FUTURE REPAIR AND MAINTENANCE
FOR AEROSPACE INDUSTRY

Deliverable 7.5   **IT System module Library Management**

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Executive summary

This document gives a description of the part library management. The part library can be considered as a component that feeds the different systems with the information to demonstrate the possibilities of the RepAIR project has as a whole. The part library is included in the Central Node, developed in WP8, and the proposed part data structure developed, representing typical aircraft parts, can be uploaded to the Central Node. All data are categorized in order to provide the option to filter according to certain criteria and relate them to the decision component developed in WP3. In addition, the library structure proposed for certification in deliverable D7.1, is taken into account during the definition of the part library.

The structure of the library is explained, describing the technical, the manufacturing and the assessment parameters based on the shown structure in the following figure.
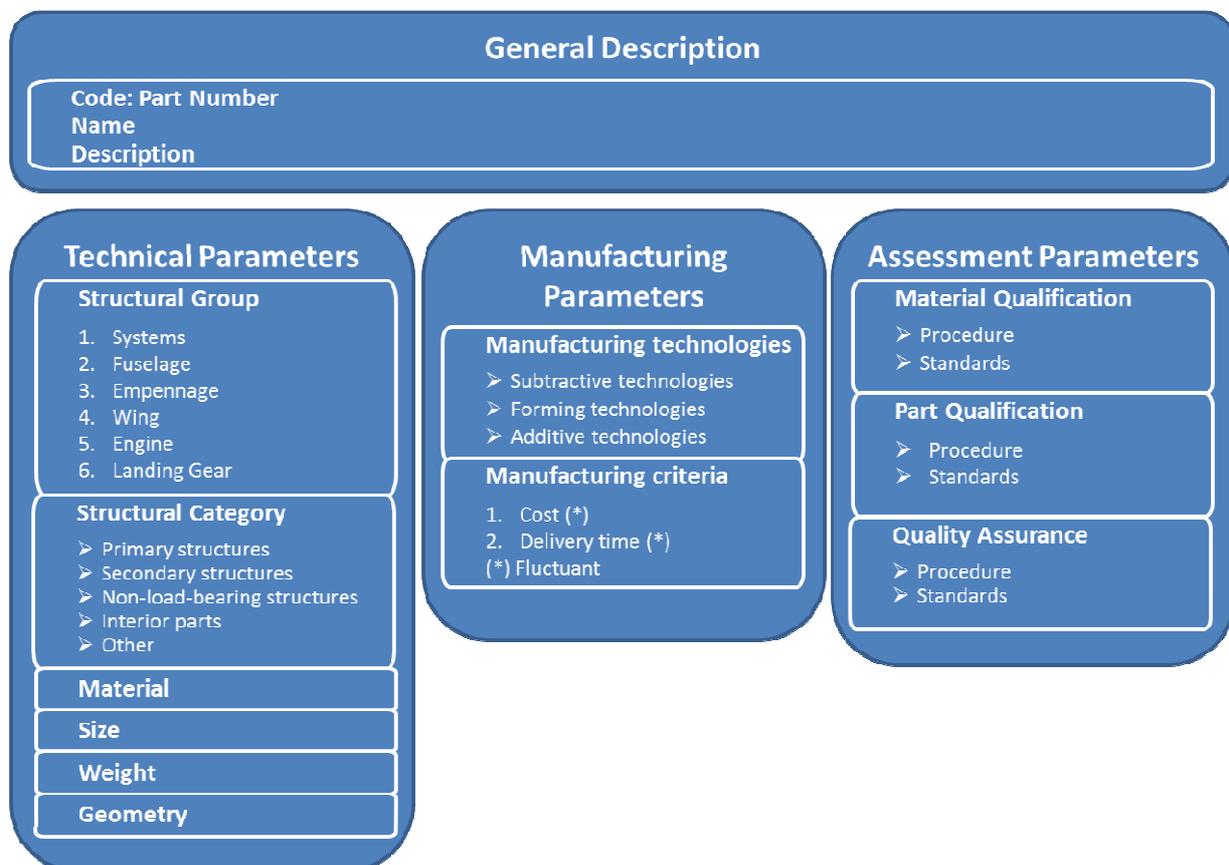
General Description

Code: Part Number
Name
Description

Technical Parameters

Structural Group

1. Systems
2. Fuselage
3. Empennage
4. Wing
5. Engine
6. Landing Gear

Structural Category

➢ Primary structures
➢ Secondary structures
➢ Non-load-bearing structures
➢ Interior parts
➢ Other

Material

Size

Weight

Geometry

Manufacturing Parameters

Manufacturing technologies

➢ Subtractive technologies
➢ Forming technologies
➢ Additive technologies

Manufacturing criteria

1. Cost (*)
2. Delivery time (*)
(*) Fluctuant

Assessment Parameters

Material Qualification

➢ Procedure
➢ Standards

Part Qualification

➢ Procedure
➢ Standards

Quality Assurance

➢ Procedure
➢ Standards

Figure: Part library structure

An airplane is usually divided in structures: fuselage, wing, power plant, empennage and landing gear. Moreover, although the avionics and the electrical and hydraulic systems are not considered as structural parts, they are considered as a major group at the same level as the principal structures. By doing this, a fast classification of the parts of an airplane is allowed and not only the location can be figured out, but also the dimensions and the structural importance, which directly are described in the technical parameters.

Concerning the manufacturing parameters, the following three manufacturing methods are distinguished:

- Subtractive technologies

- Forming or shaping technologies

- Additive technologies

Subtractive technologies achieve the desired geometry by removing defined areas of a part's material.

Shaping technology models a given volume to the desired geometry by retaining the volume constancy.

Additive Layer Manufacturing is characterized by a layer-wise production on the basis of 3D-CAD data without the need for shaping tools. There is a huge diversity of different technologies but the project RepAIR focuses on the SLM and EBM as well as on a specific Laser Cladding process.

The manufacturing criteria which are directly related to the parts, such as the original part price and the delivery time are described. Furthermore, some other criteria, not directly part related, are mentioned and explained.

The assessment parameters are related to both part and material qualification procedures and standards, as well as the part quality assurance procedure and standards have been taken into account.

Finally, the use of the part library during all RepAIR processes is described.