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## Rotables – Repair or Replace?

### The constant challenge facing MROs

By David Dundas

Is it fair to say that components which make up the structure of an aircraft fall into one of three main categories: Expendable, repairable and rotatable. Expendable parts are those over which MROs can have little control. They get replaced when needed and there is never any question of repairing them. Repairable parts and rotatables, on the other hand, share a lot of common ground, primarily the fact that they can all be repaired where appropriate in terms of safety and cost efficiency. However, rotatables differ from repairable components in that they not only come with critical serial numbers, but they are subject to checks and maintenance at strictly pre-determined intervals. Also, like repairable parts, one of the biggest challenges involving rotatables is knowing when a part can be repaired, and when it has to be replaced.

To find out what factors influence the rotatable repair or replace dilemma, we decided to approach eight leading MRO operators for their input and knowledge to see what the overall industry perspective may look like.

#### What factors typically determine whether a rotatable should be repaired or replaced?

When it comes to aircraft maintenance, one of the greatest challenges is reducing the overall running costs, with MRO activities forming a major element. As a consequence, in order to minimise such costs, there is a constant battle going on between repairing or replacing various components. Joe Greenwood, Vice President Sales, AAR Component

Services clearly defines his company's approach to the problem in relation to rotatables. "We assess the current market value, as well as overall availability of the rotatable in the marketplace. If there is sufficient availability, the rotatable is typically repaired up to a threshold of 60-70% of the current and fair market value (FMV). Another contributing factor is the amount of Used Serviceable Material (USM) and/



Oliver James, VP Trading - Americas, AerFin

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or availability of OEM piece parts to support a repair. When piece part supply is limited, the decision is often made to replace the rotatable if there are overhauled units in the market." Oliver James, VP Trading - Americas, AerFin is of a similar opinion, as is Mike DeMicco, SVP Sales and Material Management, VAS Aero Services, and Tony Kondo, President and CEO, Werner Aero LLC. James adds that: "...if lead times are long, the component has recurring failures, or a newer version offers better performance, replacement may be the better option. Availability of spares, contractual obligations, and market conditions also play a role. Ultimately, the choice balances cost-effectiveness, aircraft downtime, and long-term operational efficiency." DeMicco also points out that:



Kyle D. Olson, VP Sales, Ascent Aviation Services

"In cases where the part is critical to flight operations, has significant damage and has expected risk of future failure, the part is best suited for replacement," while Kondo advises that that you also need to consider the BER rate of any rotatable.

Ismaël Fadili, Vice President Sales Europe – AMETEK MRO has a slight variation on the theme, commenting that: "The main factors are economic and focus on price comparisons with the purchase price of a new unit. Most of the airlines consider that at a cost of up to 65% to 70% of the purchase price for a new unit, a rotatable should be repaired. Some airlines are also questioning low value rotatables, like ballast, with a repair or buy strategy." Kyle D. Olson, VP Sales, Ascent Aviation makes it clear that: "The age of the component plays a significant role, as older parts often provide diminishing returns on repairs, which may lead us to choose a replacement. Turnaround time is another key consideration—if repairs take longer than sourcing a replacement, we prioritise operational efficiency, and we explore exchange options. Lastly, regulatory compliance is paramount, ensuring that all components meet stringent safety and

airworthiness standards after any repair. These factors guide us in making the best decisions to support our customers' needs," adding that "Each of these factors ensures that we make informed decisions that prioritize safety, cost-effectiveness, and operational efficiency."

Craig Padvaikas, VP Asset Management, Broward Aviation Services adds to the growing list of factors to be taken into account when he points out that: "The service life of a unit is another factor noting that some units can only be repaired or overhauled so many times. Additionally, the impact (if any) on the operating efficiency and operational costs on the bigger picture. The overall revenue stream of that larger asset (the aircraft) needs to be taken into consideration." Meanwhile, Scott Loza, Snr. Component Trader, Setna iO also has a clear strategy "[when] determining if a rotatable should be repaired or replaced, the decision depends on a mix of financial, safety, operational, and regulatory considerations, all tailored to the specific circumstances of the aircraft and the component." He then points out that if the cost of an OEM new unit is lower then the repair and repairs are complex,

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Scott Loza, Sr. Component Trader, Setna iO

replacement may be the more practical. He further comments that some manufacturers may recommend replacement after a certain number of hours or cycles to ensure safety and performance standards, while regulatory requirements such as Airworthiness Directives (ADs) may either mandate repairs or replacement of certain components. Compliance with these regulations is essential for continued operation.

