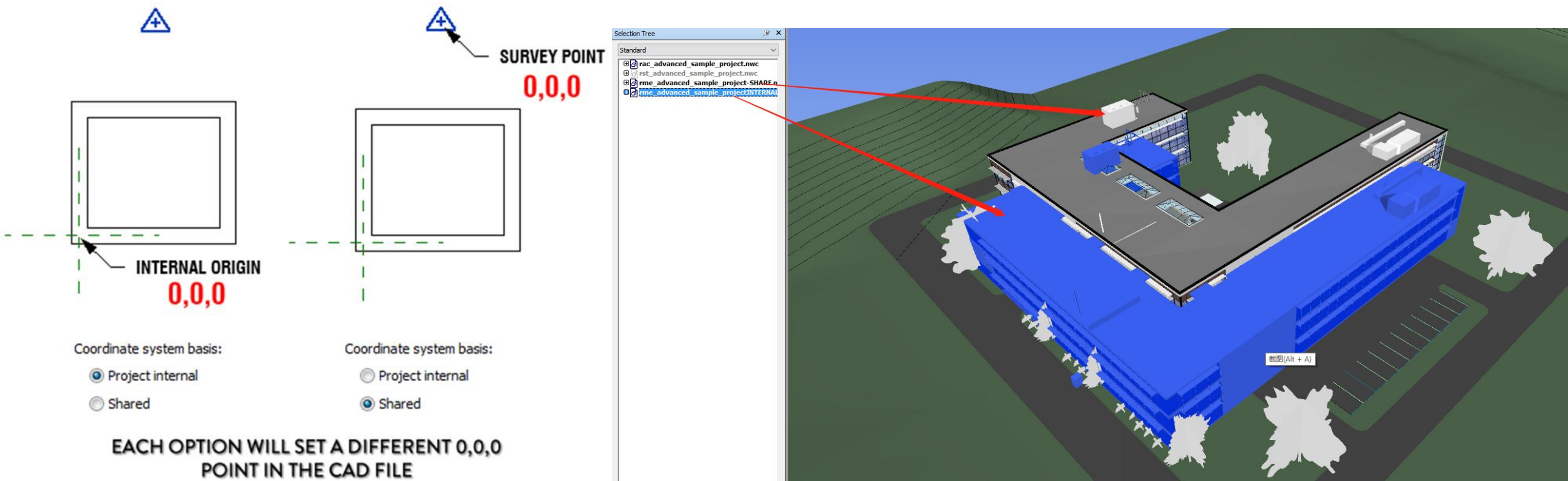




# 联合模型创建

## ► 在Navisworks中添加各个模型

- 输出不同的坐标原点会导致组合模型位置的不同



# 三种碰撞类型

## ► 4D碰撞（不与关注）

