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5th ANSA & µETA INTERNATIONAL CONFERENCE

Safety Model-Build Process using TC-ANSA Integration

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OVERVIEW OF THE TC-ANSA INTEGRATION

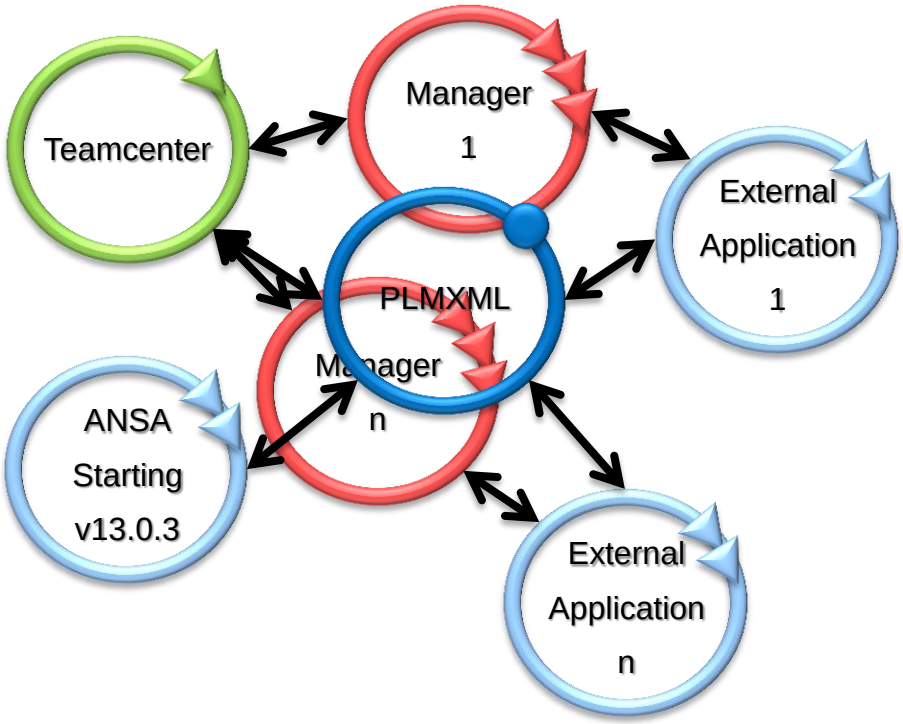
Overview of the TC-ANSA Integration

PLMXML Format

- The communication between Teamcenter and external applications (e.g. pre-processor, solver, scripts, etc…) is done via the PLMXML format.

Advantages

- Same format is used independently of the external application used
- Teamcenter and external applications can be released independently
- Constant PLMXML format
- No customization of Teamcenter



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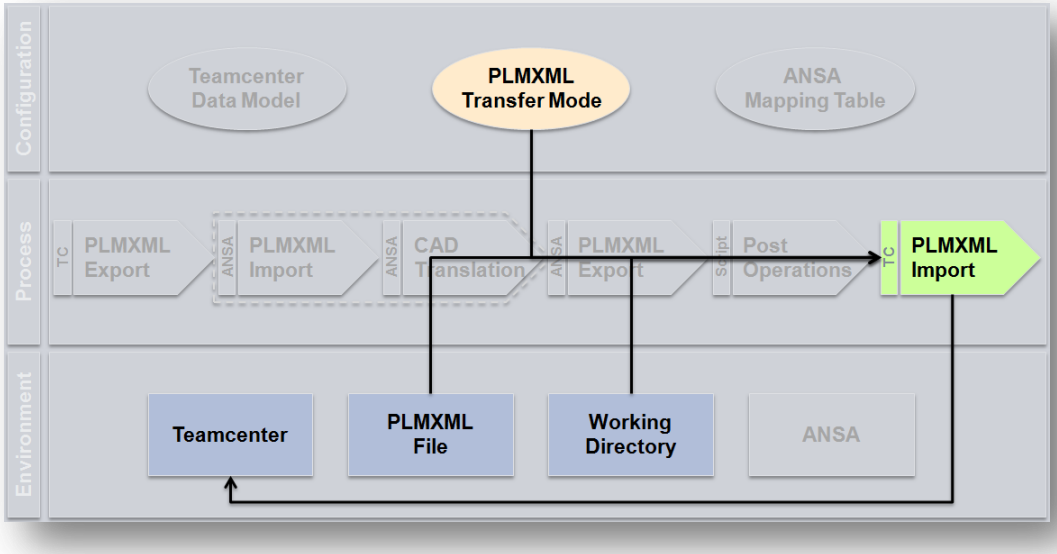
Overview of the TC-ANSA Integration

Solution Elements

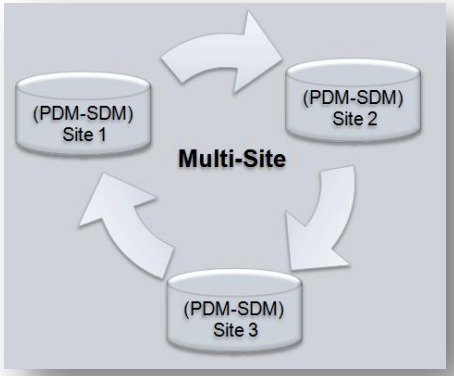
- The process can be fully automated, or the user can start manually each process independently either from Teamcenter or from the working directory.
- The same process is applied for all use cases (e.g. batch meshing, CAD translation, mesh assembly, connections,…)
- The ANSA-PLMXML Import and ANSA-CAD Translation processes are one unique process step.
- The ANSA Mapping Table contains the data model mapping definition.

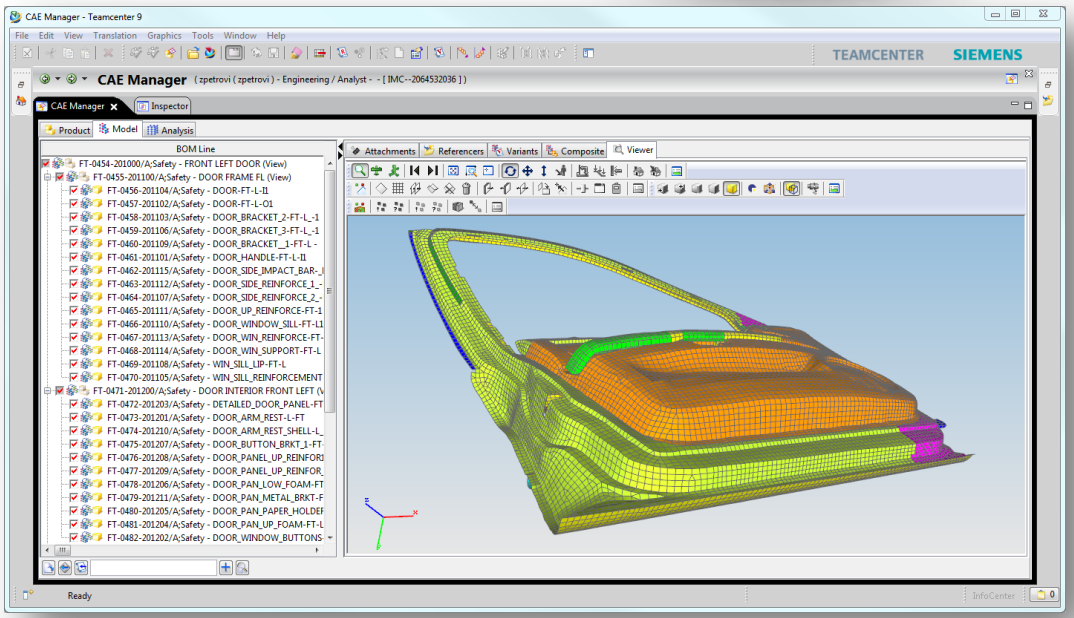


Overview of the TC-ANSA Integration

Tasks realized in Teamcenter

- Create & configure CAE Structure
- Maintain relationships to the source data
- Manage CAE Engineering Properties
- Control read & write accesses
- Enable reuse of data
- Support data exchange (e.g. multi-site, suppliers)
- …





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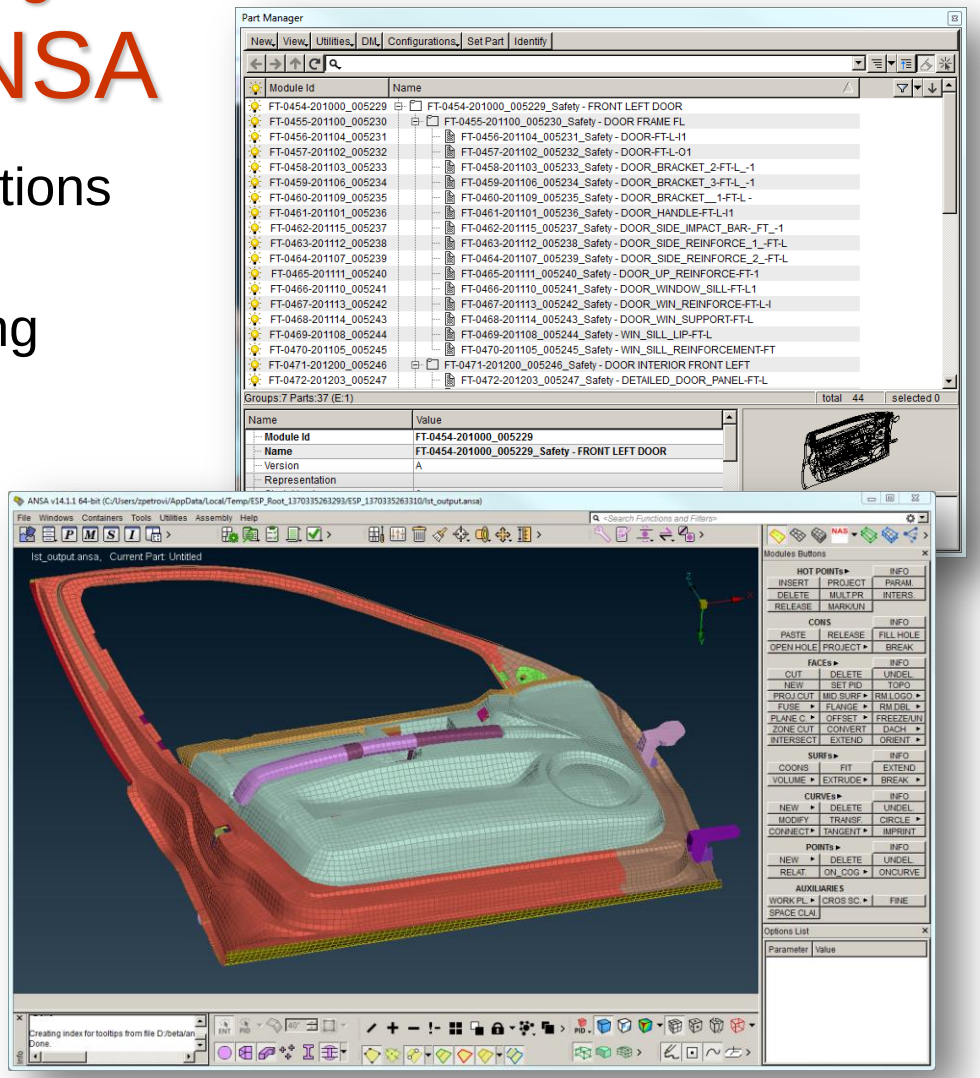
Overview of the TC-ANSA Integration

Tasks realized in ANSA

- Import CAE Structure, apply positions and process instances
- Apply & manage CAE Engineering Properties
- Translate CAD geometries (directly processed during PLMXML import)
- Create and modify meshes
- Define & realize connections

- **Tasks not realized in ANSA**
  - Changes in CAE Structure

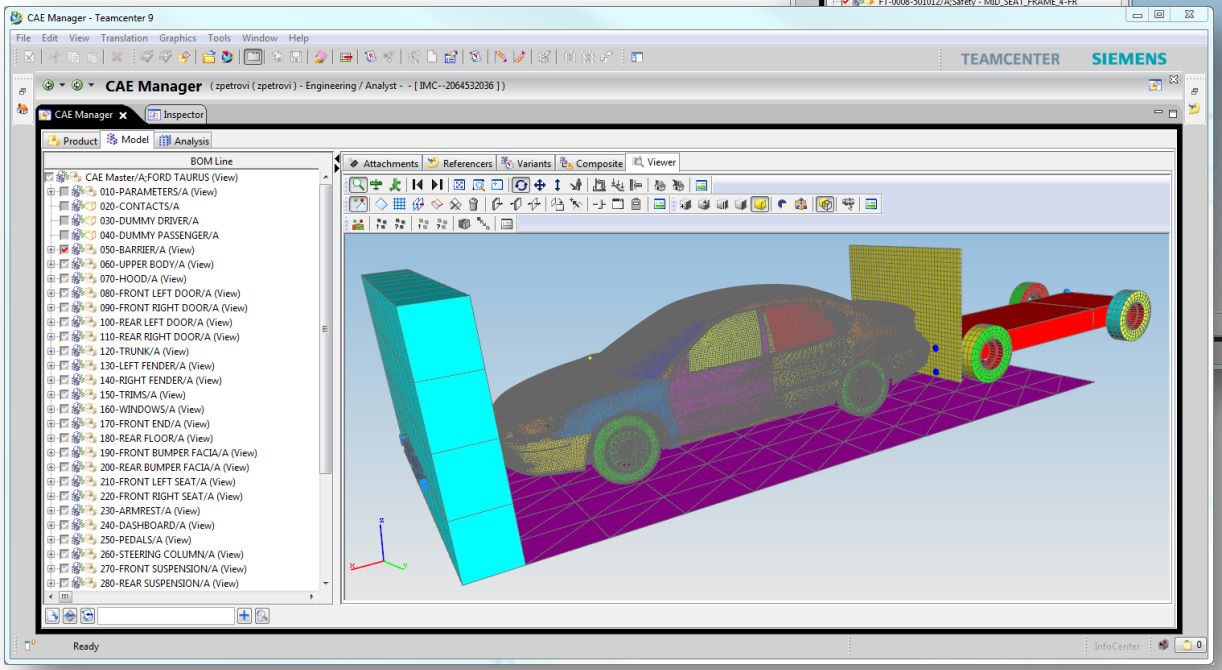


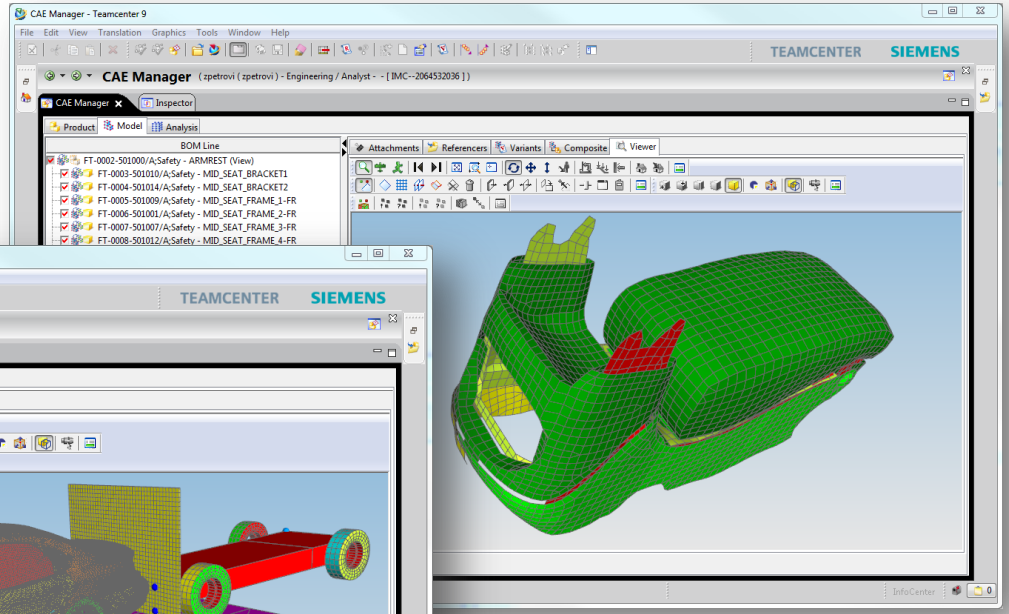
MODEL BUILD USE CASE

Model Build Use Case

Load Context in Teamcenter

- Before sending the data to ANSA, the user loads first the context he wants to work on.
  - The context can be everything between a component and the whole CAE Structure





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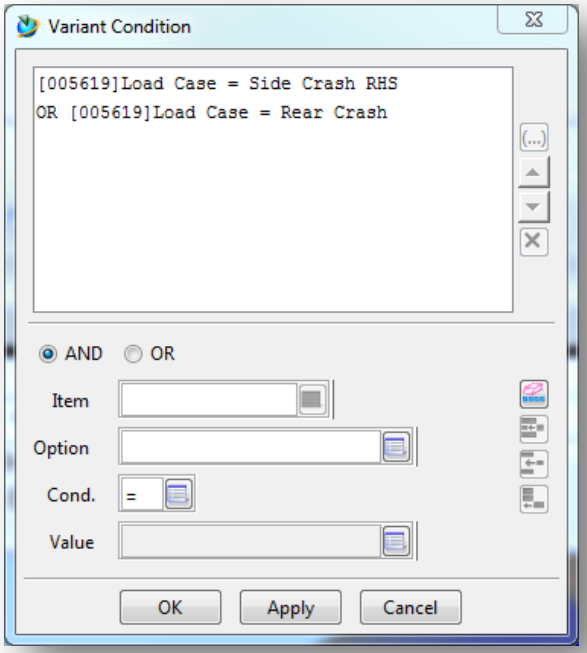
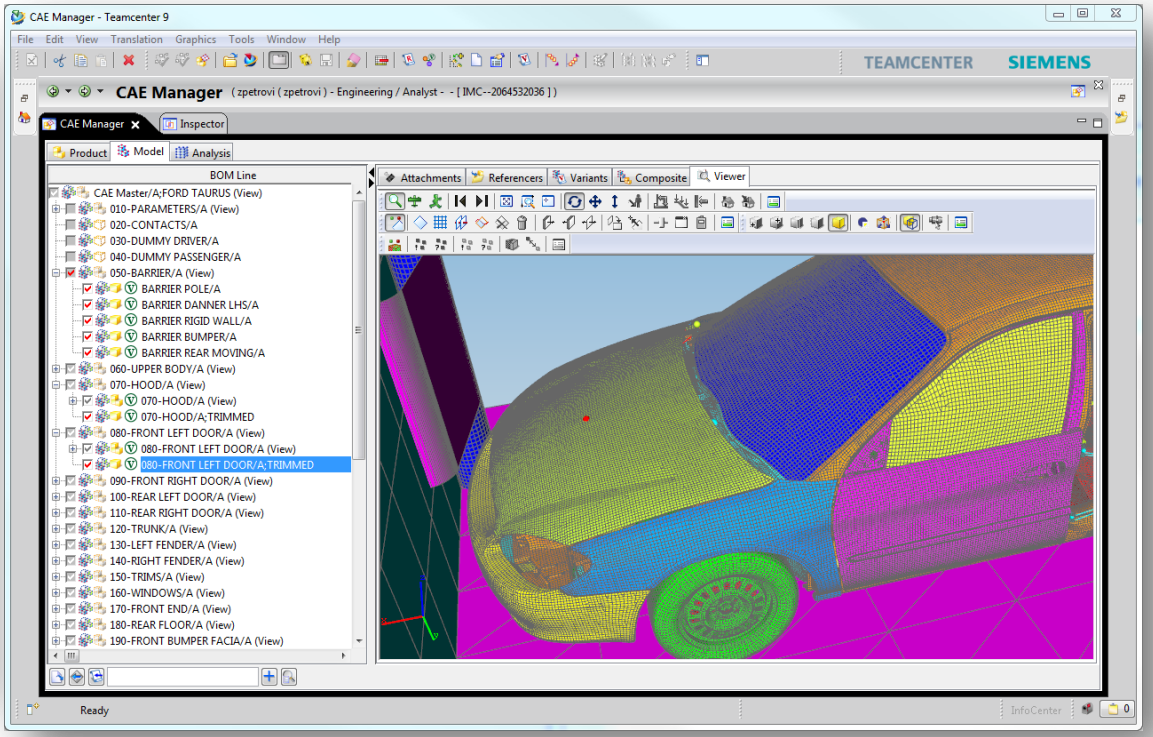
Model Build Use Case

Configure Context in Teamcenter

- The CAE Structure can be configured using Variant and Revision Rules
- The Variant Rule helps the user to get the right components were as the Revision Rule is used to choose the correct version of them.





