MTU **Value**Care

Getting to the core of engine value: Understanding lifecycle costs for long-term savings

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When lifecycle costs are considered, high-performing and well-maintained MTU engines outmatch the competition with purpose-built design, unmatched quality and tailored service.

In the never-ending pursuit to boost bottom lines, businesses are more motivated than ever to find ways to reduce costs. When making equipment investments under constrained budgets, it is tempting to focus only on the short-term. However, the upfront price is only a small piece of the financial puzzle. Costs over an entire lifecycle can be significant when investing in large and technically advanced equipment like an off-highway engine. To understand the long-term value of an engine, it is imperative to evaluate not just the initial acquisition price but also maintenance, operating and disposal costs during ownership. Doing so will reveal how investing in a superior engine design and comprehensive lifecycle support can take a meaningful bite out of total cost of ownership.

Value is an often-discussed concept. Consider a midsize car. Sticker price is $20,000. Cost to own and operate it for five years? $43,500—more than double the purchase price. Smart new vehicle buyers consider fuel, insurance, maintenance and repair, as well as the length of time they plan to own the vehicle when making such a significant purchase.

Another way to look at value is examining long-term savings. The upfront price of installing triple pane windows is twice the amount of double pane windows. Factor in the increased efficiency and decades-long savings in energy costs and the scales tip the other way. It makes good financial sense to spend more upfront for a superior product when it offers better long-term savings.

Considering lifetime value is a must when purchasing an off-highway engine. This technical article will help equipment purchasers, owners and operators, along with facility and maintenance managers, gain a deeper understanding of an engine's true value by examining total costs, their impact on lifecycle costs and the opportunities wise investors can leverage to benefit the bottom line.

In addition to comparing engine options prior to purchase, lifecycle costs are also often used as a basis for writing long-term service agreements, non-binding spare parts budgets and for general profitability analysis and planning.

Breaking down lifecycle costs

For an off-highway engine, lifecycle costs are comprised of four distinct cost categories: acquisition, operation, maintenance and disposal.

– Acquisition
  This non-recurring upfront cost is the initial engine or system purchase price, and typically includes installation and administrative costs including necessary facilities and training. The cost of an engine overhaul also falls into this category.

– Operation
  Fuel, lube oil and urea consumption are the primary contributors to operating costs, accounting for up to 90 percent of total lifecycle costs. This is especially true in mining or rail applications where the equipment endures high run hours.

– Maintenance (preventive and corrective)
  Savvy operators understand that planned maintenance and equipment availability go hand-in-hand. Preventive maintenance helps ensure peak performance, extend equipment life, and can even improve profitability.

– Disposal
  Costs also occur at the end of equipment life. Decommissioned engines must be removed and disposed of properly, in accordance with local regulations.

Acquisition

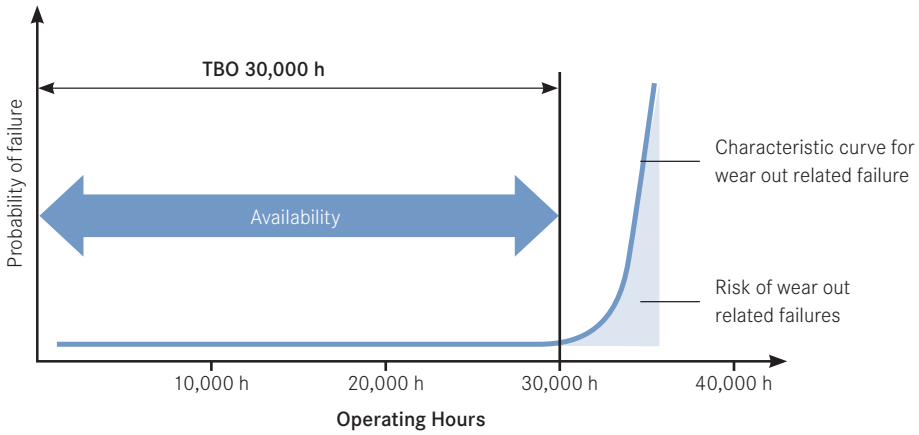
Upfront costs are easy for most people to grasp, which is exactly why their assumed contribution to total lifecycle costs is often overestimated. In terms of potential financial gains, or losses, the implications of an inaccurate lifecycle cost calculation can be quite significant—especially when considering equipment with a long life expectancy and high utilization rates. In these circumstances, often an upfront investment in higher equipment quality pays dividends over the life of that equipment in terms of lower operating costs.