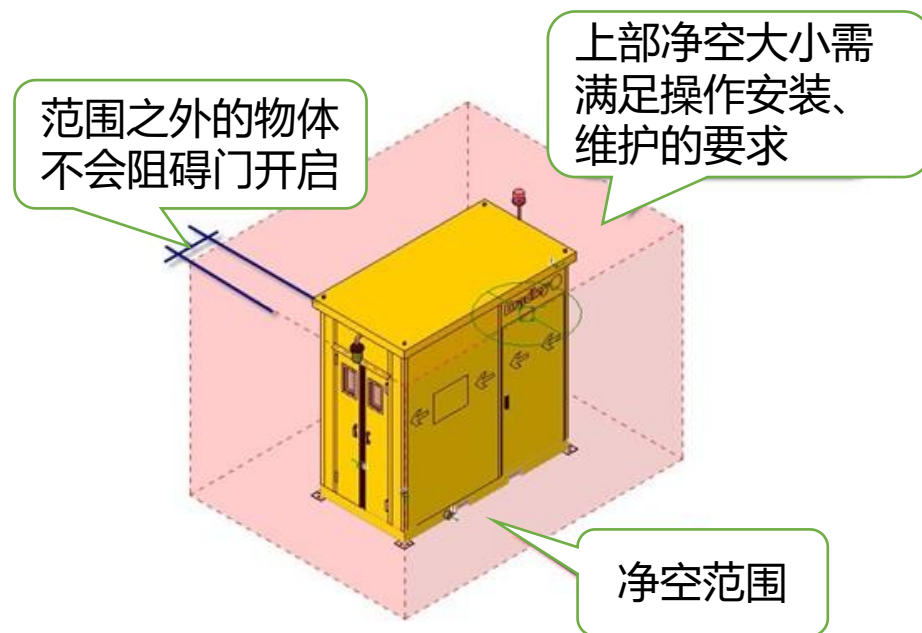
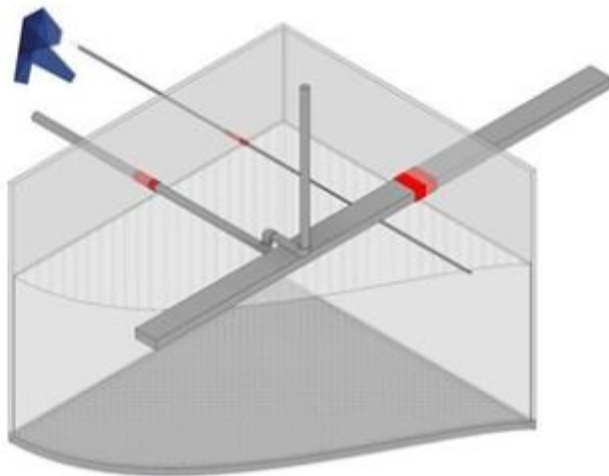
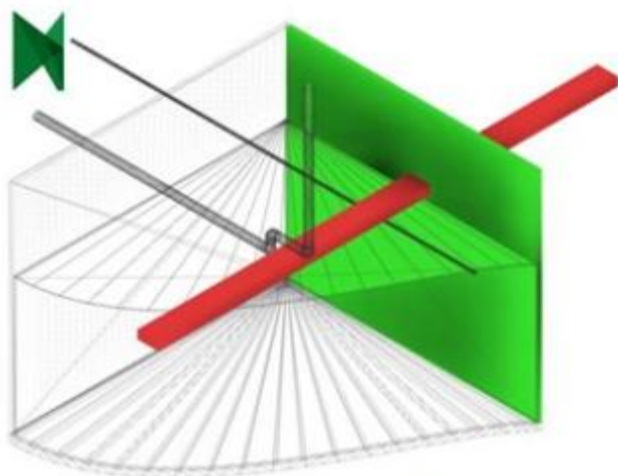
- 施工计划在给定的时间上，各专业的任务出现空间上的冲突 – 缺少工作面

