SEEKING INTERNATIONAL ASSISTANCE IN AIRCRAFT ACCIDENT INVESTIGATION FOR DEVELOPING NATIONS

9th & 10th Nov, 2014 – (MENA SASI)

Wing Commander

Syed Naseem Ahmed

President SASI Pakistan

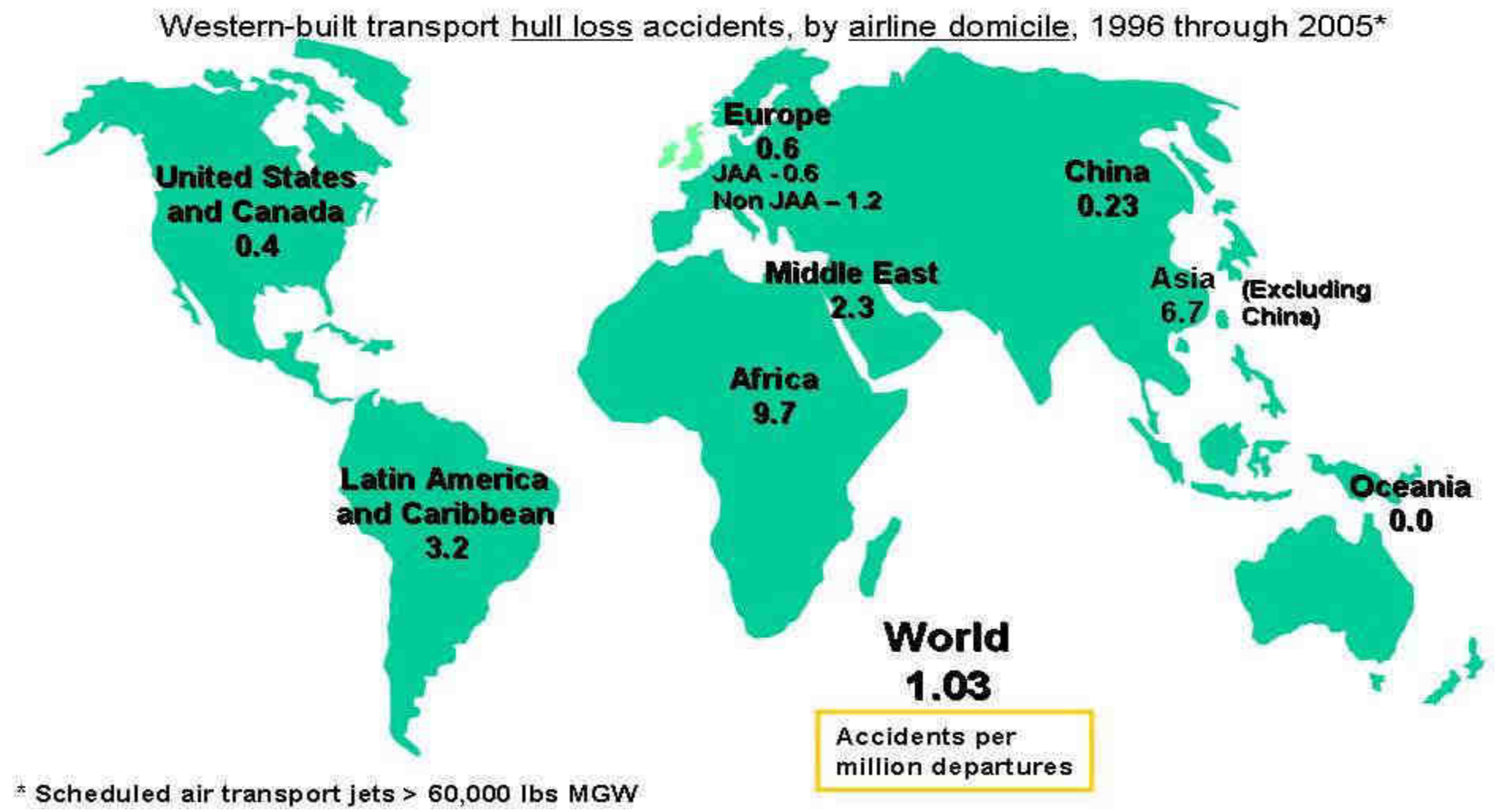
International Assistance in AAI

- Flight Data Recorder Labs at NTSB USA, BEA France
- Cockpit Voice Recorder Analysis at BEA and UK AAIB
- Boeing Investigation Facilities at Seattle for B737 Parts
- Airbus Investigation Facilities at Toulouse for Airbus 321
- Aircraft and Engine Parts of Fokker F 27
  - Rolls Royce Engines
  - Dowty Propellers
  - Good rich Fuel Components
  - Material Labs and ATC at ANSV, Italy
- Investigation for Afghanistan as per Annex 13 at IAC
- Reopening and conducting an Investigation in Iran under a Court for C 130