Time Between Overhaul

Another important lifecycle factor to consider is time between overhaul (TBO), which refers to the overall life expectancy of an engine. TBO can be a difficult concept to grasp because some systems, such as MTU engines, are built to be overhauled as many as four times—giving operators four lives from a single engine. The important thing to keep in mind is that an engine has a life expectancy, and at the end of that expected life an operation can exercise one of three options: 1) scrap the engine and purchase a new one, 2) overhaul the existing engine and begin its "second life," or 3) purchase a remanufactured engine from the factory and return the existing engine for a "core credit." Each of these scenarios warrants a fresh look at LCC because it represents the start of a new engine life. New acquisition costs must be considered whether for a new engine, an overhaul or the expense of a remanufactured replacement engine.

Because MTU engines are built to be overhauled up to four times, MTU considers TBO as it would any other preventive maintenance activity. The end of the TBO refers to the point in time when an engine's availability and reliability rates begin to decline due to wear. Overhauling at this point helps the owner/operator avoid the increased risk of potential failures, and restore their engine to like-new condition. MTU TBOs are estimated based on decades worth of field data and analysis based on engines with comparable load profiles and other life limiting factors.

Sample Time Between Overhaul



Operation

For off-highway engines, especially those operating in high run hour applications, the most significant contributor to lifecycle costs is operating expenses—primarily because of fuel. With the potential to account for as much as 90 percent of total lifecycle costs, it's not hard to see why. Unfortunately, fuel is often one of the most neglected categories when evaluating overall value. Organizational silos can prevent purchasing analysts and decision-makers from understanding the critical role fuel plays in operating costs. When evaluating lifecycle costs and the potential purchase of an engine, it is critical to consider fuel—even a fraction of a percentage gain in fuel economy can yield tremendous savings throughout the life of an engine.

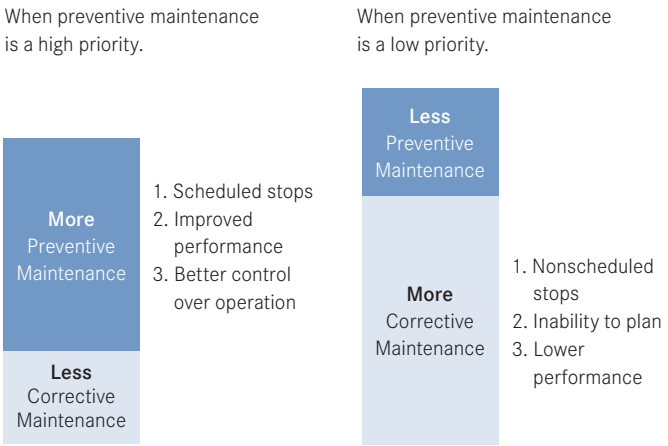
Maintenance

Maintenance and its related costs are also extremely important to consider when evaluating lifecycle costs, primarily because of the direct influence maintenance has over long-term operating costs and equipment life. Savvy operators recognize that proper maintenance throughout an engine's life pays for itself and then some by extending equipment life and preventing declines in fuel economy and performance due to equipment wear. Unfortunately, a love-hate relationship often plays out between those who acquire operational assets and those who operate and maintain them. These often-siloed roles represent competing interests; one focused on maximizing profitability to meet short-term targets, which could mean deferring maintenance for short-lived savings. The other advocates for the continued investment in caring for valuable equipment—care that typically increases availability, improves equipment performance and extends equipment life. Given the fundamental role that equipment life and fuel economy both play in determining lifecycle costs, the gains achieved from a recurring investment in preventive maintenance must be considered alongside the costs of maintenance itself within any meaningful lifecycle cost calculation.

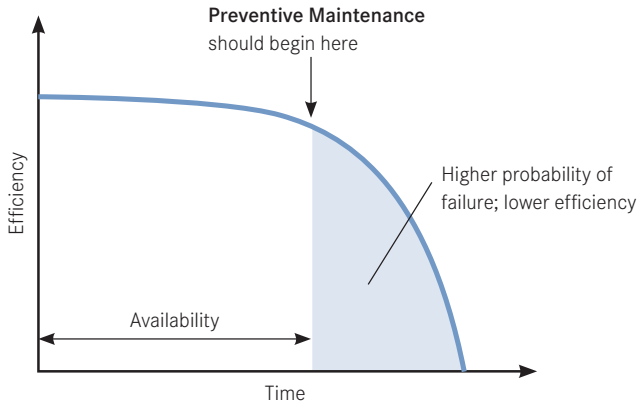
Disposal

Finally, it is important to factor in costs that occur at the end of equipment life. Decommissioned engines must be removed and disposed of properly, in accordance with local regulations. Repowered engine cores must either be destroyed or sent back to the manufacturer to be remanufactured and stamped with a new serial number. This critical step cannot be overlooked, as some operations in certain applications and geographies can face hefty fines that accumulate on a per-day, per-engine basis. With potentially high financial implications, mishandling a repowered engine core simply isn't worth the risk.

