

Study for Establishing the Car Recycle System Based on the Utilization of Recycle Parts

-the case of environmental load evolution model for reused engine-

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In China, as the motorization develops, the amount of the waste cars is increasing rapidly, together with the saturation level of automobile, which is predicted to influence the situation of "environmental pollution by scraping car process" and "exhaustion of resources by mass production" greatly. It has become the problem close related to the development of sustainable society at national and local level. So it is necessary to analyze the utilization of the recyclable resources through more detailed scraping car process. The practical car recycle system is also desired. Thus, the current situation needs to be studied in details. However, the restriction of available data makes it difficult for quantitative environmental load evaluation such as LCA analysis.

From the viewpoint of sustainability, it is worth researching how to make the used parts, even the waste parts be resources. The effective recycling process requires lest energy loss, at the same time, the quality of the products to ensure the long-term durability. The parts, as the aggregate of detailed items, will not be waste, if each detailed item can be reused. And the final product, as the aggregate of virgin parts, can save more resources and energy. The system which can provide such kind of products is considered to be very important in the future. Regarding the promotion of low carbon economy, the recycle of detailed items and reuse of parts can contribute to the reduction of CO₂ emission and satisfy the industrial requirement of efficiency, less environmental load and low cost for developing counties.

In the study, the integrated model of reusing recyclable parts is established and the integrated model for China is evaluated within Chinese automobile vein industry. The LCA analysis of the durability of the targeted part, the re-manufactured engine, is applied for the environmental impact assessment to explore what kind of recycling system is effective and realizable for China. Finally, the market scale of the re-manufactured parts is discussed considering the promotion policies for utilizing re-manufactured parts.

Since the data for inter-industry table of China is not enough, the LCA database of Japan Environmental Management Association for Industry is used as the reference for LCA analysis in the study. And LCA software of Japan is used for the analysis. In the further study, the analysis is to be implemented based on LCA data of China, which needs the thorough survey of reference documents and the calculation using standard data of China. The efficiency assessment model of re-manufactured engine will be studied in the following research.