International Assistance in AAI

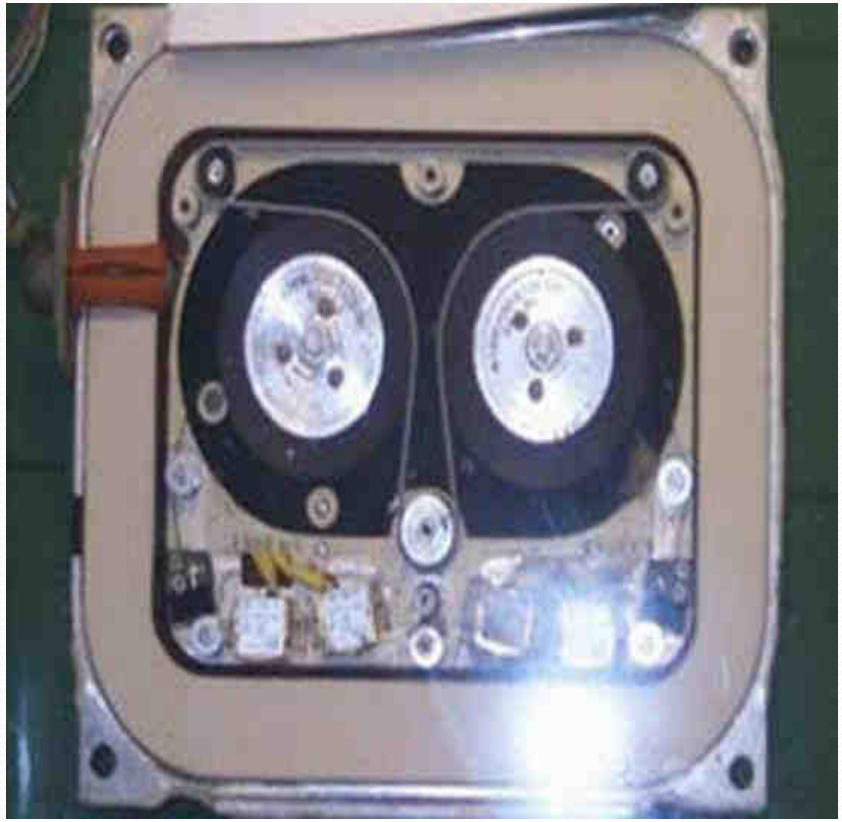
- Scope
- Nature, form and processes
- It is not all Free
- Interested Parties
  - State of operator, design and manufacture or registry
- Families of Victims
- Report writing

Aircraft Accident Rates 1996-2005



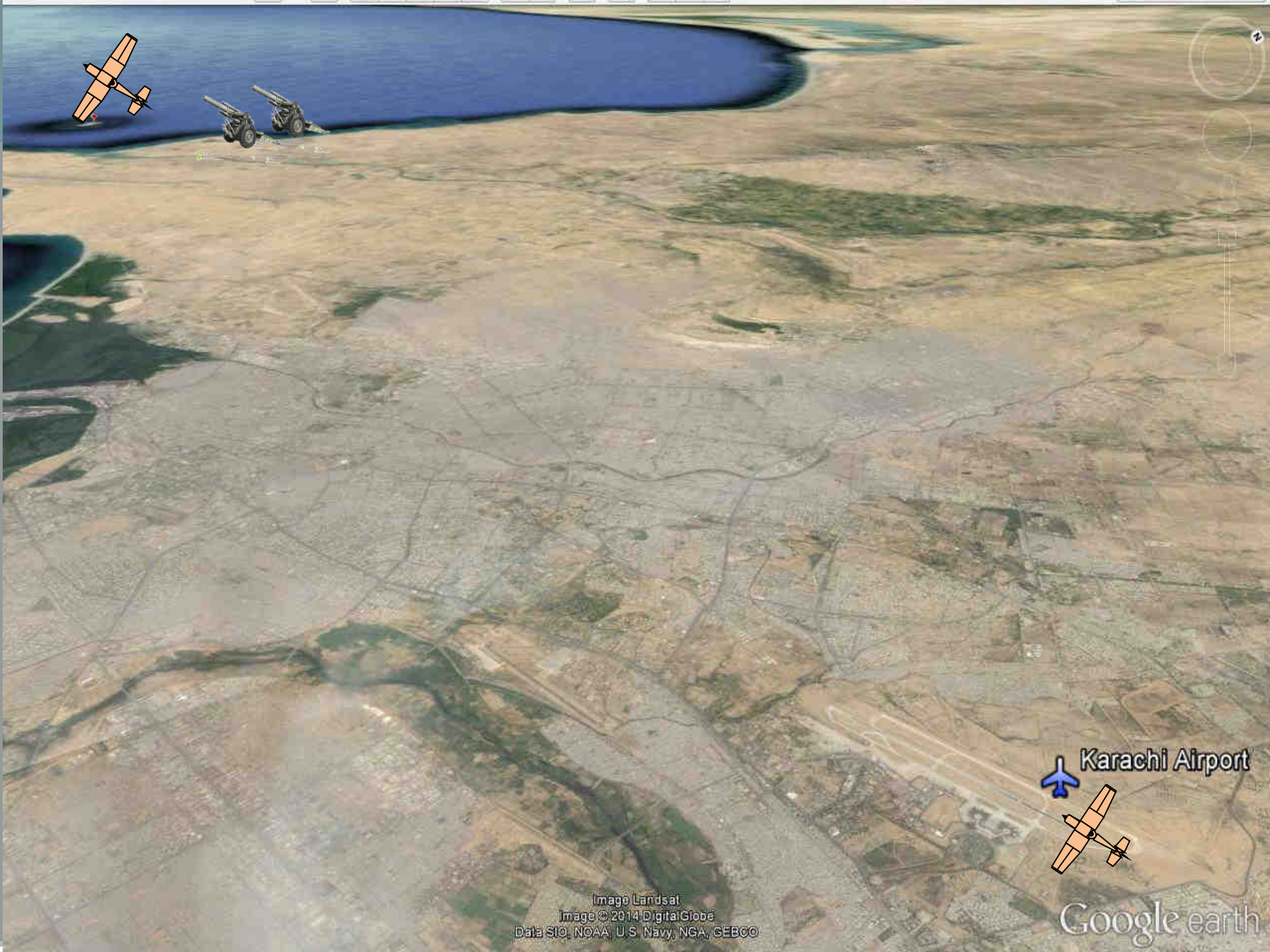
International Assistance and Investigation In Charge

- Get the Black Boxes and complete the investigation
- Preservation of evidence
- Wreckage analysis
- Aircraft Documents Analysis
- Interviewing
- Handling Media and
- Family members of Crash Victims
- Dealing with other states
- Utilizing experts



International Assistance –Military to Civil Aviation

- Military Investigations
- Secrecy of data on accidents
- F 6 , A 5 and F7 Ps
- Mirages
- C 130 with President Zia on Board and Fokker with CAS on board
- P 3 C Orion
- Helicopters
  - **Establish specialty and credibility of experts**


Karachi Airport
Image Landsat
Image © 2014 DigitalGlobe
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Google earth

Cessna-402B – Reconstruction

Cessna-402B – Reconstruction

Cessna-402B – Reconstruction

The first Lessons learnt

Prompt Accident Notification

Find Whom to Contact for a 40 years old aircraft.