**How to decide if a rotatable is still repairable?**

Here we are not talking so much about the financial or time-sensitive constraints, but simply the physical condition of any rotatable. Oliver James explains that “Maintenance teams determine if a rotatable is repairable through inspection and testing in accordance with component or engine maintenance manuals. Inspections include physical inspections, use of NDT methods to check for internal defects, and functional testing.” Ismaël Fadili goes further: “This is mainly based on the reason for the removal or what time has elapsed since the new installation or latest repair. Nevertheless, when a rotatable has been identified as repairable, the airline first sends the unit

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for final investigation by a specialist repair provider like AMETEK MRO. A decision is then taken depending on the findings of that inspection, and the cost of the repair.”

“At Ascent Aviation Services, our decision-making process for evaluating rotatables is guided by several key factors. Our teams conduct thorough reviews of components, aircraft maintenance manuals, and manufacturer guidelines, alongside the associated task card,” explains Kyle D. Olson. Additionally, Craig Padvaiskas advises that at Broward Aviation Services, “All Part 145 repair facilities are directed by the Component Maintenance Manuals to inspect, test, repair, or overhaul the units they receive. This determines how much of the unit needs to be repaired/overhauled,” while Joe Greenwood points out that “The rotatable undergoes an incoming inspection and evaluation against the corresponding Component Maintenance Manual (CMM) to determine the material requiring repair or replacement.”

Scott Loza goes into greater detail with his assessment of the challenge. “Maintenance teams rely on detailed inspections, historical data, manufacturer guidelines, and cost-effectiveness to make an informed decision on whether a rotatable is repairable. If the repair would compromise safety, reliability, or cost-effectiveness, replacement is generally the better choice. Preliminary inspection checks for visual damage and any signs of physical damage, such as cracks, corrosion, or wear, are documented. If the rotatable had performance issues before removal, diagnostic tests are run to understand the root cause of failure. A review of the component’s maintenance history

helps assess whether the rotatable has had frequent failures or repairs. If it has been repaired multiple times already, it may be approaching the end of its useful life.” This is backed up by Mike DeMicco who states that, “Rotables are sent to a qualified MRO organization with the necessary inspection and repair capability to determine their condition and viability for repair service. The MRO will check for cracks, corrosion, excessive wear, and other defects which would compromise the part and render it not recoverable through repair.”

**When is a rotatable cheaper to replace than repair?**

The next deciding factor in relation to whether to repair or replace a rotatable is the overall cost factor. This doesn’t necessarily include just the cost of repairs or replacement, but also the availability of any replacement and therefore the length of time on ground for the aircraft, as noted by Tony Kondo. This is backed up by Craig Padvaiskas who says that: “I believe an industry guideline is if the cost of repair is more than 70-80% of the total cost of replacing the unit, then it is better to go with the replacement. Though once again,



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Technician working on brakes

© Antavia AMETEK MRO

readiness or availability of such a rotatable unit is major factors in the decision.” Ismaël Fadili also provides an answer very succinctly: “I would say when the rotatable is beyond economical repair (BER). This means that the cost of the repair is close to, or above, the fair market value or the purchase price of a new part from the OEM,” with Oliver James following the same line of thought.

More comprehensively, Kyle D. Olson explains: “At Ascent, we carefully evaluate several factors when deciding whether to repair or replace a rotatable. High repair costs are a key consideration—when repair costs approach or exceed the cost of replacement, replacing the component becomes the more economical solution. Obsolescence also plays a role, as older components that are difficult to repair or no longer supported may necessitate replacement. Frequent failures are another factor, as rotatables with recurring issues often lead to increasing long-term costs, making replacement the more cost-effective choice. Additionally, operational urgency is a critical aspect; when repair lead times exceed operational deadlines, replacing the rotatable ensures minimal downtime and helps maintain operational

efficiency. These considerations guide our approach to ensuring the best outcomes for our customers.” He adds: “In addition to these factors, we also consider regulatory standards, Service Bulletin requirements, and downtime/operational efficiency to ensure the most cost-effective solution. By evaluating all variables, we ensure our customers receive the most reliable and financially viable option for their needs.”

