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Engines: Managing costs

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Putting a lid on engine maintenance costs

The industry is seeeing new approaches to engine maintenance procedures.
Photo: AAR

Keith Mwanalushi monitors some of the variables involved in engine maintenance and speaks to some key players on how to key keep repair costs down.

Engines are the most expensive assets on the aircraft and keeping them turning profitably and at the lowest cost is key to the operator and the cost of maintenance even more so.

Avoiding large material costs is a key element and Neil Russell, Chief Operating Officer at Aero Norway says there are various options open to MROs but it depends on what the customer wants to achieve during the shop visit, he states, for example, if all the LLPs need to be replaced and it's known HPT blades are scrap; a high material cost is hard to avoid.

Neil Russell, Chief Operating Officer at Aero Norway

"On the CFM56, SP10 allows you to continue time modules that then don't require full disassembly which reduces exposure and potentially material replacement. Using used serviceable material is less expensive than new where available; with upfront planning ahead of a shop visit this can give a big advantage. Obviously if a part is repairable it saves on the cost of a replacement part, however in some cases it can be cheaper to buy a used serviceable part too. Using PMA can potentially save costs too, but many airlines and lessors don't want to install them, in our experience," Russell explains.

Russell agrees that the industry is applying any new approaches in order to have more efficient engine maintenance procedures. "Over the next few years you will see a lot of digital transformation that will allow a lot of data tracking and the use of artificial intelligence tools." He predicts that this will allow MROs to see trends in almost everything they do and highlight improvement areas vs many different variables. "It will also allow a highly efficient supply chain linked to upcoming inductions. I think you'll also see IoT used to connect machines together (in house and external suppliers) allowing higher product quality and high engine performance."

Mitch Weinberg, President, IAA

Mitchell Weinberg, President at International Aircraft Associates (IAA) feels that MROs can avoid large material costs

Proper planning can help avoid large engine material costs.
Photo: AAR

for engine maintenance by continuing to enhance their planning and sourcing of material to include a USM (used serviceable material) business model.

"The MRO can build a business model based upon growing their relationships with the aftermarket distributors. They can produce a plan to make this a priority going forward. This plan can include developing partnership agreements to allow the sharing of data, committing to the procurement of material with agreed upon pricing, agreeing to specific repairs and approved repair stations and the type of certificates required, scheduling material delivery. This approach provides for overall cost savings, baseline quality, on-time deliveries and reduced inventory carrying costs. It all adds up to a win-win for all parties involved; the MRO, the MRO customers and the aftermarket distributor partner," Weinberg states.

Alfredo Alvarez Technical Services Manager at Kellstrom

He adds that at many MRO's the aftermarket distributor USM model is in place; "MRO's can place additional emphasis on this and for those not taking advantage, they can implement this approach to provide increased value to their customers and stay competitive in price and delivery."

Alfredo Alvarez, Technical Services Manager at Kellstrom sees that the industry is always seeking ways to minimise labour costs through various automation and time studies. He says Kaizen, Six Sigma and other streamlining tools have been utilised for the last couple of decades. "The biggest driver in elevated shop costs is the length of time and engine sits in WIP."

David Shilliday, Vice President, Airlines – EMEAI, Honeywell Aerospace says the key to avoiding large material costs for engine maintenance is proper preparation. "Predictive maintenance helps owners and operators better prepare and anticipate the need for engine maintenance instead of reacting to them. This helps owners and operators avoid costly downtime and expensive replacement procedures."

Honeywell's offering, GoDirect Connected Maintenance is a solution that analyses aircraft data and delivers diagnostics as well as predictive, prescriptive alerts to take the costly surprises out of maintenance. Shilliday explains that

David Shilliday, vice president, Airlines - EMEAI, Honeywell Aerospace.

it not only predicts an imminent system issue, it also provides prescriptive information to help maintenance crews pinpoint the fault down to the subcomponent level. "The solution identifies the part that needs to be repaired or replaced along with the repair procedure to be followed. As a result, technicians spend less time and money manually troubleshooting components and get to the right fix the first time."


Martin Friis-Petersen VP MRO Programmes, MTU Aero Engines

When it comes to material management, understanding the hardware and the market is key, contributes Martin Friis-Petersen, SVP MRO Programmes at MTU Aero Engines. He says MTU Maintenance benefits from being an MRO provider, leasing and asset management specialist. "We combine nearly 40 years of MRO experience and high shop volume with in-depth market understanding and financial strength, so we can assess fair market value of assets and make purchasing and planning decisions accordingly."

