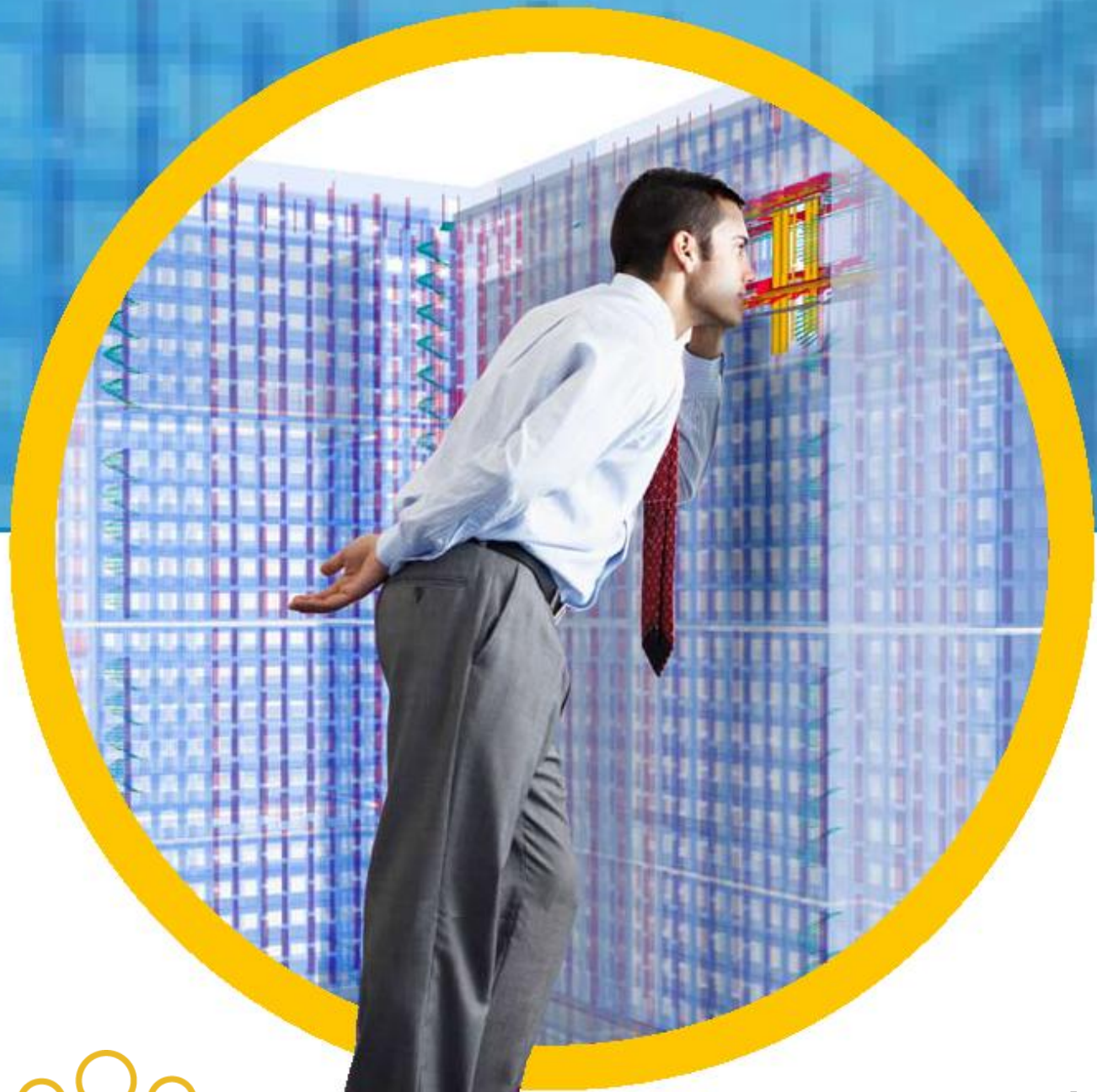


Solibri Model Checker

for Better Quality & Higher Accuracy



Introduction to Deficiency Detection

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Introducing Deficiency Detection

the Next Generation of Quality Control

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The latest innovation from Solibri for Detecting Design Deficiencies and Missing Elements

Solibri's expertise is model-based Quality Assurance and Quality Control. To be more precise, we want to ensure the required information is available, can be trusted, and follows set criteria and guidelines (e.g. building codes). To achieve this, we use rules to analyze information associated with spaces and elements in the models. Additionally, we have developed innovative ways to verify and validate information - and now discern the absence of it.