Pay attention or seek clarifications when you receive a carton full of technical literature

Investigate material behind rumors

Take time to finalize as Cause " Un Determined"

The literature was sent with purpose

Special Inspection Documents are based on research

Prepare well for Investigations

Fokker Crash - Multan

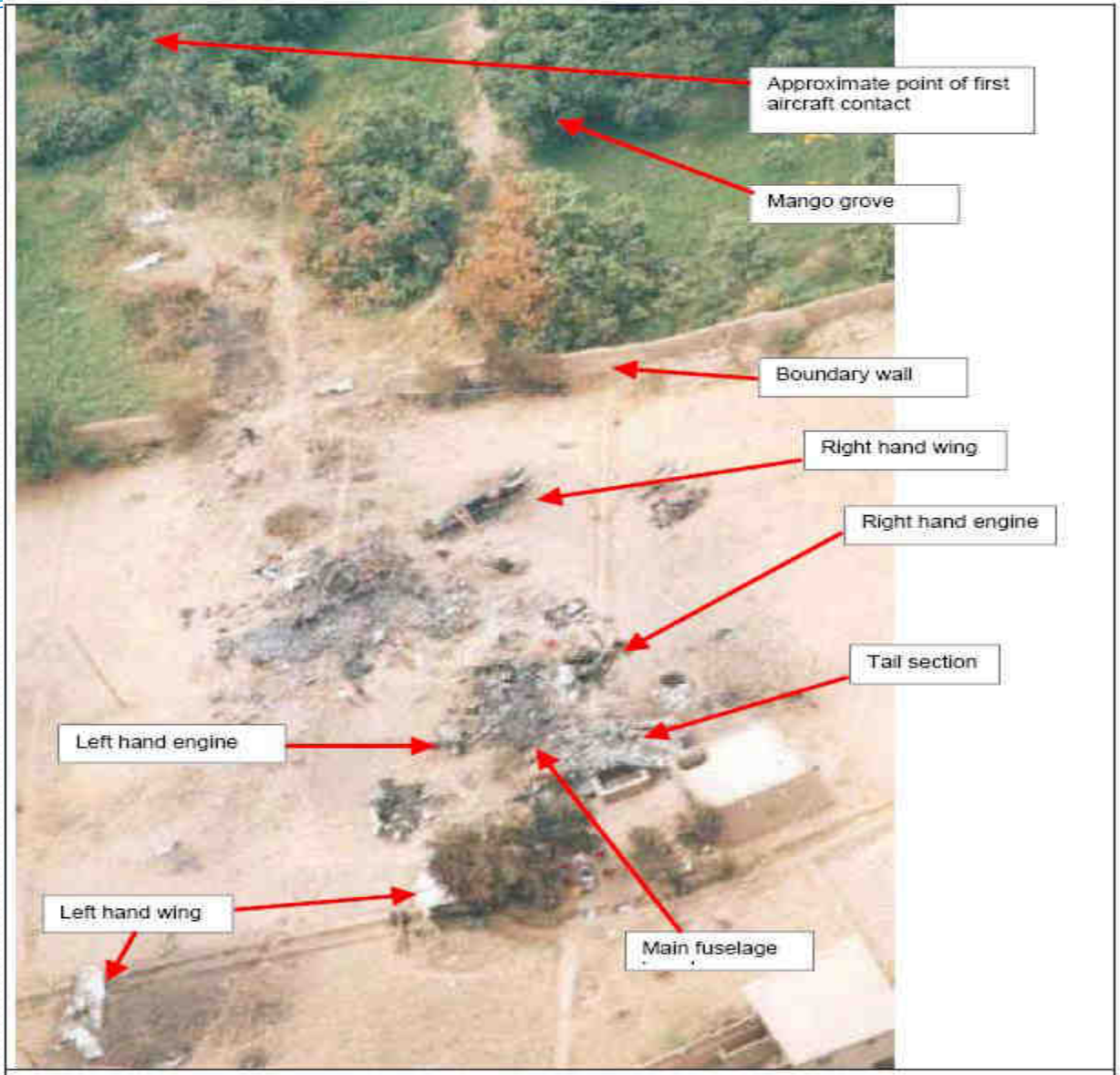


Figure 1. Aerial view of the accident site showing general location of engines relative to the airframe.

The Team

- **Pakistan CAA (PCAA)**
- **AAIB – UK**
- **FAA – USA**
- **BAe – France**
- **Rolls Royce – UK**
- **DSB – Netherlands**
- **Stork Fokker Services – Netherlands**
- **Dowty Propeller – UK**
- **Goodrich – UK**
- **Honey Well - USA**

