ICAS Daniel & Florence Guggenheim Memorial Lecture

COLLABORATION CHALLENGES IN THE GLOBAL AEROSPACE MARKET FOR SMALLER COUNTRIES – AN AUSTRALIAN PERSPECTIVE

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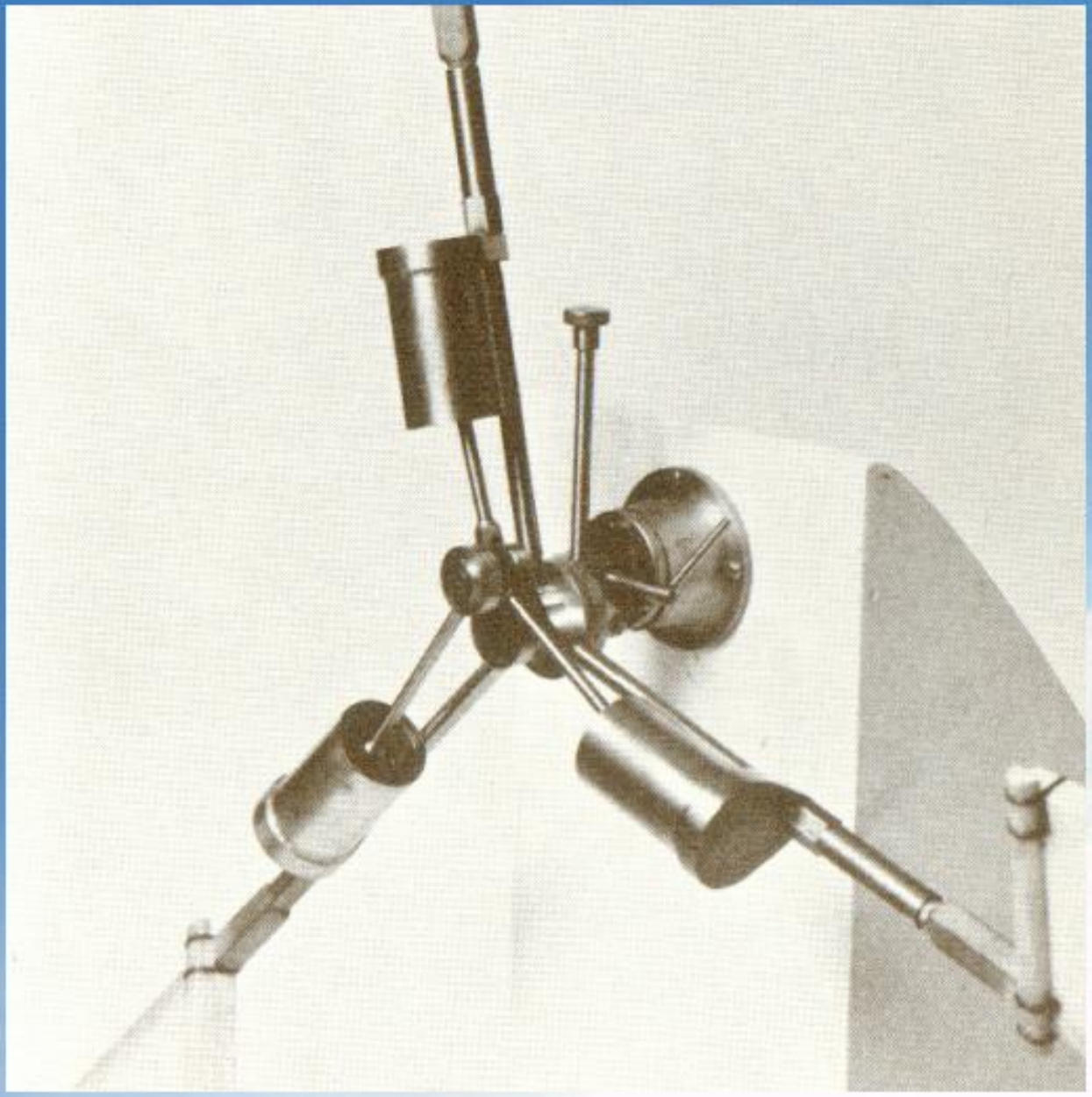
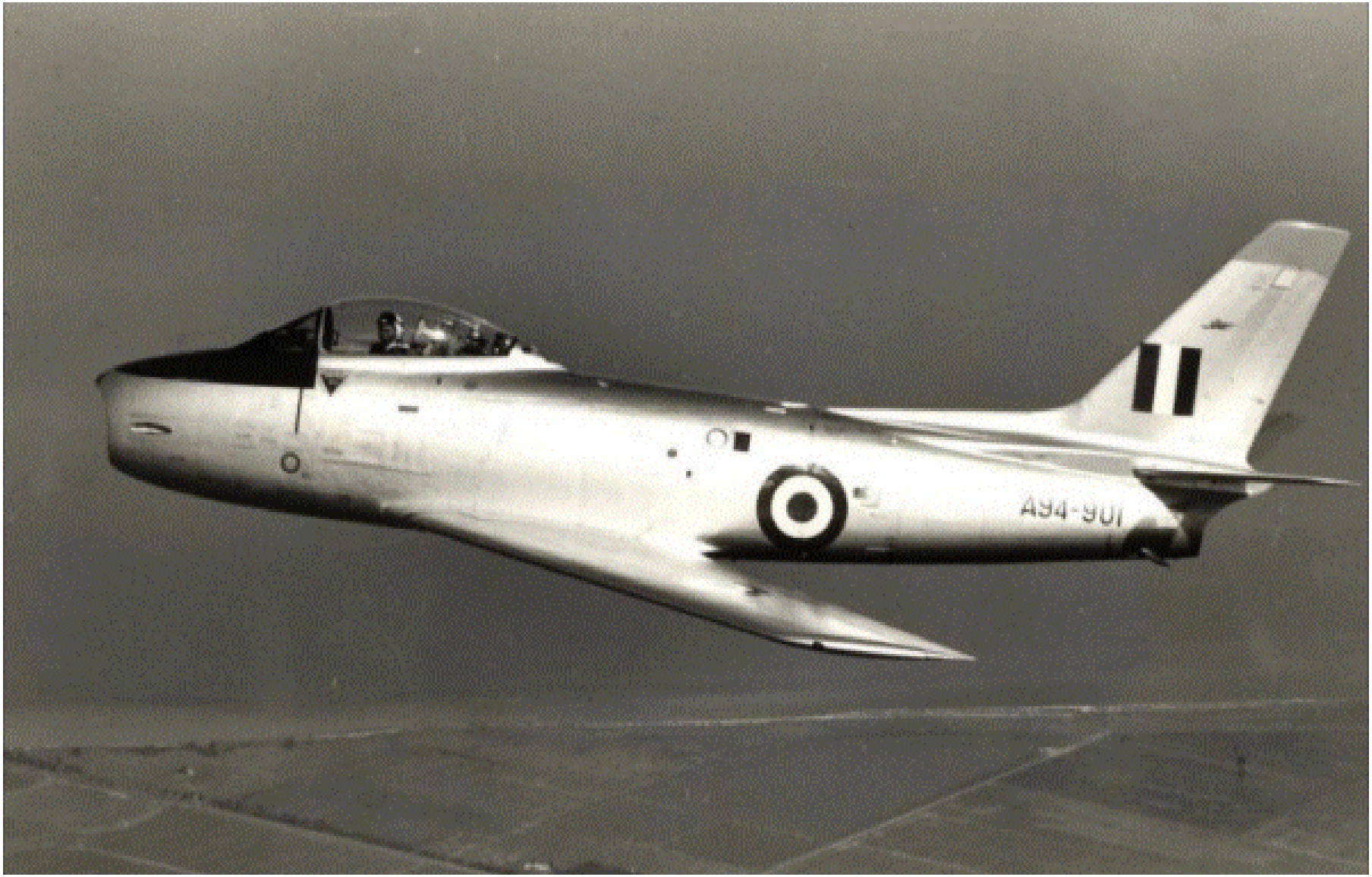


