

## The 7 Highly Effective Steps Of Remanufacturing

Written by Lonnie Morris, Rockwell Automation Repair Services  
Monday, 01 October 2007 00:00

---

**Undecided on the path to take? Here's how the choice to remanufacture is helping end users across industry increase Mean Time Between Failures.**

As more and more manufacturers turn to automation to improve their productivity and profitability, asset management becomes an even bigger part of the overall picture. Deciding whether to repair, remanufacture or replace equipment is a big part of that picture. As a result, Mean Time Between Failure (MTBF) has become an important measurement for determining which path to take.

Contrary to what some may believe, MTBF only represents a unit's reliability (expected time frame between two consecutive failures), expressed in terms of hours—it is not synonymous with a unit's service life. Surprisingly, there is no established industry standard when it comes to measuring MTBF. Therefore, many manufacturers have different ways for calculating it, mostly because the definition of a "failure" also can vary from company to company. In some cases, short periods of downtime (one hour or less) are not counted as a failure, even though frequent, minor interruptions usually point to a more serious performance issue.

The higher an MTBF rating, the more reliable the equipment will be, and, in turn, the greater its availability. Both MTBF and Mean Time To Repair (MTTR) are used to calculate a unit's availability (expressed as a percent), as in the following equation:

$$\text{Availability (\%)} = \frac{\text{MTBF}}{\text{MTBF} + \text{MTTR}}$$

Some companies don't measure MTBF at all. One reason may be that those manufacturers operate primarily in a reactive maintenance mode and measuring reliability is not a priority—reducing failures is. Reliability and failure reduction, however, are not mutually exclusive.

## The 7 Highly Effective Steps Of Remanufacturing

Written by Lonnie Morris, Rockwell Automation Repair Services  
Monday, 01 October 2007 00:00

---

**So, just how do you increase your MTBF and overall equipment availability? Consider the benefits of remanufacturing.**

### Remanufacturing vs. repair

Today, doing more with less has become the rule instead of the exception. Reduction in staff and spare parts inventory can lead to longer downtimes, reduced productivity and lost revenue. Consequently, manufacturers must find reliable resources to help keep their production equipment operating to specifications while increasing MTBF.

## THE 7 HIGHLY EFFECTIVE STEPS OF REMANUFACTURING

*Rockwell Automation's seven-step remanufacturing process ensures that quality is built-in at every step.*

1. Receipt and Verification for warranty; a bar code is assigned for easy tracking.
2. Revisions and Enhancements performed to properly clean and update equipment.
3. Component Verification of suspected faulty components.
4. Dynamic Functional Test against current OEM specifications. Specialists determine if equipment meets or exceeds OEM specifications.
5. Environmental Testing to highlight intermittent problems not readily apparent.
6. Final Quality Inspection is performed by Quality Control Inspectors to ensure equipment meets or exceeds OEM specifications.

## The 7 Highly Effective Steps Of Remanufacturing

Written by Lonnie Morris, Rockwell Automation Repair Services  
Monday, 01 October 2007 00:00

---

### **7. Securely Shipped in custom-engineered, anti-static bags and contain**

When a failure occurs, many maintenance personnel are in the habit of sending the failed unit to a known thirdparty repair vendor without much thought being given to the process the vendor follows. Many times, these types of repair services are not only costly, they tend to focus solely on the part of the equipment thought to be the source of the problem—as opposed to focusing on the entire unit.

Remanufacturing goes beyond repair to offer a proactive, cost-effective approach to reducing equipment failures. It restores failed equipment to “like new” or better condition by providing firmware updates that can enhance product functionality and insure compatibility with future systems. Additionally, remanufacturing uses original (sometimes proprietary) components that maximize MTBF. Remanufacturers test to the original design parameters, which is a key component in certifying that the entire unit will function to specification. Testing outside of these parameters may compromise MTBF. The result: the remanufacturing process increases MTBF, reduces unplanned downtime and lowers overall asset costs.

For many types of equipment, true remanufacturing can be provided only by the original product manufacturer. That’s because only the manufacturer possesses the propriety knowledge, documentation, parts, revision updates and custom testing equipment to perform these services. Thus, many third-party repair companies are unable to test to the original design parameters. Moreover, the use of non-OEM parts can be quite problematic in some cases. Remanufacturing improves Overall Equipment Effectiveness (OEE), extends equipment or system life expectancy and allows for future integration with newer, more sophisticated automation products and technology.

Remanufacturing also helps to stabilize budgets by reducing the amount of repairs required each year, and provides the performance capabilities of new equipment at up to half of the cost.