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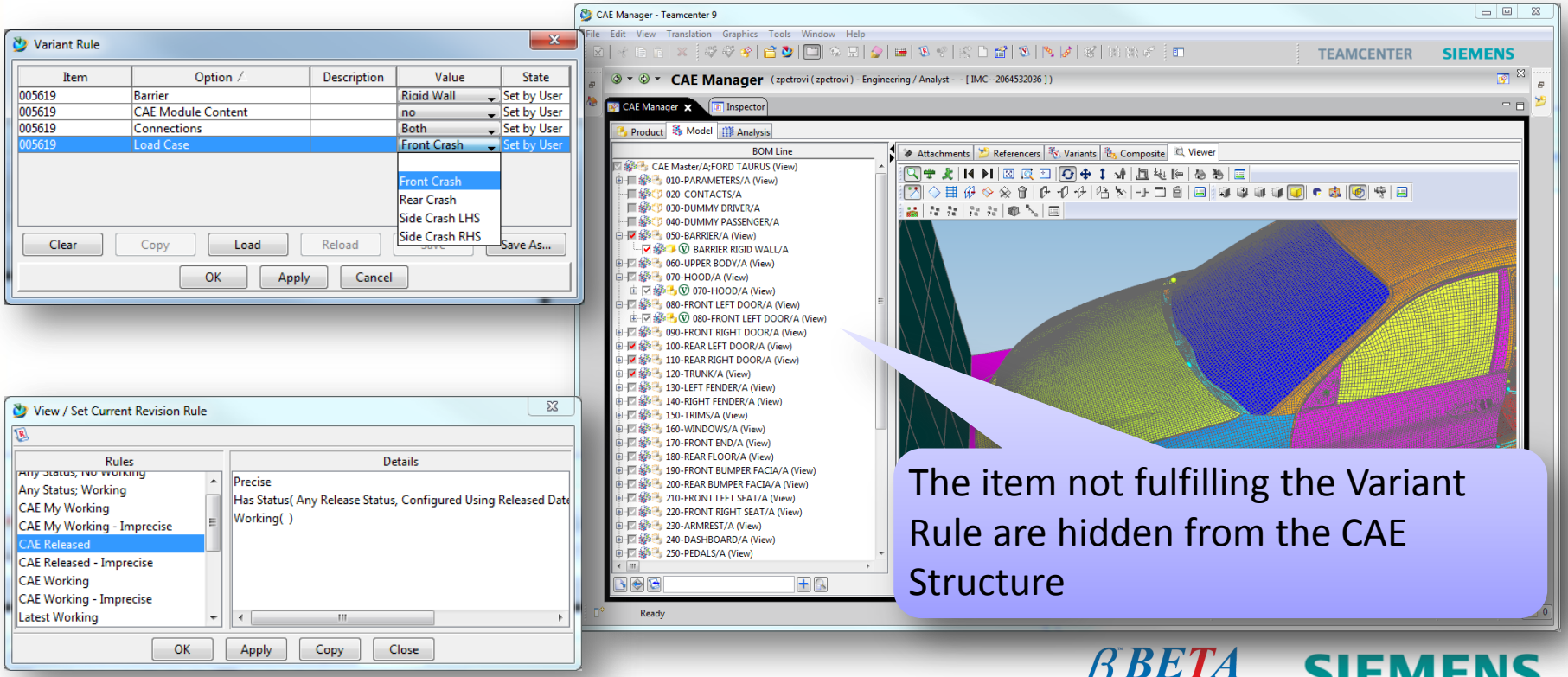

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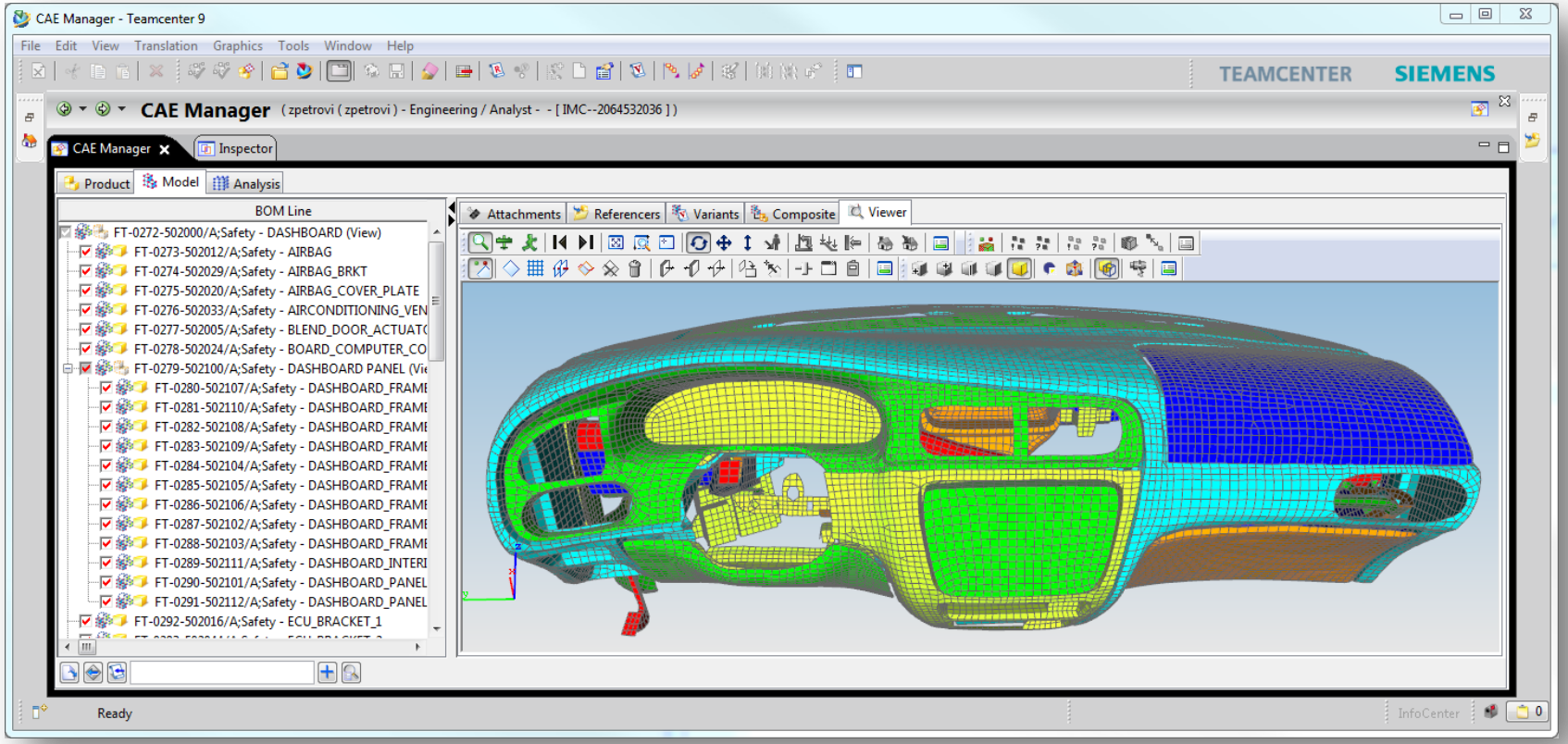
Model Build Use Case

Define Working Context in Teamcenter

- The number of items to be sent to ANSA can even be reduced by selecting only the data required for the meshing task.



Without Selection

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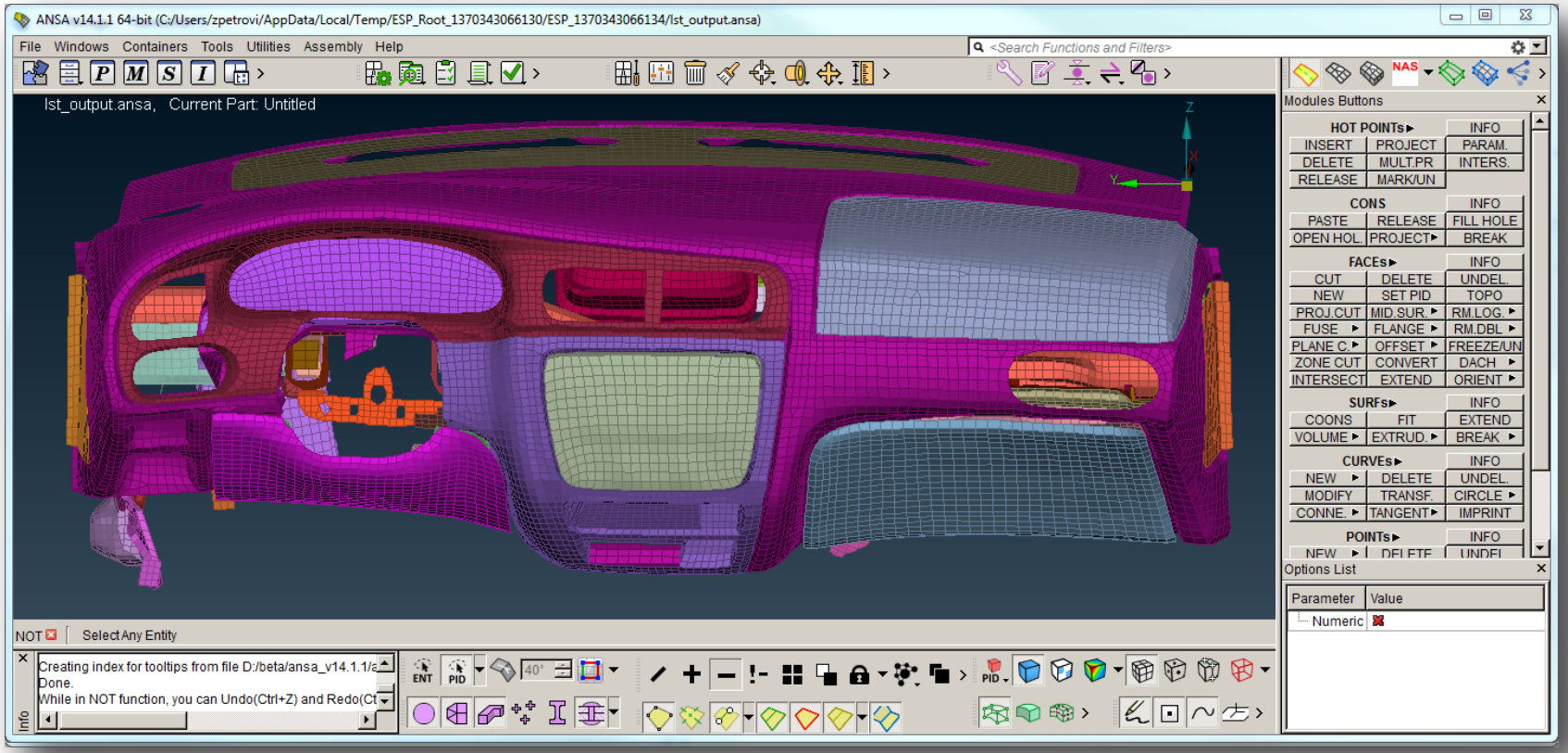

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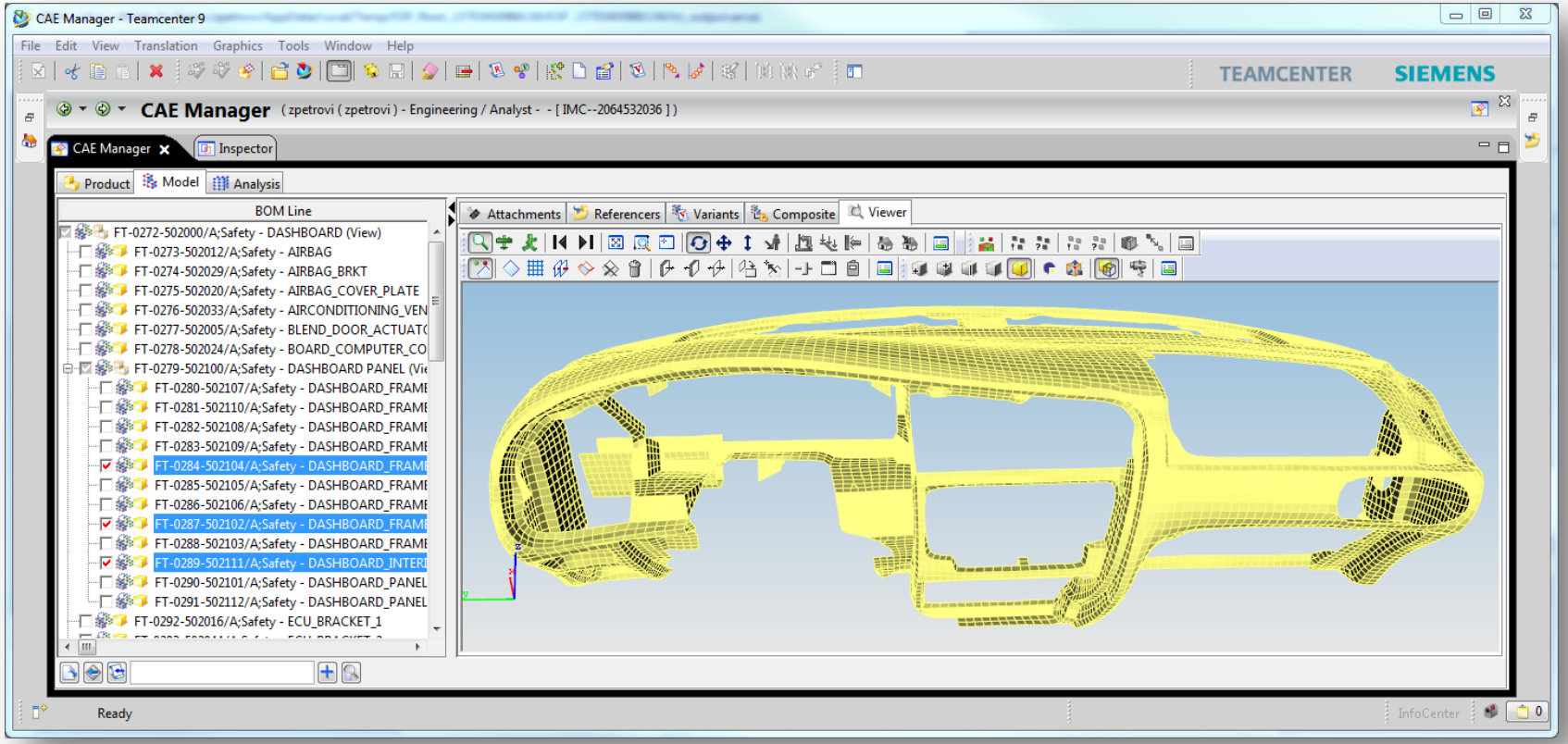

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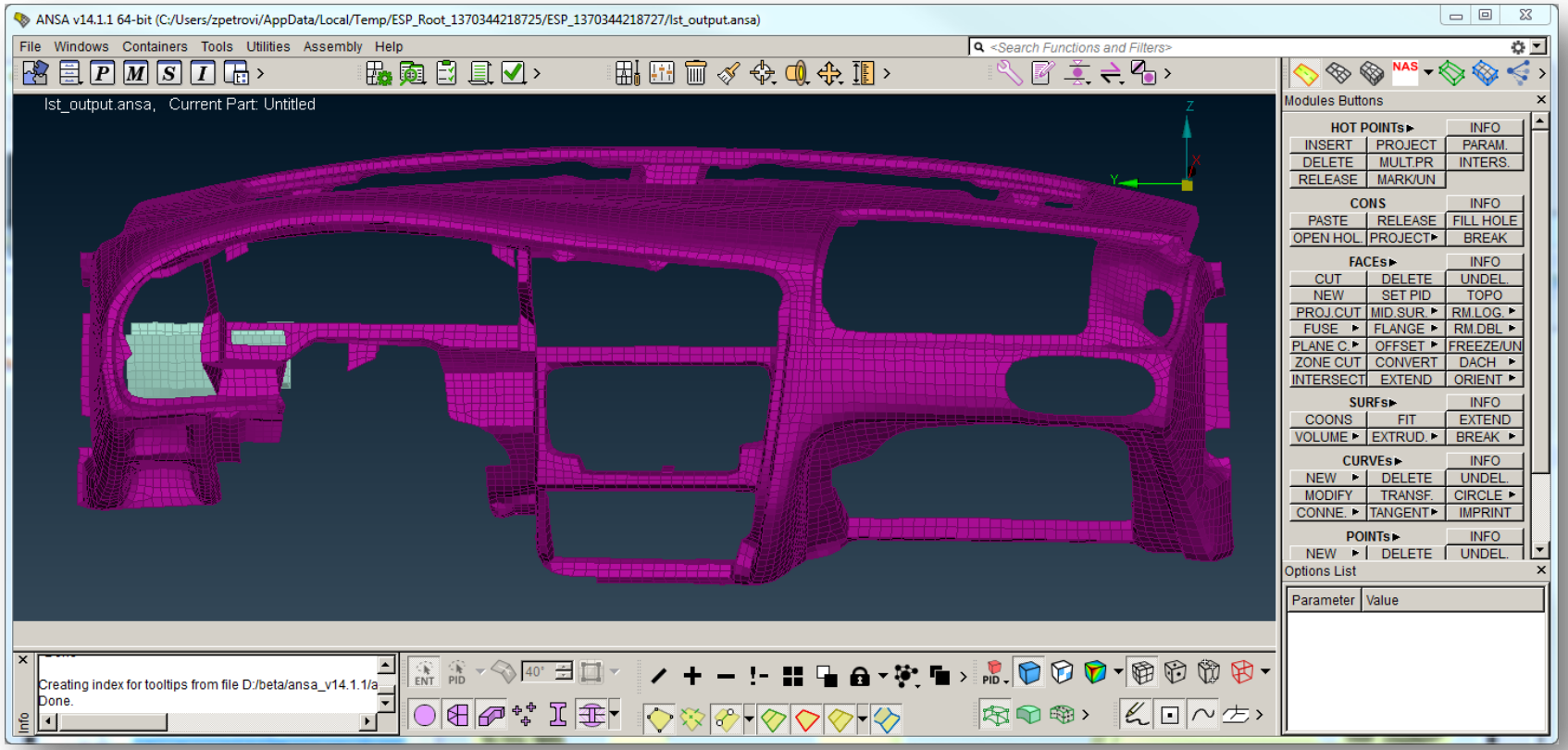

