

BY ROBERT W. MOORMAN

The Cost of Power

Original Photo: Lufthansa Technik

DESPITE SIGNS THAT THE WORST MAY BE OVER for the airline industry, providers of maintenance, repair and overhaul services remain under intense pressure to reduce the cost of engine servicing and improve turnaround times.

Overall, the MRO business is estimated by various experts to be worth \$36-\$41 billion. The engine portion is around \$12.2 billion, according to AeroStrategy. OEMs and their designated MROs, as well as independent repair stations, have devised ways to cut costs and make themselves more marketable in the highly competitive and potentially lucrative engine service business.

Factors helping to reduce engine maintenance costs and move hardware back on line faster include greater use of PMA parts and Designated Engineering Representative-approved repairs, long-term OEM-provided fleet and material management programs, predictive maintenance solutions, partnerships

and joint ventures, and arguably most important, the adoption of Lean and Six Sigma.

Standard Aero, one of five Rolls-Royce AE3000 authorized service centers worldwide, credits the implementation of Lean processes for reducing turnaround time on the AE3007 powerplant for the Embraer family of regional jets to 15 days from 30 days at its Maryville, Tenn., facility and now works on 30 AE3007s per month.

American Airlines' Tulsa maintenance base has reduced TATs by 50% for the P&W JT8D-200s on its MD-80s and the GE CF6-80C2B6s powering its 767-300s as a result of employing continuous improvement

programs and Lean. Bucking the trend to outsourcing among US legacy carriers, 80% of AA's engine and airframe work is performed in-house and the carrier aims to capture a share of the third-party market going forward. "Initially, we were running 100 days for TAT," admits Carmine Romano, Tulsa base VP. "Now some of the engines are coming out of the shop in 40 days" as a direct result of Lean.

American began its Lean journey five years ago. "We knew that if we were ever going to be competitive in engine maintenance, we had to adopt Lean techniques," Romano says. A key to successful implementation is involving those who actually perform the work (ATW,

8/04, p. 38). Specifically, the Tulsa base employed "5S," a key element of Lean that stands for Sort, Set in Order, Shine, Standardize and Sustain. Distances between workstations were shortened to make maintenance more efficient and parts were kitted, which greatly improved productivity.

In preparation for the arrival of the first CFM56, technicians built a 3D model of the most efficient workflow process. The "virtual engine maintenance Lean-based workflow model" helped American to set aside the 30,000 sq. ft. of floor space needed for the new engine type and ensured the production design was centered around just-in-time and one-piece flow concepts.

Rolls-Royce and AA have had a joint venture since 1998 that employs some of the same Lean processes as Tulsa. Based at Alliance Airport near Ft. Worth, Texas Aero Engine Services Ltd. overhauls Trent 800s, RB211-535s and Tays for American and outside customers such as Delta Air Lines, Mexicana and Avianca. "Our productivity is way up and costs have gone way down," says Pat Stewart, COO and VP-operations for the facility.

Since implementing a continuous improvement program a few years ago, TAESL has recorded a 22% drop in MRO man-hours. TAT on the RB211 declined to 70 days from 110 days and the goal is to reduce TAT on all engines to 60 days, says Stewart. Surprisingly, 50 jobs have been added owing to CI. Stewart and Romano say the cooperation in daily operations between management and labor is a principal reason for cost savings and TAT improvement.

10-Year Investment Pratt & Whitney has spent more than \$50 million transitioning to Lean for engine services over the past decade. In addition, it has invested \$200 million in development of an enterprise resource planning network linked to a common SAP platform for its 25 service facilities worldwide. On the shop floor, Kit Carts have been created for 4-hr. and 8-hr. work cycles. "Cellular environments" streamline the flow of maintenance work, with each cell responsible for single or multiple tasks. Pratt also uses 5S, adding a sixth S for safety.

As a result of these and other process improvements, "we have seen the TATs

on engines we overhaul reduced on average by 25%," says Jim Keenan, senior VP and GM of P&W Global Service Partners. "Not only will that reduce the cost of individual overhauls, but the faster we can return these assets to our customers, the fewer spare assets they will need and the less inventory they will require."

GE Engine Services employs Lean techniques to improve TAT at all of its service centers. In 2005 it held 300 Lean events, "action workouts" in GE parlance, at its service shops. Its Aviation Materials business, which sells used parts, gives customers another way to save money on MRO costs, according to GEES GM Jacques Chausse.

