Science of The Total Environment
Available online 11 October 2020, 142922
In Press, Corrected Proof

Review

Remanufacturability evaluation of end-of-life products considering technology, economy and environment: A review

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https://doi.org/10.1016/j.scitotenv.2020.142922

Highlights

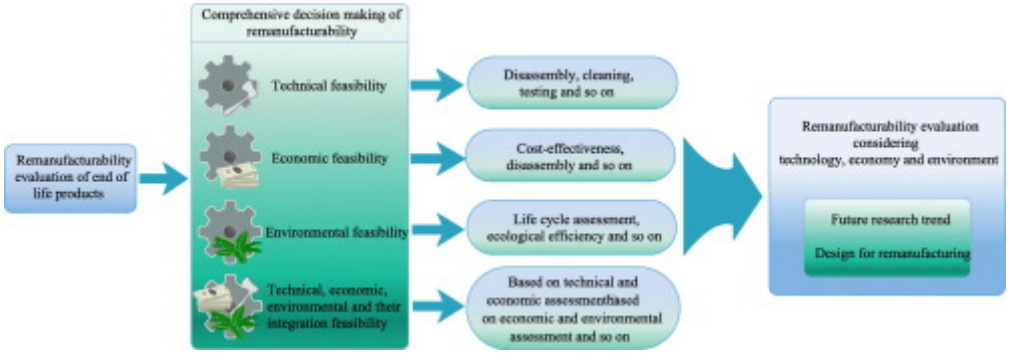
- Remanufacturability evaluation is the premise and theory of remanufacturing.

- We systematically reviewed remanufacturing evaluation studies for end of life products.
- We found technical evaluation of remanufacturability requires more research.
- Design for remanufacturing is a hot topic in the future.

Abstract

Remanufacturing has been regarded as an environmentally friendly way to dispose of End-of-Life (EOL) products to like-new condition, which can effectively save resources, energy and greatly prolong the service life of products. After entering the remanufacturing system, EOL products are disassembled into individual parts that may have different failure types and degrees, thus not all of them are suitable for remanufacturing. Remanufacturability needs to be conducted to determine the feasibility of remanufacturing. Due to the products' structural complexity and customer demand uncertainty, many factors need to be considered when evaluating the remanufacturing feasibility of waste products. In this article, we take three pillars of sustainable development as decision factors and make a comprehensive literature review on the technical performance indicator (TPI), economic cost indicator (ECI) and environmental benefits indicator (EBI) of remanufacturability to emphasize the importance of remanufacturability. The purpose of this literature review is to conduct critical review on the current literature and establish a contemporary understanding of the status of remanufacturability study by assessing the advantages and disadvantages of existing methods in this field. The research results demonstrated that there was relatively a lack of research on technical feasibility assessment, more on economic and environmental assessments. Most of remanufacturability assessment approaches are comprehensive, considering multiple factors. This article summarizes the limitations of previous evaluation methods, proposes the challenges and future development trends. It is concluded that design for remanufacturing, finding it will be one of the hot topics in the future remanufacturing research, which will provide valuable insights for academia and industry.

Graphical abstract



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Keywords

Remanufacturability evaluation; Technology; Economy; Environment