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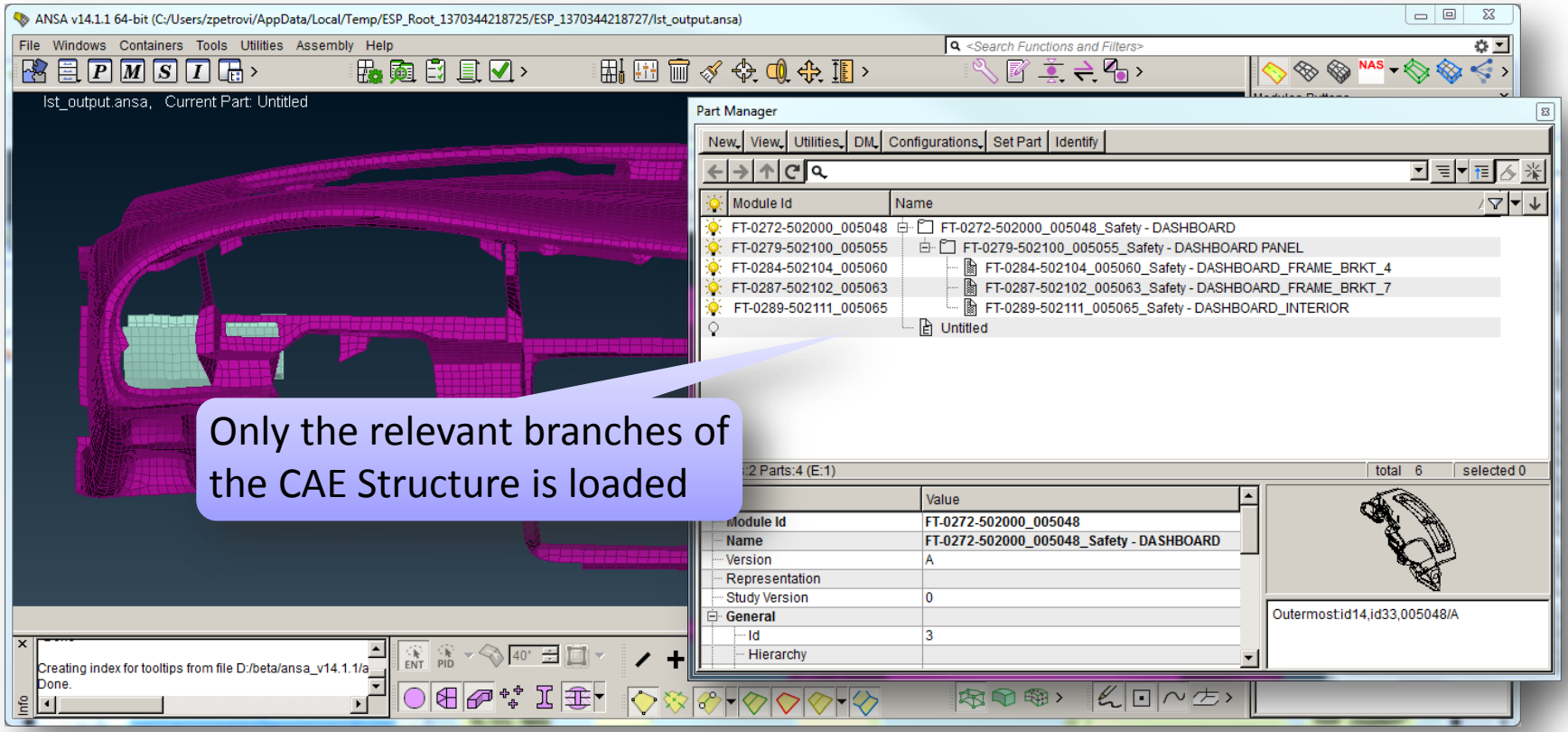

With Selection

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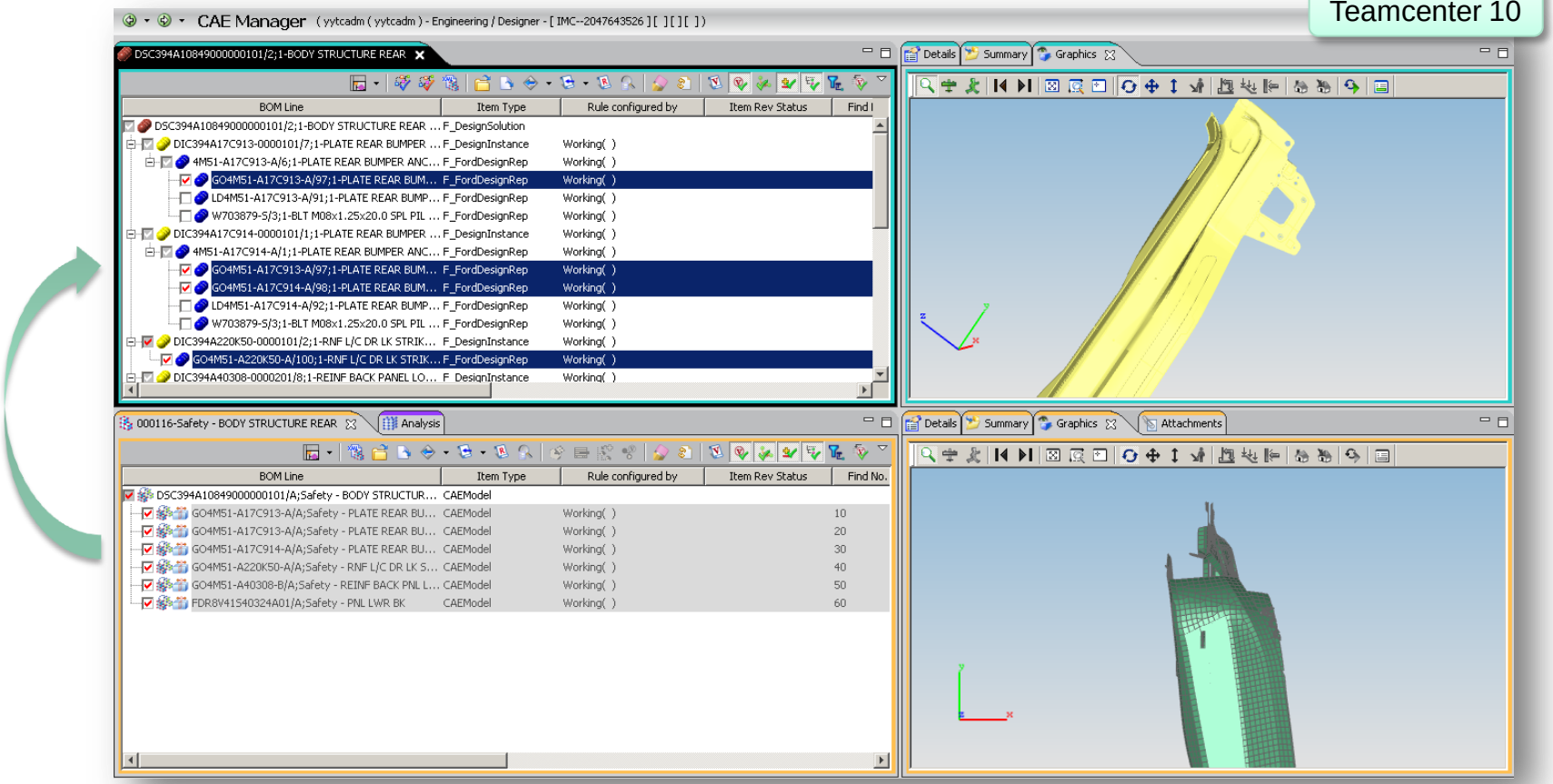
Model Build Use Case

Define Working Context in Teamcenter

- In Teamcenter, the item selection can also be automated

Teamcenter 10



Example 1: selection from related CAE Items/Product Items

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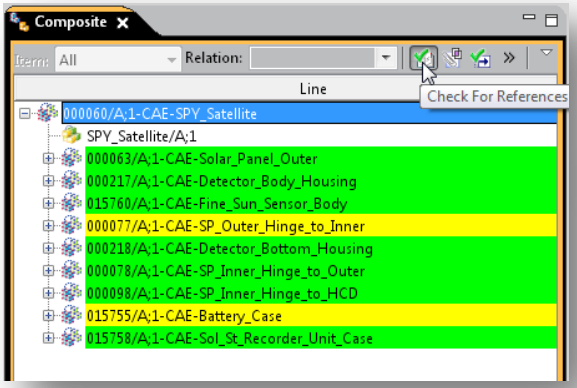
Model Build Use Case

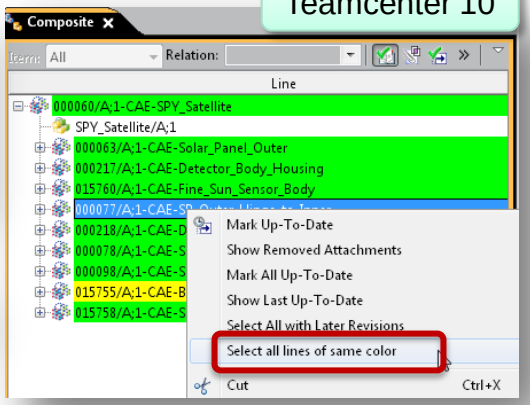
Define Working Context in Teamcenter

- In Teamcenter, the item selection can also be automated

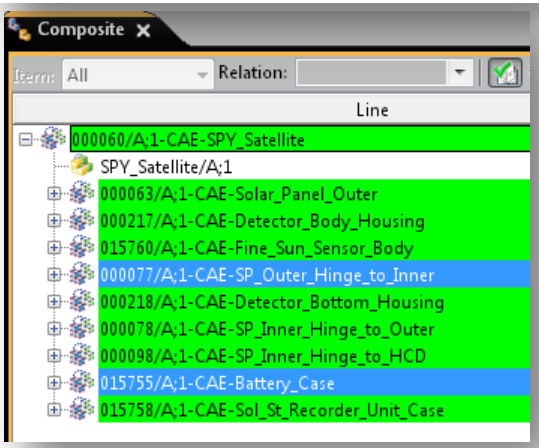


1. Check for References – to see if any of the product components have new or different revisions. System presents the results.

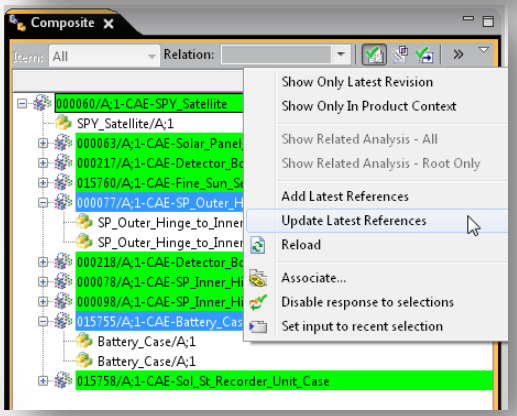
Teamcenter 10



2. User want to select all models color coded in Yellow (which have different product IRs), based on color coding



3. System highlights bomlines with same color



4. User performs a follow-up action (e.g. update CAE Structure and send the selected item to ANSA)

Example 2: selection by color

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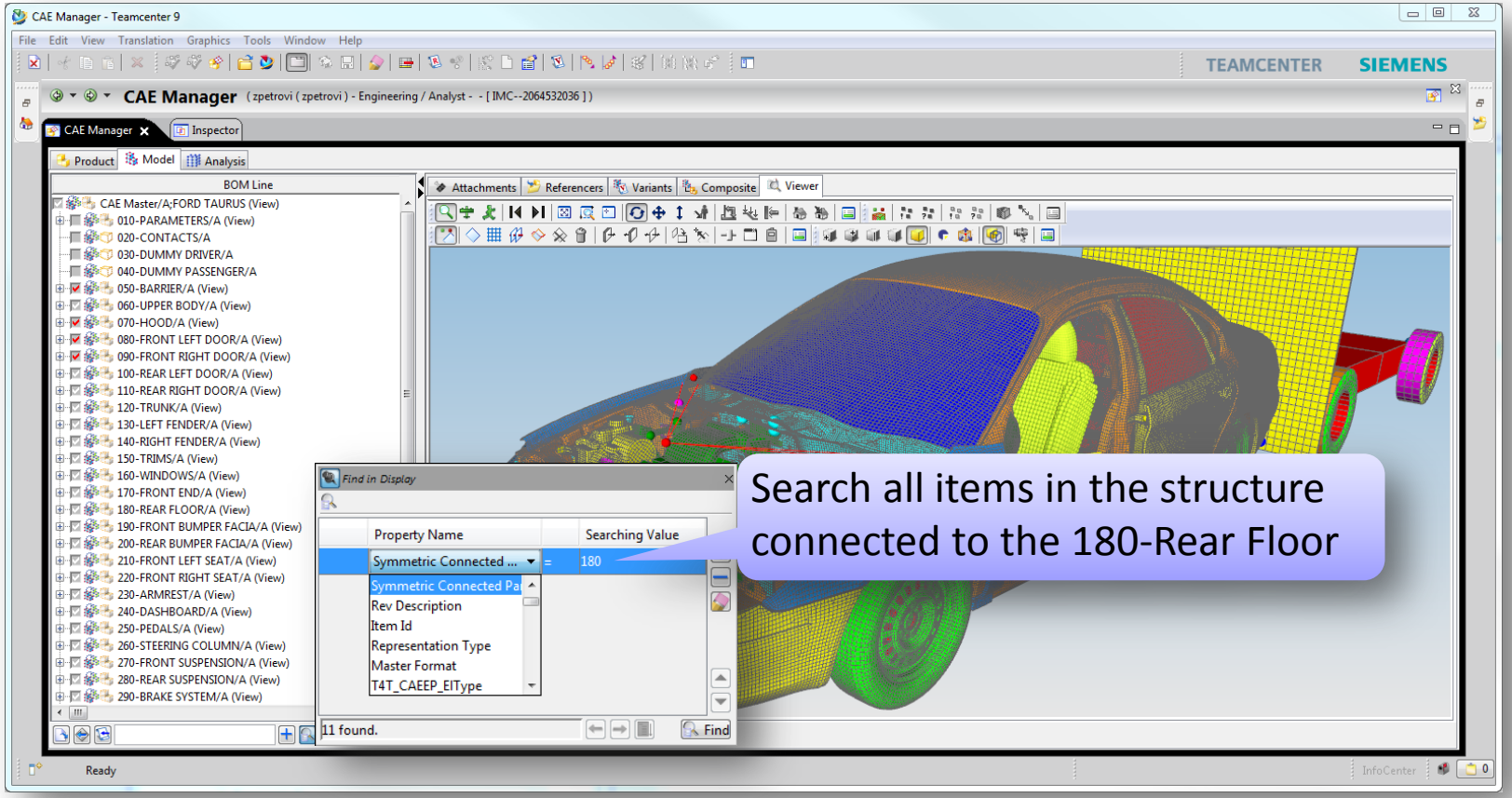
Model Build Use Case

Define Working Context in Teamcenter

- In Teamcenter, the item selection can also be automated



Example 3: selection based on attribute values (e.g. connected parts)

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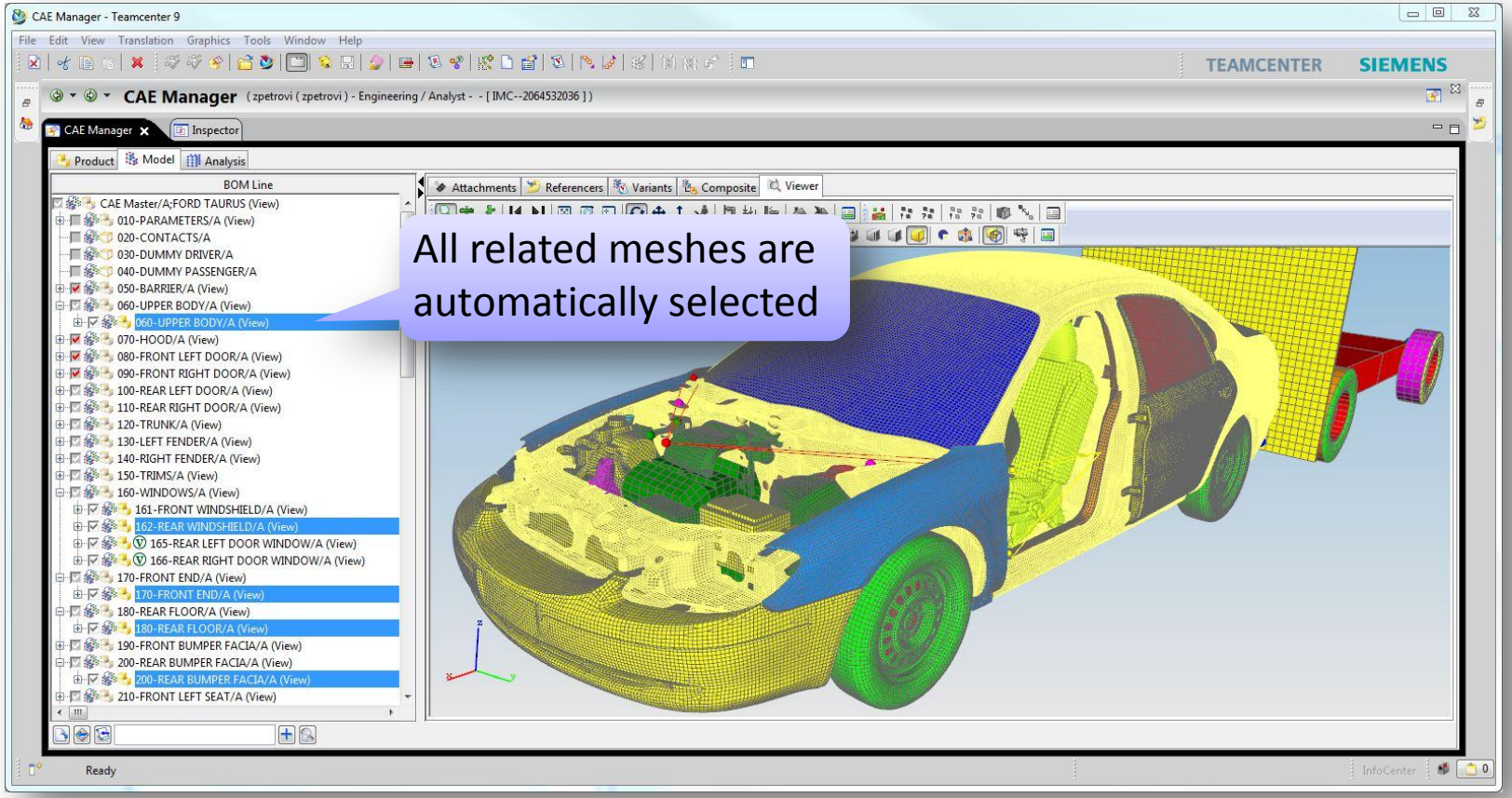

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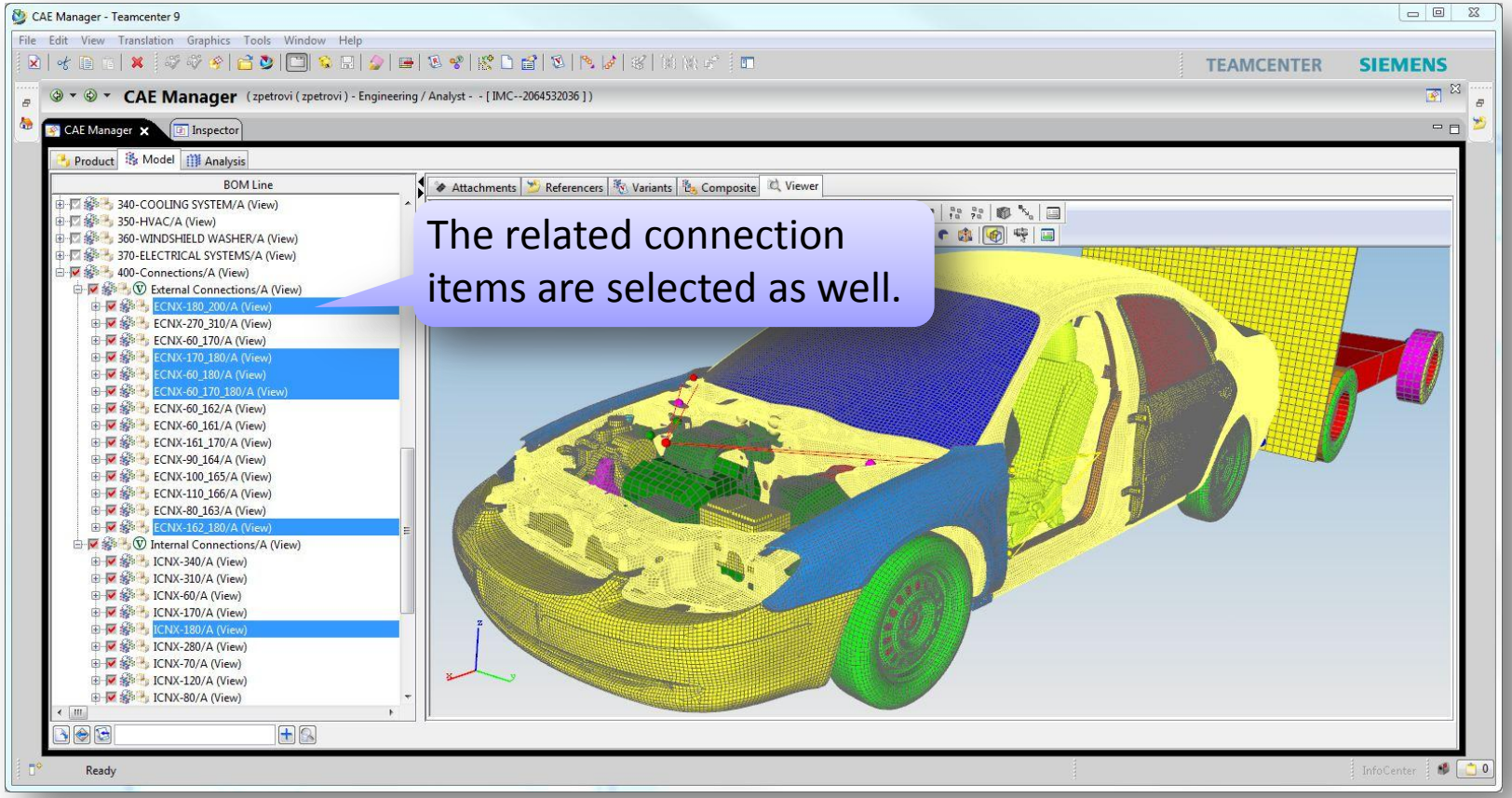