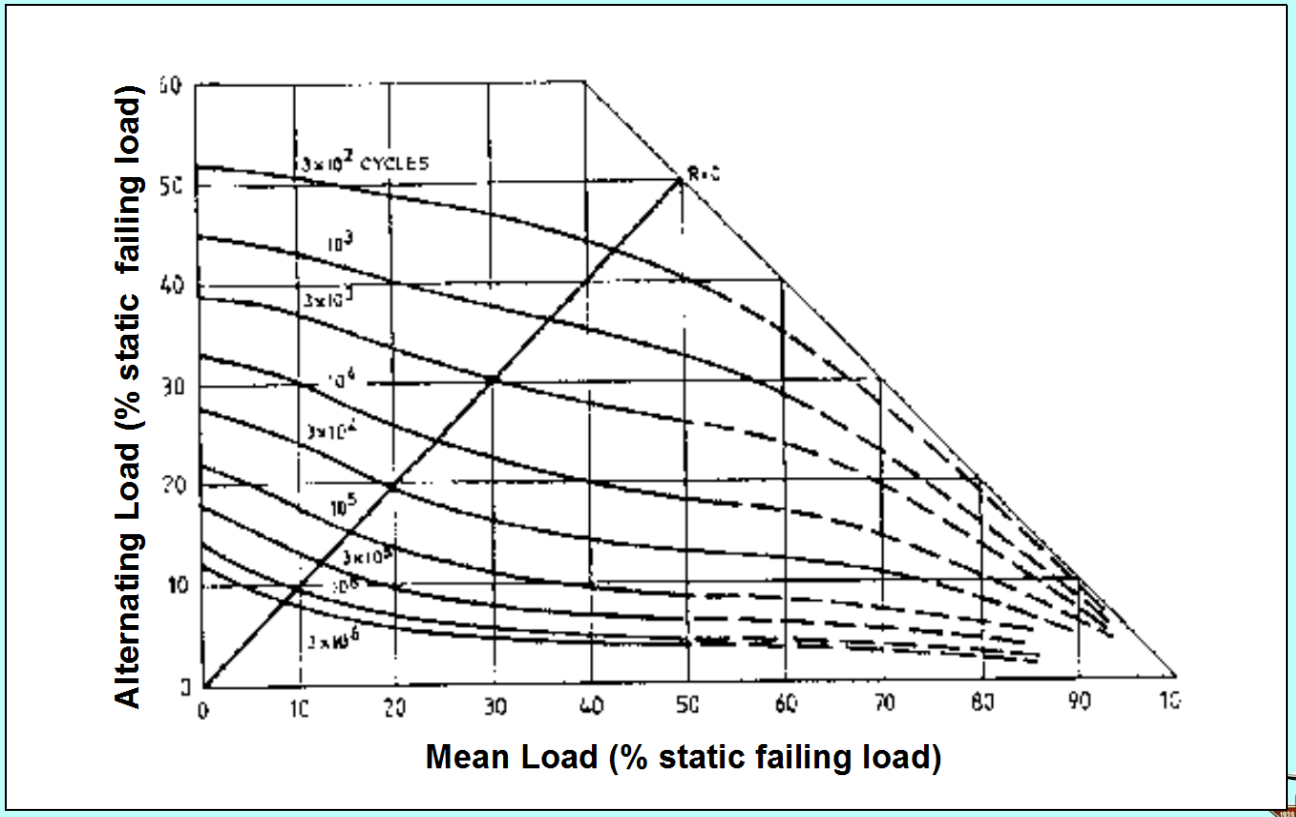

QH
A9-427


A68-105

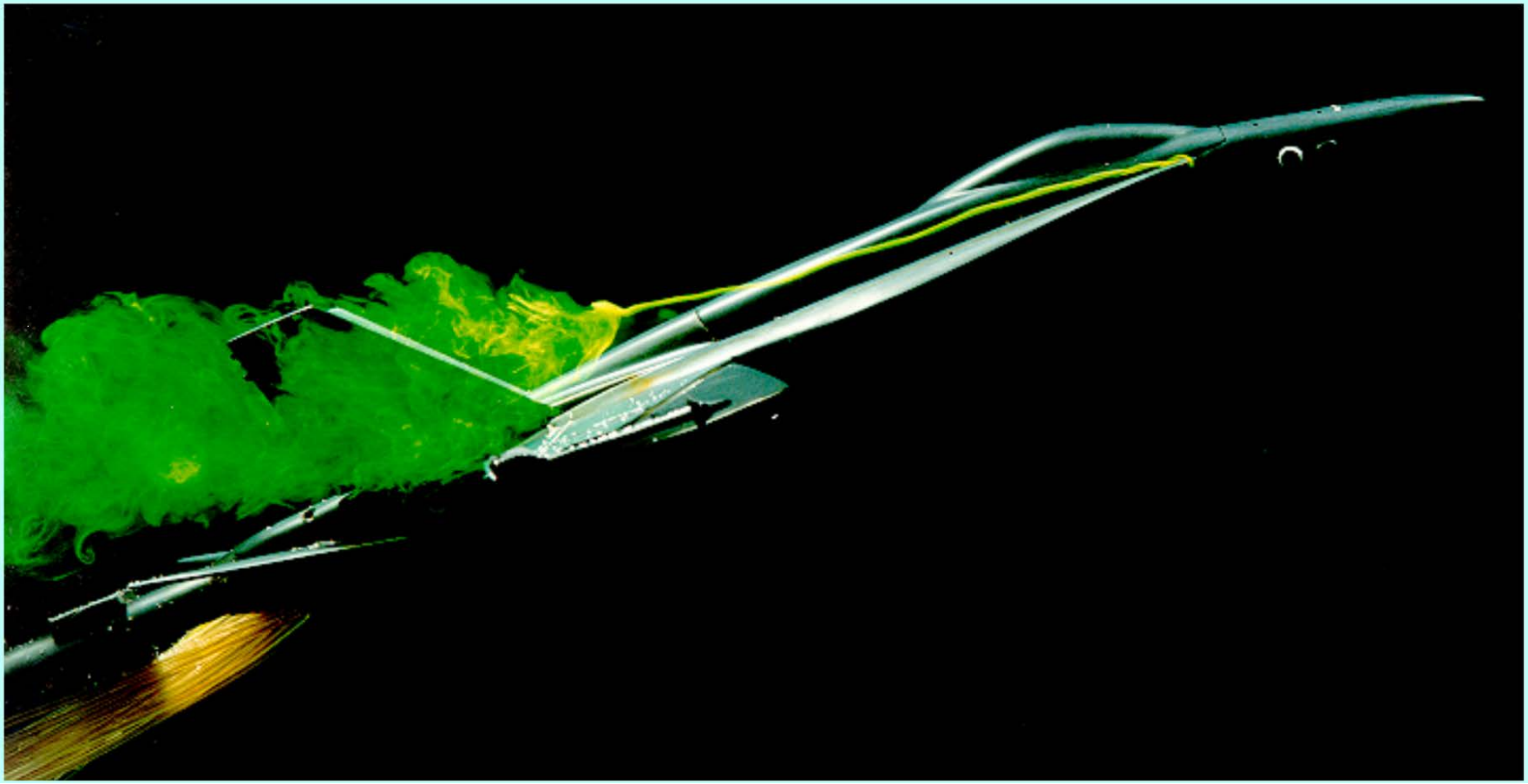

A94-901

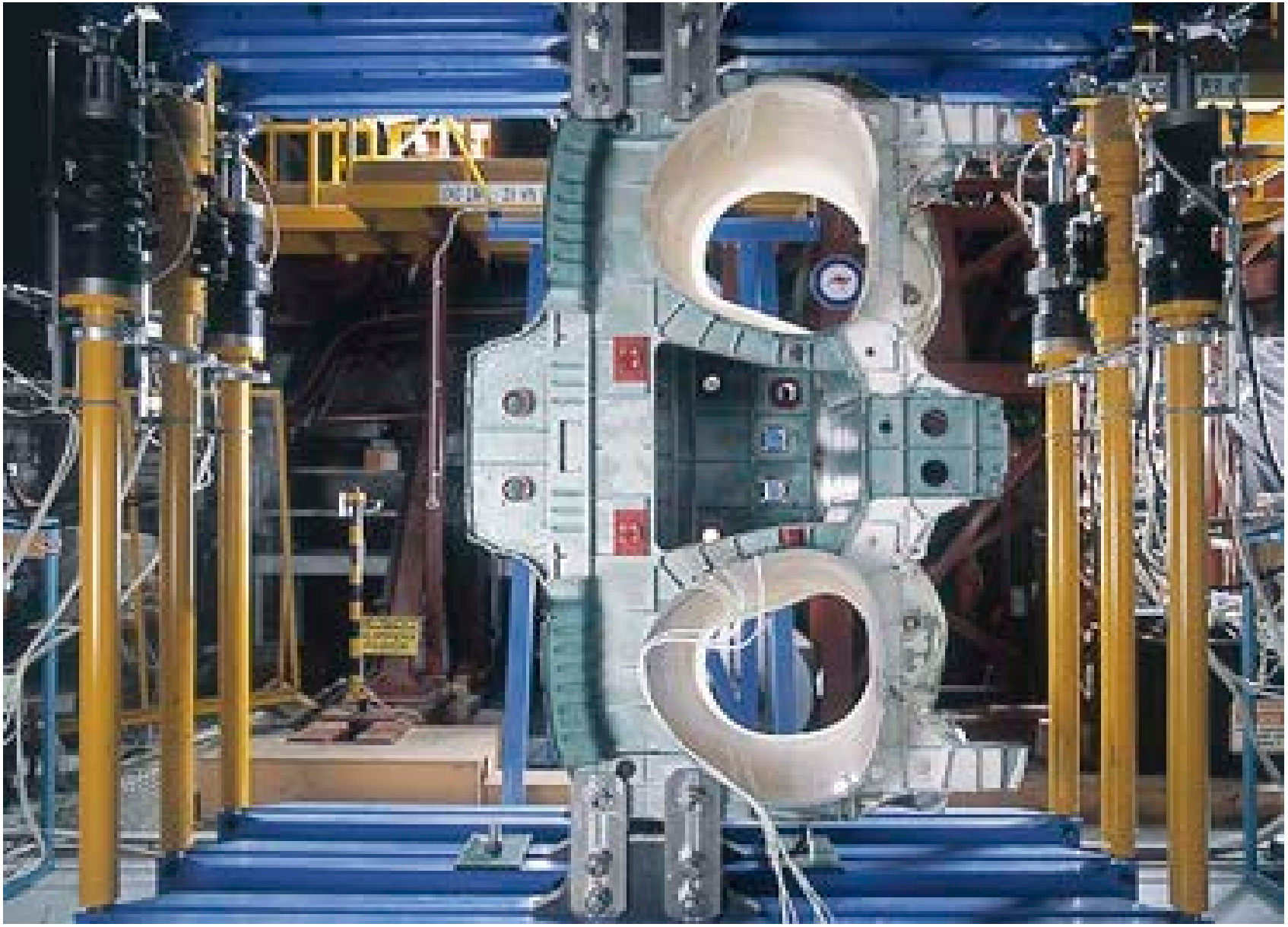
STINSON AIRCRAFT

Alternating Load - Mean Load Diagram for Mustang Wing



VORTEX BREAKDOWN ON AN F18 MODEL IN AMRL WATER TUNNEL

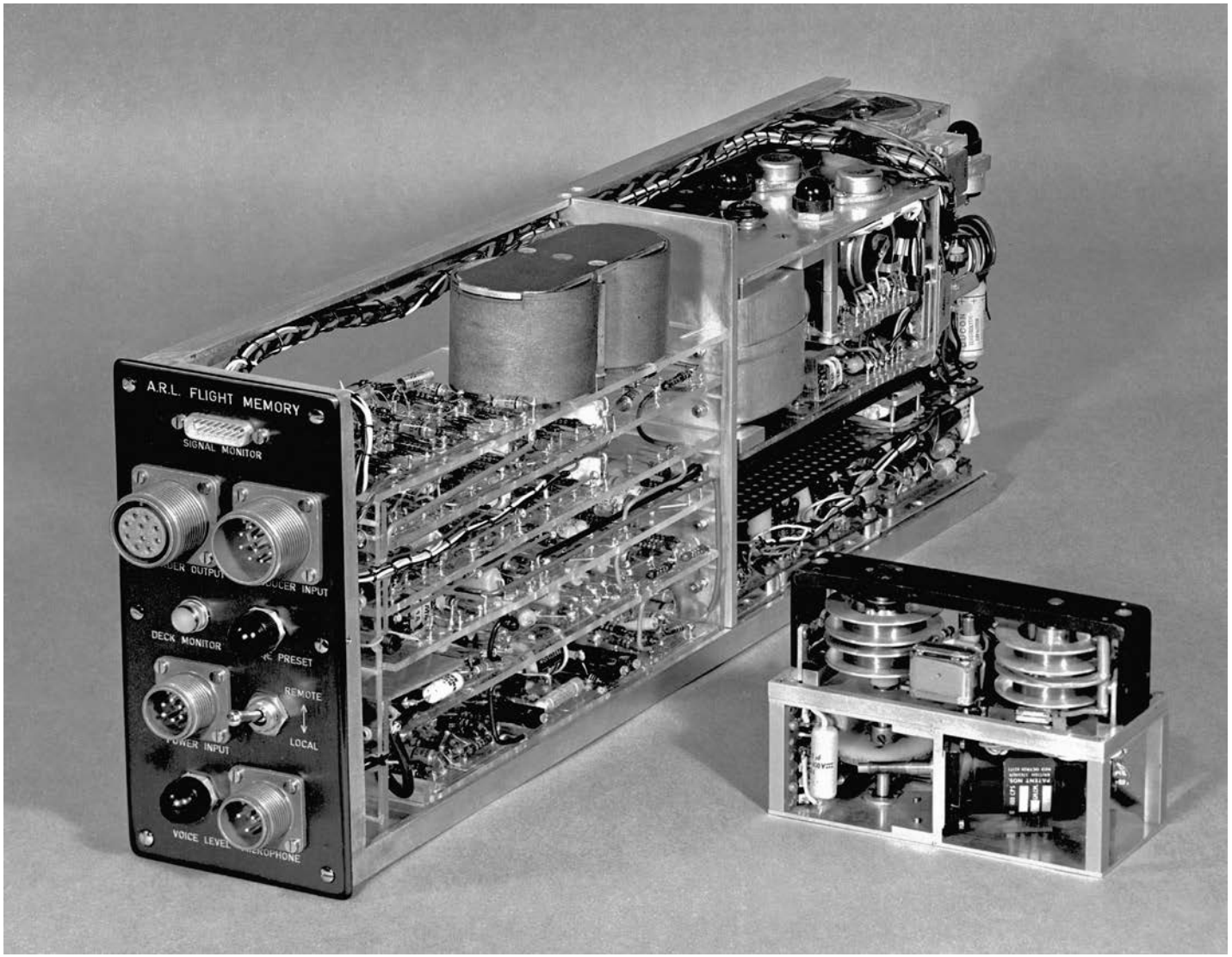




CASE STUDY: PC-9 FATIGUE TEST

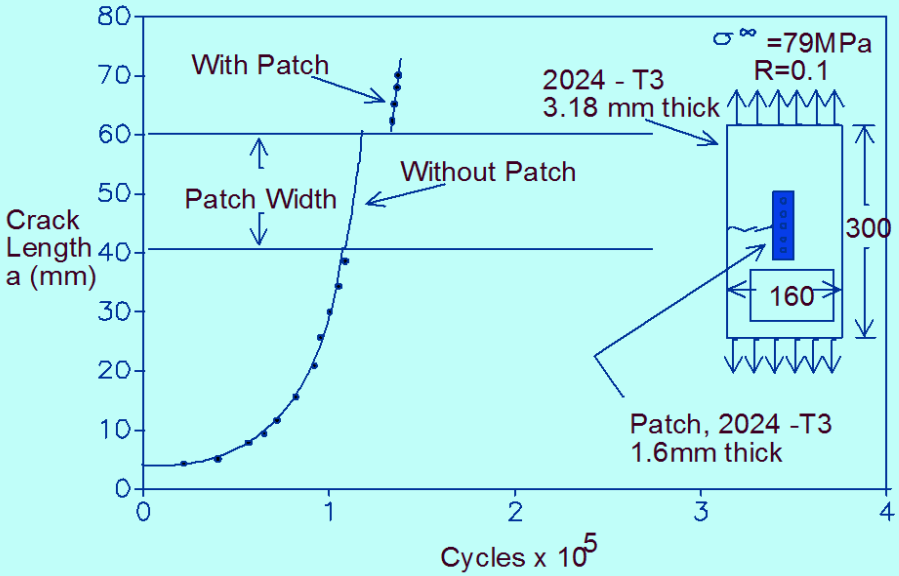
- Aircraft interim fatigue life 6,000 hours
- Australian target fatigue life 12,000 hours
- Increase in fatigue life 100%
- Capital cost of PC9 fleet including ancillary costs (in 1996 dollars) $438 million
- Value of additional life arising out of the test (100% of $438m) $438 million
- Estimated cost of DSTO/RAAF Program $6.0 million
- Estimated cost of RAAF flight program to develop flight load data $1.1 million