## ► 硬碰撞（予以关注）

- 设计构件在同一空间交叉、相汇

## ► 软碰撞（予以关注且适用于规则检查）

- 设计构件出现在、交汇于所不容许的空间内

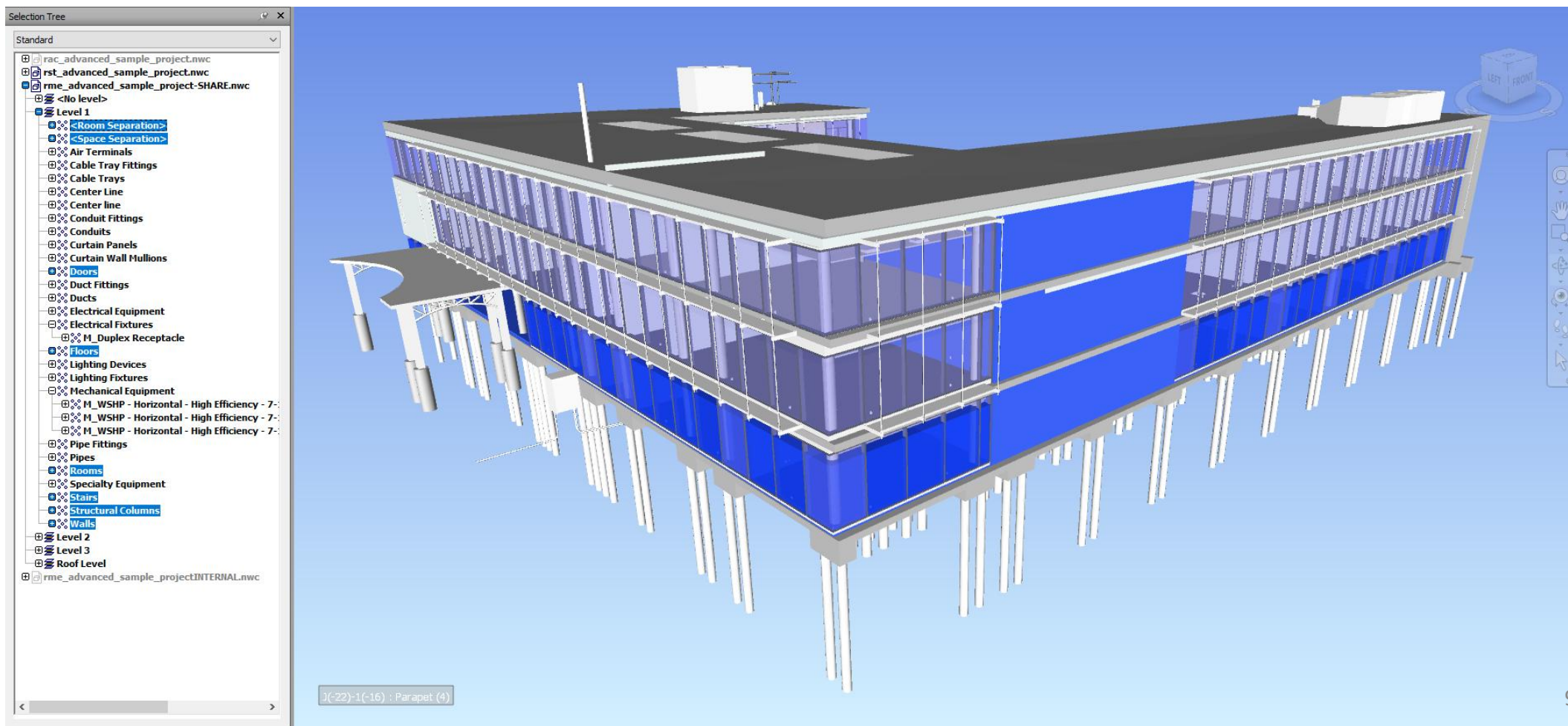




# 模型准备

## ► 视觉清理

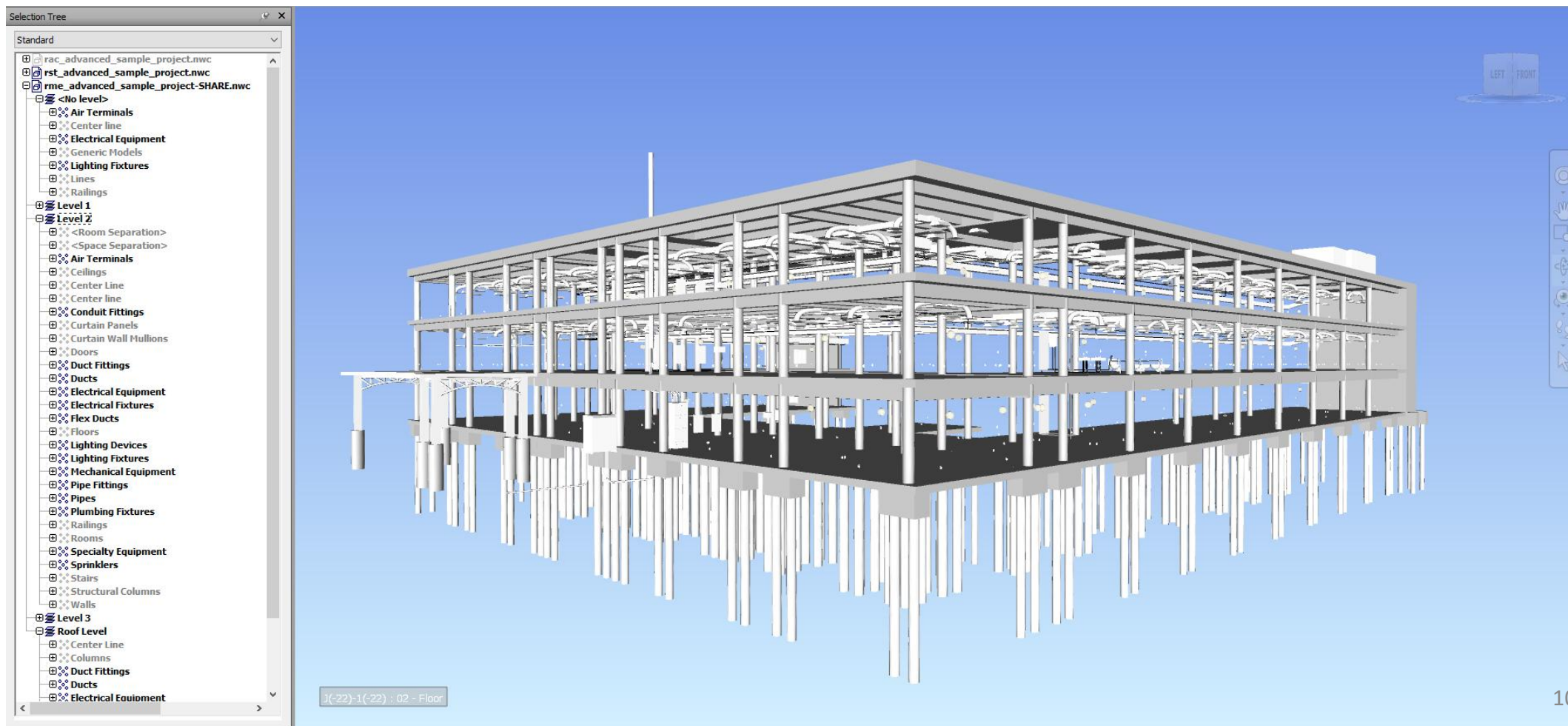
► 隐藏不相关的设计构件避免注意力干扰



# 模型准备

## ► 简化关注点

► 设计内容仅留下需要检查的系统, 例如: 机电专业风管 vs. 结构专业

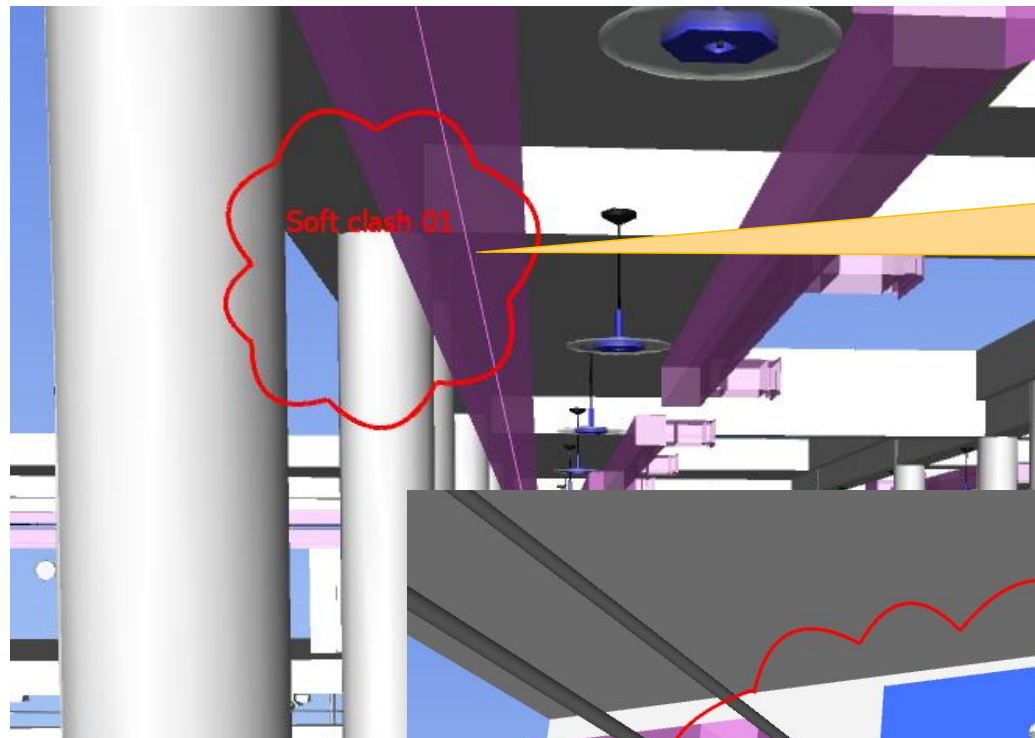




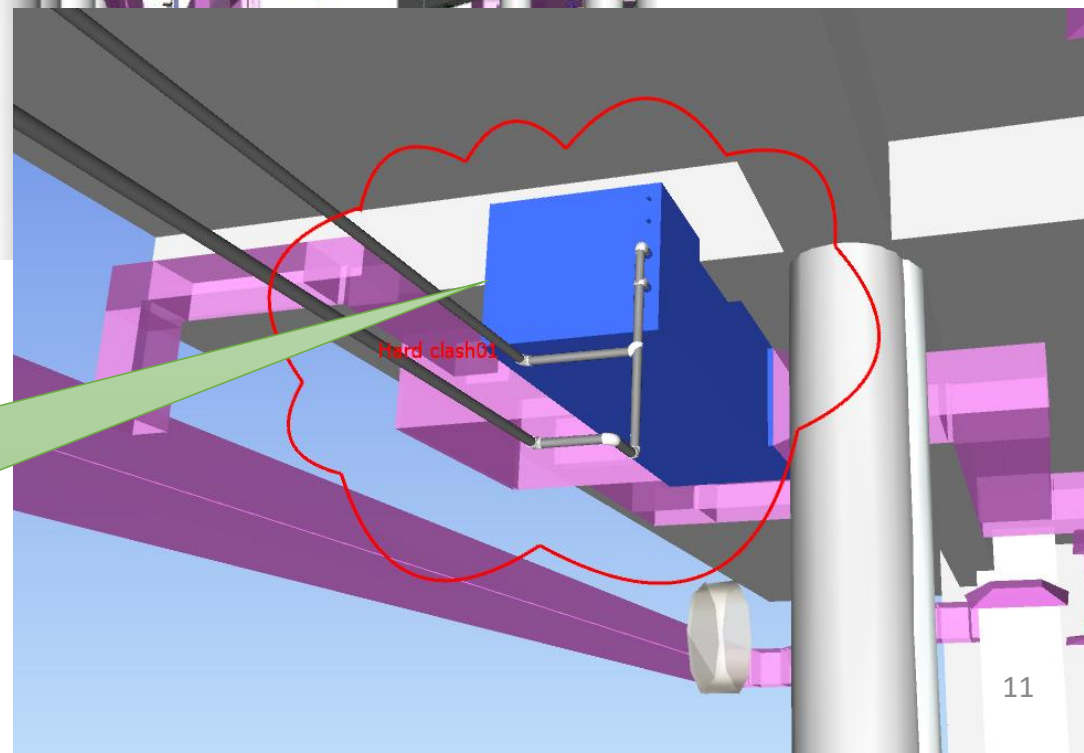
# 有目的碰撞检测

## ► 步骤

- 外观渲染器
- 走入模型
- 碰撞识别
- 设定目标
- 创建选择集