Solibri has essentially established the Model Checking market by developing technology that employs excellent rulesets for Quality Assurance and Quality Control. Spatial Coordination or Design Version Management (e.g. Model Revision Comparison) are examples of some of the many available rules that deliver high value and tangible benefits, that are widely appreciated throughout the AEC market. Initially, these rules focus on showing what is not fitting properly, is incorrectly located or is additional (or duplicated) in the models. While those are extremely powerful and valuable capabilities, some of the bigger problems typically surface when something is totally missing from the models. This of course is more challenging to determine.

Deficiency Detection

To fully appreciate this capability, let us first define what we mean by 'Deficiency'. We are speaking specifically about the relationship between the 3D Model (BIM) and the information that it is supposed to include. We could have used the terms 'shortcoming or oversight' but there are too many instances of different issues that neither of these would have been ideal. By deficiency, we mean that the model is either missing components (geometry or spaces), the objects in the model don't meet the specifications, or there is a lack of consistency with the behavior of the objects.

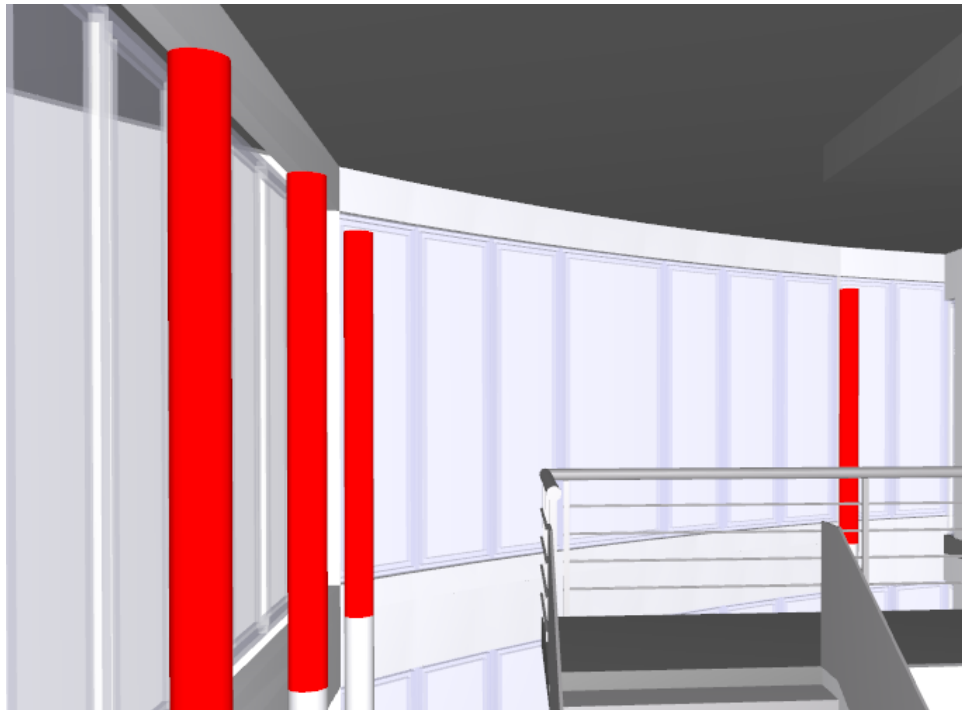
Solibri Model Checker is the only solution available with dedicated rules that can detect what is missing from the model. This ability greatly reduces risks when exploiting BIM information for area calculations and quantity takeoff (as well as many other uses),

When the design is missing spaces, structural components, or other critical information this impacts multiple operations such as energy calculation, quantity takeoff, spatial calculations, etc. Deficiency Detection is an excellent solution that dramatically extends QA/QC for all project participants.

How is it possible to determine what is missing?

Finding additional or overlapping things is relatively easy as there typically is a collision of some kind having 3D mass on top of something else. Solibri has a wide variety of very powerful rules for these purposes. Finding what is actually missing from the design is much more challenging. How is it possible?

Solibri Model Checker can interpret the information in BIM files by using rulesets and reasoning. As the system is purposely built for the design and construction field it “understands” typical logical dependencies and relationships, (e.g. a space should be bounded by walls and also the opposite, where there should be a space inside walls). We have a similar logical situation with columns and their ‘normal’ behavior. Columns typically should stand on top of some load bearing structure and columns primary function is to support some structures above. If this is not reflected in the model there is reason enough to identify the situation as a potential problem or issue.