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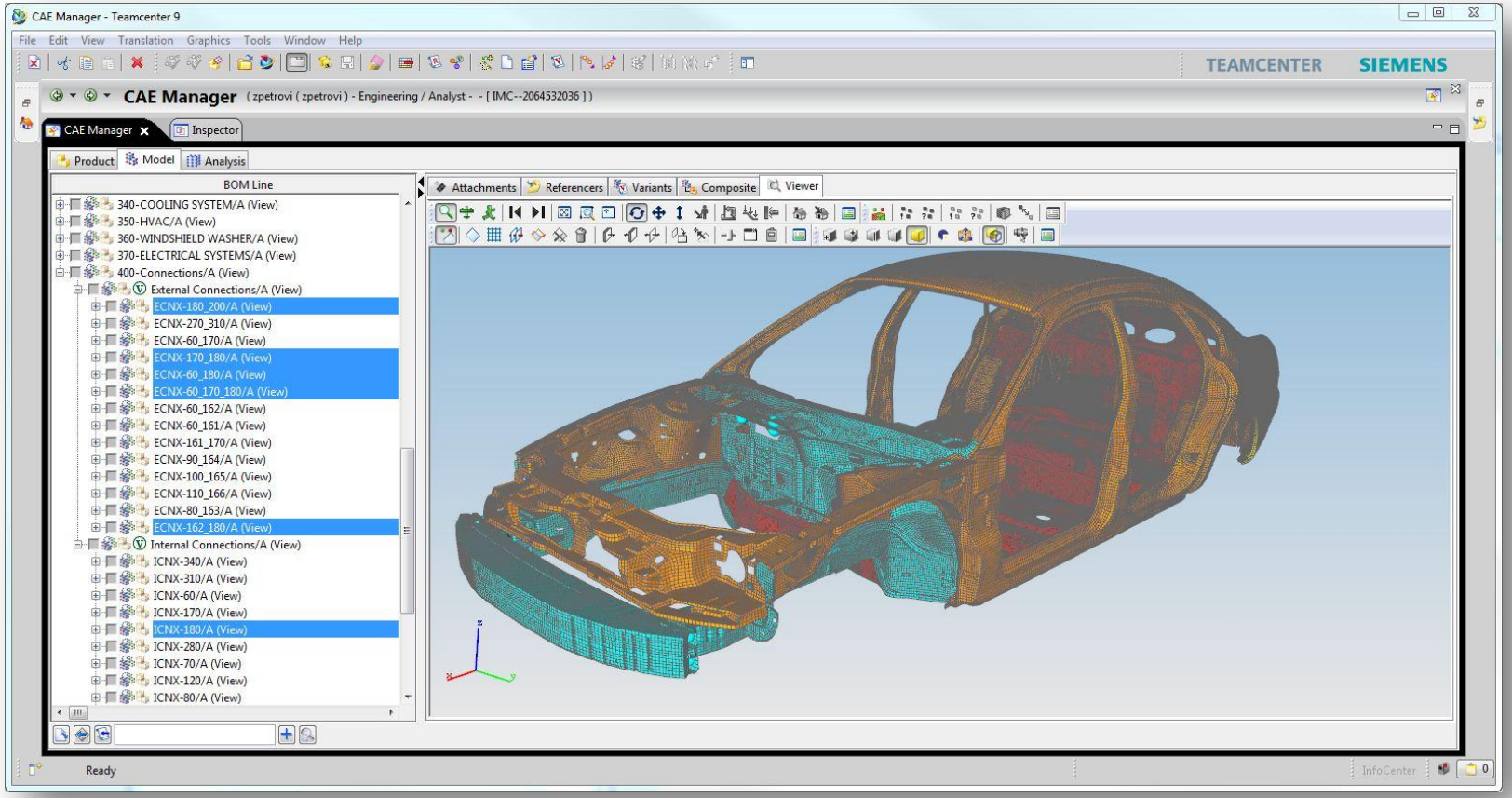

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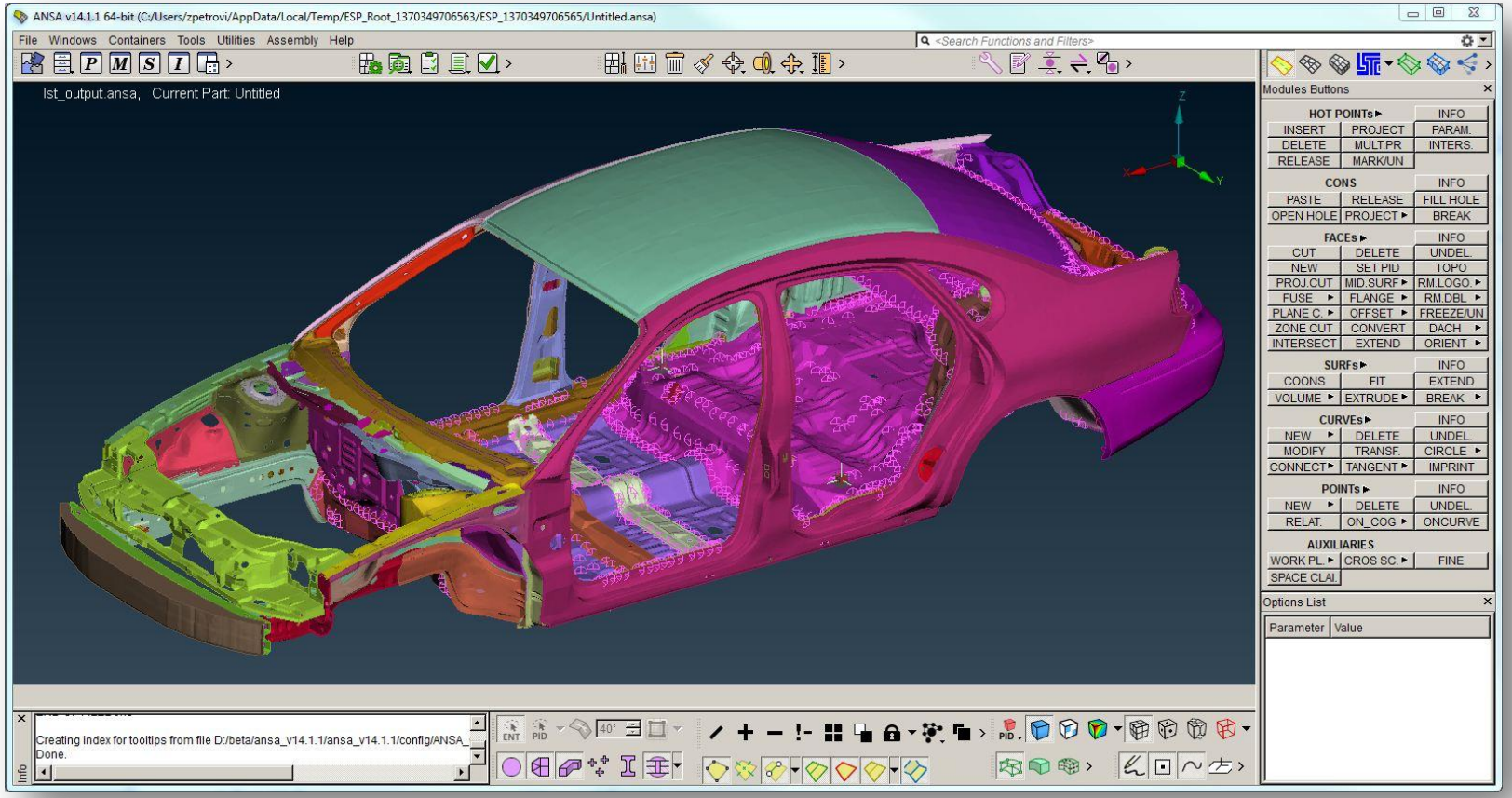

Example 3: selection based on attribute values (e.g. connected parts)

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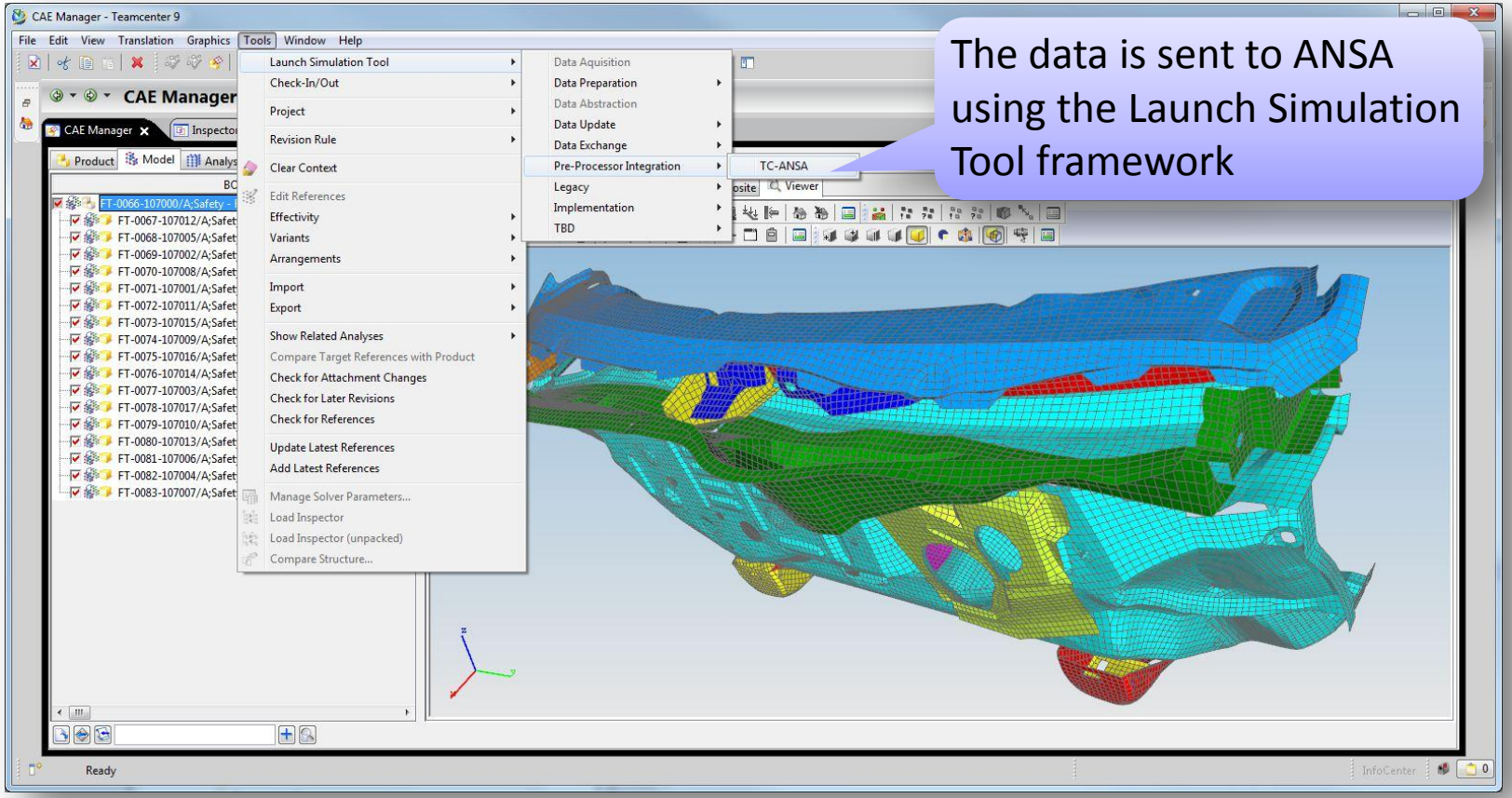
Model Build Use Case

Send Context to ANSA

- The data can be sent to ANSA synchronously or asynchronously



Synchronous method: Launch Simulation Tool framework

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Model Build Use Case

Send Context to ANSA

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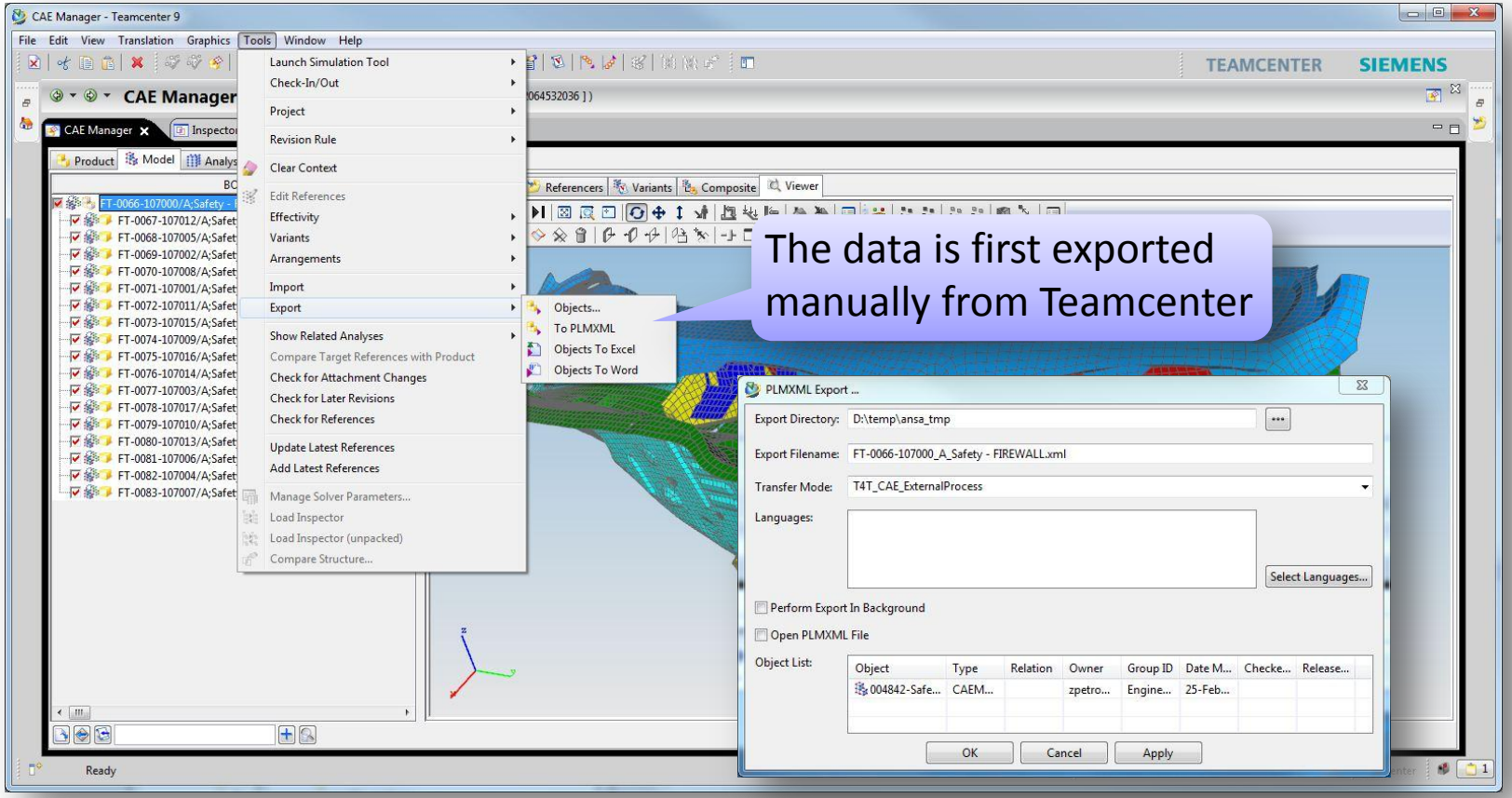

Asynchronous method

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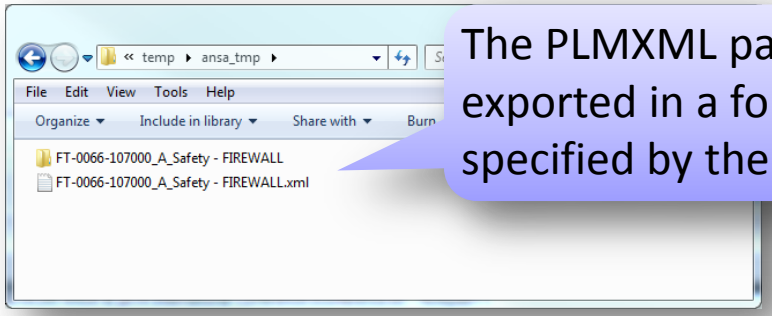
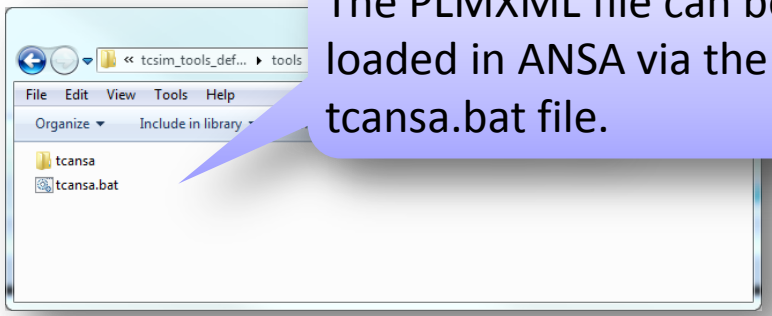
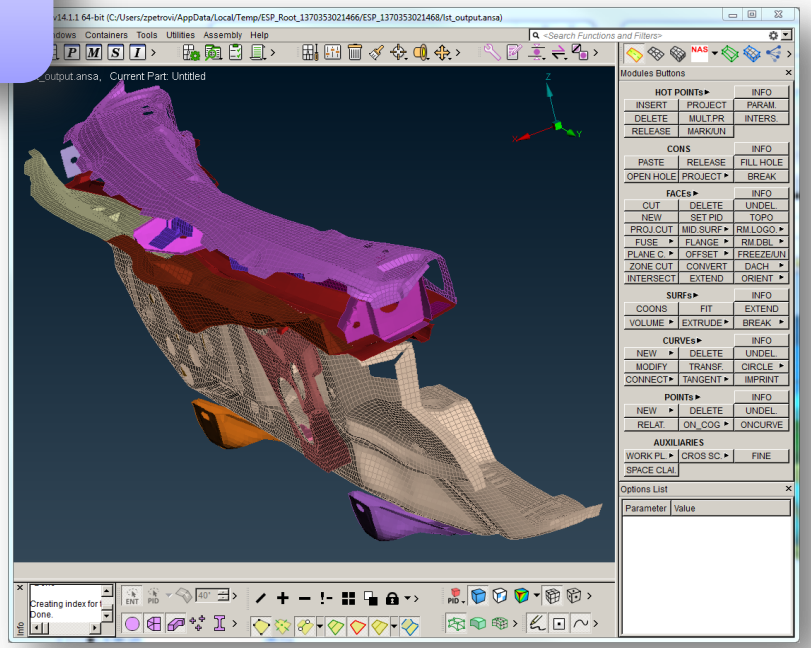


The PLMXML package is exported in a folder specified by the user



The PLMXML file can be loaded in ANSA via the tcansa.bat file.