- **RETURN ON INVESTMENT 62:1 (or 6,200%)**

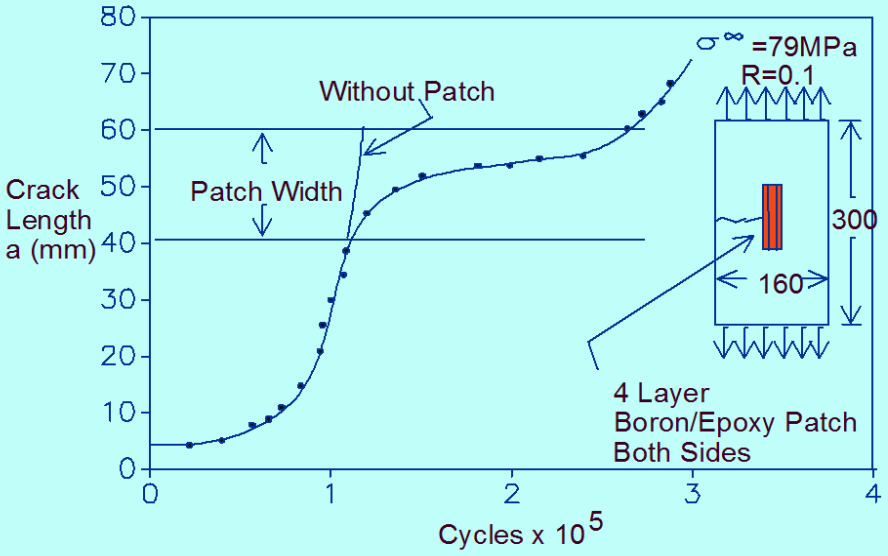

A.R.L. FLIGHT MEMORY
SIGNAL MONITOR
DECK MONITOR
REMOTE
LOCAL


VH-CTM


P 803
P 83

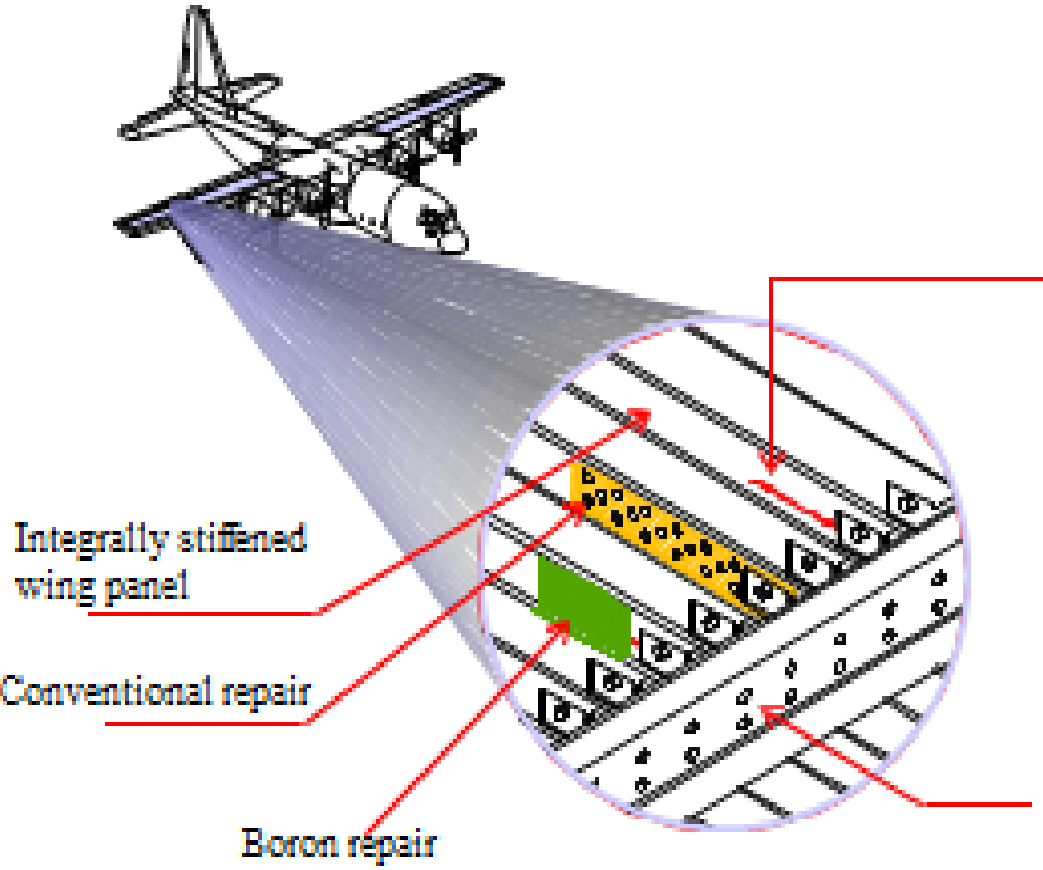


MECHANICAL REPAIR



COMPOSITE REPAIR

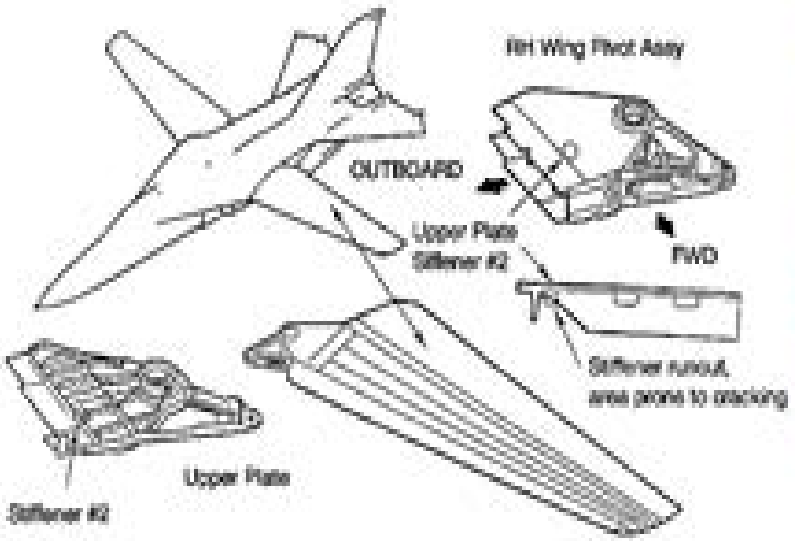
Stress Corrosion Crack Repair

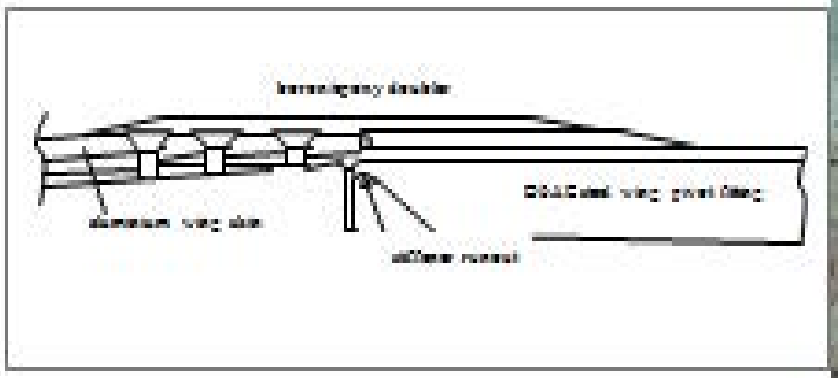