Fokker Crash - Multan

Fokker Crash - Multan


2006/07/14


2006/07/14

CVR Analysis

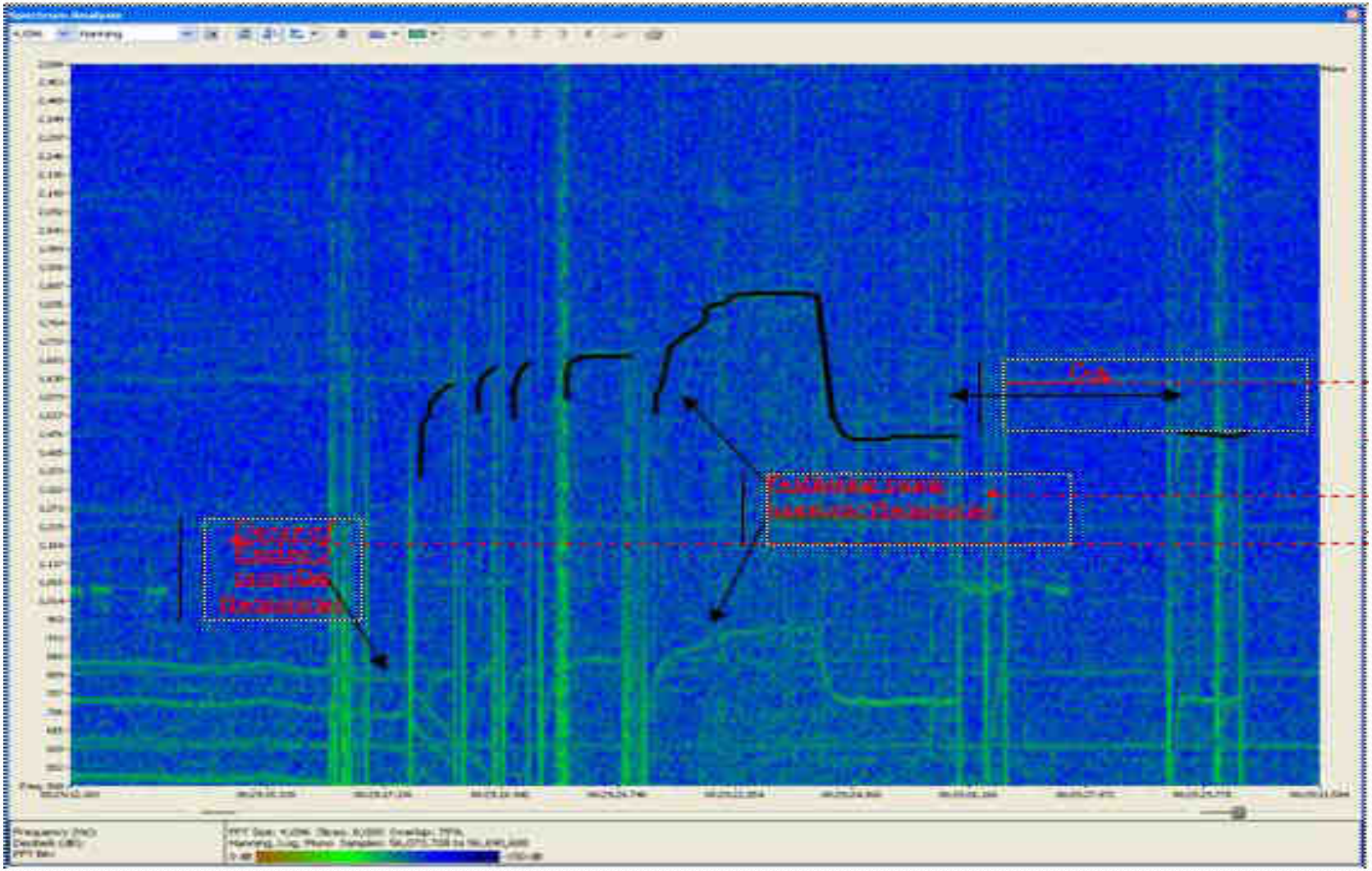
FDR Read-out at BAe - France

FDR Read-out at BAe - France

CVR Analysis at AAIB - UK

- **Independently determine again**
  - **Engine & RPMs**
- **Lest engine was running at 15000 RPMs at the time of impact**
- **Spectrum Analysis plots**
- **Harmonics & it is 7^{th} Harmonic**

Behavior of Feathering Pumps



Engine Investigation by Rolls Royce, Bristol, UK

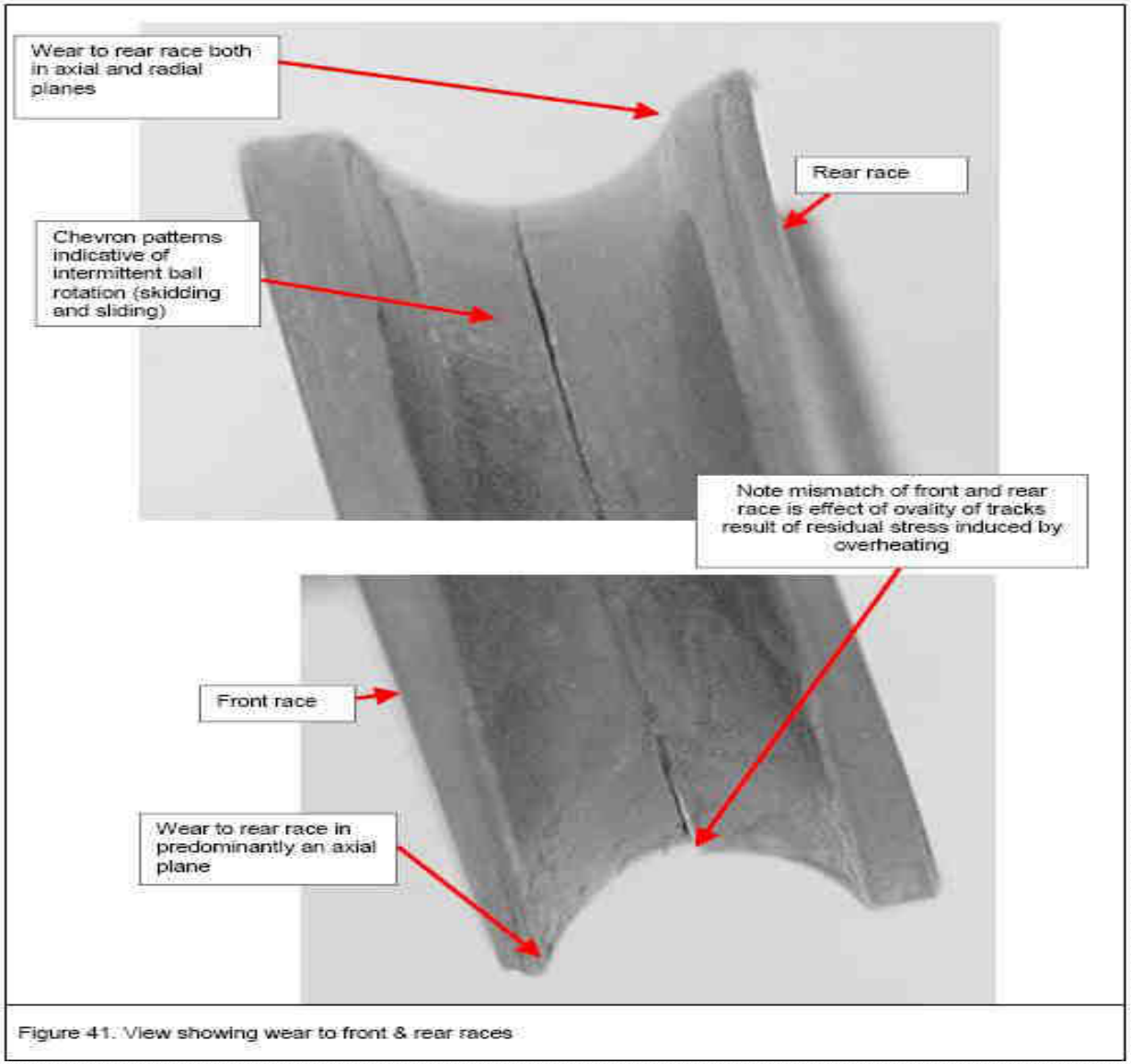
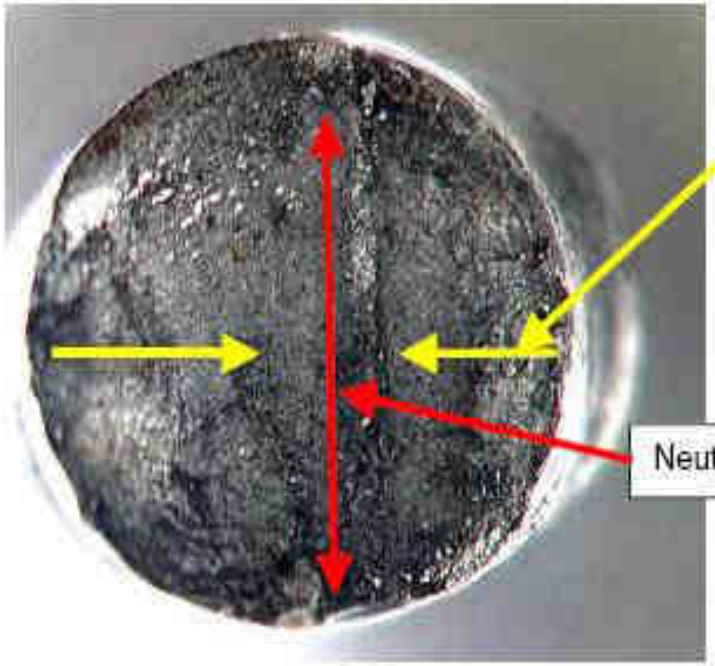