The Importance of Preventive Maintenance



MTU focuses on preventive maintenance to reduce the downtime and added costs of corrective maintenance.



Delaying maintenance increases unexpected failures and decreases performance and fuel economy.

Optimize your investment

As equipment ages, its needs—and your needs—change. Complete lifecycle solutions from the original manufacturer can help ensure those changing needs are met—and lifecycle costs optimized—by wrapping your investment with 360 degrees of support, tailored to your equipment. As the only service and support portfolios designed by the manufacturer with your specific equipment in mind, these packages can add tremendous value depending on your needs. Common lifecycle solutions include long-term service agreements, extended warranty options, on-demand support, digital tools and resources, and remanufactured products.

Extended Coverage

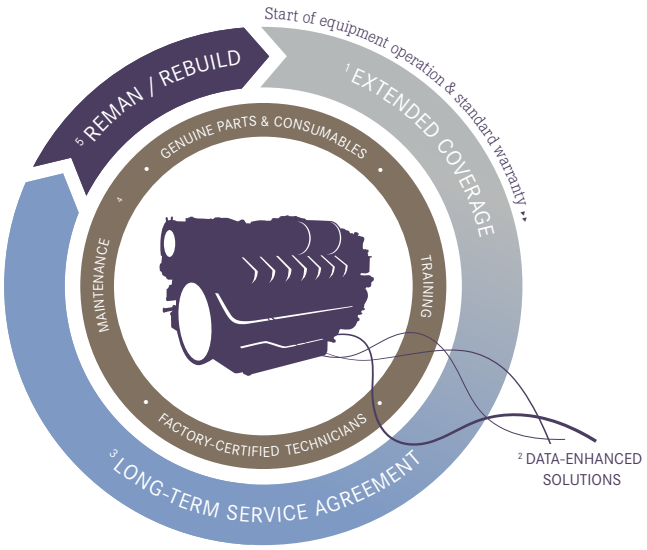
Most operators prefer limited exposure to unexpected costs. When operations are primarily focused on avoiding unexpected costs associated with corrective maintenance, extended coverage can be a preferred method for limiting financial risk. Extended coverage plans provide added protection beyond the standard warranty, covering all costs associated with corrective maintenance (e.g. travel, troubleshooting, parts, repairs) within the contract period—no surprises.

Data-enhanced Solutions

Equipment manufacturers are investing heavily in digitization, offering an increasing range of smart monitoring tools that keep a pulse on engine vitals, such as fluid levels, runtime, temperature, alarms and overall performance. Real-time information from these tools can help operators make informed decisions faster, while streamlining equipment ownership, operation and maintenance.

Long-term Service Agreements

In applications with high equipment utilization rates, such as commercial marine, rail, mining and oil & gas, operations depend on high equipment availability and predictable costs. Long-term service agreements, also known as maintenance and repair contracts (MARC), lock in the cost of maintenance and optimize availability through an engine's entire lifecycle



1. Avoid the unexpected with added protection beyond the standard warranty.
2. Make better decisions faster with data-enhanced tools.
3. Maximize availability and optimize lifecycle costs with an individually tailored Long-term Service Agreement.
4. Improve system performance and extend equipment life with on-demand support.
5. Keep a good thing going with factory reman/rebuild solutions.

through planned, professional maintenance. The terms of these agreements are often customized to fit the unique needs of the operator and can include preventive maintenance only (e.g. travel, parts, service, etc.), or preventive and corrective maintenance (e.g. troubleshooting and repairs).

On-demand Support

Equipment manufacturers go to great lengths to provide local support worldwide, offering everything from preventive and corrective maintenance to genuine spare parts and remanufactured products. Often these products and services are sold through a network of factory-owned or factory-certified service partners.

Reman/Rebuild Solutions

Factory remanufactured and rebuilt products can provide a smart alternative to investing in new equipment by turning back the clock on your existing equipment and restoring it to like-new condition. Reman/rebuild solutions are produced by the same experts as your original engine, allowing operators to keep existing equipment in play and avoid the hassle of emissions recertification and additional redesign and reintegration work that are often necessary when repowering with a new engine.

Conclusion

Business leader and philanthropist Warren Buffett once said, "Price is what you pay. Value is what you get." Understanding lifecycle costs upfront can help identify potential long-term savings opportunities and increase financial performance for an operation. It's all about making informed decisions and spending wisely. In many cases the upfront purchase price of a superior, purposefully engineered engine pays dividends in the long-term when it comes to meaningful reductions in operating costs—particularly fuel consumption. Although superior engine technology often comes with a higher acquisition cost, with the right preventive maintenance plan and comprehensive lifecycle support these costs are more than offset by overall lifecycle costs.

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