Mike DeMicco concurs with Kyle D. Olson with regard to when repair costs approach or exceed the cost of replacement, replacing the component becomes the more economical solution. However, he also points out that “That calculation should include the time required to repair the part and how long customer operations may be idled. Downtime is expensive, so it may be less costly, and faster time to service resumption, to replace the part. Additionally, some parts are tracked by TSN and replacement becomes a requirement. Another aspect that should be considered is whether the part is being replaced with a newly manufactured unit or a Used Serviceable Material (USM) part. As a leading supplier of USM, VAS engages with global airline operators to find cost-effective USM solutions.”

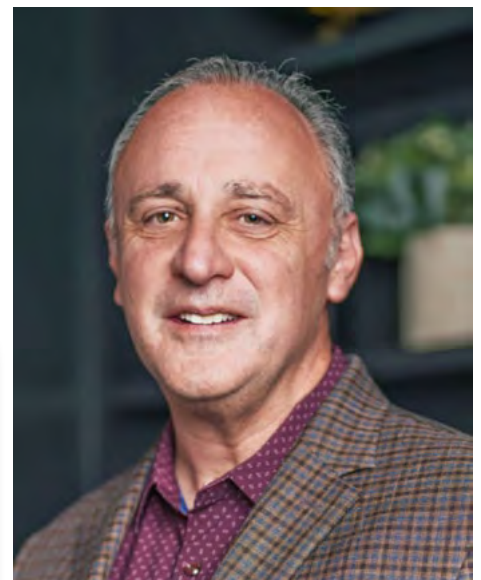
Joe Greenwood pays particularly close attention to full market value (FMV) for components, commenting that: “When the condition of the rotatable exceeds the established threshold against FMV, then the rotatable is typically replaced. This cost analysis includes the original acquisition cost of the rotatable as well. However, when there is limited availability on the market, the threshold for repair goes up, and in some cases a decision is made to repair even when exceeding FMV due to no availability.”

### Are there challenges in sourcing replacement rotatables, especially for older aircraft models?

As if there weren’t sufficient factors to be taken into consideration for repairing or replacing rotatables, the age of the aircraft adds a further raft of challenges, especially for older models, especially now that more and more carriers are extending the operational lifetime of many of their aircraft owing to the delays in delivery of new models. Kyle D. Olsen at Ascent Aviation Services is very much aware of the challenges, as he explains: “Yes, sourcing replacement rotatables for older aircraft models can be challenging due to several factors. At Ascent Aviation Services, we understand that: sourcing replacement rotatables for older aircraft models presents unique challenges. Limited availability of parts due to discontinued production or reduced stock of older components can make finding replacements more difficult. Additionally, the higher costs associated with the scarcity of parts often

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drive-up procurement expenses. Ensuring that replacements meet certification requirements is also critical, as components must adhere to strict aviation authority standards to guarantee safety and compliance. Moreover, we often rely on third-party suppliers or surplus inventories, which can introduce variability in lead times and quality. Despite these challenges, we leverage our expertise to navigate these complexities and provide reliable solutions for our customers.”

At Broward Aviation Services, Craig Padvaiskas has noted that “older aircraft models” are now getting much older, and with that comes additional problems. “It definitely can be hard to find some older parts. OEMs sometimes stop supporting certain components and this can make products difficult to find. Supply chain disruption has slowed production too and driven up prices. Generally, OEMs support discontinued airframes for anywhere between 20 to 40 years dependent on the airframe’s popularity, or how similar the parts are to those on newer airframes. Aftermarket suppliers like Broward Aviation Services play a very significant role in this supply chain through the acquisition of inventory through aircraft teardowns and

other strategic acquisitions. There was a Forbes article in December 2024 that said the average age of the global fleet is 14.8 years old. Though this is trending up from the previous years due to supply chain issues, it also illustrates that ‘older aircraft models’ in operation on a global scale are no longer 28-30 years old, some are 35 years which makes sourcing some parts more difficult,” he tells us.