Figure 41. View showing wear to front & rear races

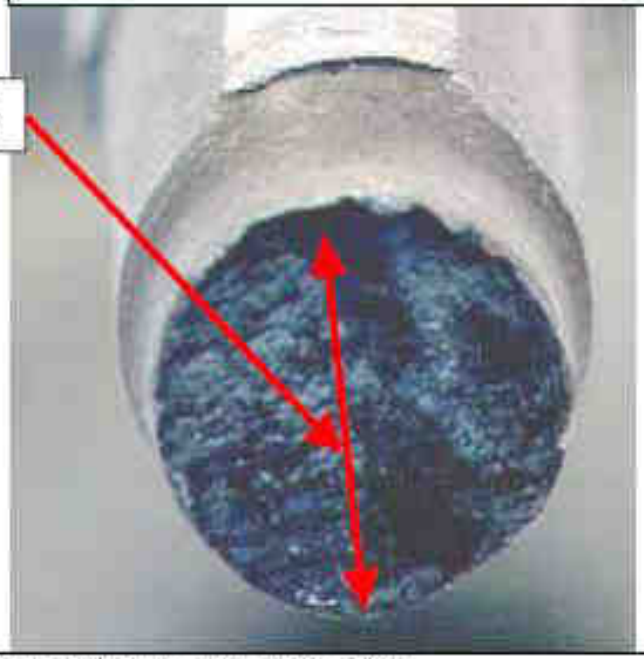


Fracture face of the bolt that failed in the wasted section showing the neutral axis, the location of the reverse bending fatigue nucleation sites and the direction of fatigue propagation. The neutral axis of this failure is parallel to the 'D' flat of the bolt head.

Reverse bending fatigue propagation direction indicated by yellow arrows

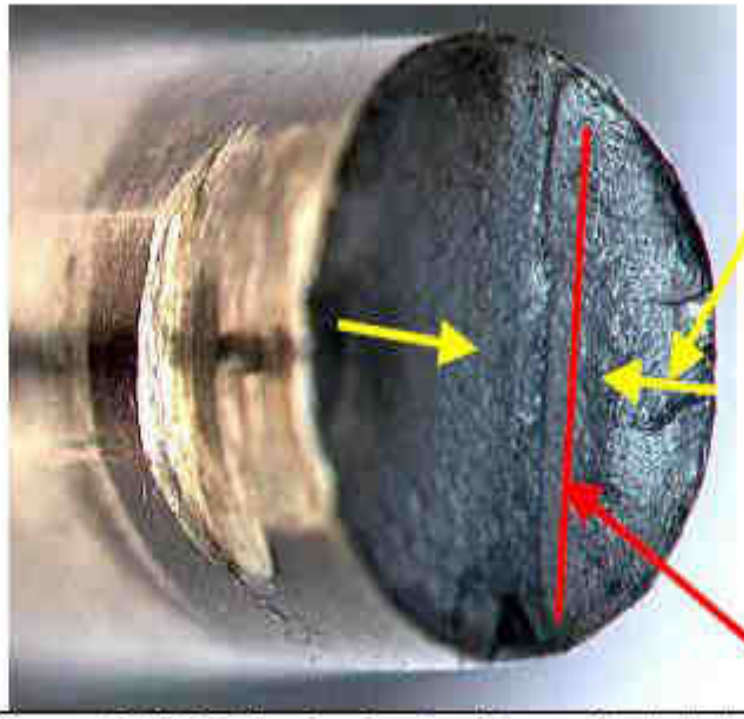
Neutral axis

Fracture face of the bolt that failed in the wasted section showing the relationship between the neutral axis and the location 'lands' on the bolt shank diameter.