Asynchronous method

Model Build Use Case

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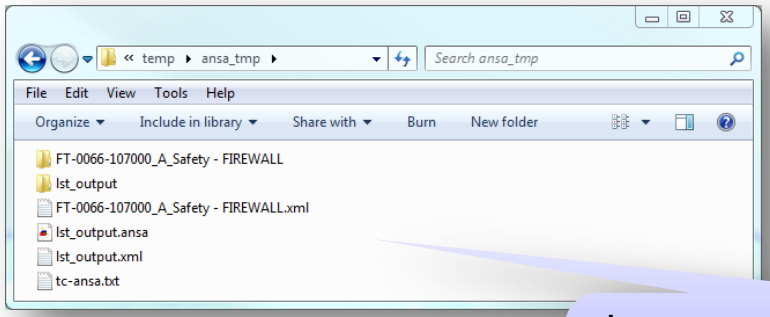
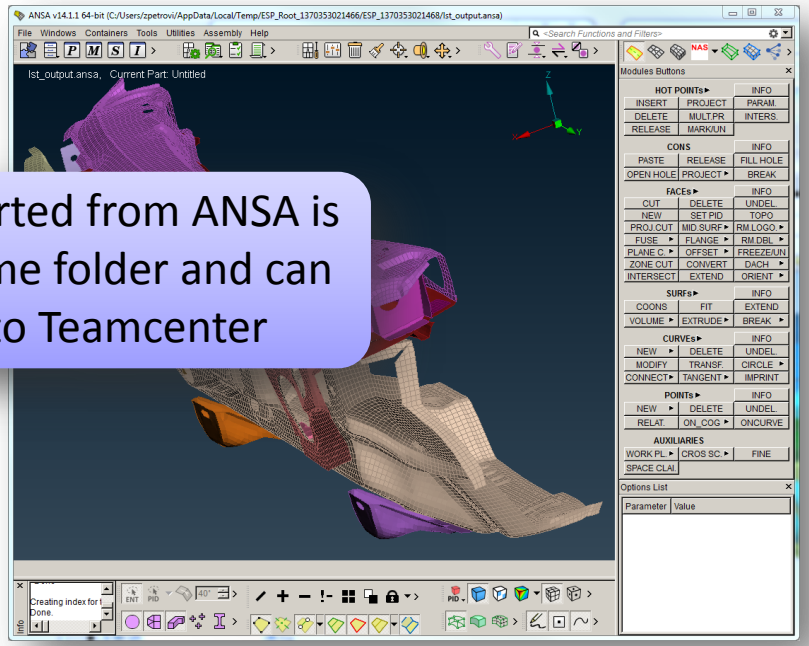
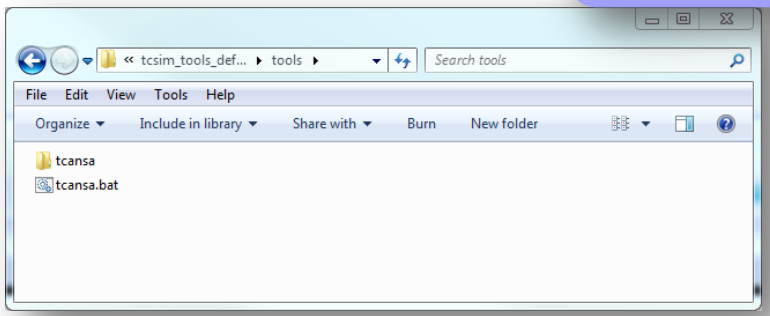




The PLMXML exported from ANSA is available in the same folder and can be imported back to Teamcenter



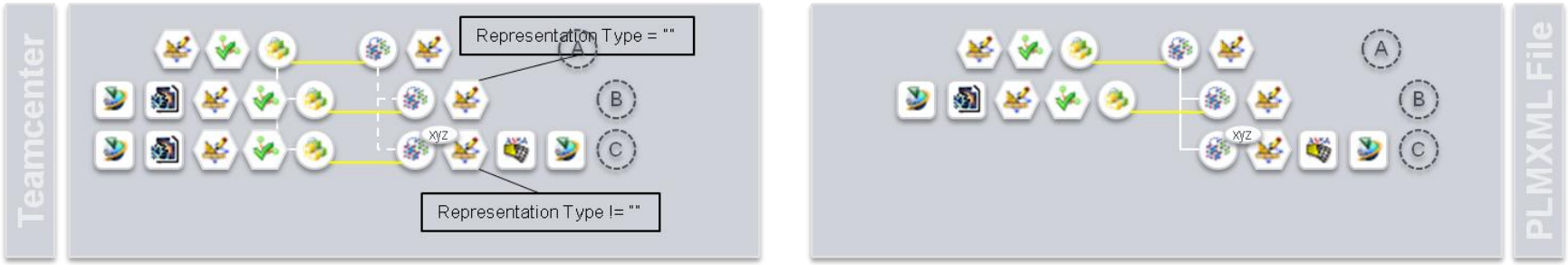
Asynchronous method

Model Build Use Case

Send Context to ANSA

- The PLMXML transfer mode used to export the PLMXML file out of Teamcenter is also trying to reduce the amount of data to be provided to ANSA based on two attributes.

Case 1: “export only the CAD datasets if the CAE Model revision contains no representation”



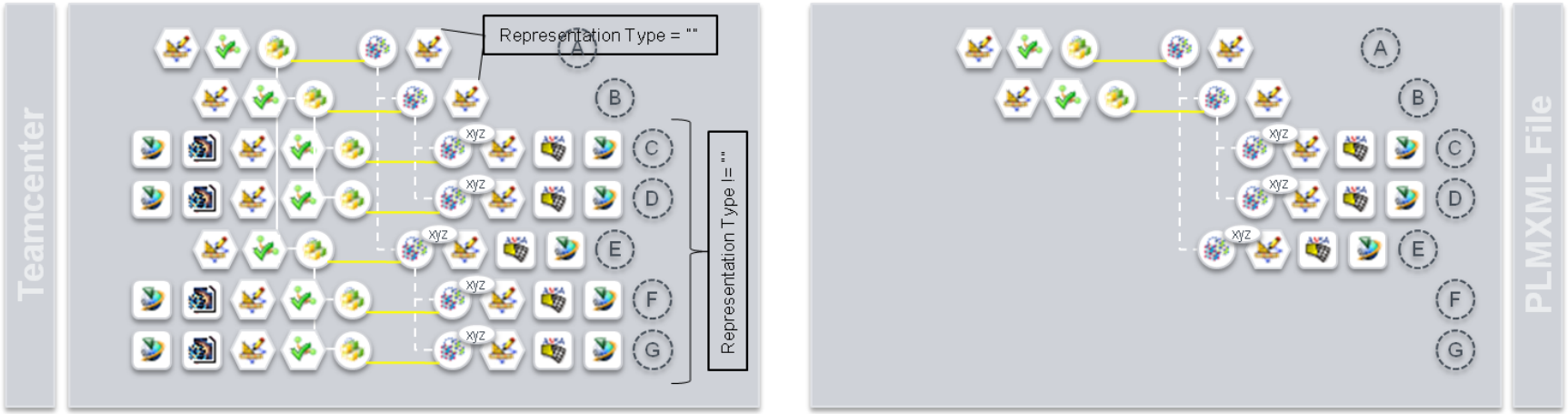
Representation Type attribute

Model Build Use Case

Send Context to ANSA

- The PLMXML transfer mode used to export the PLMXML file out of Teamcenter is also trying to reduce the amount of data to be provided to ANSA based on two attributes.

Case 2: “stop parsing a CAE structure branch once a representation is found”



Representation Type attribute

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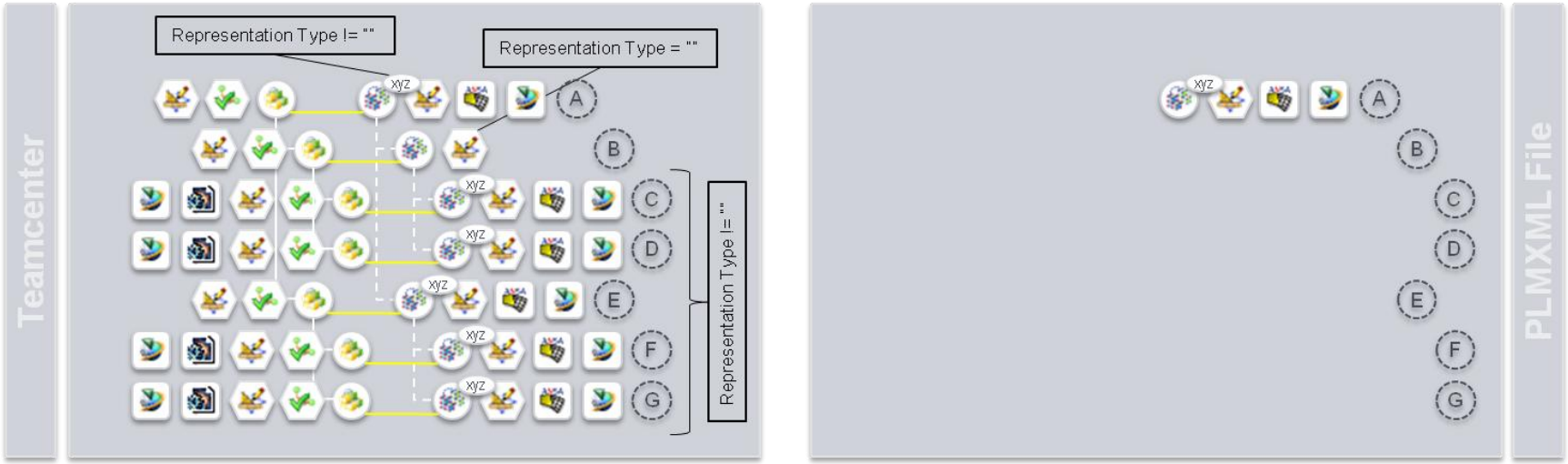

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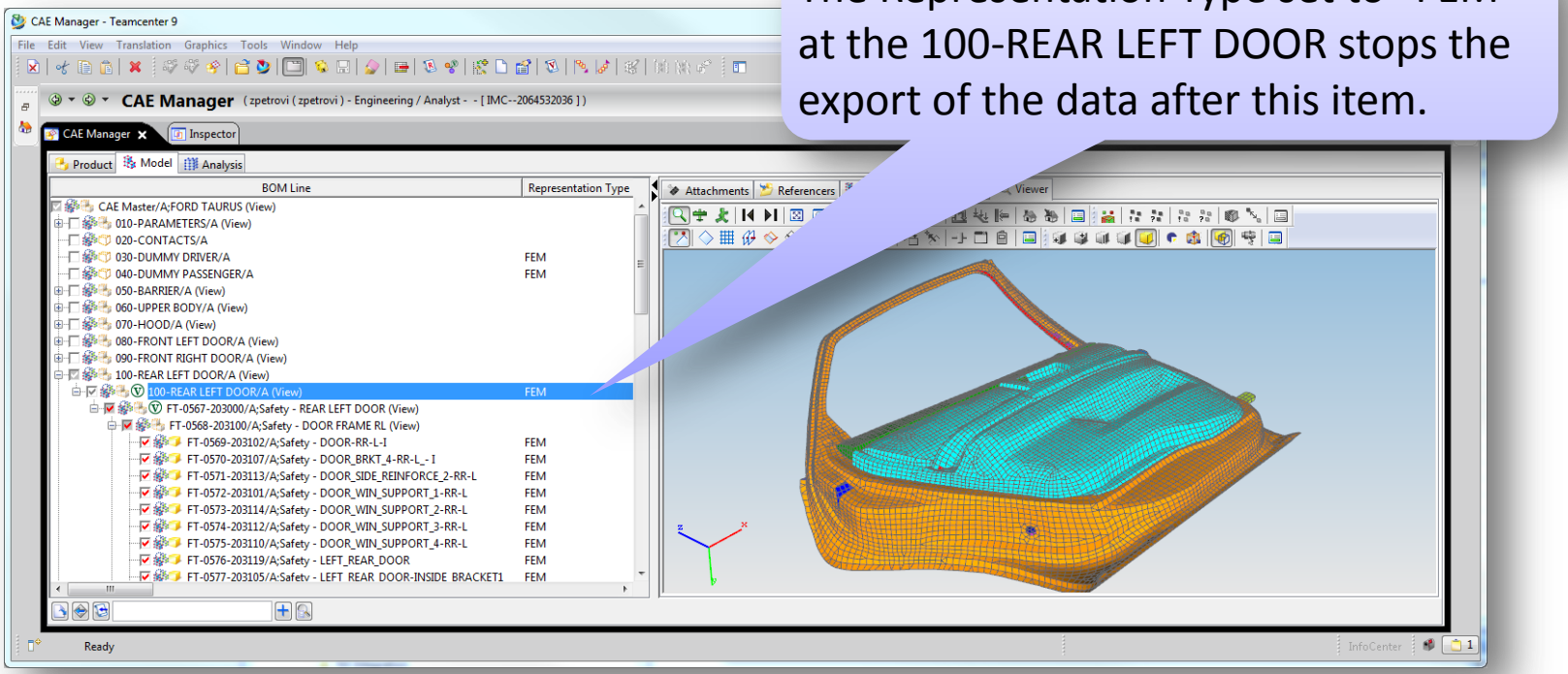

Representation Type attribute

Model Build Use Case

Send Context to ANSA

- The PLMXML transfer mode used to export the PLMXML file out of Teamcenter is also trying to reduce the amount of data to be provided to ANSA based on two attributes.
  - The user can modify manually the value of the Representation Type attribute to influence the PLMXML export process (e.g. re-mesh a component).
  - ANSA assigns the Representation Type value to the CAE Model item revisions during the ANSA-PLMXML export.

Representation Type attribute

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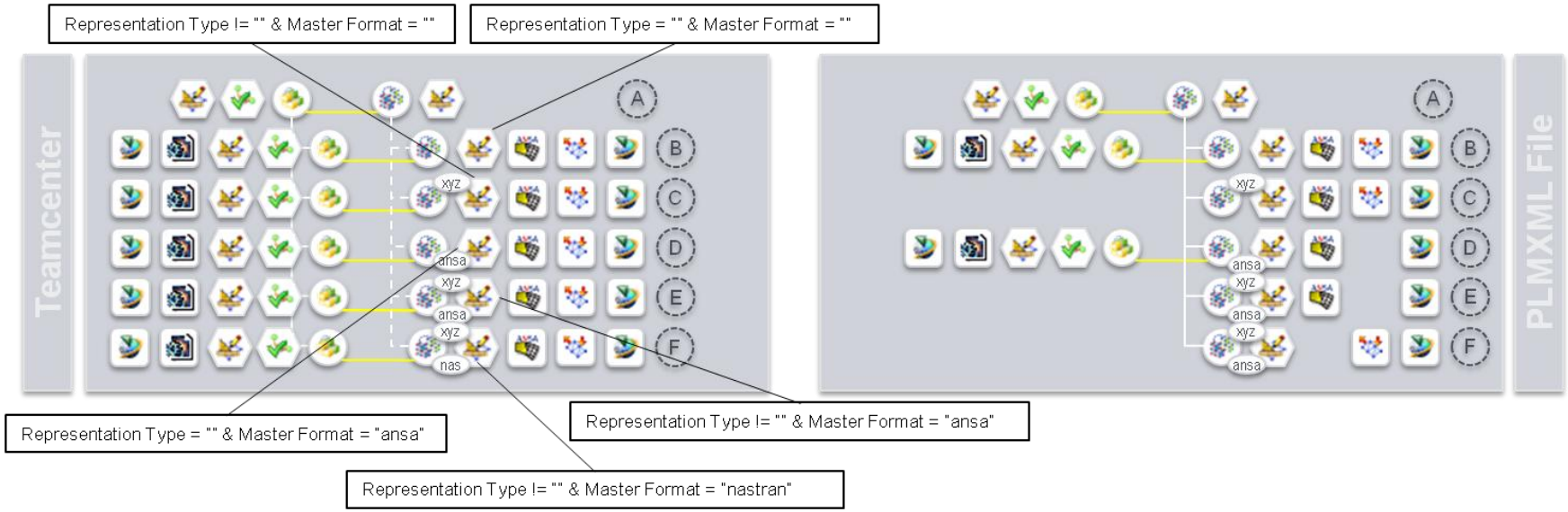
Case 1: “export only specified representation formats”



Master Format attribute

Model Build Use Case

Send Context to ANSA

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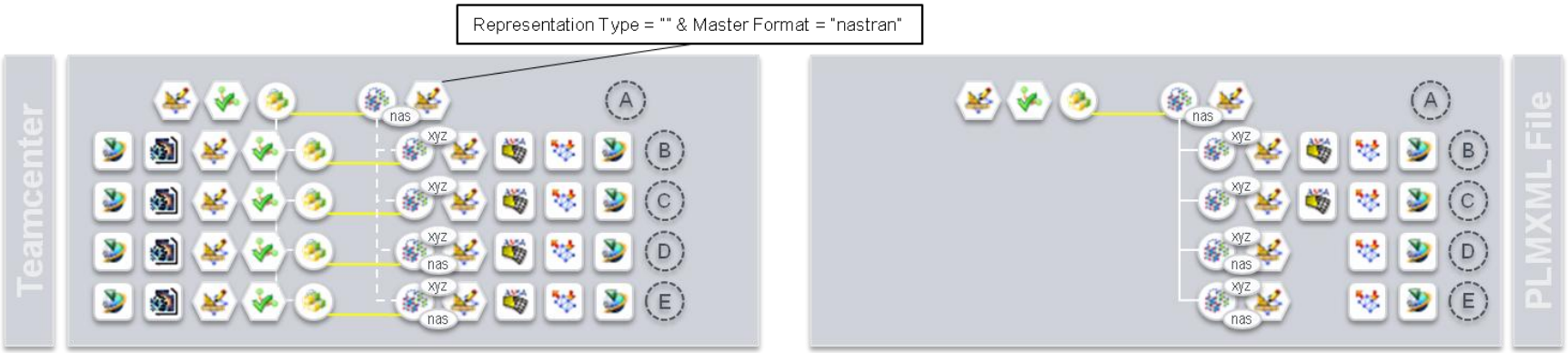
Case 2: “assemble a specific format”



Master Format attribute

Model Build Use Case

Send Context to ANSA

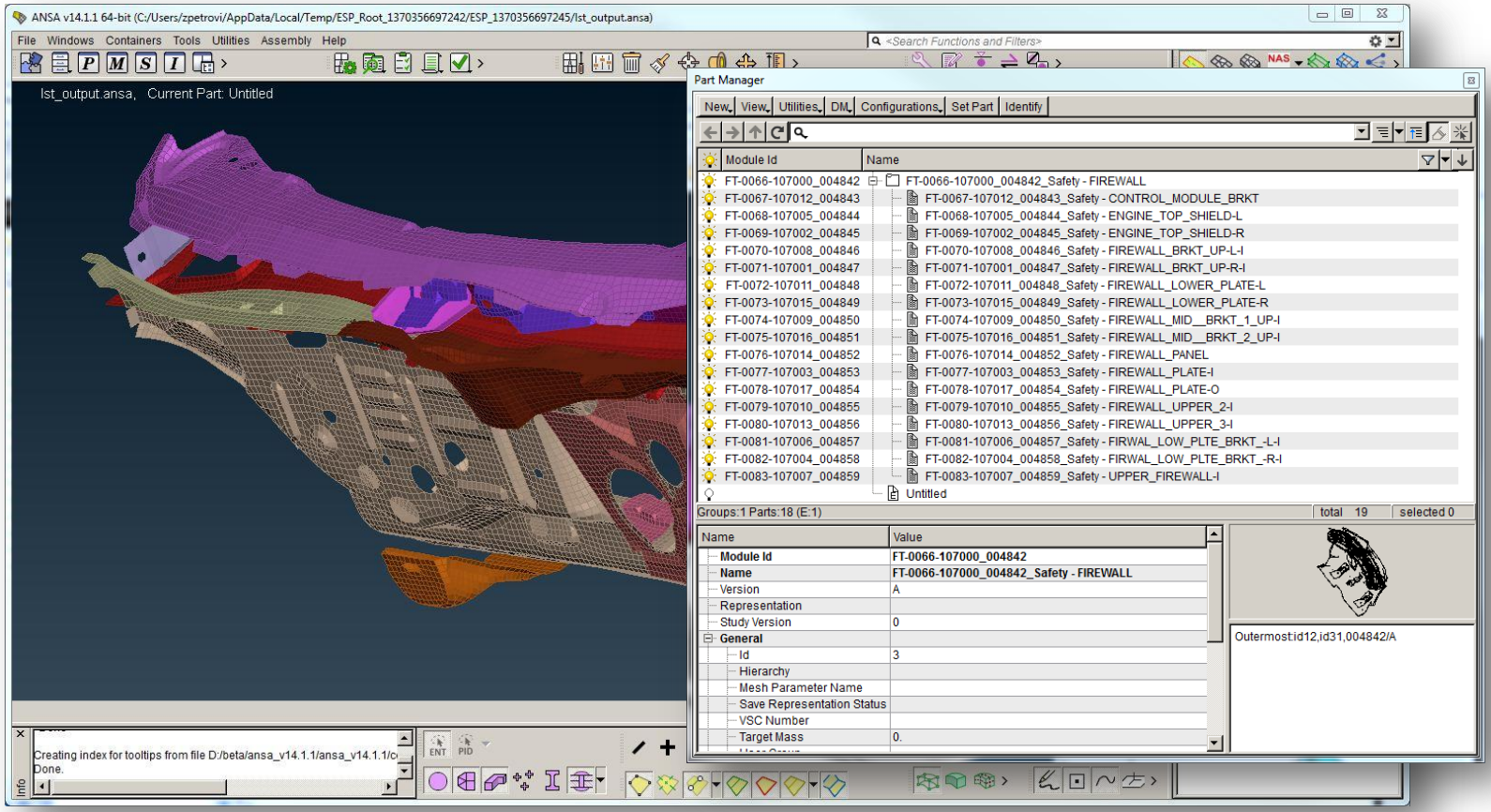
- The PLMXML transfer mode used to export the PLMXML file out of Teamcenter is also trying to reduce the amount of data to be provided to ANSA based on two attributes.
  - The Master Format attribute is also used at the top context level to tell ANSA which format to assemble. If no value is applied, ANSA will assemble ANSA files.
  - The Master Format values of the item revision below the top context level doesn't influence the decision of the format to be assemble. It is used to filter the dataset to export and tells ANSA in which format to export the mesh representations of the children items.