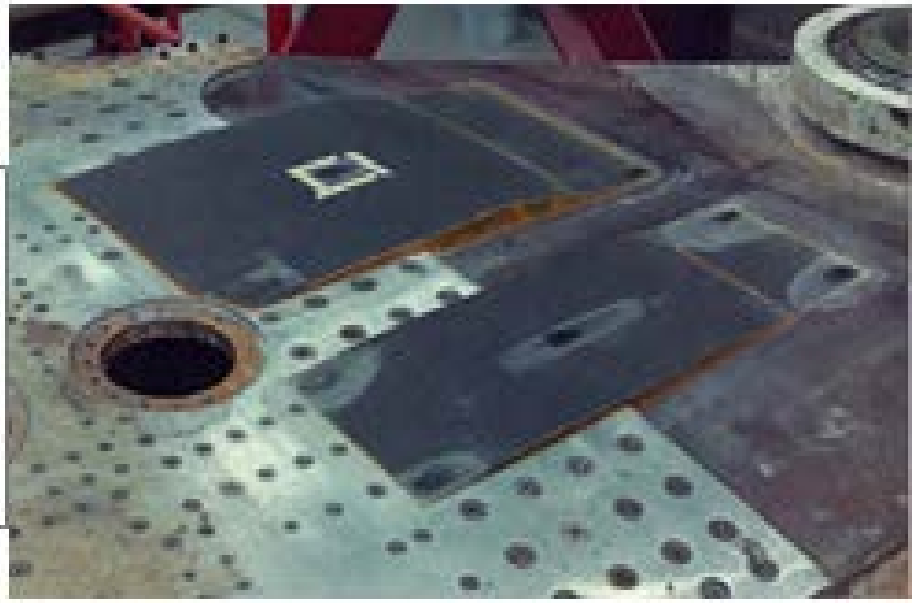
- **Solution**
  - boron/epoxy bonded repair applied inside the wet wing
  - over 1000 repairs applied with no crack growth in 20 years
  - estimated savings over $100 million by 1985

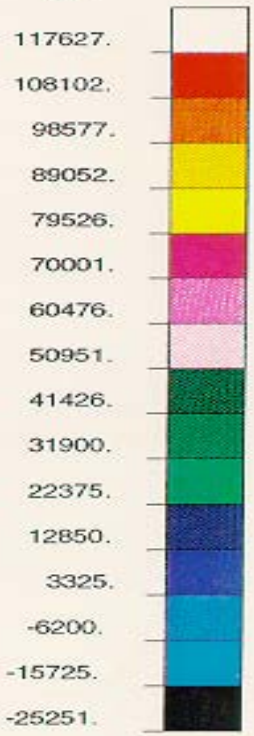
Completed Repair

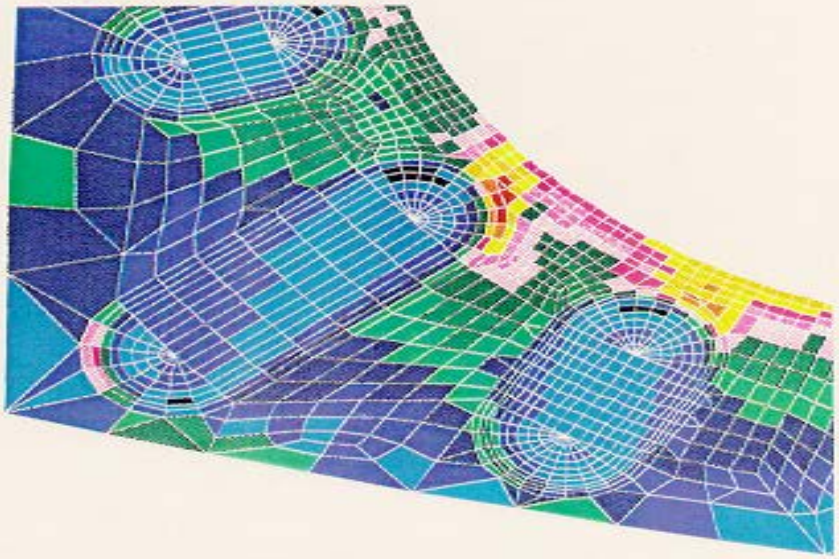
Strain Reduction: Wing Pivot Fitting F111