Scott Loza at Setna iO has his sights set clearly on the fact that the harder it becomes to find replacement rotables for older aircraft, the higher the price becomes. “Yes, sourcing replacement rotables for older aircraft models can present several challenges. These challenges stem from various factors related to the availability, support, and regulatory requirements of components. For older aircraft models, parts can be in limited supply. OEMS may stop producing certain rotables, especially if the aircraft is no longer in production or has been retired. If the component is no longer in production, it might only be available through secondary markets or from other aircraft that are being dismantled for parts. These parts may be rare, and prices could rise as demand surpasses supply. Because of these challenges, airlines or operators with older aircraft often develop long-term relationships with parts suppliers, specialised repair shops, and salvage operations to ensure they can continue sourcing rotables when necessary.”

Supply chain problems seem to pervade every aspect of the MRO industry and Mike Demicco at VAS Aero Services is keen to



Mike DeMicco, SVP Sales and Material Management, VAS Aero Services

point out how the supply chain for OEM has influenced the operating procedures where rotables are concerned for older aircraft. “As aircraft models mature and production lines are discontinued, material supply chains become limited and must rely on aftermarket options to maintain the remaining fleet. The aftermarket industry has been working through supply chain constraints for some time now, which were only worsened by the pandemic. As a result, newly manufactured parts are oftentimes not available, making USM parts a suitable, cost-conscious replacement option. Today, it’s critical for aircraft operators to have close partnerships with USM suppliers such as VAS, allowing them to access needed parts, not only for older models, but for other fleet and operational support,” he says.

Ismaël Fadili at AMETEK MRO also has concerns relating to the supply chain disruption of rotables for older aircraft. “Yes, at AMETEK MRO we are managing challenges right now because of the supply chain disruption affecting older aircraft MRO programmes. This is primarily due to OEMs prioritising components for new aircraft production. It is also evident that extending the operational lives of legacy aircraft, due to deliveries issues for new



Ismaël Fadili - VP Sales EMEA, AMETEK MRO

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aircraft, is leading to less teardown activity. So, there are far less used rotables on the market. At AMETEK MRO we have built robust solutions to forward plan and cope with these issues. As OEM-approved repair stations our business units like AEM, Antavia and Muirhead Avionics, need to sustain reliably good turn-around times for customers."

Werner Aero's Tony Kondo has major concerns in relation to a lack of product support for older aircraft, while AerFin's Oliver James is also concerned about limited OEM support. "There are a ton of issues with supporting older aircraft. One of the main ones is lack of product support as the aircraft ages. For component repairs, as the aircraft model gets older and fewer airlines operate them, fewer shops will keep this PN on their capes list as their customer base dwindles. OEMs sometimes stop supporting their parts on older aircraft and push operators to purchase new instead. Often, the older parts are still repairable, but OEMs will hold the piece parts to force operators to spend more on a new unit they might not necessarily need. With dwindling options, operators must get creative to continuing supporting their fleet," Kondo advises. "Yes, sourcing replacement rotables for older aircraft can be challenging due to limited OEM support on out of production parts this can lead to supply chain delays. Airlines and MROs can occasionally turn to PMA parts, DER repairs, and strategic inventory planning methods to mitigate these challenges," suggests James.

AAR Component Services' Joe Greenwood supports Kondo and James with

regard to the problem concerning OEMs and components of older aircraft, though he acknowledges that continued teardowns of older planes helps to feed the supply chain for those still in service. "Due to the high number of retirements and aircraft teardowns for older generation aircraft, there are typically more opportunities to source replacement rotables. The challenges with sourcing are generally associated with newer generation aircraft, where there is less availability of USM due to limited teardowns. For older generation aircraft, as the market dries up, rotables are a challenge as most OEMs are typically not supporting the aircraft components from a manufacturing standpoint at the next higher assembly (NHA) level," he states.