Additionally, vendor management is an important aspect regarding material costs, he continues saying key to both repair and scrap rate management and parts sourcing. "Having materials and repairs available at the right time, for instance through GTAs with OEMs and key suppliers, is imperative in achieving turnaround times for our customers. We have excellent supplier relationships and take a partnership approach to our dealings."

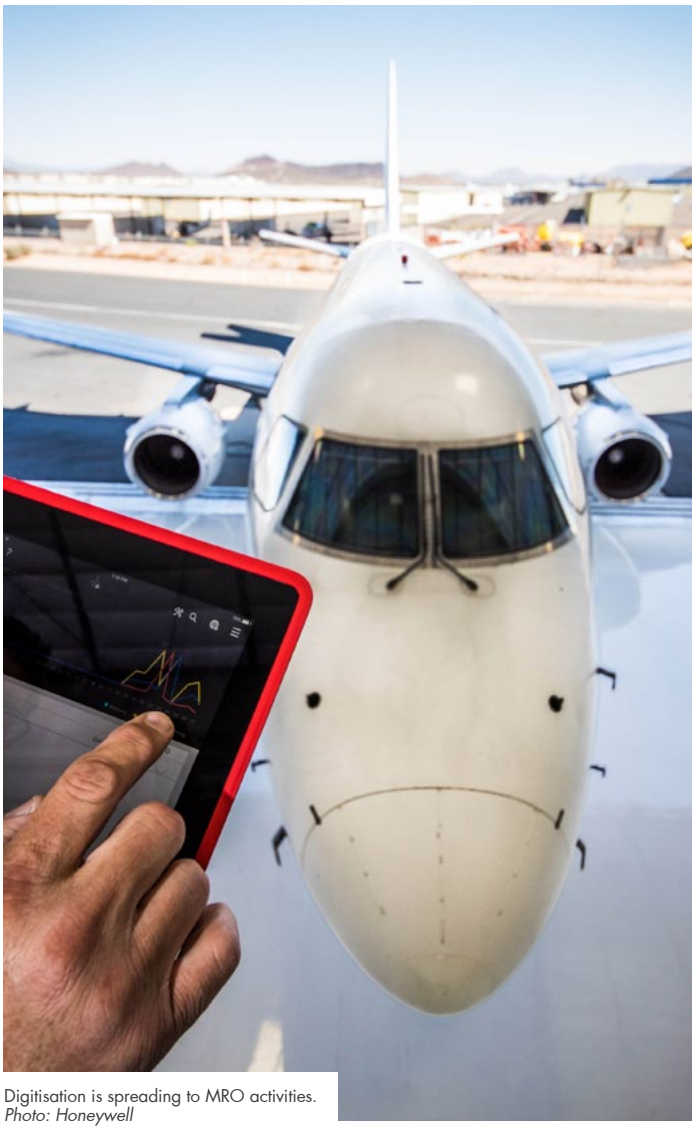
The industry is applying adapted approaches to assist in greater efficient maintenance procedures, according to Carl Glover, Vice President Sales and Marketing Americas at AAR. "Most of them are focused upon analytics and interaction in the value chain supporting engine shop visits; including working closer with repair shops and suppliers (Vendors). This is becoming increasing evident and key at the moment as component shops are facing capacity constraints in supporting sub-component repairs."

Mature shops are recognising (as in many other industries) that the flow of data up and down the value chain is critical to de-risking the engine MRO practices. Glover says this is both supply versus consumption, engineering findings and more importantly inventory replenishment options.


Filip Stanisic introduces engine repair capability at Magnetic MRO

Filip Stanisic, Magnetic MRO Head of Engine Management Department notices that the industry is facing a big problem with repair capacity at this moment for main narrow body engines like CFM56-5B/7B and V2500-A5. Engines are waiting in line for a long time just to be inducted.

Lessors own about half the commercial aviation fleet and supposedly they are still wary of using PMA parts for engines. "To put it simply, there is a lack of universal acceptance for PMA parts," comments David Rushe, Director, Sales and Marketing – Europe at Magellan. He says until that's no longer the case, lessors will continue to have concerns about the residual value and remarketing impact of having PMA content in aircraft.


Digitisation is spreading to MRO activities. *Photo: Honeywell*

Glover feels the issue of PMAs is a bit broader. AAR sees a mix of PMA advocacy and none advocacy from the lessor community. "Much of the concern was around devaluing residual values through final part out values of the engines, other concerns were relating to asset marketability with some operators own policies impacting their acceptance of the engines."


