Use Case: Exchange of Alternate and Substitute Parts
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Aim

Along the data exchange between partners of assembly structures with 3D geometry, alternate parts and substitute parts shall be exchanged.

Actors

- OEM or customer partner
- Supplier partners

Preconditions

OEM is able to produce a valid technical data package from different applications of its information system, which is essentially its CAD and PDM systems. The content of the dataset exported is the multilevel assembly structure, alternate and substitutes parts, the master data of each assembly/component part, the 3D positioning of each component part and a reference to 3D geometry and associated documents.

Description

Alternate Parts may be used in place of each other, independently of their usage in products. This may be defined on all versions or on a dedicated version of the parts.

Substitute Parts may be used in place of each other on a given usage in a product. This may be defined on the BoM level (so-called view usage) or limited to a given occurrence (so-called occurrence usage) of the part.

In all cases, these relationships are not symmetrical: for example, if part B is an alternate part for part A, part A is not implied to be an alternate part for part B.

Effectivity and 3D placement associated to alternate or substitute parts should be identical.

Postconditions

The supplier/partner is able to interpret the assembly structure with alternate and substitute parts to perform his design process and manufacturing process.

Test case

Example of designing with alternate and substitutes parts:

The following model provides a representative complexity, near to real life data exchange.

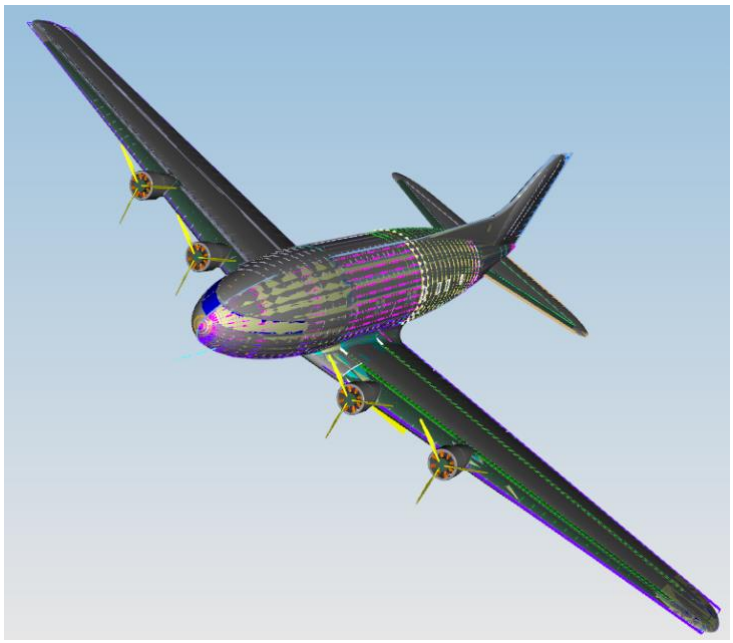
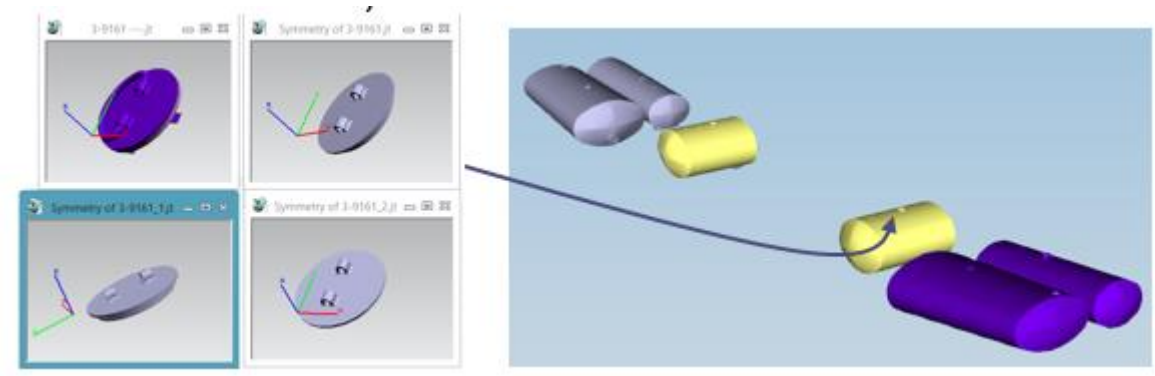


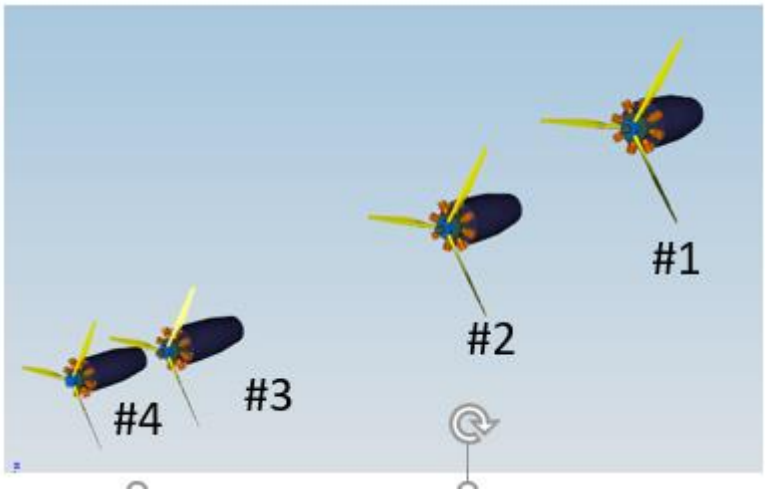
Figure 1: Illustration of MBE Demonstrator public test model

Three fuel tank caps are defined as alternate parts on part level to a fourth one, in both directions.
Two fuel tank assemblies are defined as alternate parts on part version level, in both directions.



On 2 of 4 engines, each one made of three propeller blades, two propeller blades are defined as occurrence-level substitutes (i.e. applying to one of the three blades of the engine) to a third one, in both directions.

On a third engine, one propeller blade is defined as view-level substitute (i.e. applying to all three propellers of the engine) to another one, in both directions.



Benefits

Enable a powerful design collaboration across company boundaries.
Ability to describe all aspects of the assembly including alternate and substitutes parts in a semantically accurate way with the associated recommended usage of AP242.