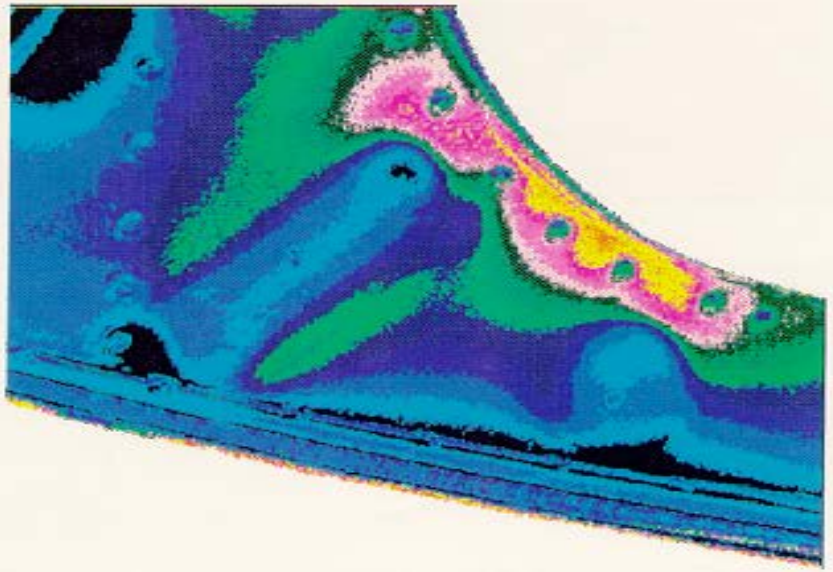


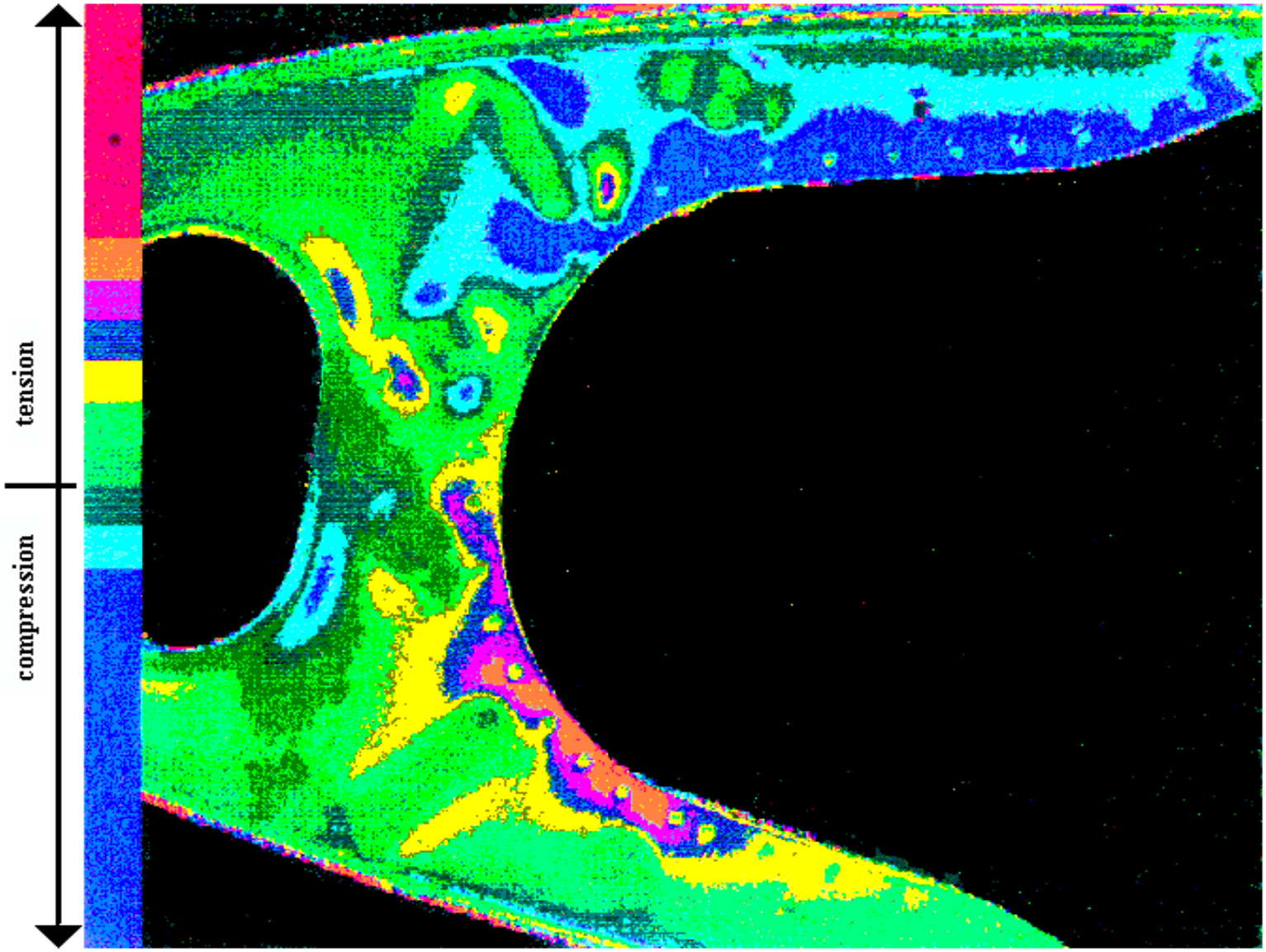




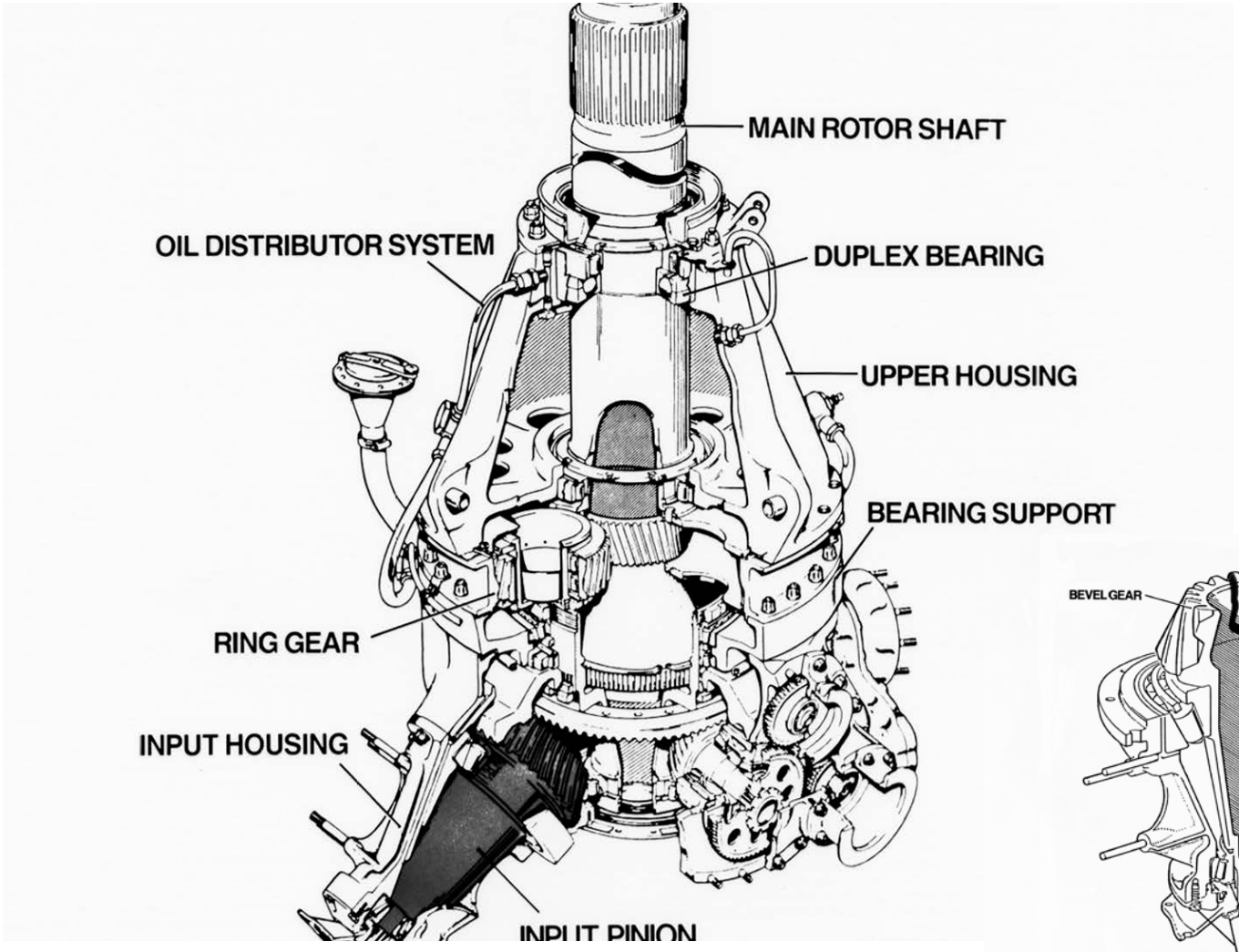


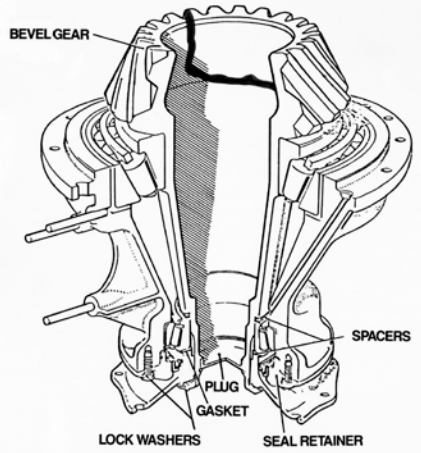
NAVAIR 3-D FE ANALYSIS OF CRITICAL REGION.





FAST STRESS SCAN OF LEADING EDGE