Master Format attribute

Model Build Use Case

Working in ANSA

- In ANSA the user can process to the following tasks:



Review the CAE Structure content

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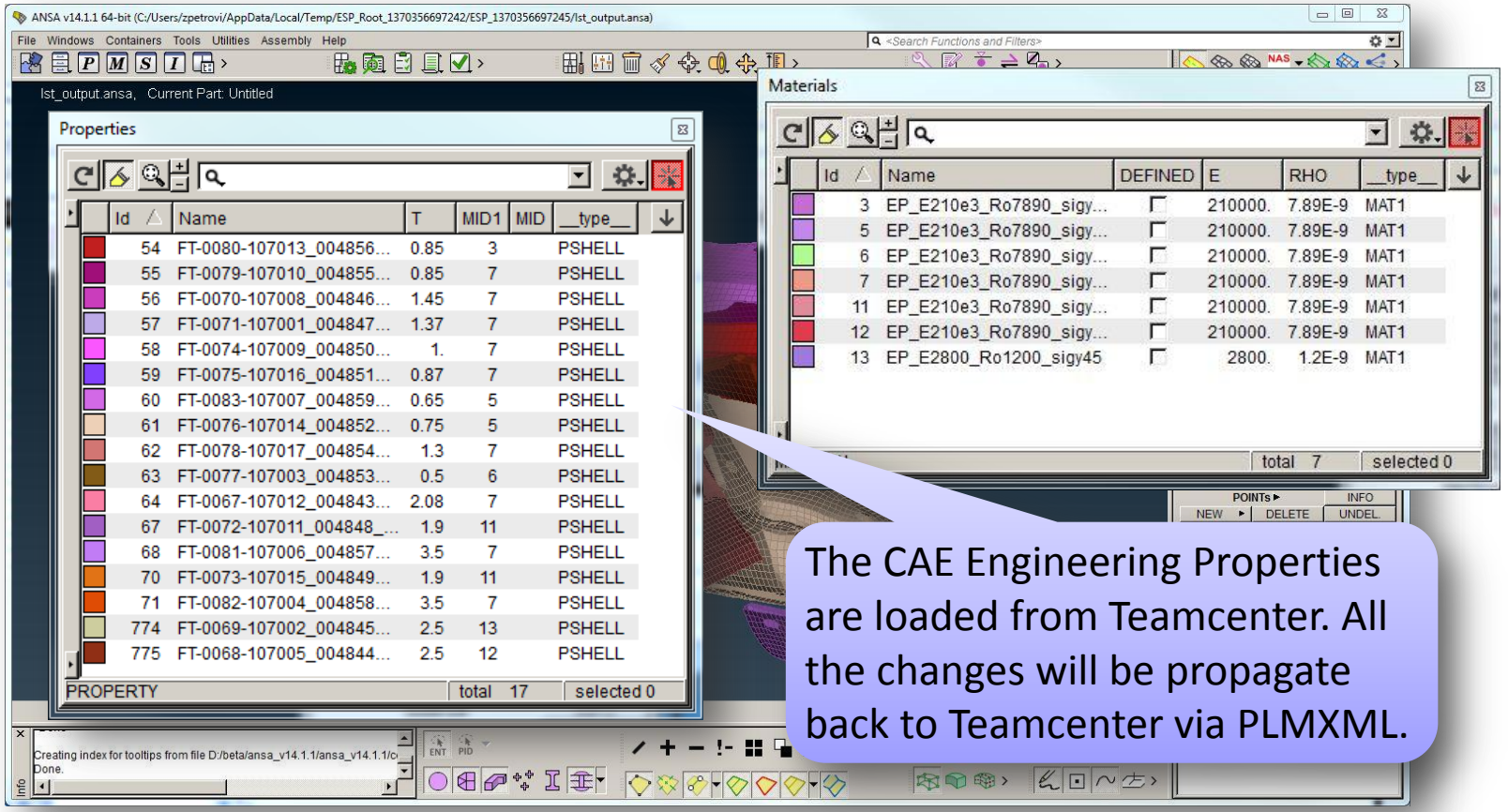

Modify the CAE Engineering Properties

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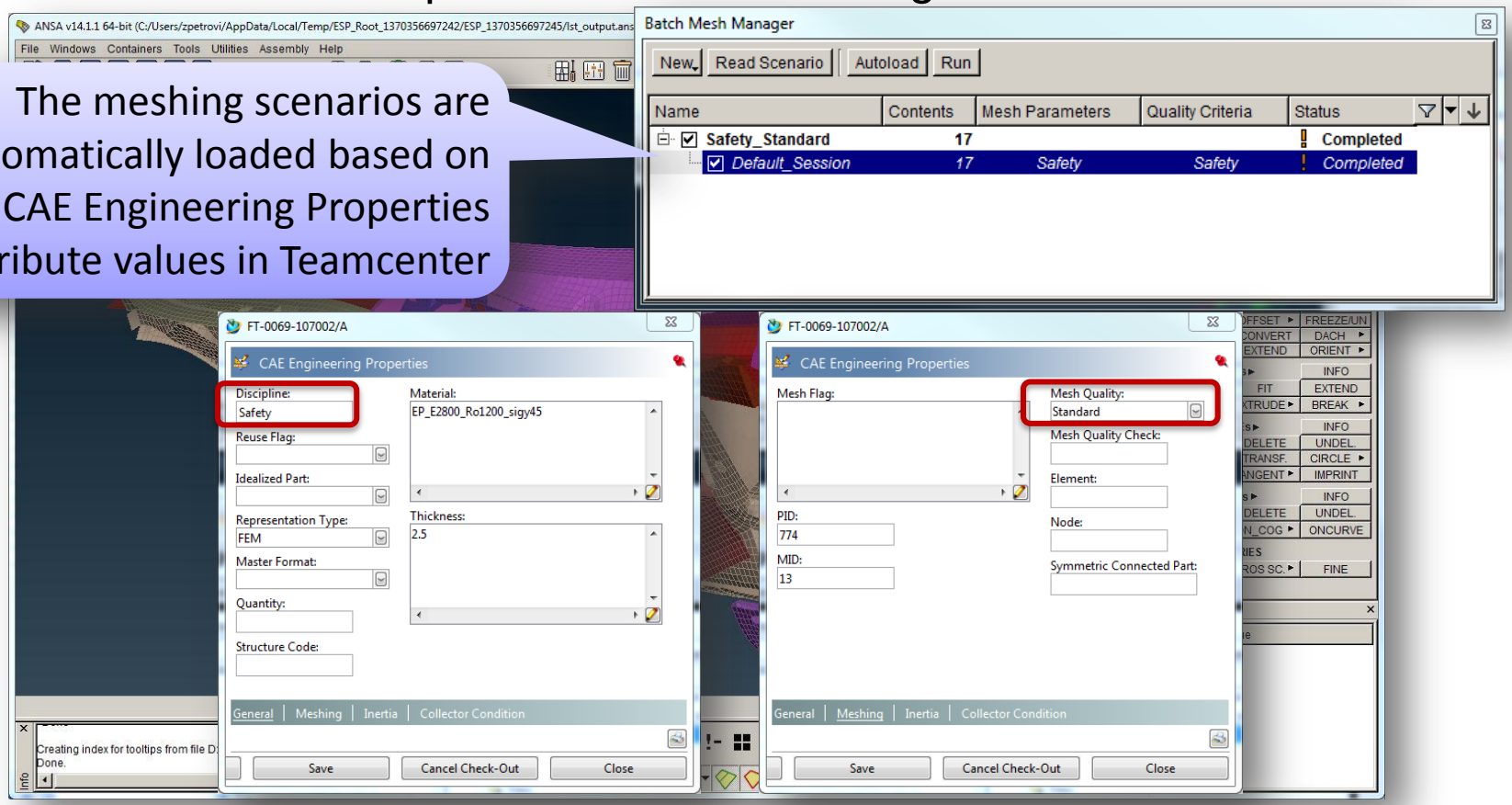
Model Build Use Case

Working in ANSA

- In ANSA the user can process to the following tasks:

The meshing scenarios are automatically loaded based on the CAE Engineering Properties attribute values in Teamcenter

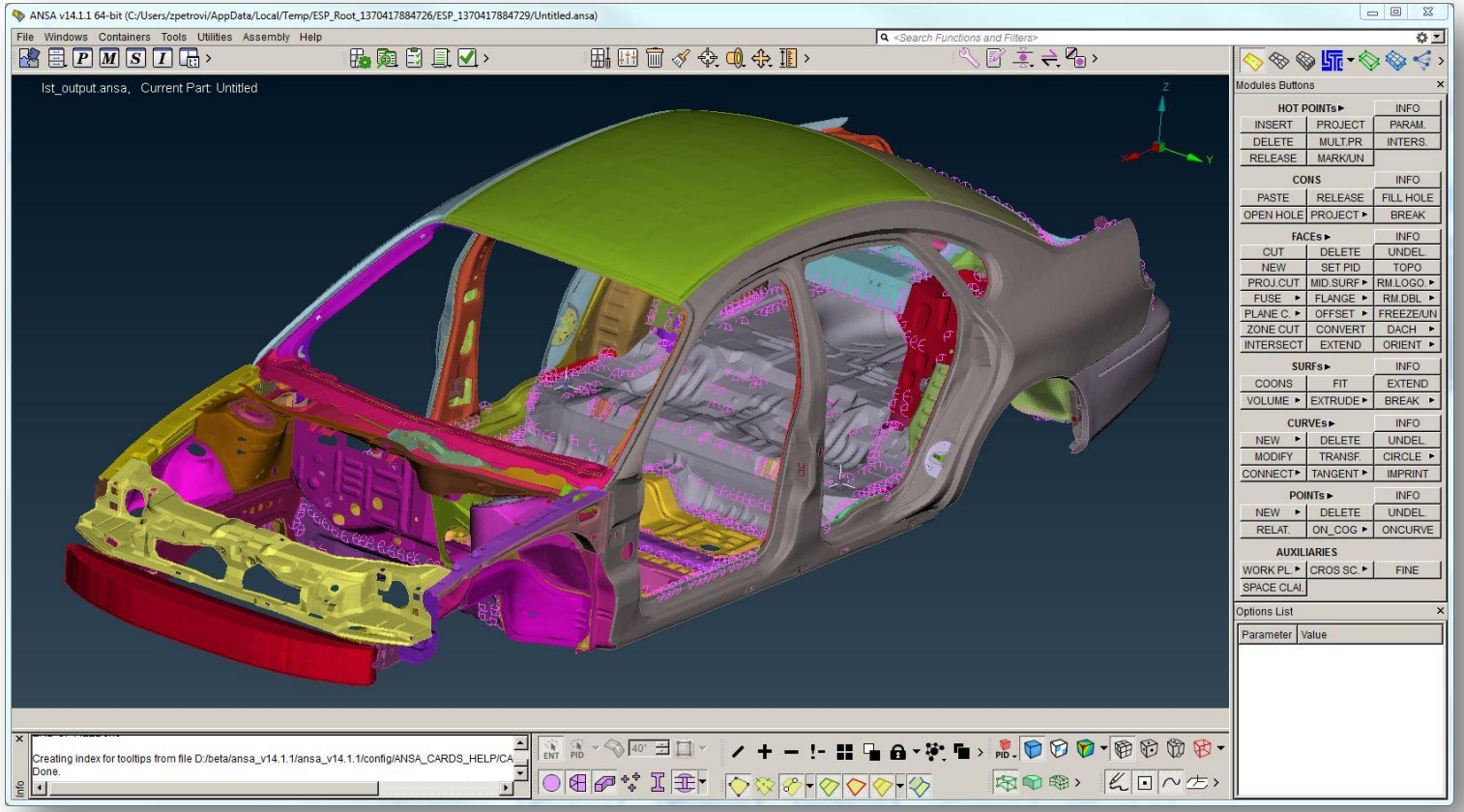


Run Batch Mesh

Model Build Use Case

Working in ANSA

- In ANSA the user can process to the following tasks:



Create / Modify / Realize Connections

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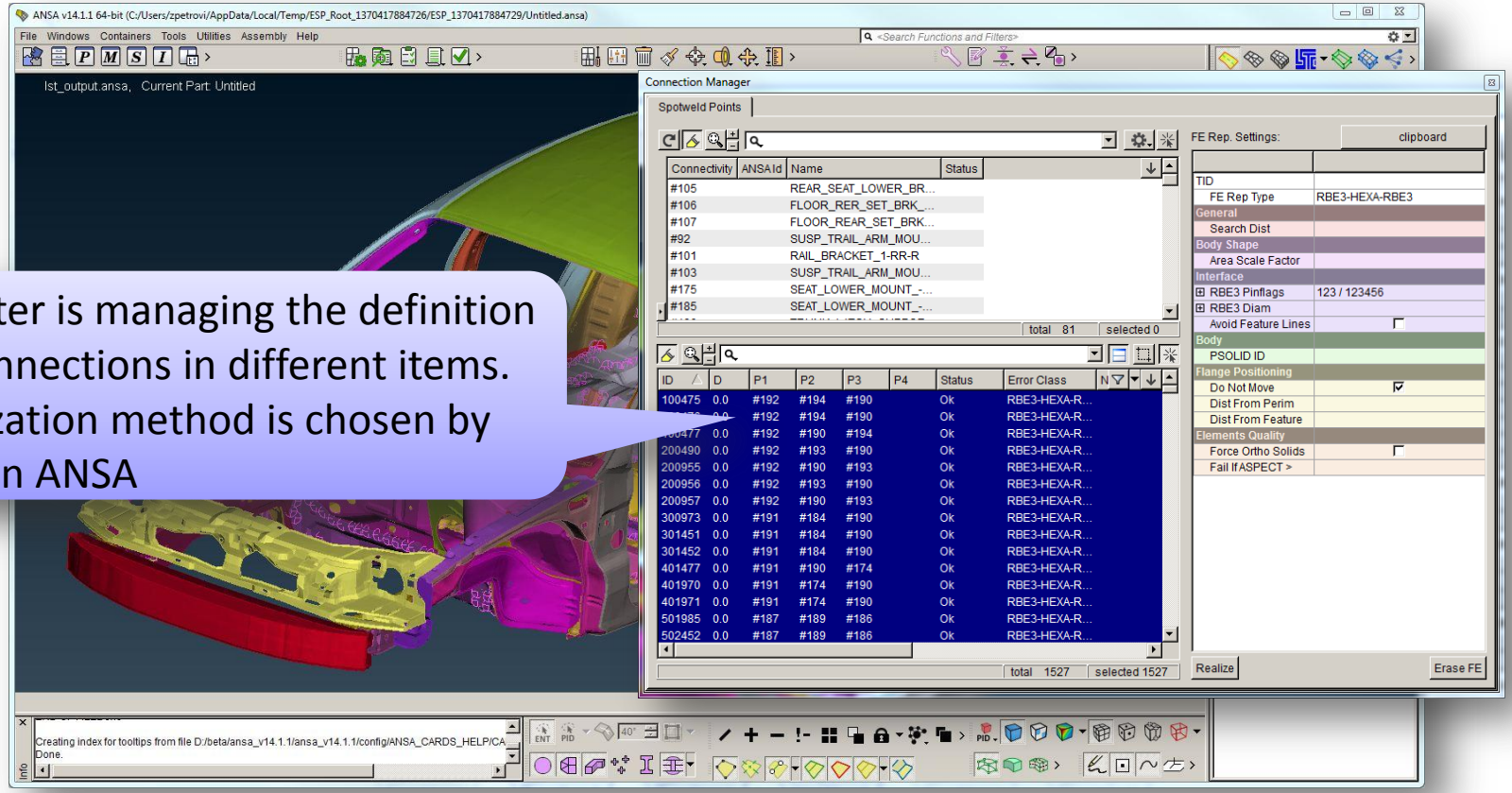
Model Build Use Case

Working in ANSA

- In ANSA the user can process to the following tasks:

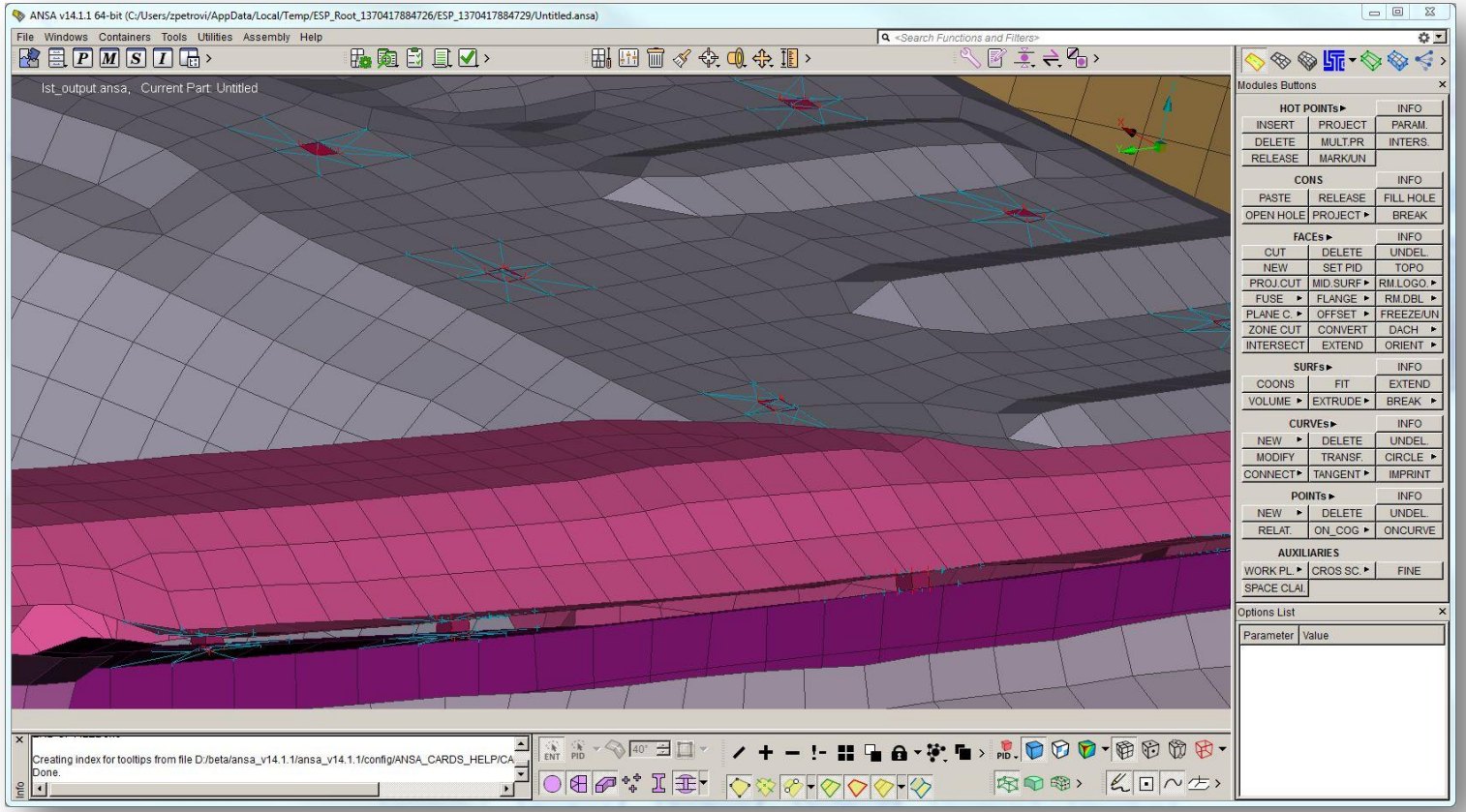


Create / Modify / Realize Connections

Model Build Use Case

Working in ANSA

- In ANSA the user can process to the following tasks:



