

Scaling Remanufacturing Processes by improving efficiency and productivity

Mackie Automatic Transmissions Ltd & University of Strathclyde
A Scottish Institute for Remanufacture Case Study

Project Summary

An anticipated increase in production at Mackies Automatic Transmissions Ltd has the potential to prevent approximately 60,000 kg of raw material from entering the UK waste stream by remanufacturing to “as new” standard, enabling multiple product lifecycles – a key component in Scotland’s transition to a circular economy.

It is expected that the implementation of recommended improvements in housekeeping and remanufacturing processes to ensure quality assurance and traceability could lead to a 56% increase in number of units remanufactured increasing to a potential increase of over 200% over three years.

Scaling up the remanufacturing process was critical for Mackie Automatic Transmissions Ltd to secure a significant increase in unit throughput requested by an existing global customer. They approached the Remanufacturing Group at Strathclyde University to contribute their business and engineering management expertise to a programme of operational improvements across their remanufacturing processes.

Mackie Automatic Transmissions Ltd

Mackie Automatic Transmissions Limited is a leading UK manufacturer of automotive, commercial, industrial and marine transmissions since 1977.

The remanufactured transmissions are rebuilt to meet or exceed the original product specification and are given at least the same guarantee as the original equipment.

The company employs 38 people in their premises in the east side of Glasgow and are recognised as the leaders in torque converter repair, reconditioning and remanufacturing services for all types of torque converters.

They are the remanufactured unit supplier for Subaru, Isuzu, Hyundai, Nissan and Chevrolet and have also been a ZF service partner for over 20 years.

Project Background

A global customer plans to enhance their partnership with Mackie Automatic Transmissions Ltd and include their torque convertor remanufacturing services within a global business plan. As part of the preparation for this partnership extension, the customer carried out a pre-audit of the processes at the workshop and made a number of recommendations to ensure that operations met the requirements for global expansion.

The Remanufacturing Group based within the Design, Manufacturing & Engineering Management (DMEM) department at the University of Strathclyde provided bespoke solutions to improve the management efficiency, stability and quality in the existing remanufacturing operations.



Improved workstation layout and part labelling at Mackie Transmissions Ltd

Project Outcomes

The existing remanufacturing processes were documented using process flow diagrams - from receiving the used core through to shipping the remanufactured part. These processes were then reviewed and a quality traceability system was created to ensure all parts were traceable and identifiable at each stage of the remanufacturing process.

Through the creation of the system, there were opportunities to further assist with other areas of their remanufacturing business including:

- Create build sheets to improve traceability and create a standardisation for the remanufacturing process
- Development of a manual for torque convertor remanufacturing process to support knowledge transfer and business growth
- Documenting personnel skills and capabilities to maximise efficiencies and create career development

Torque Converter Remanufacturing Process Overview



This diagram illustrates each stage of Torque Converter Remanufacturing and provides a clear overview of the process. From this, process flowcharts were created which highlight responsible personnel for each task, including back office, sales and administration tasks.

This structure allows opportunities for further improvements to be readily identified and ensures smooth running of the remanufacturing operations.

A funding award from the [Scottish Institute for Remanufacture](http://www.scot-reman.ac.uk) supported the academic research time invested by the Remanufacturing Group at Strathclyde to research, analyse and prepare recommendations.

The economic benefits of the research will be fully realised when the company enters into the new phase of partnership with the global customer but it is expected that productivity will increase by over 200% in a three year period and will create an increase in the workforce of around 15%.

The environmental benefits will be clearly measured once the increase in productivity is known, but each torque convertor remanufactured by Mackie Automatic Transmissions Ltd saves approximately 12kg of materials entering the waste stream, conserving the original energy used to manufacture them and preserving natural resources.



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