Engine Component Repairs-PMA & DER Repairs Market Overview

Gorham Conference
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DASSaero engine services

Overview of DASS Aero Engine Services

- A Texas based company
- Global service company; responsible for over $80m in Repair Sales. Also support a number of Capital Equipment Suppliers
- Established in 1994, have 14 people in 9 countries
- Offices in
  - USA, Mexico
  - United Kingdom, Netherlands
  - Jordan, India
  - Singapore, Indonesia and China

Principals:

Component Repair:

SKF Aerospace, SR *Technics*, GKN Chem-tronics, Interface Air Repair, AGC Inc

Capital Equipment:

Bauer Inc, MCR Odlings, S2 Aerospace

"Destined to make a difference"

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Current Market Conditions

- Tough Market Conditions
- Global Recession
- Demand for travel down -> especially in premium sector
- Bottom fell out of the freight market
- Conditions “tougher” than after 9/11

Will everyone survive?

- Absolutely ***NO***
- Most at risk are those airlines that:
  - Heavily leveraged
  - Weak balance sheets
  - Legacy work practices
  - Culture adverse to change

“How will this affect the MRO business?”

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Simple Facts…

- Less demand results in less flying (currently anything from 8 to 20% cutbacks)
- Deferred/delayed maintenance → Fewer engine shop visits
- Utilization of spares from parked aircraft… cannibalization
- Limited workscopes… Do the minimum now, but possibly pay later

What does this mean to me?

- Engine shop visits down +/- 20%, dependant on the platform
- Redefine Buy/Repair decision matrix
- Look at alternatives… PMA, DER and Surplus Market?
- Competition hungrier… strongest will survive

However, not everyone will be affected equally

Who will benefit?

Airlines/Operators

- Low cost carriers
- Those carriers who are flexible and change quickly
- Those with strong balance sheets

MRO's

- Low cost providers
- Those who focus on "value for money"
- Creative alternative solution providers
- OEM's

With a recession also comes opportunities… critical to identify and focus on opportunities.

Engine Shop Visit Forecast

ENGINE	2009	2010	2011	2012	2013	2014	2015
GE/CFMI	5415	5465	6590	6600	6650	7085	7295
PW (Less JT8)	1435	1225	1220	1155	1170	1135	1190
Rolls Royce	1670	1555	1730	1585	1760	1775	1805
IAE	725	945	1005	1140	1160	1270	1300

Accuracy: +/-20%

Issues to consider

- How much of the EOH market is controlled by the OEM?
- How does this affect the PMA/DER opportunities
- What percentage of the fleets are owned by Leasing Companies

"What is the true market potential for PMA's and DER's?

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Summary

- Those overhaul shops focused on support of the CFM56-5B/-7B and the V2500 will continue to see healthy business
- ***Warning: Both these platforms have high levels of control by the OEM (up to 40%) and fleets are dominated by lease companies***
- New technology engines are still some way from maturing and creating valuable business opportunities
- ***Warning: High percentage of New Technology engines are under OEM control via Flight Hour programs, Engine Overhaul activity and control of technologies***
- Mature aircraft/engines will be the focus of the cut backs due to the recession. **What percentage of "parked" aircraft will return to service after when the environment picks up?**
- Approx 25% of the aircraft on order will not be delivered or deliveries significantly delayed

"Not a bright picture'

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Bad news…. March 17th to 24th only!

- SIA load factors fall below 70% despite 8.5% capacity reduction
- IATA report Premium traffic falls16.7% in Jan 09
- US Airways passenger unit revenues (p.r.u) down 9 to11% in February
- ILFC CEO recommends 25% reduction in Airbus and Boeing production rates
- Continental load factors drop to 71% despite 7.3% capacity cut
- AMR expect 1Q/09 revenues to be down 10 to 11%
- SIA considers deferring A380 deliveries
- United expect 11 to12% drop in 1Q p.r.u
- IATA report Asian traffic dropped 8.4% in January
- Lufthansa Cargo report a 35% decline in global cargo volumes
- Finnair Technical to temporarily lay-off employees, up to 1,600 people
- Alaskan report 21.85 p.r.u decline on 17.2% capacity reduction
- ATA of America reports p.r.u decline of 19% in February
- IATA forecast $4.7bn losses in 2009, double the December forecast

The Role of PMA's and DER's going forward

"How does this affect your policy?"