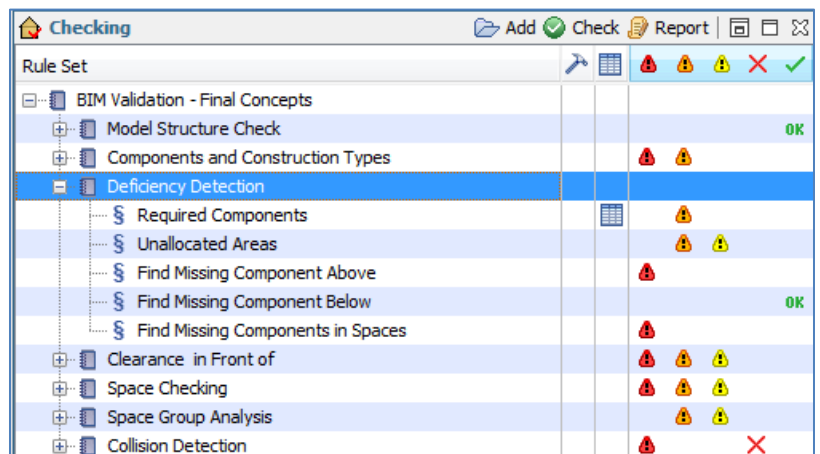


All Columns don't seem to have components on top to show they are supported

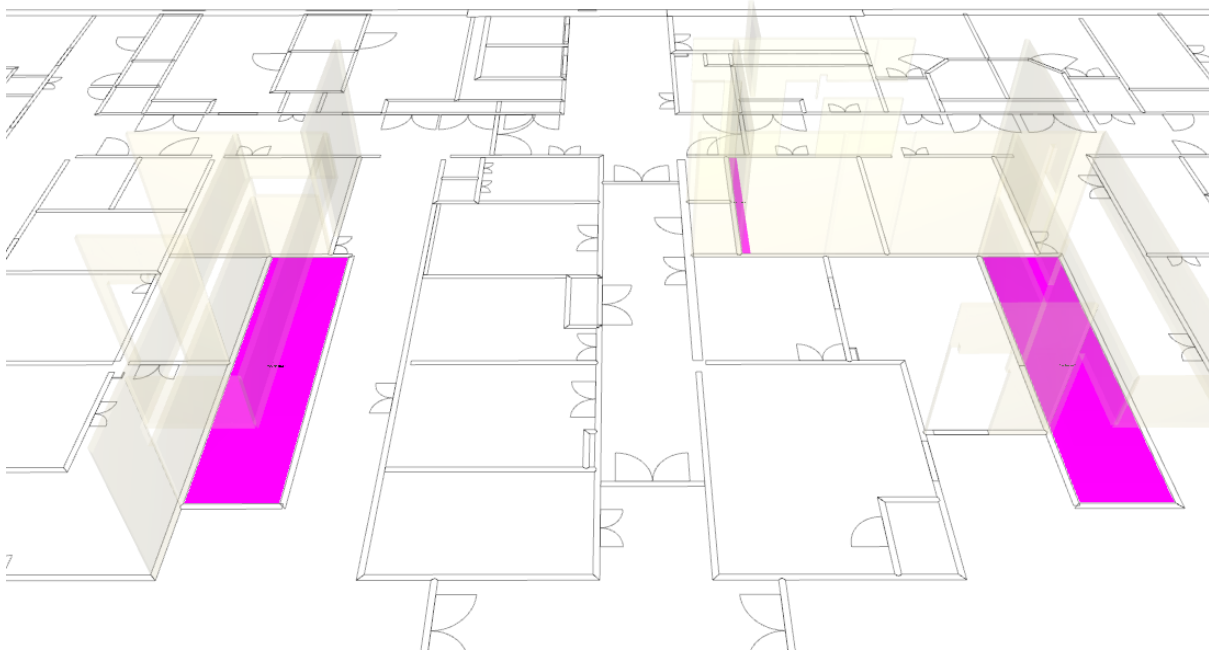
Deficiency Detection Rulesets

Solibri Model Checker includes rulesets dedicated to finding what is missing from the BIM file. Most of these rules are generic for all kinds of buildings, yet some rules can be specified according to what users expect or are required to have in a specific building.

An example of a generic rule is to find all unallocated spaces. Here, the idea is that spaces and walls should cover the whole building area. If this is not the case, Solibri Model Checker will visually indicate the areas where this occurs. If this is not corrected, the area calculation would not be accurate and energy analysis based on the model would be impacted (probably too optimistic).



