

Mackie Automatic & Manual Transmissions



Mackie Automatic & Manual Transmissions have been remanufacturing automotive transmissions since 1977. The company based in Tollcross, Glasgow, employs 32 people and has a turnover of £2.5m—all generated from its remanufacturing activities. The company is now a global supplier of remanufactured transmissions with 25% of its products destined for Europe.

The company's founder, John Mackie, started the business after noticing that broken transmissions were routinely discarded rather than repaired. John taught himself how to re-manufacture transmissions through reverse engineering and now the company is one of only three in the UK (and the only company in Scotland) with the facilities to fully remanufacture and test automatic transmissions.

The company operates in the aftermarket segment of the automotive value chain

The remanufacturing process

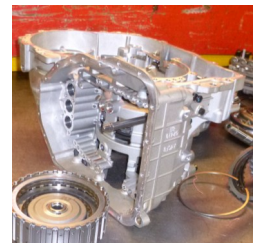
The transmission connects the engine with the gearbox of a vehicle, converting speed and torque in the process. The three main components of an automatic transmission are the:



Torque converter



Valve body



Transmission body

Remanufacturing an automatic transmission takes 12-14 hours and involves the following steps:

- **Tear down**—the transmission is disassembled into individual components.
- **Cleaning/Inspection**—after cleaning, the components are segregated into re-use, re-work and scrap.
- **Torque converter remanufacturing**—the torque converter is split in half and the internal components removed and washed; the thrust bearings are replaced and the bearing surface re-machined; a new converter lining is applied if necessary; the converter is reassembled and welded together; the converter is pressure tested and balance checked before shot blasting and finishing with an anti-rust coat.
- **Valve body remanufacturing**— the valve body is stripped; any internal wear is re-machined and oversized valves are used to compensate; the valve body is tested using a test cycle reportedly more rigorous than the cycle used by some OEMs.
- **Assembly**—the transmission is re-assembled; “soft” or wear parts, such as gaskets, bearings and seals are replaced; “hard” or durable parts are checked for functionality and replaced if necessary.
- **Dynamic testing**—the fully assembled transmission undergoes a 30 minute test cycle; each test cycle is linked to the transmission job number allowing full traceability of the test results.

Why remanufacture transmissions?

- **Product suitability**—transmissions (particular automatic transmissions) are well-suited to remanufacturing operations as they are high value and complex products, with a steady pace of technology evolution
- **Cost**—remanufactured transmissions are a minimum of 60% cheaper than a new product
- **Waste reduction**—remanufacturing reuses approximately 85% of the original components by mass
- **Reduced lead times**—as many models of transmission are kept in stock, orders received by 3pm will usually be dispatched the same day
- **New model resilience**—by partnering with a remanufacturer, OEMs releasing new transmission models can protect themselves against any warranty failures



Cleaned torque converters



Heavy duty core

Mackie Automatic & Manual Transmissions operates a diverse range of five different remanufacturing business models, described below:

OEM CONTRACTS

Mackie Automatic & Manual Transmissions is the sole UK supplier of remanufactured transmissions for Subaru, Isuzu, Hyundai, Nissan and Chevrolet for warranty repairs. The company can provide remanufactured transmissions from stock with a warranty to cover the remainder of the original warranty period. This work makes up about 45% of the business.

FLEET CONTRACTS

The company has remanufacturing contracts with delivery vehicle fleets. The transmissions on these vehicles require frequent remanufacturing due to the start/stop style of driving.

INDEPENDENT GARAGES

The company supplies remanufactured transmissions to independent garages. Typically garages will send over the whole vehicle. If the right transmission is not in stock, the company will remanufacture the original transmission.

COMPONENTS SUPPLIER

The company will supply remanufactured transmissions to smaller companies for them to sell under their own brand.

PUBLIC SALES

The company will remanufacture transmissions for members of the general public, on request.



“Remanufacturing attracts cowboys who market themselves as remanufacturers, but aren’t. This damages the whole industry”

John Mackie—Managing Director, Mackie Automatic & Manual Transmissions

While Mackie Automatic & Manual Transmissions has been successfully remanufacturing transmissions for 37 years, the business still faces a number of challenges:

- **Damage to industry reputation**—there is no legal definition of remanufacturing and the reputation of the industry is being damaged by companies claiming to remanufacture transmissions who produce sub-standard products.
- **Raising finance**—banks do not understand remanufacturing making it difficult to get finance. To keep up with the latest transmission models, the business requires continual, long-term investment in equipment and training. With payback periods of 7-8 years, this type of investment may not be attractive to lenders. Additionally, many of the grants available to traditional remanufacturing are not available to remanufacturers.
- **Lack of design for remanufacturing**—design for weight reduction and efficiency improvements take priority over design for remanufacturing, making it increasingly difficult to remanufacture parts and components. For example, some steel and cast iron components have been replaced by thin aluminium parts and some solid components have been replaced with pressed sheet components.
- **Limited relationship with OEMs**—while the company has a good relationship with its OEM partners, there is not yet a free exchange of information. If design information was available to the company, it would be much easier to develop the remanufacturing processes and equipment for new transmission models., rather than relying on reverse engineering. Additionally, the learning that the company gathers about recurring faults and components could be fed back to the OEM to improve the transmission design.
- **Focus on OEM remanufacturers**—historically, the focus of any discussion on remanufacturing at a governmental or policy-based level has focused on those OEMs that remanufacture. The challenge is for independent remanufacturing SMEs, like Mackie Automatic & Manual Transmissions, to be involved with these discussions and to get their voices heard.

Future plans and opportunities

Mackie Automatic & Manual Transmissions are keen to expand their remanufacturing operations while keeping their focus on transmissions. With continued investment in equipment and training, there are opportunities for the company to expand their OEM contracts. The design of equipment and test programs that the company has developed to remanufacture different transmission models could also be sold to non-competing companies overseas.

We would like to thank John Mackie at Mackie Automatic & Manual Transmissions for his assistance in preparing this case study.

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