Figures 44 & 45. View showing the fracture face of the bolt that failed in the wasted section.

Fracture face of the bolt that failed in the shank section showing the neutral axis, the location of the reverse bending fatigue nucleation sites and the direction of fatigue propagation. The neutral axis of this failure is at 90° to the 'D' flat of the bolt head.



Reverse bending fatigue propagation direction indicated by yellow arrows

Neutral axis

Figures 46 & 47. Showing fracture faces of the bolt that failed in fatigue in the location shank.

General view of the six bolt shanks and the 5 bolt head sections recovered (fifth retained in rear bearing housing) (sixth bolt head not recovered). Note the shank on the far right, is straight and has failed in the wasted section under the bolt head. The bolt shank, third from the left, is also straight. See figures xxxx – xxxx for further details. The other four bolts have sustained varying degrees of bend sustained during the final rotation of the bearing assembly.

Figure 43. Showing the general condition of the bolts. One bolt head was still located in the rear bearing housing and the bolt head of the straight bolt has not been located.

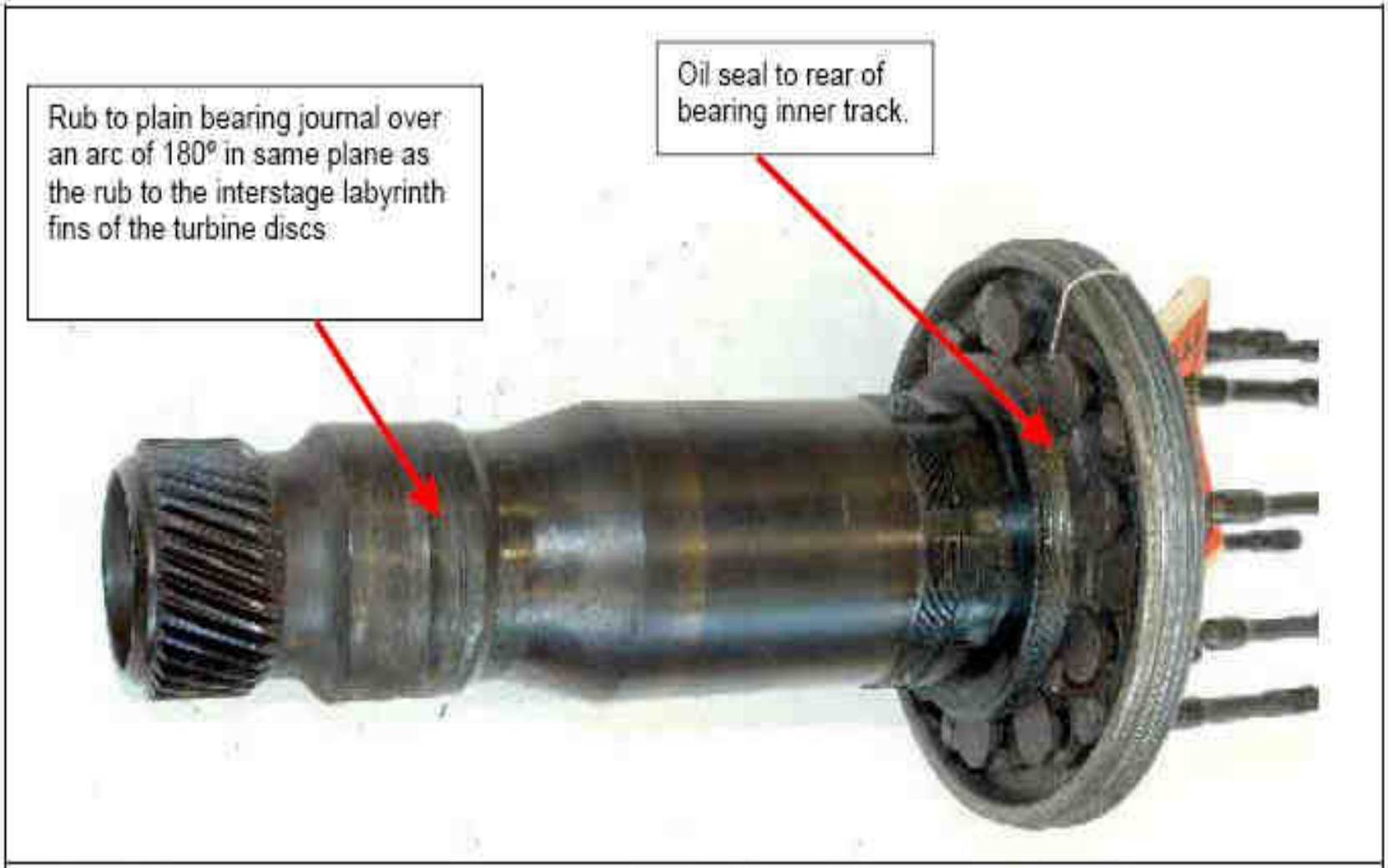
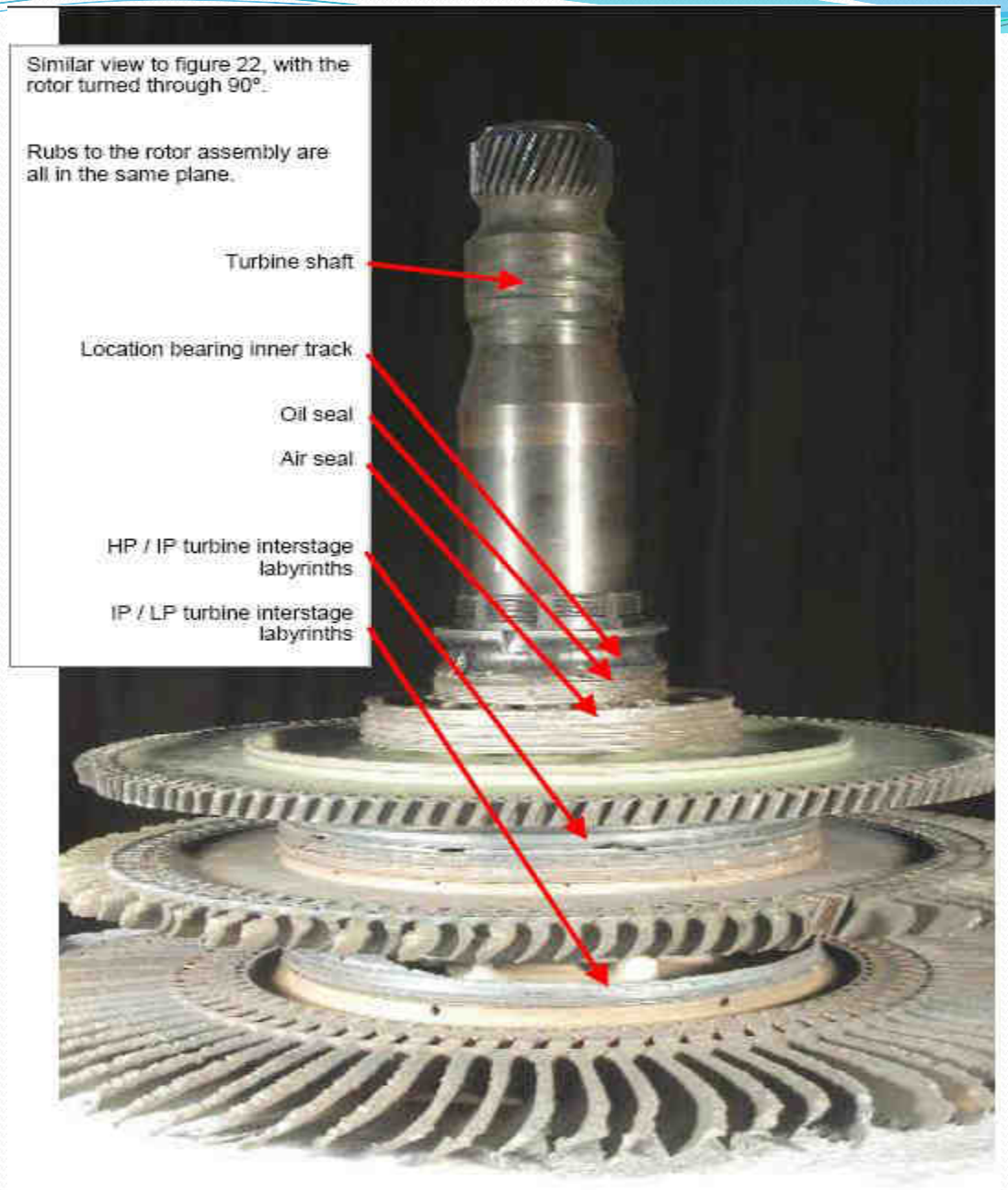
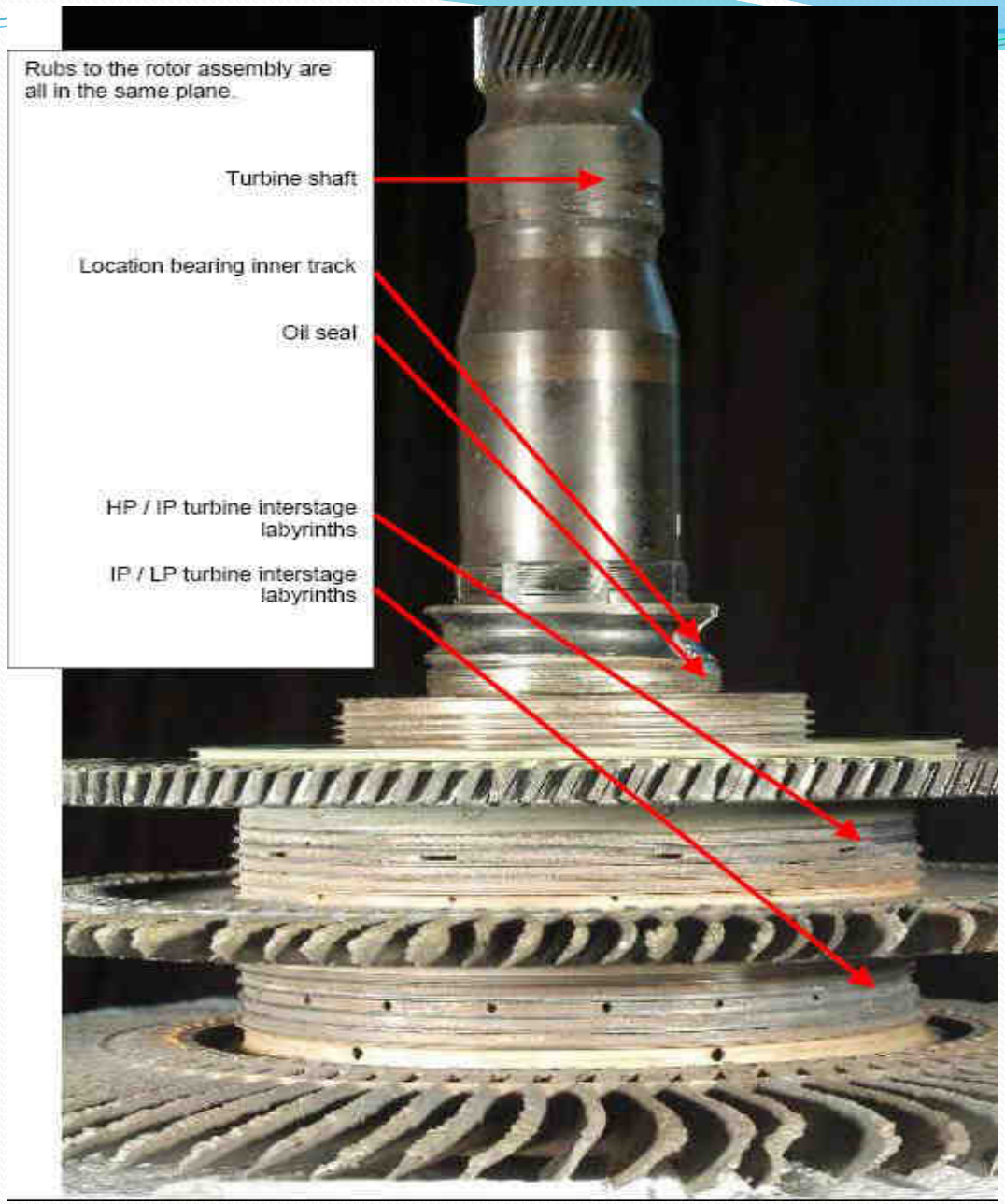


Figure 20. LPT shaft. View showing position and arc of heavy rub to the plain bearing journal.