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PMA's

- Traditionally utilized for consumable and high scrap items (usually non repairable)
- Growth in "High Visibility" parts such as Turbine Airfoils and LLP's (Potentially) has changed the original dynamics.
- Core PMA engine parts are becoming a greater reality: thus challenging the dynamics of component repair (OEM CLP vs. PMA Price vs. Repair Price) but most importantly challenging the "crown jewels" of the OEM spares business
- Growth into New Generation Engines
- Sales of PMA parts to double during from 2007 to 2012.
- Typically PMA parts are >30% less than OEM Prices
- OEM's defend the ***"non use"*** of PMA's not based on ***"PMA Part Integrity"*** but how the PMA interfaces with the rest of the engine/system. ***They say "we" (the TC holders) are the only ones to determine that.***

DER's

- As overhaul shops seek to reduce EOH costs, a viable and quick solution is increasing Repair Yields via DER's. Repair rather than replace
- DER repairs can also improve product design and performance
- ***Approval process, industry acceptance and experience more favorable than the PMA route***
- OEM's are recognizing independent DER repairs and embracing them, provided they manage the application via a license agreement

Repair of PMA parts

- PMA parts cannot be repaired to OEM substantiated data (CMM) unless approved under a License Agreement (vast majority of PMA's are not OEM licensed)
- As part of the PMA approval, the Production Approval Holder must issue Instructions for Continued Airworthiness (IfCA). These become the controlling repair document… ***or***
- The Repair Source raises a DER repair to cover the content of the PMA component repair
  - Note: The Repair station must have the PMA P/N not the OEM P/N recorded within its approved Repair Station Repair Capability List
- The Production Approval Holder must make the Instructions for Continued Airworthiness (IfCA) data available to the Part Owner ***but not necessarily*** directly to the Repair Station

Repair of PMA Parts

Example of a PMA approved under License Agreement

- For over 20 years SKF Aerospace had a License Agreement with GE for the support of GE Mainshaft Bearings which included the replacement of non repairable bearings with a NEW bearing at the cost of the repair.
- At the last renewal (March ’08) GE authorized the Pre March PMA bearings to be repaired to the SKF/GE Approved Technical data.
- Other Bearing Repair Stations are not allowed to use the GE data for these components; they have to use an OEM alternative repair approval

Repair of parts previously repaired with DER approved repair schemes

- Parts repaired under DER approvals should be marked accordingly.
- Subsequent repair activity must recognize that a DER repair has been carried out and:
  - Remove the original DER repairs; through, as example, part replacement, coatings removal or removal of welds performed. If this is the case the Repair Station can perform a repair/overhaul i.a.w the OEM approved data and certify it accordingly. No need to record the original DER on the part or the Release Documentation (8130/Form1)

Or

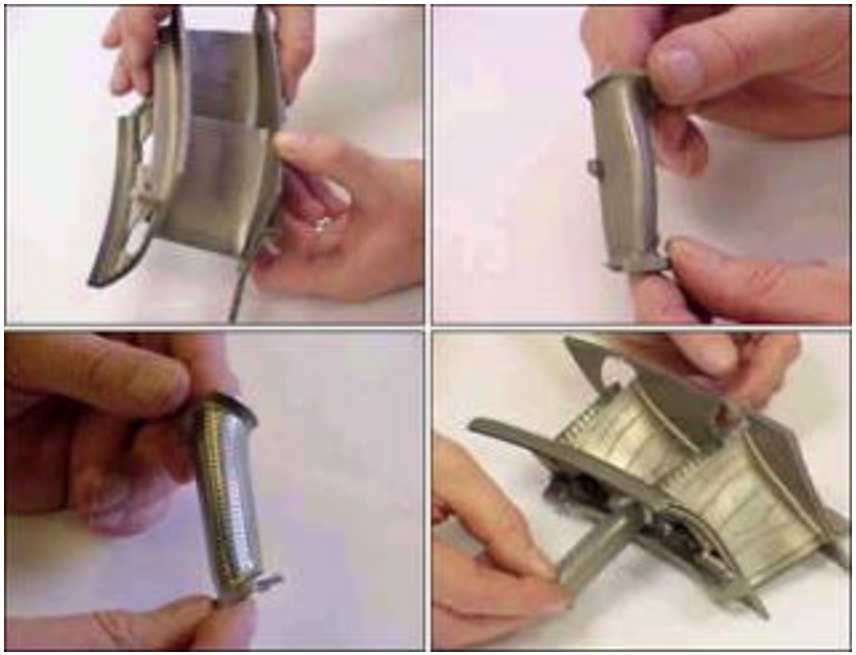
  - Perform the standard repair to its own DER approval and recognize the DER on the release documentation
  - ***Note: The Repair Station performing the last repair will take full responsibility, and liability, for the ongoing airworthiness of the component including the original DER repair.***
  - **The DER source must make the basic repair data available to the owner of the part**