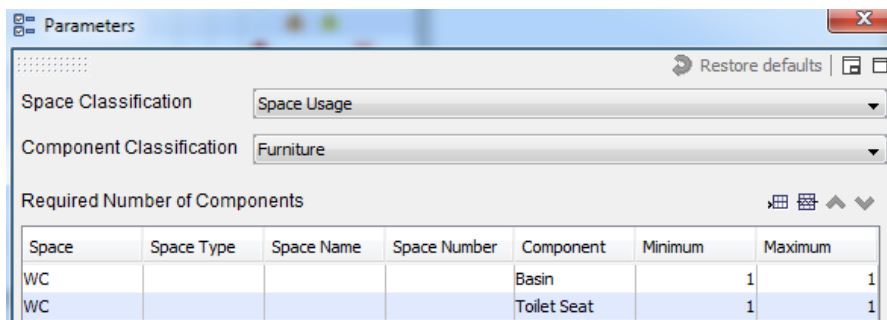
Sample of Deficiency Detection rules



Highlighted areas are missing defined spaces.

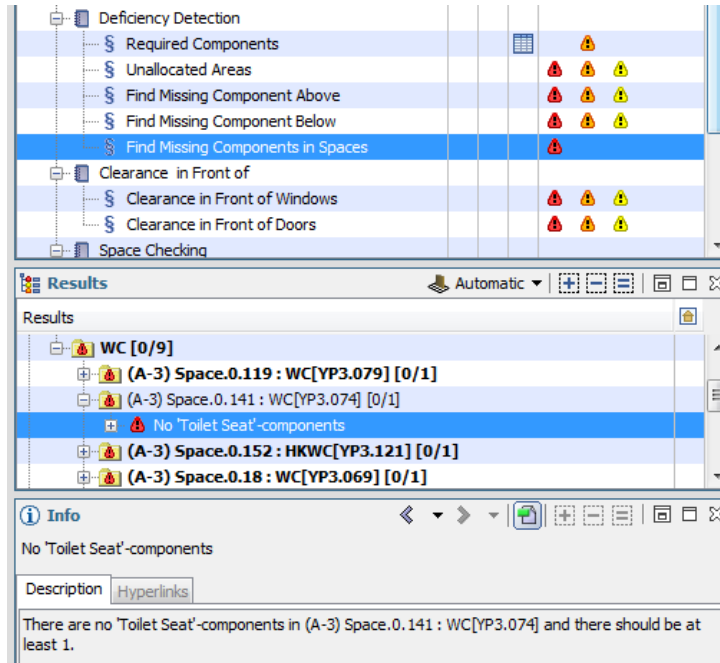
Components missing from Spaces

Solibri Model Checker is also able to check if spaces are equipped with their required components. In the next example there is a requirement to have at least one toilet seat and one basin in all spaces that are classified as "WC".



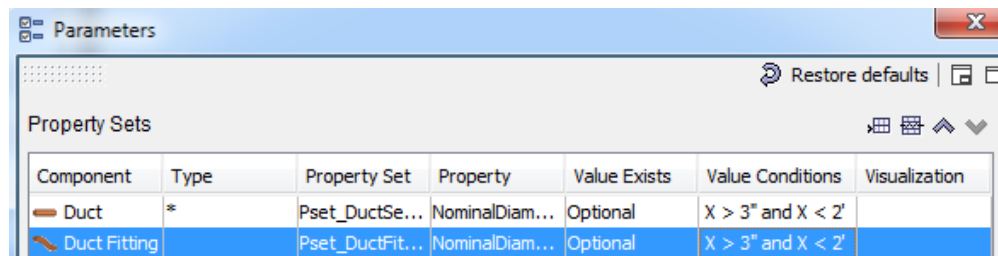
Parameters for the "Required Components" rule

The requirement is to search for "Furniture" like "Basin" and "Toilet Seat" and each space with "Space Usage" of "WC" should have one of each. You could of course have other spaces and furniture included in the same check.



Results from the earlier check look like this

Checking parameter existence and values is useful when information is required for a specific purpose and it is important to have consistent definitions. It is also possible to check that certain components have properties and those properties are within a specific range.



Parameters for the "Required Properties" rule

Manual Discovery vs. Automated Search

You might think and hope that visual browsing and walking through the whole building model from corner to corner will expose what is missing. Theoretically, yes, this is possible however it would be very time consuming, most likely frustrating in the long run and the risk of human error is high. And let's face it; we have these unspotted problems in current designs every day. Obviously, the manual way does not seem to work. This will be much more efficient using a systematic reasoning based approach. Computer Aided Quality Assurance will consistently perform this task in a fraction of the time. Now, the user can focus on the most serious problems and communicate those to the design team.

The Deficiency Detection capability in Solibri Model Checker will significantly help find missing elements from the designs – as another leading innovation from Solibri. Incorporating this process in your workflow will definitely improve the quality and consistency of models.