### How the repair-or-replace decision impacts overall maintenance costs for an airline

Finally, we come to the question of the bottom line. Costs, and how these are affected by the repair or replace decision where airlines are concerned. On an even playing field, it would be simple to say that when it becomes necessary to replace a component because it would be cheaper to do so, or the original component is simply too worn out or damaged to repair, then there is no problem. You simply replace the original component. However, do you replace it with an OEM (if available) or USM? When supply chain factors enter into the equation and time on ground becomes an additional factor, the repair-or-replace

decision becomes more complex and can have a greater-than-anticipated effect on overall maintenance costs. This is implied by Craig Padvaiskas when he says that: "Everything is effectively driven by cost, availability and lead time - so there will be occasions when taking on higher costs in the immediate moment make more sense for long-term operational efficiency, and support of the operators' overall revenue stream. Irrespective of such events, a robust planned maintenance schedule is what will minimise the downtime, reduce overall costs, and ensure that aircraft are operating efficiently and safely."

Scott Loza, Oliver James and Ismaël Fadili suggest slightly different strategies, but each taking a longer-term view of the challenge to hand. As Loza further explains: "The decision to repair or replace is not purely about upfront costs, it's about balancing short-term savings with long-term operational efficiency, and it's something airlines must consider carefully when managing their fleet. Repairs might offer lower immediate costs, but they come with the risk of higher unplanned maintenance, frequent downtime, and reduced reliability. Replacements, while initially more expensive, can reduce long-term costs by improving reliability, reducing unplanned downtime, and potentially increasing resale value. Lastly, if the repair process is lengthy or involves multiple rounds of maintenance, the aircraft could be out of service for an extended period. This downtime can have a significant operational impact, especially if the aircraft is a critical part of the airline's

fleet.” James points out that: “Repairs are cheaper upfront but may lead to higher recurring costs and longer lead times, increasing AOG risks. Replacing with a new unit reduces downtime and improves reliability but comes with a higher initial cost. A robust airline strategy will balance both fleet efficiency and cost predictability.” Lastly, as Fadili puts it: “Depending on the value of the rotatable and from a short-term perspective, repairing is more cost effective. But this must always be carefully compared with the costs of replacement with a new unit which brings additional benefits of an extended warranty term, and a longer lifetime.”

Tony Kondo is very much of the opinion that ‘time is money’ and that the least disruptive option is so often the most cost effective. “Many factors are involved when deciding to repair or replace a component. Maintenance needs to understand how much ground time is available to perform the work. Also, if they have the experience mechanics, tooling and technical documents available to complete the repair. Often, maintenance will make a repair/replace decision that least disrupts the airline’s operation as that usually has a bigger financial impact than the cost of most repairs,” he says. Conversely, Mike DeMicco is very succinct in his approach to the financial challenges. “Most airlines have a capital expenditure budget that a replacement part would fall into as well as a component repair budget. Both budgets are affected depending on which decision is made,” he states. At AAR Component Services and in response to the predicament, Joe Greenwood tells us that “As a component MRO, we work



closely with our airline partners to manage the lifecycle costs associated with their maintenance. Rotable inventory to support AOG and critical components is paramount to keeping aircraft operational. When weighing the repair-or-replace decision related to rotatables, we work jointly with our airline partners to assess the availability and costs associated with repairing vs replacing rotatables. This constant analysis and awareness of market conditions is key to airlines budgeting properly for these components.”

And to round things off, Kyle D. Olson provides us with a comprehensive reply regarding such a critical decision-making process. “The repair-or-replace decision has a direct impact on maintenance costs for an airline by focusing on a strategic approach to managing maintenance costs. By optimizing budgets, we strike a balance between repair and replacement

to effectively manage overall maintenance expenses. Reducing downtime is also a priority—faster turnaround times from replacements can minimize aircraft downtime, ultimately helping to maximize revenue. We also consider lifecycle management, where repairing components to extend their life allows airlines to defer costly major capital expenditures. Additionally, we recognize that inventory costs can rise with an over-reliance on replacements, which is why a strategic focus on repair helps minimize inventory carrying costs. This comprehensive approach ensures we deliver cost-effective and efficient solutions to our customers,” adding that “At Ascent Aviation Services, we carefully evaluate these factors, ensuring that airlines achieve the right balance between safety, cost-efficiency, and operational reliability.”



Tony Kondo, President & CEO, Werner Aero LLC.

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