Create / Modify / Realize Connections

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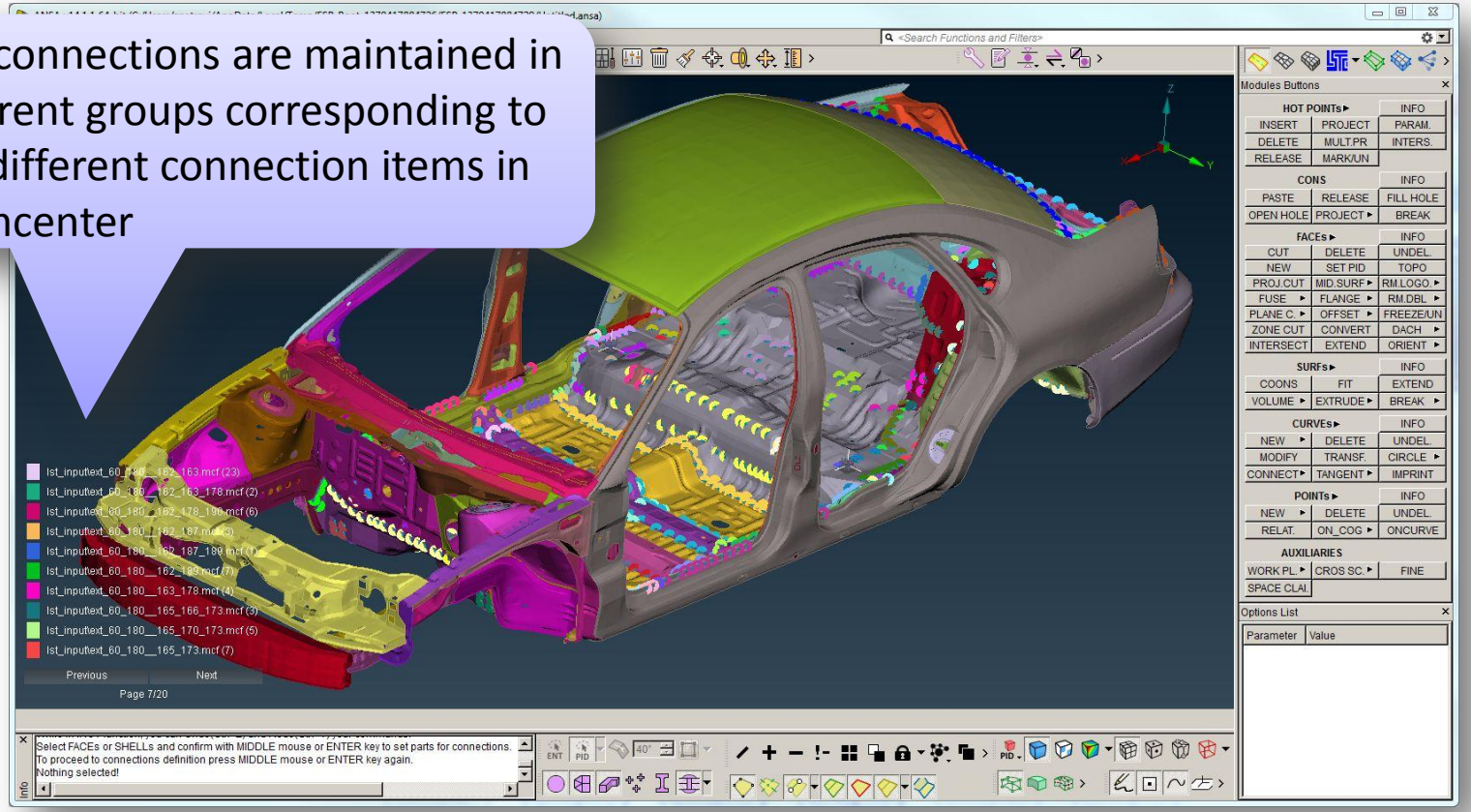
Model Build Use Case

Working in ANSA

- In ANSA the user can process to the following tasks:

The connections are maintained in different groups corresponding to the different connection items in Teamcenter



Create / Modify / Realize Connections

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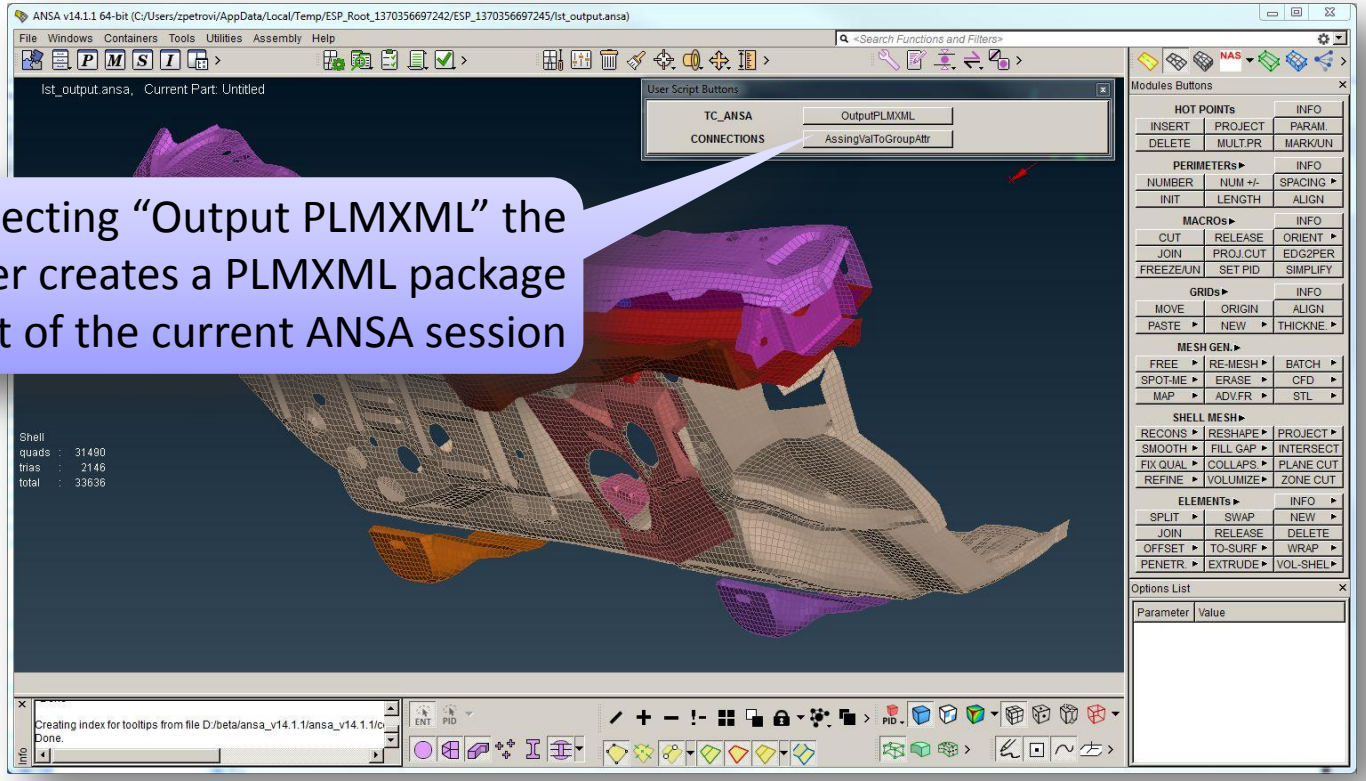
Model Build Use Case

Working in ANSA

- Once the work is done, the user can provide the changes back to Teamcenter by creating a PLMXML package out of the ANSA session.



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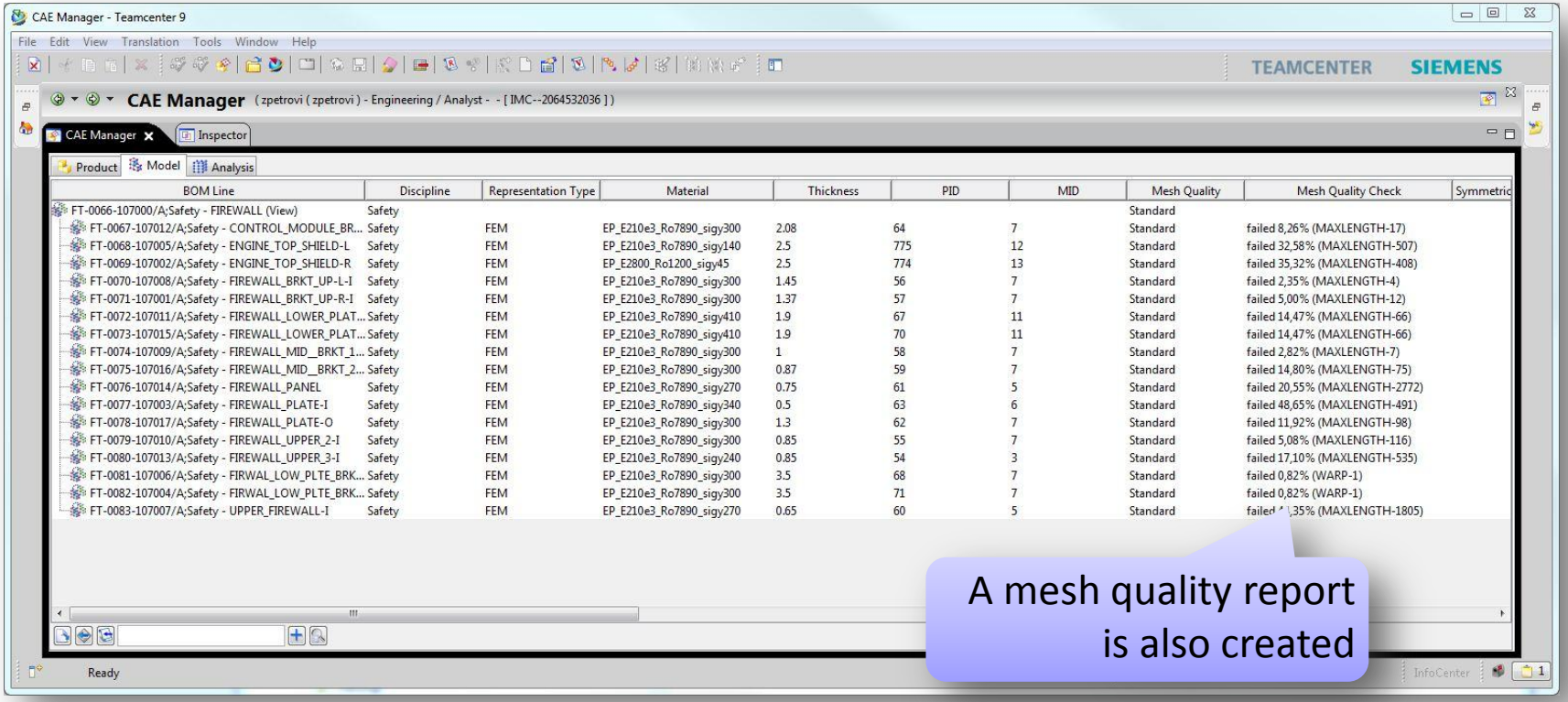
Model Build Use Case

Back in Teamcenter

- The PLMXML package created by ANSA has uploaded the updated meshes and CAE Engineering Properties.



CAE Engineering Properties

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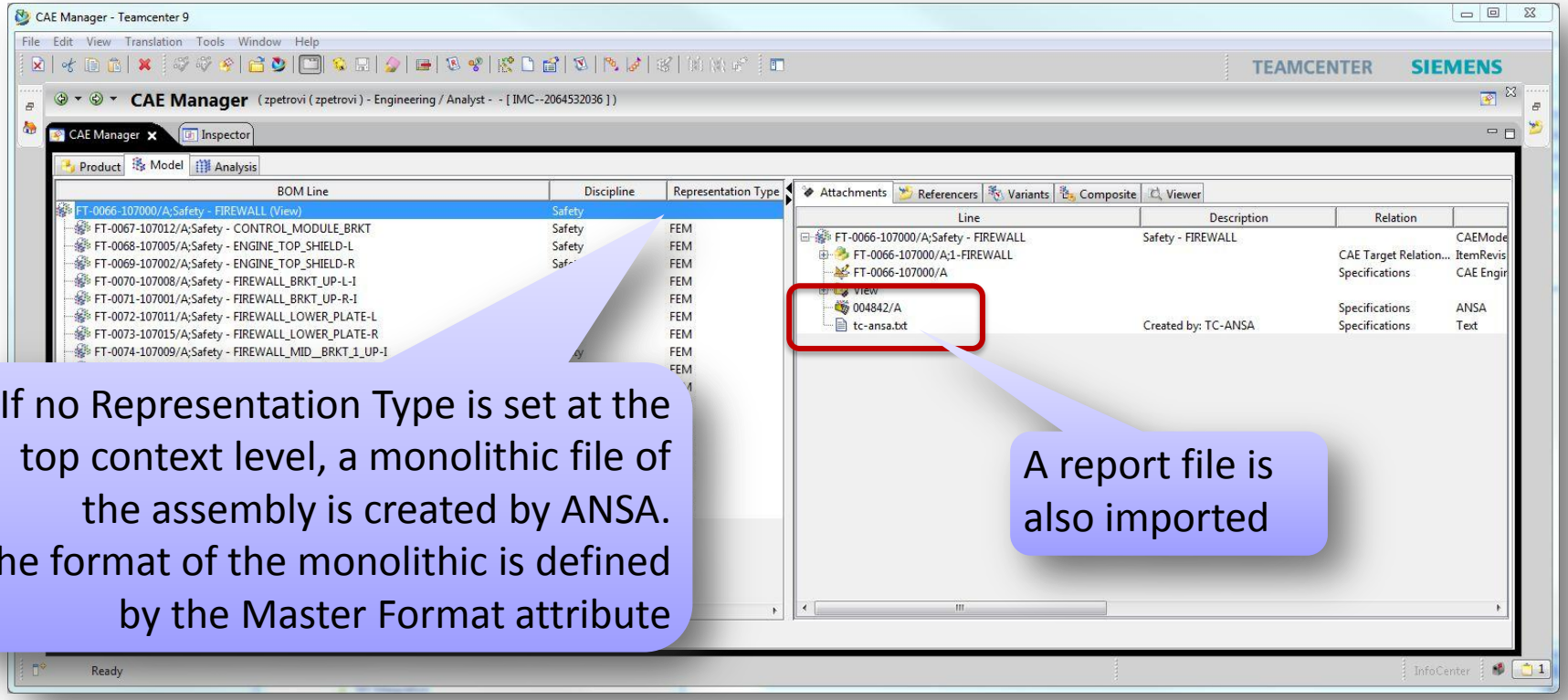
Model Build Use Case

Back in Teamcenter

- The PLMXML package created by ANSA has uploaded the updated meshes and CAE Engineering Properties.



Monolithic File

SUBSTITUTE IN CONTEXT USE CASE

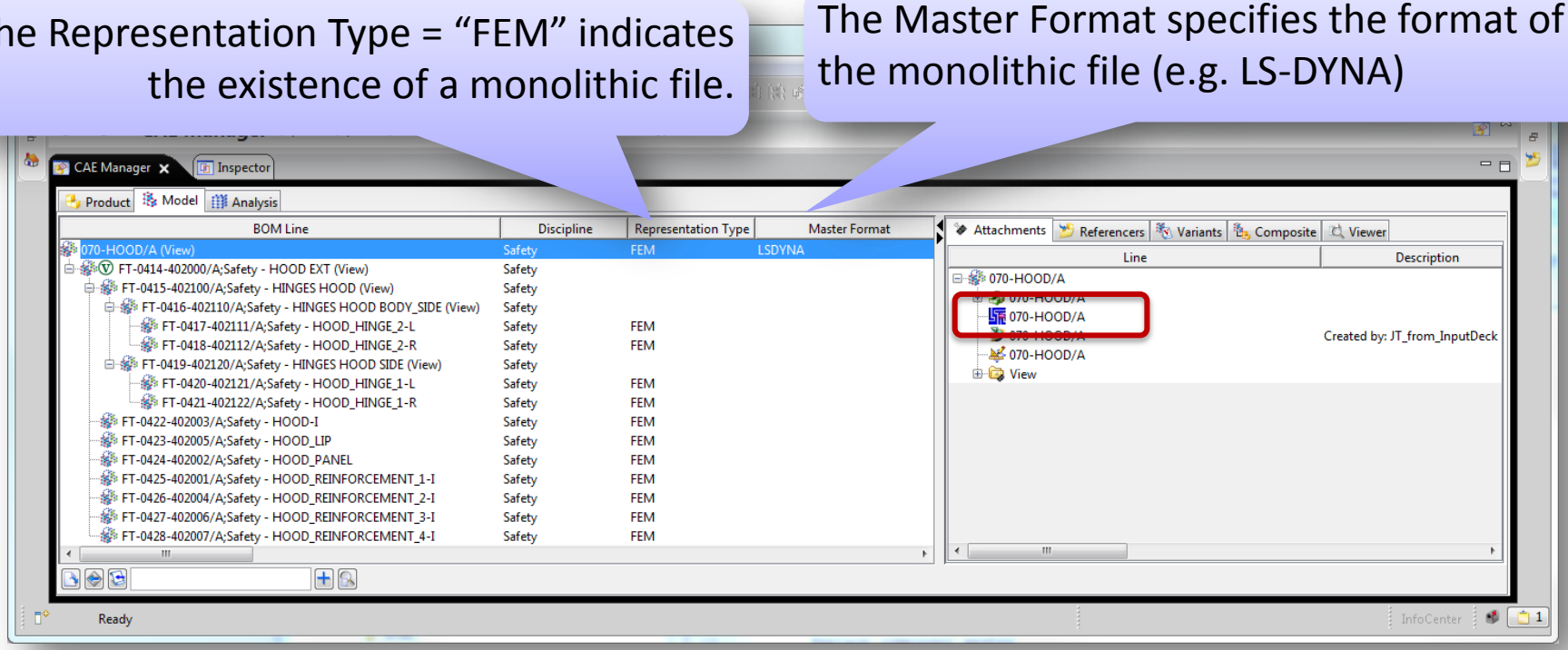
Substitute in Context Use Case

Load Context in Teamcenter

- This use case consists to update component meshes in an existing monolithic file. Like in the previous use case, the user loads first the context he wants to work on.

The Representation Type = “FEM” indicates the existence of a monolithic file.

