

A quantitative analysis method of greenhouse gas emission for mechanical product remanufacturing based on Petri net

Shi, J.L.^{a,b,*}, Fan, S.J.^a, Wang, Y.J.^a, Cheng, J.S.^a

^aMechanical Engineering and Automation, Dalian Polytechnic University, Dalian, P.R. China

^bInstitute of Sustainable Design and Manufacturing, Dalian University of Technology, Dalian, P.R. China

ABSTRACT

The increased greenhouse gas (GHG) emission is one of the consequences of environmental change. Waste mechanical products remanufacturing is a good production mode for environment protection. Nevertheless, GHG emissions are inevitably generated in the remanufacturing system. Some uncertainties would exist in the remanufacturing system due to the different damage statuses of old mechanical products, which result in dynamic GHG emissions. Recent studies on the characteristics of GHG emissions for mechanical product remanufacturing are not yet available. This study proposed a quantitative analysis method of GHG emissions for mechanical product remanufacturing based on Petri net. In this method, the boundary of the remanufacturing is initially defined, and the dynamic characteristics of GHG emissions are analysed. Then, a GHG emission analysis model based on Petri net is constructed. Finally, the GHG emission of a PCL803 centrifugal compressor rotor remanufacturing as a case is analysed by this proposed method. This method could provide a guidance to quantitatively analyse the characteristics of GHG emissions, and suggestions for mechanical product remanufacturing to realize cleaner production and sustainability.

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*Corresponding author:

shijunli0124@163.com
(Shi, J.L.)

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