Or

  - Reject the component as non repairable. ***This is the position usually taken by the OEM Repair Stations.***

Repair of parts previously repaired with DER approved repair schemes

- ***SR Technics Airfoil Services, Cork, Ireland*** restores the serviceability of RB211-535 HP NGV's that exhibit extensive Leading Edges burn through. **This Repair is DER/DOA approved.**
- The 8110 clearly identifies the materials and processes, including an optional PtAl coating, as part of its IfCA approval
- However, due to the complexities of the repair it would be difficult for another Repair Station, besides SRTAS, to perform the next repair correctly and comply with the Regulatory Airworthiness instructions and assume the liability for the component.
- You have a salvaged part, the DER provides improved performance characteristics (PtAl coating) **but the next repair is driven into SRTAS or you scrap the part.**



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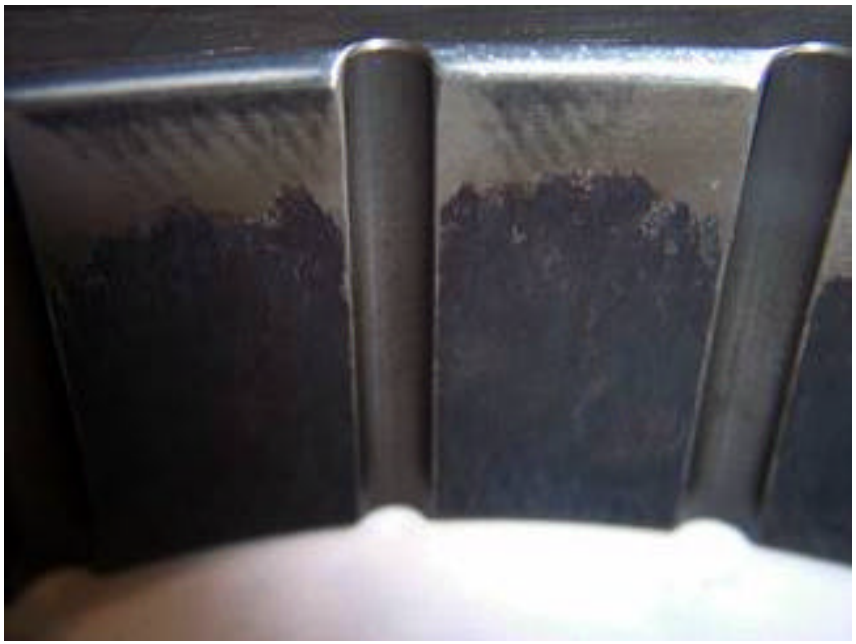
Repair of parts previously repaired with DER approved repair schemes

- ***SKF Charleston*** repair JT9 #3 Mainshaft Bearings that exhibit fretting on the Inner Ring beyond the ESM by using a **DER approved repair** that applies a Electro Ni plating to restore the Inner Ring.
- The repair could be removed completely by removing the plating and confirming the Inner Ring dimensions are i.a.w. the ESM limits (Highly unlikely)

Or

- Performing a more expensive Level IV repair that replaces the Inner Ring (and the original defect)
- In this case, the Bearing can be released as overhauled i.a.w. the OEM approved specifications



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Summary

- When an operator/overhaul shop decides to adopt a PMA/DER strategy it must understand its role and responsibilities for the **whole component life cycle**
- Not just the initial savings but also what impact that decision has on the components life cycle costs
- The flexibility (or lack of) related to on going component repair activities
- Equally, its own responsibility for ensuring on going compliance with the complexes and changing Airworthiness Requirements
- PMA/DER's have definite cost (and possibly performance) benefits but they also carry responsibilities for the operator
- ***Savings and ongoing airworthiness responsibilities go "hand in hand"***

References

- It should be noted that to date EASA have not taken a position as it relates to PMA's
- However, they have a system whereby the Repair Station, if assessed technically capable, can determine and develop "Minor Repairs" as a read across to the FAA DER system… **Approval under DoA authorization**
- For the purpose of this presentation "DER" repairs related to FAA and EASA approved repairs.
- **Reference Information**
  - Special Airworthiness Information Bulletin NE-08-40
  - Advisory Circular 43-18 Rev 1
  - 14 CFR Part 21, 43, 45, 121, 145
  - Order 8110.37D
  - Order 8110.42C
  - Order 8130.21F
  - AVS (RAF) Study: August 6,2008