As a leading manufacturer of automation and control equipment, Rockwell Automation offers valuable remanufacturing services and is the only authorized remanufacturer of Allen-Bradley products and Reliance Electric drives. Many remanufacturers have a proprietary remanufacturing process. For example, Rockwell Automation follows a

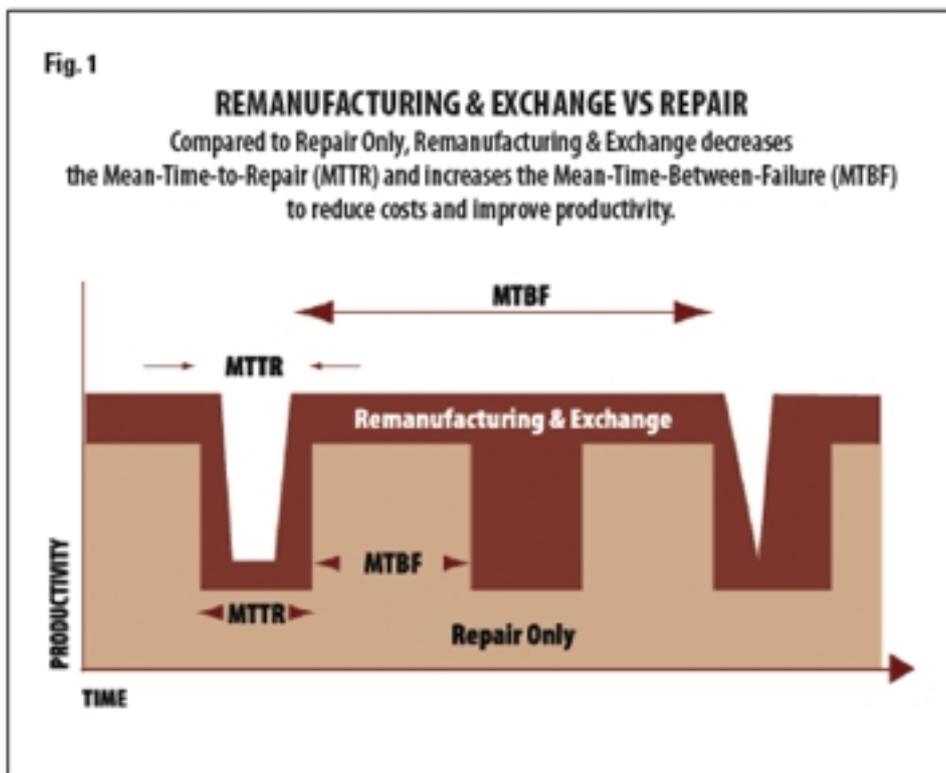
## The 7 Highly Effective Steps Of Remanufacturing

Written by Lonnie Morris, Rockwell Automation Repair Services  
Monday, 01 October 2007 00:00

---

seven-step process (see Sidebar) to ensure that every remanufactured unit operates to specifications, ensuring increased MTBF. Plus, data collected during this process is continuously analyzed to improve the design and remanufacturing product specifications.

Unlike traditional repairs, Rockwell's remanufacturing service also includes a 12-month warranty on the entire unit, not just the replaced components. Expedited delivery and longer warranty terms are available through advance remanufacturing and advance exchange services. Fig. 1 illustrates the benefits of remanufacturing versus repair.



### Quality built-in at every step

As previously noted, many remanufacturers follow a specific remanufacturing process, such as Rockwell Automation's proprietary seven step process. At Rockwell Automation manufacturing facilities, units are examined thoroughly by highly trained specialists to find the true source of the failure. After the unit has been received, the warranty is verified and a bar code is assigned for easy tracking of repair history and order status. Next, the unit is properly cleaned and updated to the latest applicable hardware and copyrighted firmware. Any damaged, faulty or outdated components—including printed circuit boards—are rebuilt, not repaired.

## The 7 Highly Effective Steps Of Remanufacturing

Written by Lonnie Morris, Rockwell Automation Repair Services  
Monday, 01 October 2007 00:00

---

**The unit then undergoes Dynamic Functional Testing against current OEM specifications. Specialists determine operational status using dedicated test equipment, including parametric testing. The unit also goes through environmental testing to highlight intermittent problems that are not readily apparent, a process that helps prevent premature failures and increases the unit's MTBF rate.**

**After the unit has been thoroughly cleaned, inspected, remanufactured and tested, Quality Control Inspectors perform a final quality check to ensure compliance with Rockwell standards. Finally, the unit is securely wrapped in a custom-engineered, anti-static bag and container to help protect it against static discharge during return shipment to the customer. Accessories such as keys, batteries and manuals also are included.**

### **Making a smart choice**

**Companies should consider remanufacturing as a viable option for:**

- 1. resolving machine performance issues that decrease machine reliability and extend the duration of unplanned downtime;**
- 2. reducing and/or stabilizing machine repair costs; or**
- 3. accommodating process issues, such as machine reliability, production flexibility and operating to design specifications.**

**Your equipment vendor should have a vested interest in your success and be able to back its products with a broad array of support and maintenance services to help you minimize your operational costs and keep your competitive edge. This includes offering a comprehensive remanufacturing service that can restore equipment to a "like new" or better condition for much less than the cost of a new replacement item.**

**More importantly, though, remember that remanufacturing increases the Mean Time Between Failure, which reduces costs (unit does not need to be repaired as often), extends product life and improves productivity. Regardless of the industry or environment, remanufacturing of failed or malfunctioning equipment is a smart choice.**

***Lonnie Morris is global product manager with Rockwell Automation Repair Services in Milwaukee WI. E-mail: [irmorris@ra.rockwell.com](mailto:irmorris@ra.rockwell.com)***

# The 7 Highly Effective Steps Of Remanufacturing

Written by Lonnie Morris, Rockwell Automation Repair Services  
Monday, 01 October 2007 00:00

---