Carl Glover, Vice President Sales and Marketing Americas, AAR

Glover observes that some of the savvier leasing companies

are talking to key players such as AAR to tailor workscopes that may (or may not) include PMA usage, it would be fair to say that the mature engine fleets out there have well known PMA's in both gas path and none-gas path areas. "Lessors are looking at the cost benefit of PMA usage (economic utility) and making decisions based on what information is out there."

Due consideration is that engines and aircraft are leased assets/ owned by funds or financial constructions that want to preserve values and rentals. "We see PMA adoption being driven by key factors on their availability and where the engine is in its lifecycle," Glover adds.


John Benscheidt, Vice President of Sales & Marketing, Jet Parts Engineering

"I believe there is a self-perpetuating cycle driven by secondary market economics causing PMA resistance by lessors – it has nothing to do with technical, certification, or warranty concerns," contributes John Benscheidt, Vice President of Sales and Marketing, Jet Parts Engineering.

The residual value of an engine with PMAs is less than without PMAs due to market demand, according to Benscheidt. "If an airline has a mixed fleet of leased and owned engines, and their lease contracts don't accept PMAs, it's easier to keep non-PMA only engines from a logistics standpoint managing parts and maintenance practices. This drives down the desirability (i.e. value) of engines with PMAs. If, hypothetically, all lessors accepted PMAs, there would be no reason for airlines to be concerned about whether PMAs are installed on their engines from a contractual standpoint, thus putting demand and value of engines with and without PMAs on parity."

Benscheidt adds that many airlines aren't sitting back and accepting non-PMA leasing contracts anymore, they continue to pressure lessors to allow PMAs to manage their operational costs, thus reducing the value of lessor's assets and overall financial health. "If all the lessors break this cycle and allow PMAs I believe we would see residual values increase, financiers benefiting with improved asset value, and airlines saving money on engine maintenance. Its win-win-win situation," he argues.

Interestingly, Pat Markham, VP Technical Services, HEICO Corporation observes that some lessors are becoming more open to accepting PMA parts and DER repairs. "They are becoming sensitive to the critical role that PMAs/DERs provide to help reduce operating costs for the airlines. In the very competitive leasing world, being able to offer an option that reduces the airline overall cost can be a big differentiating factor, especially in the area of expendables/consumables.

"In the past some lessors had argued that PMAs could lead to lower engine valuations. We see the reality of cases where not having alternative sources actually significantly decrease engine valuations and increase maintenance costs," states Markham.

Digitisation is also pushing the aviation industry to lower costs and engine maintenance is no exception. "Engines are giving more and more data while they are on wing, so real reasons for their removals can be easier located and appropriate corrective actions determined. It also allows better prediction of engine behaviour," says Stanisic.

Today's aircraft systems, such as auxiliary power units and environmental control systems, generate vast amounts of data that can be used to help predict problems and diagnose them. Shilliday states that with GoDirect offerings, Honeywell can capture and aggregate aircraft data, which can be used to create a comprehensive understanding of airline flight and maintenance operations. "By applying advanced analytics techniques such as machine learning and artificial intelligence to this data, along with insight from Honeywell's engineering and maintenance experts, we can generate accurate and actionable insights for operations and maintenance crews, helping them avoid unplanned maintenance costs, aircraft downtime and improve efficiency."

Alvarez from IAA says the use of paperless documentation procedures lessen the infrastructure needed to support the documentation required to perform maintenance. "The implementation of integrated ERP systems is another way in which organisations can lower the costs of maintenance through elimination of job functions.

AAR has invested heavily in its ability to leverage digitisation in the maintenance space (aircraft and sub-component MRO). "We use our digital offerings to interact with our MRO customers in the sharing of data, performance information and inventory supply. This has included major adoption of EDI practices with B2B direct transactions and invoicing with key customers, states Glover.

He reports that AAR is using digital analytics to forecast inventory consumption at the PN level to global customers. "These models become invaluable when we look at key trends effecting engines or a subset of engine components. AAR has developed a set of key tools that we are using ourselves and offering to our customers for them to leverage digital systems. This includes our recent announcement at MRO Europe of our Airvolution™ system which allows for cloud based (SaaS) management solutions of spares, repairs for MRO's and customer alike."

Glover notes part of the challenge facing the industry as we move to a digitised future is the absence of a common language for digital data sharing amongst the MRO and supplier communities. "This may end up creating multiple 'digital threads' for engine maintenance practices."

At Aero Norway, the journey is just starting with digitisation, but the possibilities are vast, to reduce costs and delivery time according to Russell. He says: "Using digitisation linked to Lean efforts is something we are doing as an example. Using electronic sign off, not just for the sake of going paperless, but to create an electronic platform to build future possibilities and links with artificial intelligence tools."