Similar view to figure 22, with the rotor turned through 90°.
Rubs to the rotor assembly are all in the same plane.
Turbine shaft
Location bearing inner track
Oil seal
Air seal
HP / IP turbine interstage labyrinths
IP / LP turbine interstage labyrinths


Rubs to the rotor assembly are all in the same plane.
Turbine shaft
Location bearing inner track
Oil seal
HP / IP turbine interstage labyrinths
IP / LP turbine interstage labyrinths

Outcome of Investigation

- No findings to make recommendations to avoid future recurrence.
- Some thing which caused the accident
- Extensive Evidence to support what happened
- Fokker Fleet was grounded in Pakistan due to misinterpretation of aviation safety by political leaders.
- Myth that aging aircraft will break in air
- Investigations inconclusive

Why ?

- International Assistance is discrete and specific. You need to converge it --
- Prime responsibility to investigate rests with state of occurrence.
- It depends on the abilities of IIC and his team.
- Existence of interested parties in AAI
- Writing conclusive report is an art and depends on evidence.
- IIC should determine what to extract from experts

Chenkar

Bagram Air Base

Parwan

Bagram Airfield, Afghanistan

Mir Bachahkot

Probable final position

Kabul Airport

Kabul

Pakistan

©2010 Google

Crash Site Near Kabul Afghanistan

Interpreting ICAO -Documents

- Iranian Investigations blamed ATC for not taking initiative.
- ATC officers went to the court saying that they were not suppose to intervene when aircrew has confirmed for no help.
- The investigation was based on the interpretation of ICAO documents
- Iranian Govt requested for third party investigation and comments.
- License for Aircraft Accident Investigators

Conclusions

- **Prompt Notification as per Annexure-13**
- **Notify As many organization as you may think**
- **Expectations from International Organizations**
- **Prepare well and execute your plan well**
- **Keep examining your needs keeping in view the obligations as given in Annexure-13**
- **Discuss specialist reports with experts at stages**
- **Differentiate between opinions and facts**

Conclusions

- **Do not hesitate in explaining your position and difficulties including administrative and financial**
- **Keep in loop all the stake holders while communicating with one agency**
- **When you Delegate part or entire investigation to other experts , monitor very closely.**
- **Remember International Assistance is available in specific areas.**
- **Establish the relevancy and credibility of experts**
- **Consider your and your state's position**
- **Learn to write report in non-technical as well as technical terms.**
- **Investigation is also for Public and Families of Victims**
- **Do not forget the basics of investigation in digital world.**


Thank you

Lesson Learnt

Cont. Page

Lesson Learnt

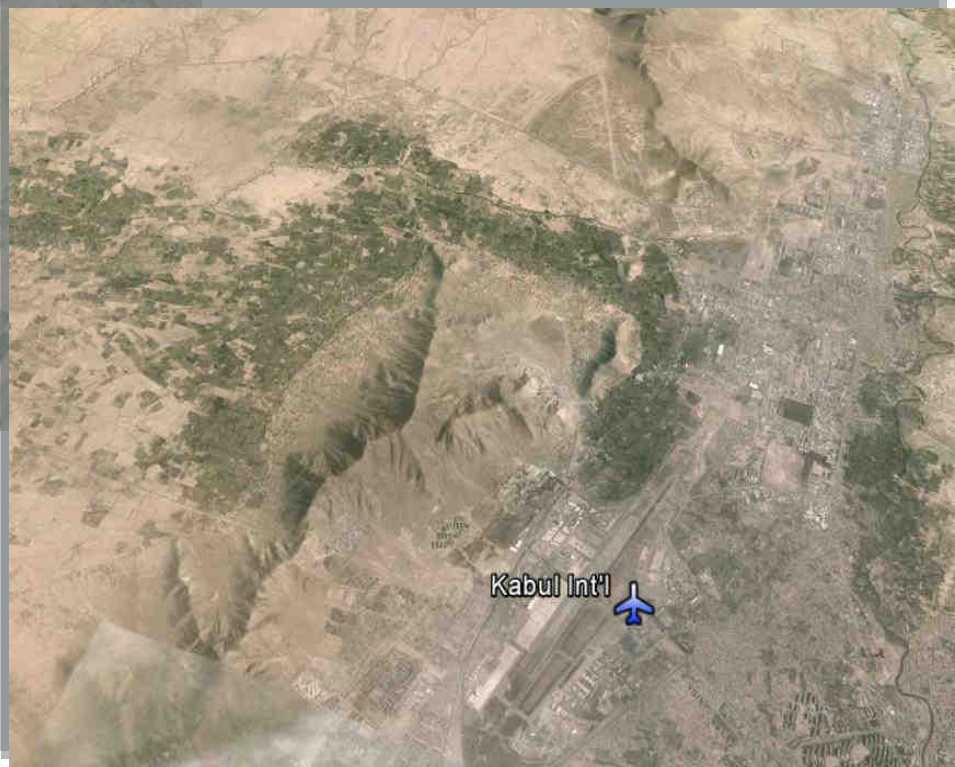
MENA SASI

- Bgajub
- Ugtghkj
  - Asd
  - Fgr
  - sdfe
- sert


Bagram airfield


Bagram airfield
Kabul Int'l


Bagram airfield


Kabul Int'l


Kabul Int'l
Bagram airfield
Karachi Airport
Dubai International Airport


Thank you