- 自动检测



风管位置离柱子太近。这个问题有多少处？

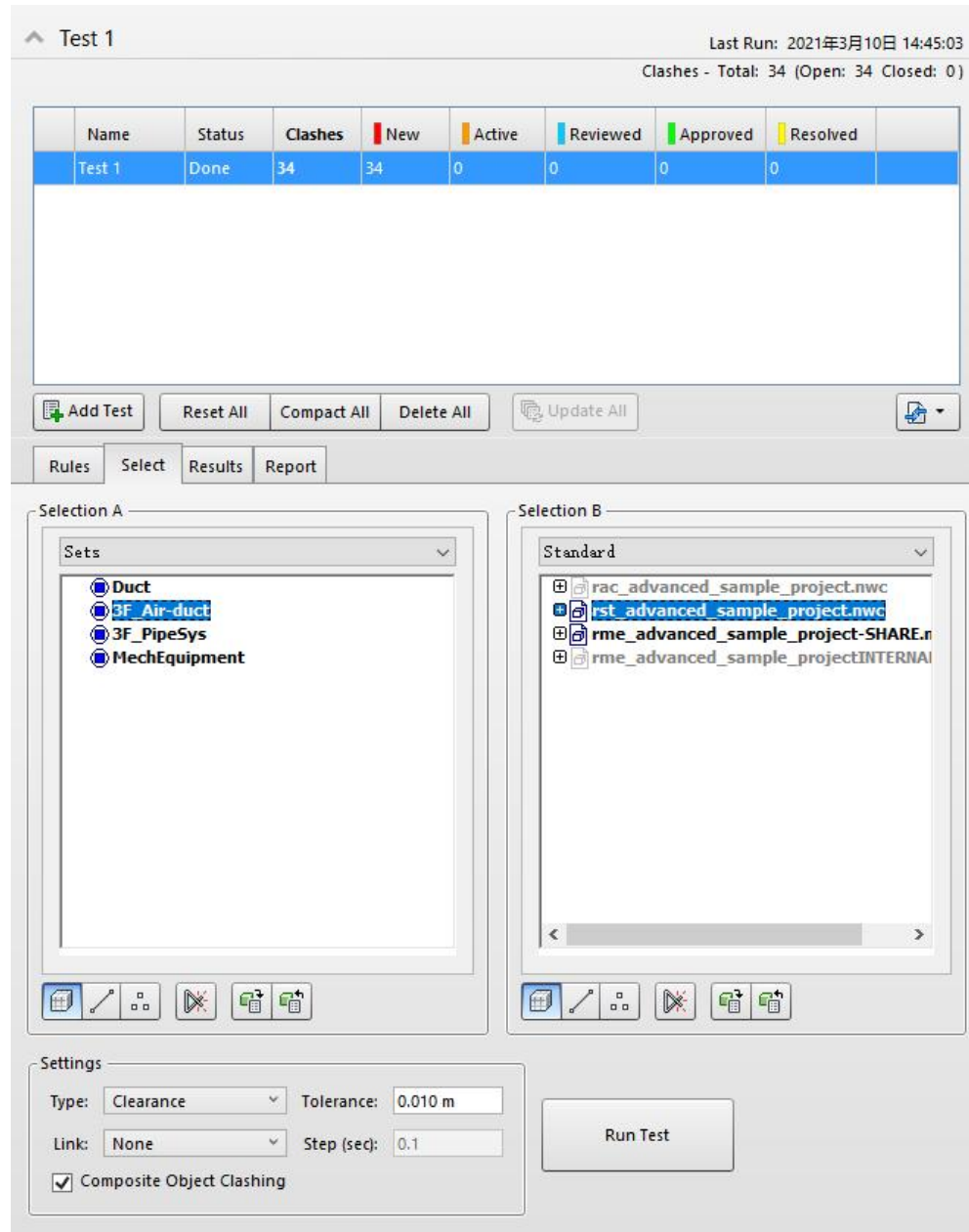


此处的碰撞冲突是否也出现在其他位置？

# 有目的的碰撞检测

## ► 执行碰撞检测

- 设定检测条件
- 结果逐条检查
- 判定问题点
- Navisworks Switchback跳转





# 有目的的碰撞检查

## ► 逐一检查结果

The screenshot displays the Clash Detective software interface. The top section shows a summary for 'Test 1' with a last run date of 2021年3月10日 14:45:03 and a total of 34 clashes (34 Open, 0 Closed). Below this is a table with columns for Name, Status, Clashes, New, Active, Reviewed, Approved, and Resolved. The table shows 'Test 1' with a status of 'Done' and 34 clashes, all of which are 'New'.

A green speech bubble points to the 'Test 1' row in the table, containing the text: "Set status to clear up through".

An orange speech bubble points to the 'Clashes' column header, containing the text: "Set one test, run multiple times and Switchback".

The bottom section of the interface shows a list of clashes with columns for Name, Status, Level, and Grid Intersection. The list includes clashes from Clash1 to Clash18, all with a status of 'New'. The 'Level' column shows various floor levels (e.g., 03 - Floor (2), 03 - Floor (3)) and the 'Grid Intersection' column shows specific grid lines (e.g., I-3, A-5).