(NOTE STRESS CONCENTRATION EFFECTS OF STIFFENING DIMPLES).

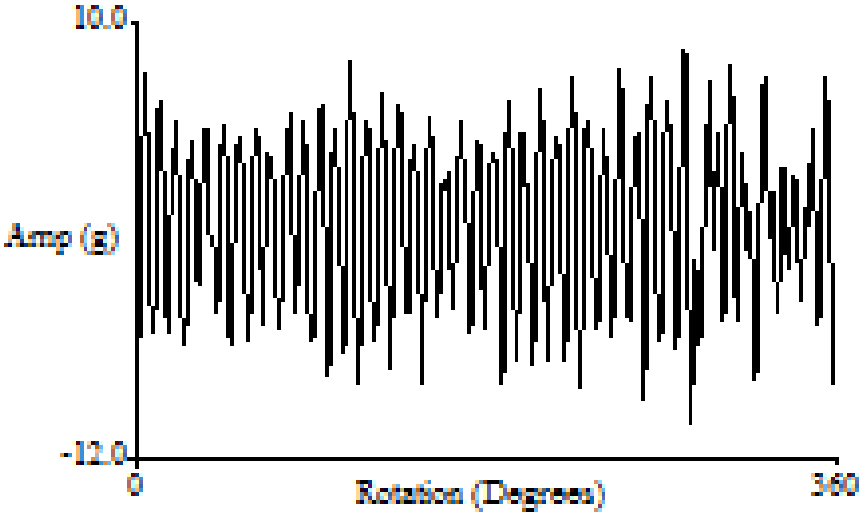




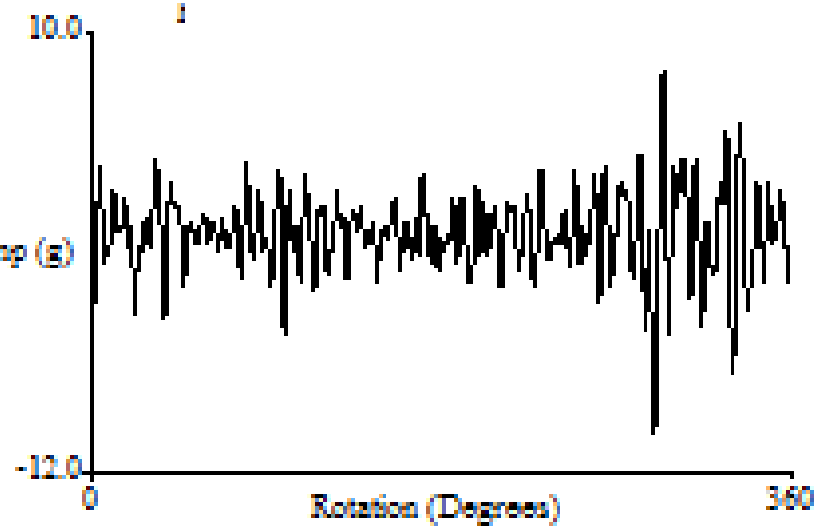
INPUT PINION

Wessex Input Pinion Failure

Subtraction of the 'normal' gear meshing signature from the synchronous average gives the 'error ' or residual signal.