A number of OEMs are offering engine management programs to help customers reduce costs. Southwest Airlines and GEES signed an eight-year, \$1.5 billion OnPoint Solutions service agreement covering the carrier's nearly 600 CFM56-7Bs. Southwest declined to provide projected dollar savings from the agreement but said they will be "significant."

P&W has two programs with United Airlines—an IAE V2500 Select fleet management agreement and a Materials Management Program for the carrier's PW4000 94-in. and 112-in. engines. Under these agreements, Pratt manages around 60% of United's engines. The 10-year MMP accord is the largest in P&W history. Such deals are becoming a trend, according to MRO experts.

In June, JetBlue Airways signed a 10-year contract with MTU Maintenance Hannover, a division of MTU Aero Engines, a member of the IAE consortium, to provide exclusive maintenance services for the carrier's IAE V2500s. The contract covers as many as 360 engines on the airline's fleet of A320s. "With one of the highest aircraft utilization rates [13 hr. per day on average], we recognize the importance of short turn-times," says spokesperson Bryan Baldwin. "This agreement will reduce JetBlue's overall maintenance costs."

Elsewhere, MROs are offering support packages to ease the cost of engine work. Star Flyer, a new Japanese airline, signed up for Lufthansa Technik's Total Technical Support program for its A320 fleet, as did Jazeera Airways of Kuwait, also for A320s.

Walter Heerdt, LHT senior VP-marketing and sales, says the overall package

helps carriers reduce costs, with part of the savings deriving from performing more on-wing repairs rather than replacing parts. LHT's Spare Part Alternative Detail Program, which furnishes PMA parts plus DER-approved repairs, also provides operators with significant savings on engine maintenance. Heerdt declines to give specific figures but says the program has allowed LHT, which has some of the highest labor costs of any MRO, to remain competitive.

Like other MROs, LHT has applied Lean-like improvements to the engine maintenance process. For example, it went from a flow line to a modular line to an optimized slot line. Apparently the streamlining has worked; for years the company took 90 days to overhaul a high-bypass fan engine while TAT now is 60 days. "Anything slower than that and you can't compete in today's market," Heerdt says candidly. To achieve further savings, airlines someday will choose not to own their spare engines, he predicts, but instead will engage in exchange programs or rent engines on a cost-per-flight-hour basis until repairs on their own engines are completed.

Before implementing any cost reduction or TAT improvement measures, "you have to first consider what is the MRO's cost structure," advises AeroStrategy principal Kevin Michaels. Since material typically accounts for at least 60% of the cost of an engine overhaul, negotiating a deal with the OEM to limit spare parts price increases or going to the surplus market for parts will go a long way to reduce expenses, he says.

Disciplined Approach David Doll, a partner in Colorado Springs-based Aviation Maintenance Management Associates and a former maintenance executive at United, argues that "maintenance in general needs the discipline of manufacturing as well as the flexibility to deal with the unpredictability of the business." The basic problem for maintainers is that an MRO shop can't control its flow of raw materials. It's all about material management. Typically, mechanics spend 80%-90% of their time waiting for parts and 10%-20% installing them, say Doll and other experts. Adopting material management

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and Lean-like programs, as well as reducing inventory to only what is needed, will go far toward lowering costs and improving TAT, but an operator must apply these fixes comprehensively and monitor them.

MRO shops need to surmount two major challenges if they hope to succeed. In addition to becoming more disciplined and consistent with their maintenance processes, they need to take a more holistic or predictive approach to engine maintenance while simultaneously recognizing the financial

realities of today's airline industry. Don't just fix what is broken and rush the plane back into operation, say some. "It's what I call saving yourself into bankruptcy," says Doll. "You need to operate the aircraft long enough between shop visits to amortize those huge fixed costs."

Yet airlines contend that they can't afford to "gold-plate" their engines or airframes today. At one time American did just that during heavy checks, "but do we really need to do all of this work to maintain a safe operation," asks Romano. The goal now is to run the base "with the least amount of people and material and still put out a safe,

quality product." Each AA MD-80 is seen annually for a light check and every five years for a heavy check, the equivalent of C and D checks. Experts tell *ATW* that MROs are looking for some middle ground between gold-plating an engine and doing only what is needed to return it to revenue service.

One thing is clear: For the foreseeable future, airlines will demand lower-cost but high-quality MRO services as well as faster turns. A change in corporate culture and maintenance processes should be a mandatory first step for any MRO organization that wants to remain competitive in an ever-evolving business. ◆