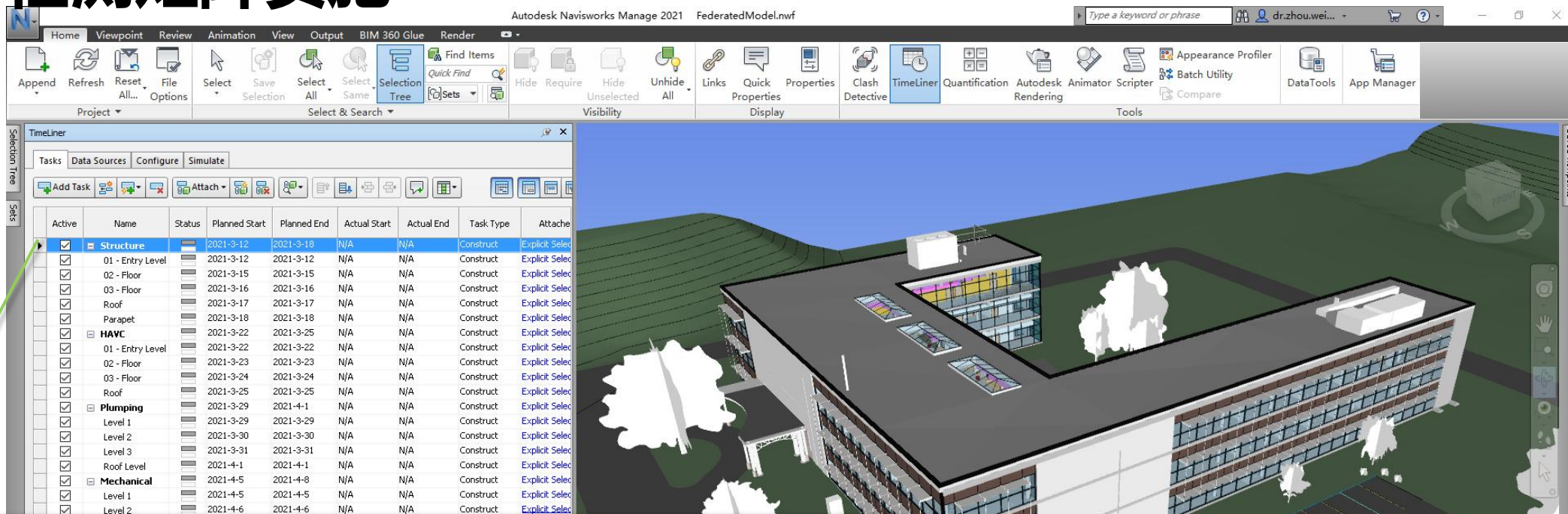
On the right side of the interface, there are settings for Highlighting, Isolation, Viewpoint, and Simulation. The 'Highlighting' section includes options for 'Item 1' (red) and 'Item 2' (green), 'Use item colors', and 'Highlight all clashes'. The 'Isolation' section includes options for 'Dim Other', 'Hide Other', 'Transparent dimming', and 'Auto reveal'. The 'Viewpoint' section includes options for 'Auto-update', 'Animate transitions', and 'Focus on Clash'. The 'Simulation' section includes an option for 'Show simulation'. The 'View in Context' section includes an option for 'All' and a 'View' button.

The 3D model on the right shows a complex building structure with various clashes highlighted in red and green. Yellow arrows point to specific clashes in the model.



# 有目的的碰撞检测

## 检测矩阵实施



Clash Matrix:

	A	E	EL	FP	M	MP	P	S
A								
E	n/a							
EL	n/a				4			
FP	n/a					2		
M	n/a							3
P	n/a							
S	n/a							1

Basement & ground- Clashes between

A – Architectural  
E – Electrical  
EL – Electrical Lighting  
F – Fire Protection  
M – Mechanical (HVAC)  
P – Plumbing  
S – Structural (Foundations, Columns, Beams & Walls, No Slabs)



# 总结

## ➤联合模型

- 3种不同的原点

## ➤输出模型 .RVT→.NWC

- Project internal vs. shared coordinates

## ➤3种不同的碰撞冲突

- 硬冲突 vs. 软冲突 vs. 4D任务冲突

## ➤模型准备

- 视觉清理 vs. 简化关注点

## ➤有目的的碰撞检测

- 步骤, 执行, 结果检查, 跳转回设计, 检测矩阵





**Thank You**