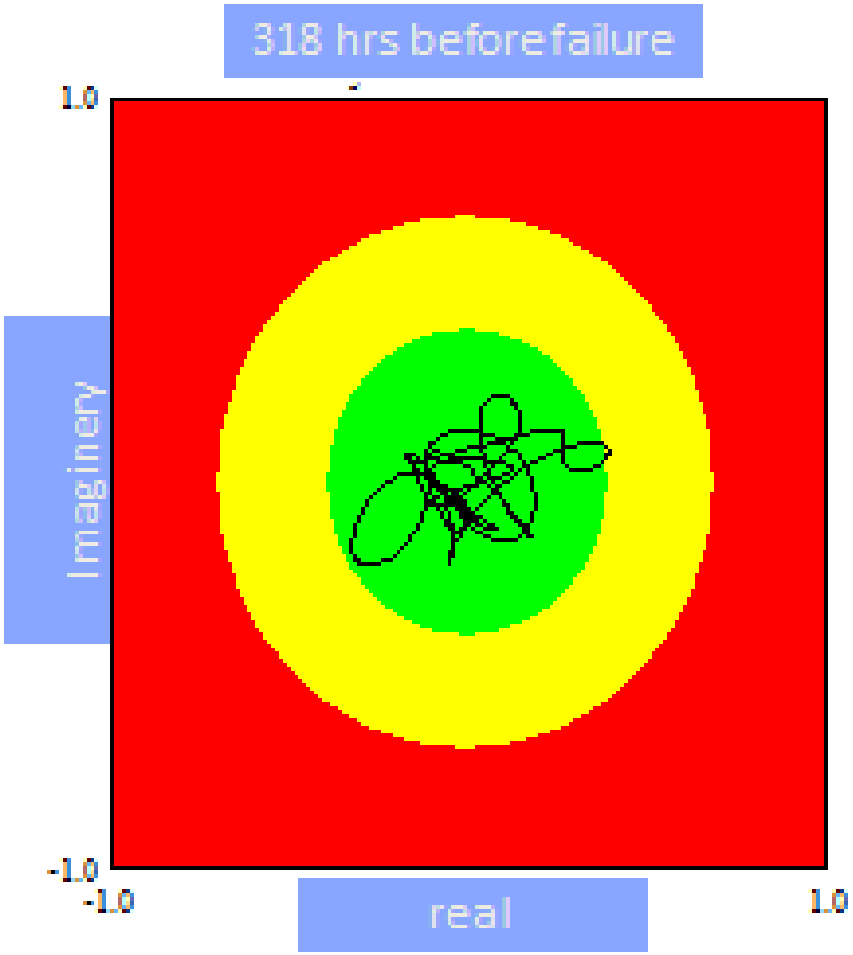


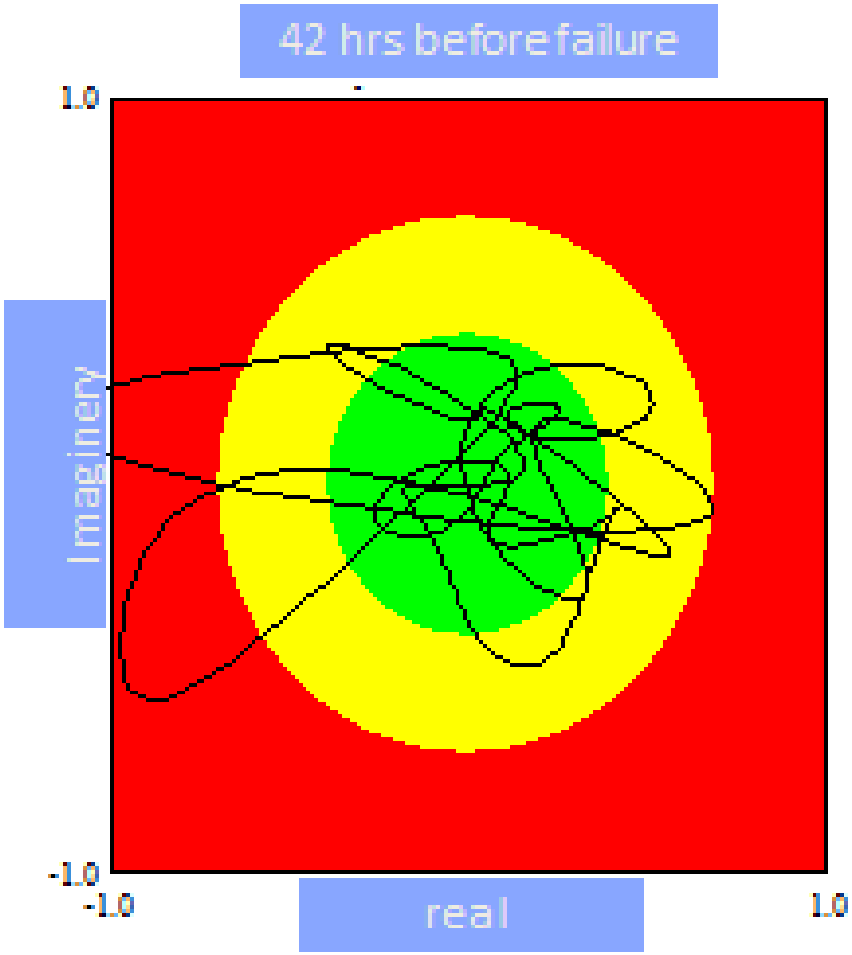
Synchronous Average
Cracked Wessex Input Pinion



Residual Signal
Cracked Wessex Input Pinion

Residuals can be transformed into 'Bullseye Plots'

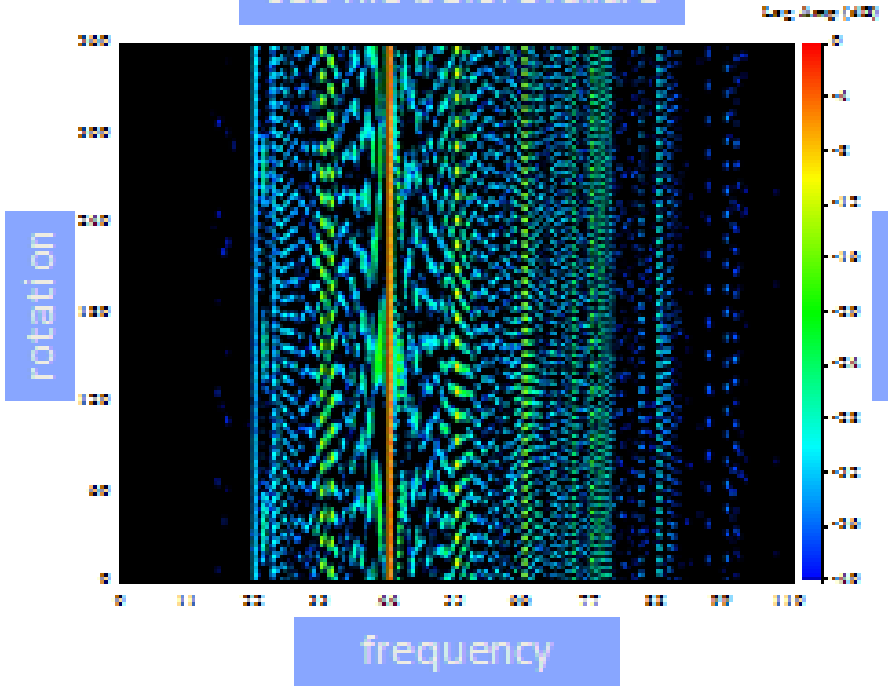




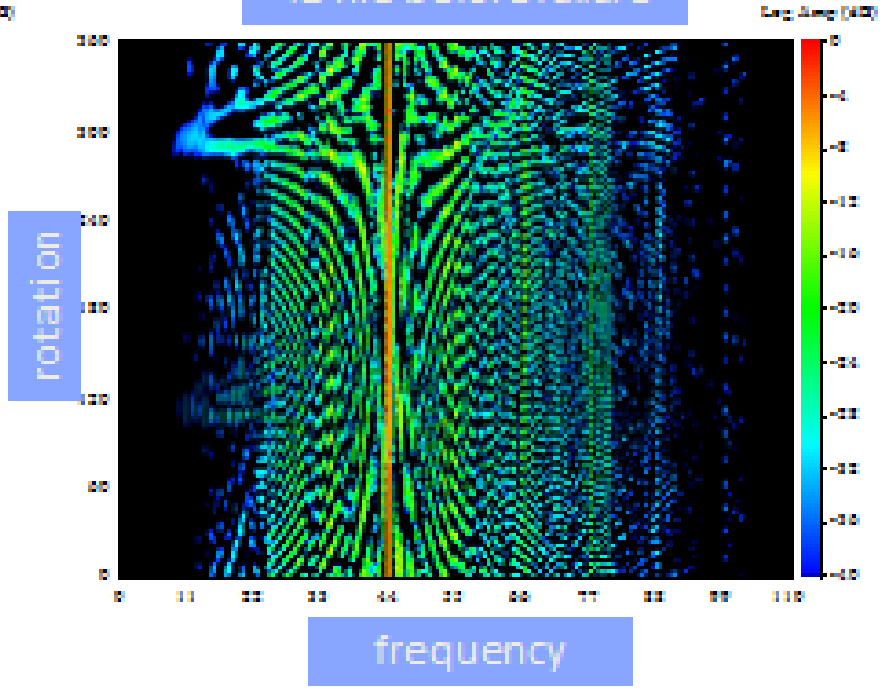
- includes phase information
- interpretation simplied

Advanced analyses retain more information of the meshing vibration

318 hrs before failure



42 hrs before failure



Wigner-Ville Distributions

- no filtering required
- contains much more information on fault