

## Outstanding tools in ANSA and μETA - Model Comparison

### Introduction

Nowadays, the CAD and CAE models are becoming increasingly complex, while more changes and updates necessarily take place before the final model is ready for release. The need for fast and accurate comparison and matching of different versions of a model or even of different models is essential and renders the use of highly efficient pre-processing software more than demanding.

### The Tool

The new "compare" functionality in ANSA allows for the full comparison of two models to identify differences in geometry, attributes, solver-specific definitions, as well as connections.

The tool offers easy navigation through the comparison results with the aid of short-cuts and filters. Any information regarding the model is now fully available to the user; according to which, the model in use can be replaced or partially updated.

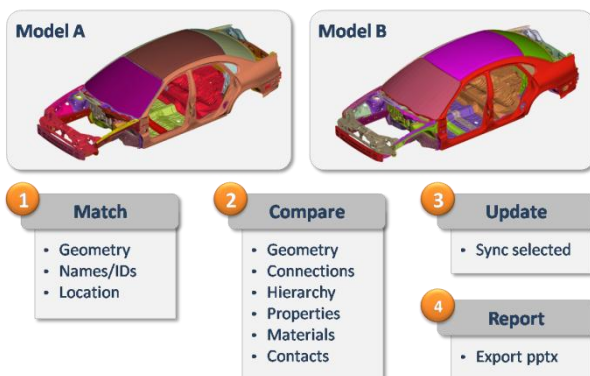


Figure 1: Model Comparison Workflow

Within the pre-processor, the engineer can have a quick overview of the differences between the models, by just browsing through a "clear-cut" comparison report. The comparison report window is split vertically in two panes, displaying information for the currently used entities in the left side and for the "incoming" entities in the right side.

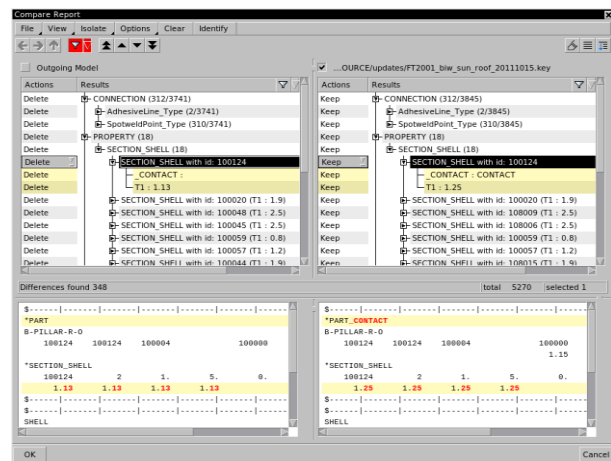


Figure 2: the Comparison Report

### Model Comparison Workflow

In order to compare two entities, they first need to be matched. The matching is performed according to specific criteria, such as the geometry, the module id, the name of ANSA parts/groups, the ids and names for solver entities (such as properties and materials), and the location for connections.

Unmatched entities, i.e. entities that exist only in one of the compared models, can be directly detected and isolated.

As displayed in Figure 3, geometric differences are highlighted in red or blue and can be previewed in exploded view or overlaid.

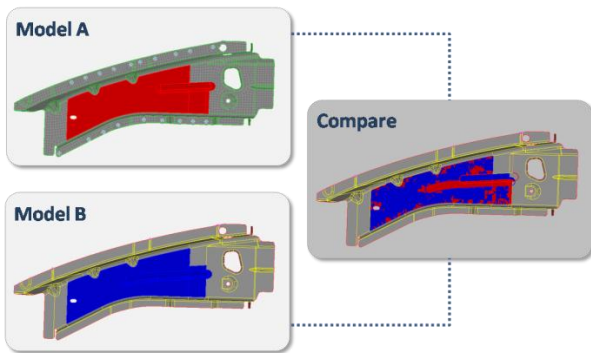


Figure 3: Comparison of geometric differences

When thousands of entities are required to be compared at once, the results are displayed clearly using color-coding to classify the differences. In this way a direct focus on those of interest is possible. Especially for connections, a color-coding display of their differences is available.



Figure 4: Comparison of connections

The rest of the entities can be compared on the basis of their characteristics, i.e. thickness, material id for materials, Young's modulus for properties, etc.

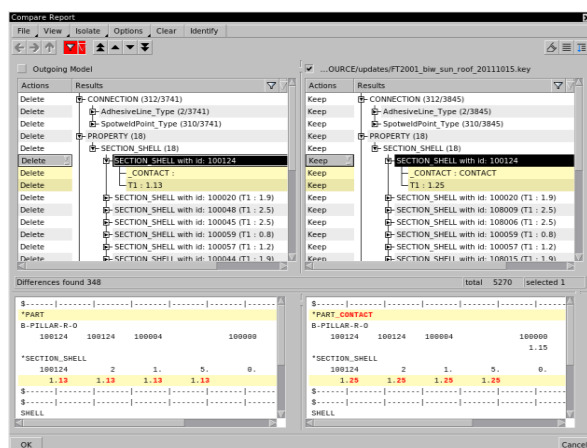


Figure 5: Comparison of solver entities

As displayed in Figure 5, for any solver entity the user can get a preview display of how this will be written out on output, with its differences highlighted as well.

### Browsing through the comparison results

One of the key features that make the ANSA Comparison Tool so powerful and easy to use is the easy navigation through the comparison results.

Specifically, the user can have direct access to a “pre-summary” of the detected differences on an entity-type basis. Through this interface, the differences concerning entities of interest can be selected and isolated.

Moreover, numerous "short-cut" options are also available in the comparison report for actions, such as the quick navigation to the next or previous difference, and the direct isolation and display of matched or unmatched items.

Additionally Pre-set filters can be applied to isolate differences between parts and properties.

Each case requires a different comparison report. The option to organize the comparison reports differently, according to the case, is available. For example, for a comparison on model hierarchy basis, the report can be viewed in a hierarchical list, according to the parts/groups structure. In this view mode, all entities are reported under the part they belong to.

Alternatively, for comparison on entity type basis, the report can be viewed in a "flat" list. In this view mode, all entities are organized per type.

The user can easily switch between these two modes at any given time via a toggle button.

### Updating the model after the comparison

By default, by confirmation in the Compare Report window all matched incoming entities will be kept and will replace all their outgoing

matches. Furthermore, unmatched incoming and outgoing entities will also be kept. All these actions are displayed in the Actions column, where the user has the ability to intervene in the default behavior by modifying the actions to be taken on confirmation.

### **The Advantages**

The quick comparison setup and its direct association with the drawing area make Model Comparison in ANSA very handy as a procedure. Moreover, the identification of geometry, connections, and FE-attributes differences that are not detectable by the eye, as well as the ability for direct update of the

model after the comparison, are integrated in the pre-processor, ensuring a radical cut-down on errors in the final results.

### **Conclusion**

ANSA Model Comparison tools through their key features and the advantages not only provide the engineers with a means for typical comparison cases, but are also a vehicle for the improvement and the acceleration of the overall CAE process.

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