

EFFICIENT GREEN AIRCRAFT DISASSEMBLY (Abstract)

1. The origins

Disassembly is, traditionally, a quite improvised and labour intensive system. The growing-aging diversified fleet and the requirements for more green-oriented reprocessing add volume and more complexity. A practical model for agile-flexible and efficient disassembly for mixed air-crafts is presented, from lay out to automation and technological challenges of the shops. This is a new field of investigation for the Sisteplant's R+D+i division Goldgym.



The objectives of a new advanced disassembly system might be agility, productivity and comprehensive very efficient materials classification by the recycling nature (RN) of them.

In the medium term, we will need to reduce lead time of the DP (disassembly process) at the same time that an nearly automated-efficient classification by RN is set up. The reduction of lead time is quite obvious, not only because this way improves productivity of the DP, but also because the consequent higher production level will allow OEMs to introduce in a regular basis the recycled materials in their manufacturing process as well.



2. Lean technicalities

The key is: “why not apply as much as possible a system which is a mirror of the assembly process”. This would mean:

- Break only by RN needs,
- Break at a convenient point, possibly never at the first stage, and thinking on radically facilitate the RN process. So, RN oriented breaking & packing are needed.
- Pulse-line in a family of aircrafts for the first stage of the DP (allow space for adjusting differences in the aircraft family).
- “Reception sub-lines” (the mirror of the feeder-lines) with as much as possible visibility and automated handling.

Ironically, the feasibility of the pulse-line (or even a moving one) in DP is greater than in OEMs, given that no supply-chain problems are involved at all, the greater limitation being the decision taken about the mix-aircraft model DP, along with some technological issues.

3. Technological issues

Four are the basics for supporting the lean DP:

- Semi-automated or assisted de-riveting with Ti and other parts recovered, and not restricting (premature un-controlled breakings) the convenient breaking level.
- Efficient waterjets cutting for Al sheets avoiding powder spread and deflagration danger.
- Efficient electronic parts separation (manual assisted).
- Separation of CF bonded composite parts (skins from reinforcements) without powder generation, or integrated powder removal.



Other systems and components also require particular DP designs, based on the disassembly-chain nature, but are not so critical in order to cope with the objectives of the efficient – green disassembly.

4. Conclusions

The lean manufacturing model can be applied with advantage for the DP, with great contribution to its strategic objectives, but to make the model more competitive, some technological issues are required to be R+D' ed, some of them intricated in complexity.



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