The Master Format specifies the format of the monolithic file (e.g. LS-DYNA)



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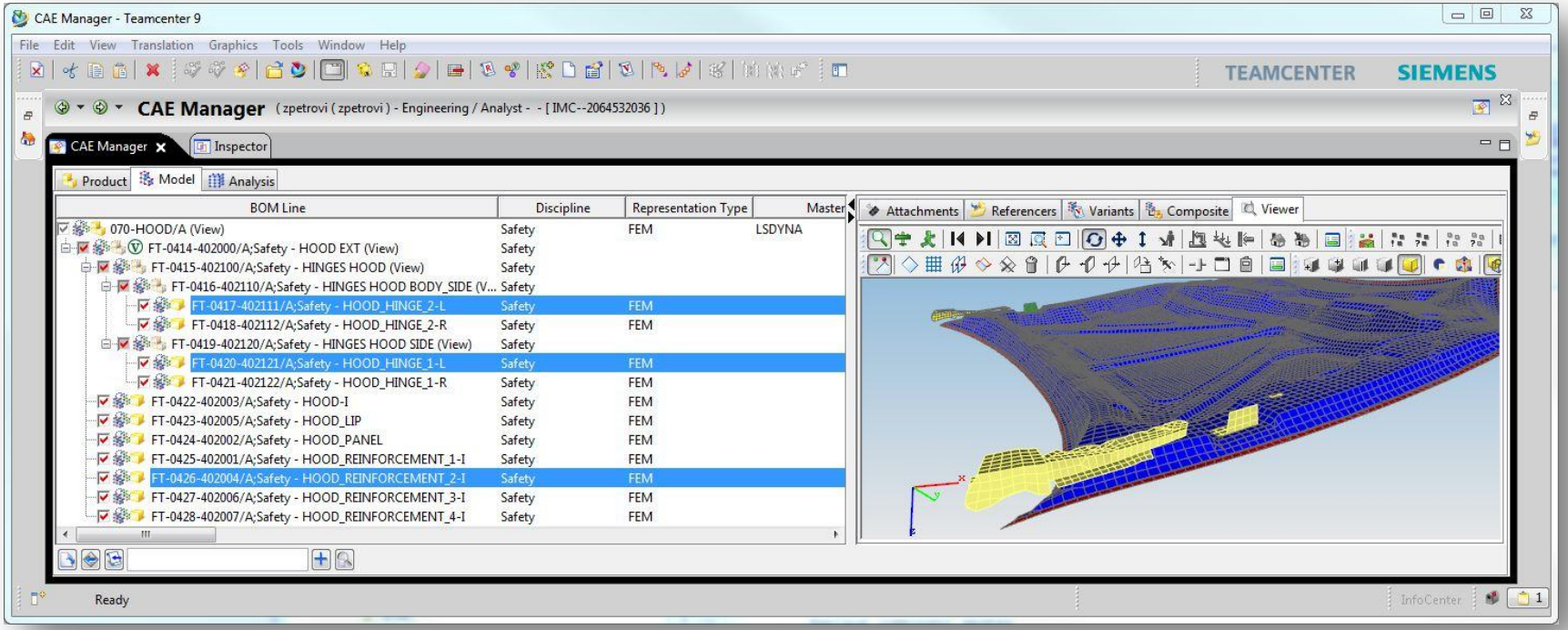
Substitute in Context Use Case

Defining Working Context in Teamcenter

- Before sending the data to ANSA, the user selects the component he wants to replace in the monolithic file.



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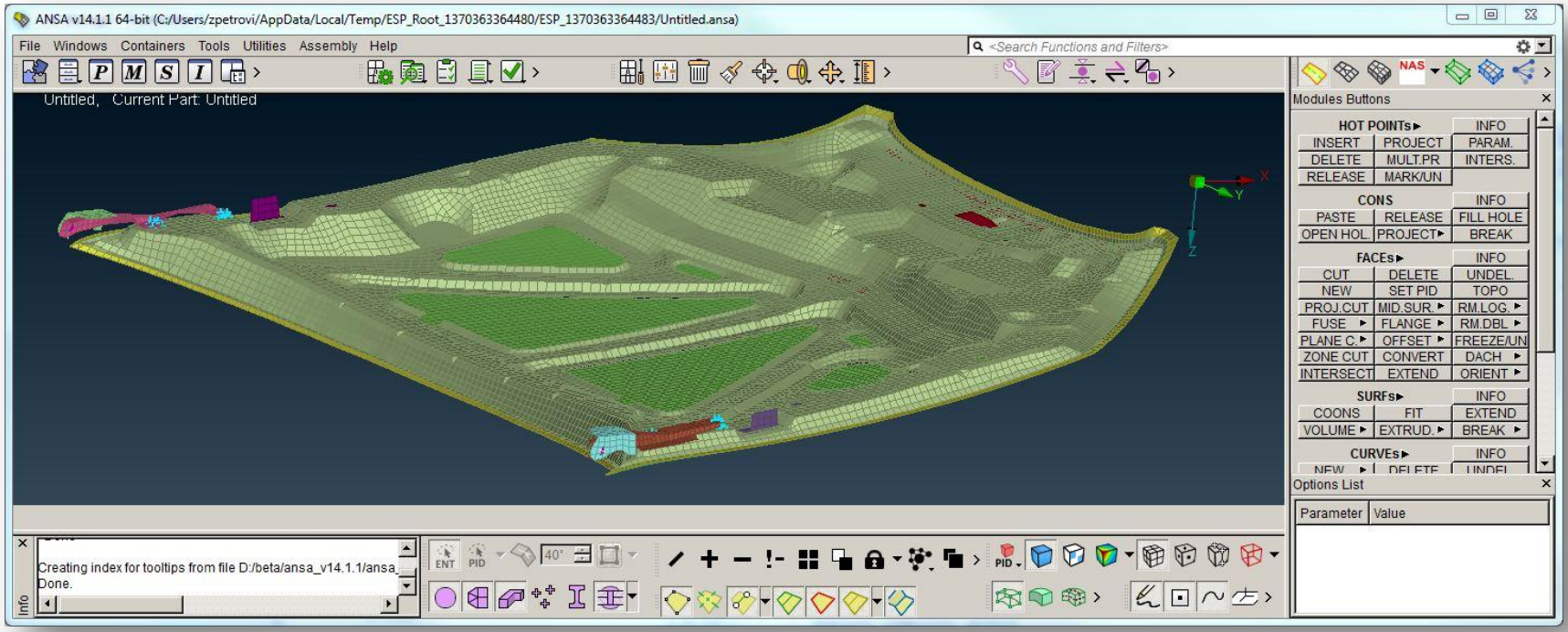
Substitute in Context Use Case

Working in ANSA

Use case will be released in September

- During the import, the component meshes are automatically replaced in the monolithic file and the result is exposed to the user.
- The next steps are identical to the previous use case.



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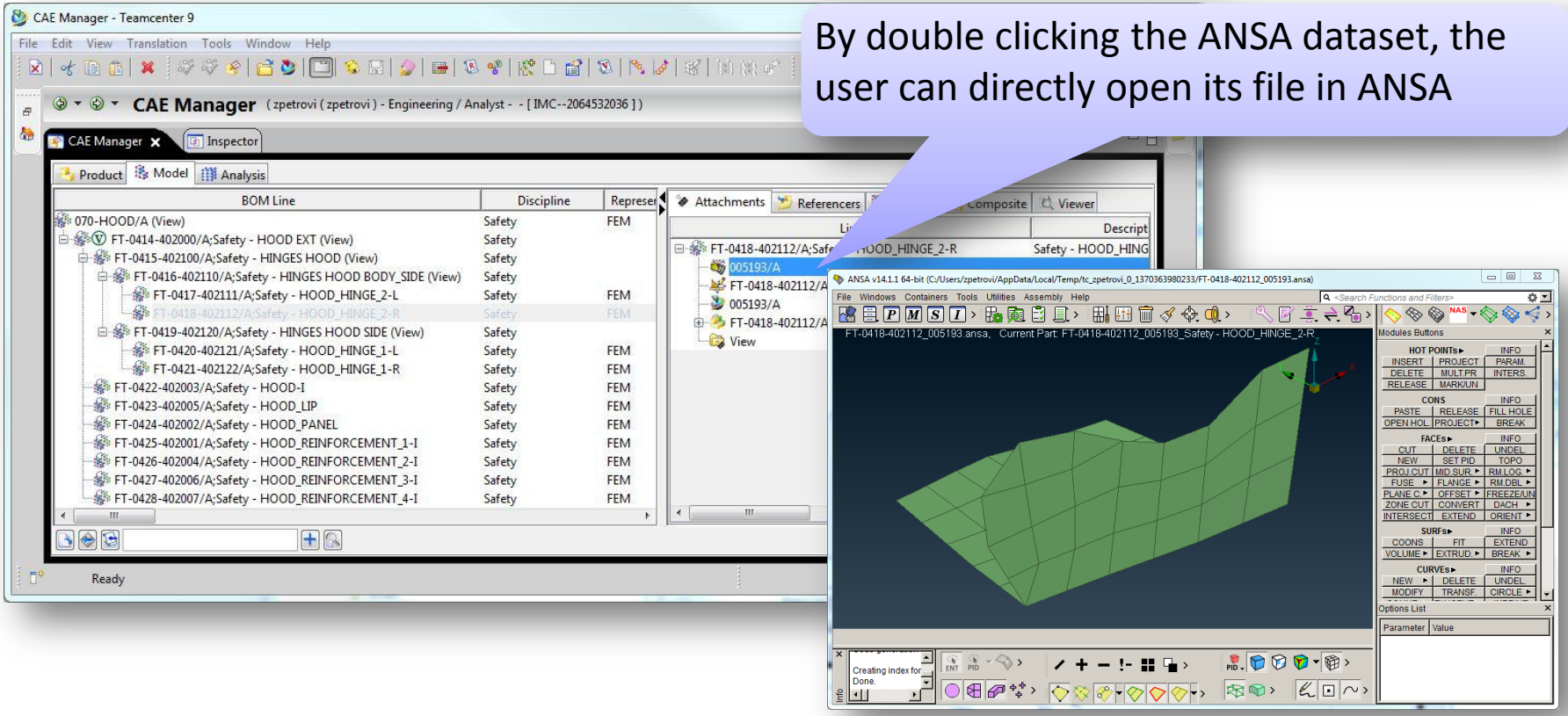
LOAD DATASET USE CASE

Load Dataset Use Case

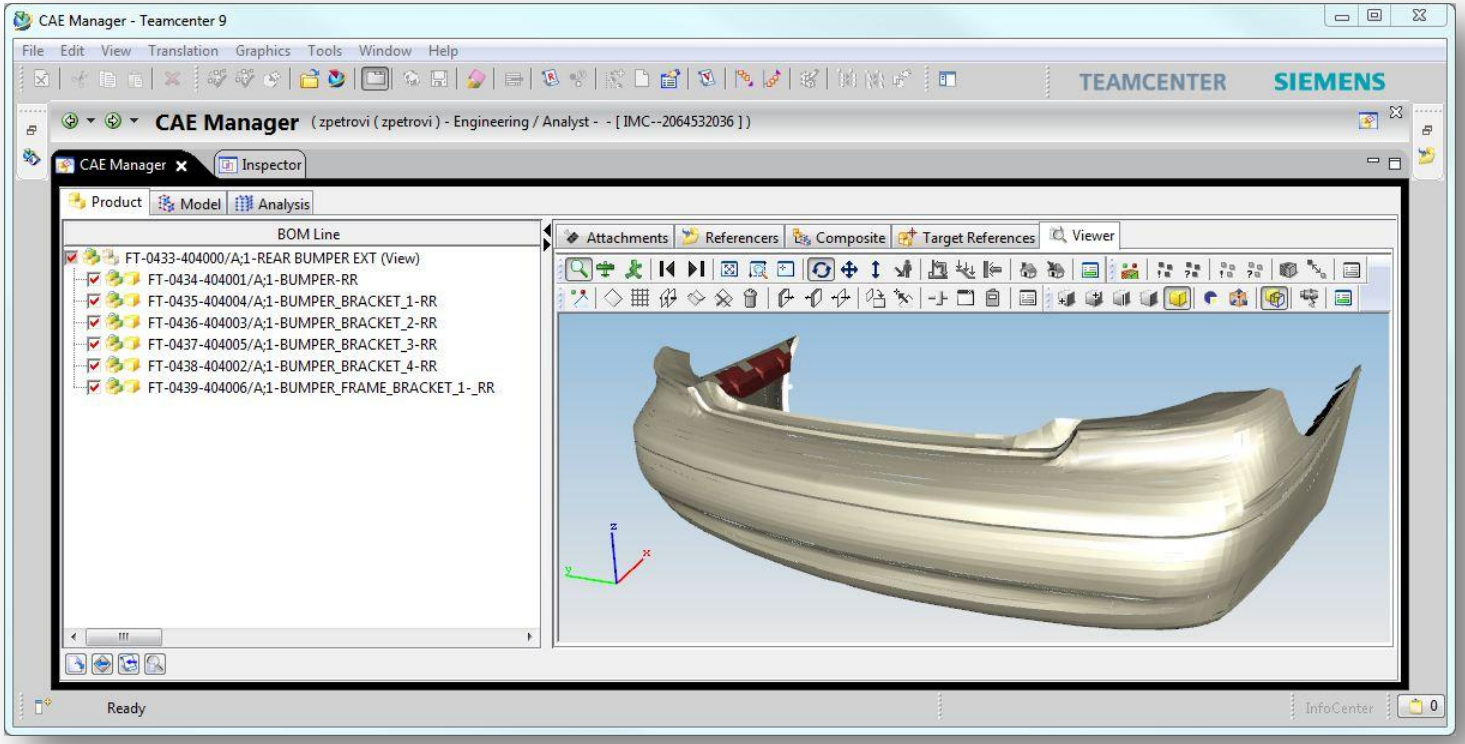
- This use case consists to open directly an ANSA file stored in Teamcenter by double clicking its dataset.



LOAD PRODUCT STRUCTURE USE CASE

Load Product Structure Use Case

- This use case consists to open directly a Product Structure into ANSA without making use of a CAE Structure. The steps to send the data to ANSA is identical as in the first use case.



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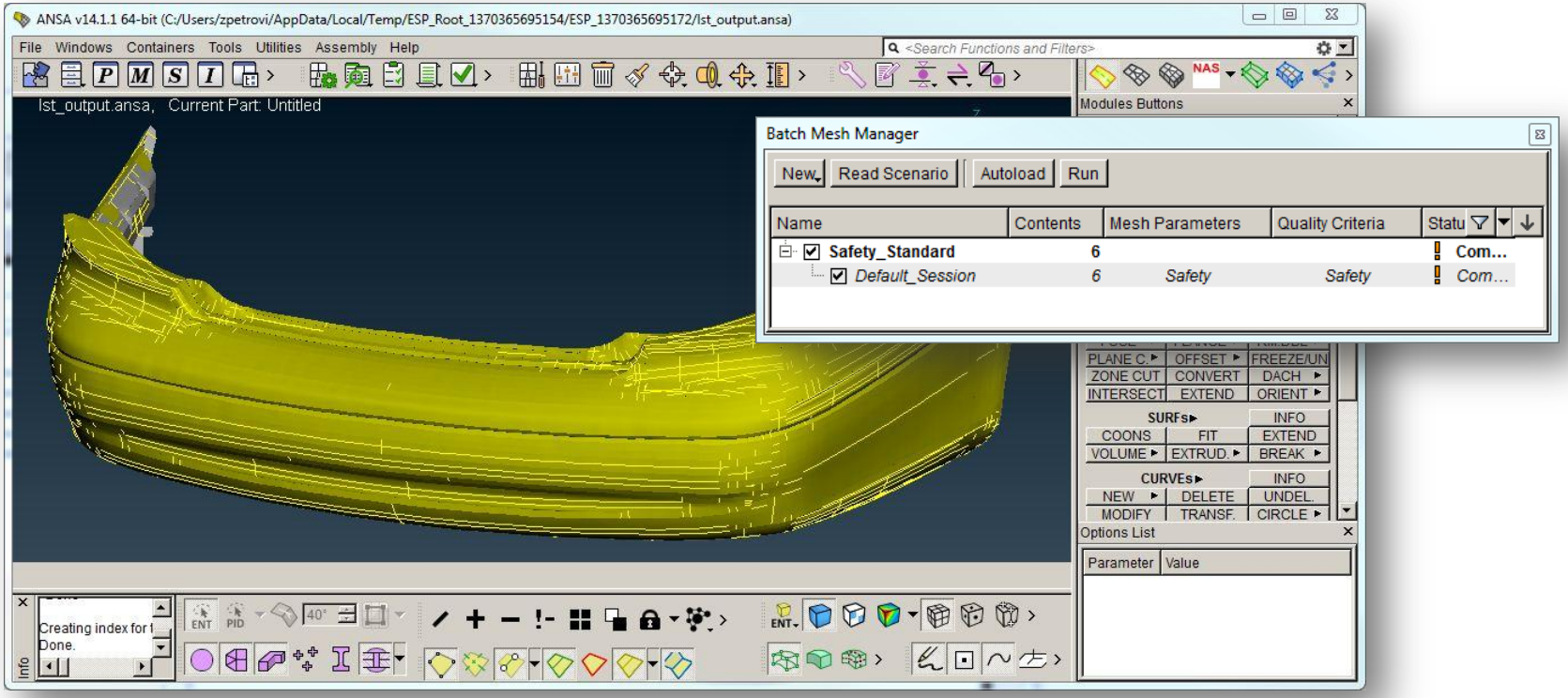
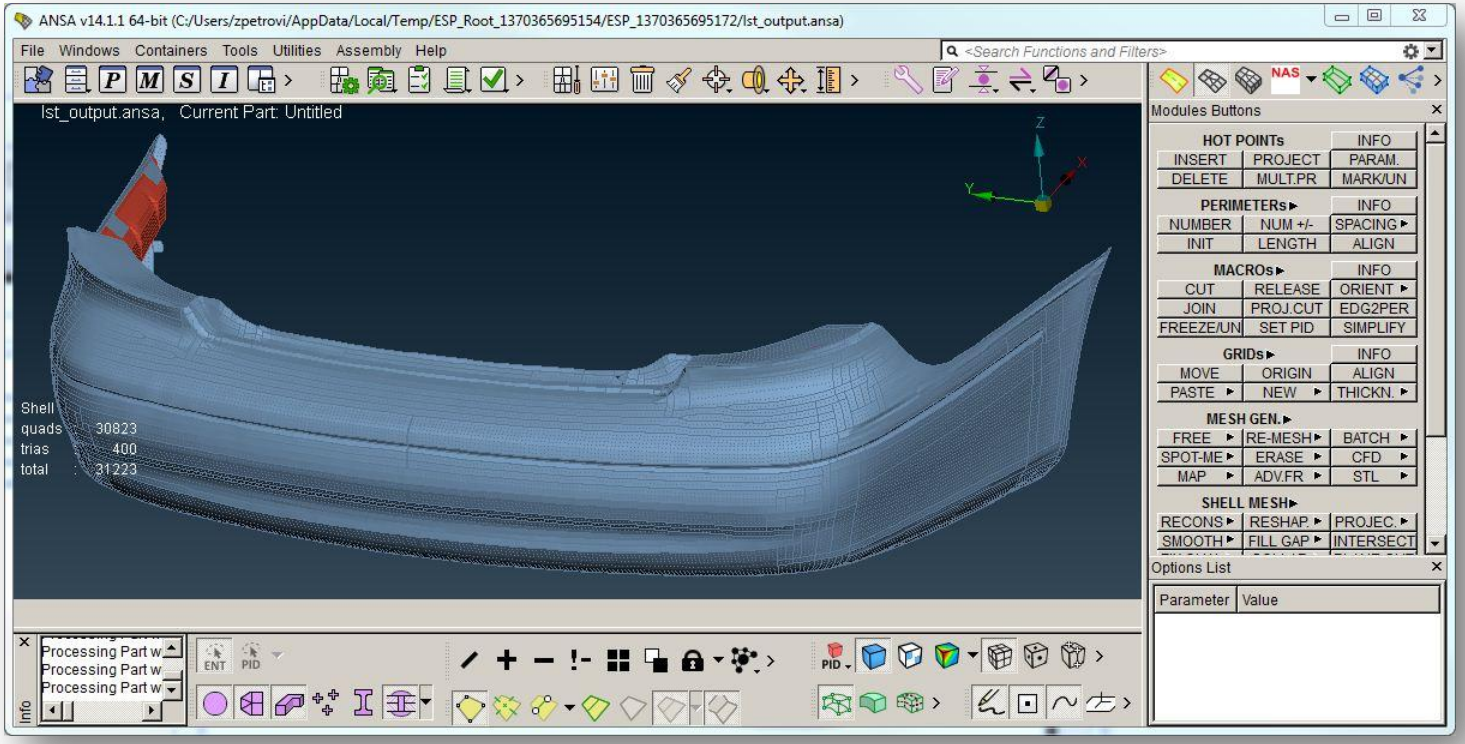
Load Product Structure Use Case

- This use case consists to open directly a Product Structure into ANSA without making use of a CAE Structure. The steps to send the data to ANSA is identical as in the first use case.



Load Product Structure Use Case

- This use case consists to open directly a Product Structure into ANSA without making use of a CAE Structure. The steps to send the data to ANSA is identical as in the first use case.



Load Product Structure Use Case

- This use case consists to open directly a Product Structure into ANSA without making use of a CAE Structure. The steps to send the data to ANSA is identical as in the first use case.
- This use case doesn't support the storage of ANSA files back to Teamcenter, as there is no CAE Structure to host them.

Thank You !

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