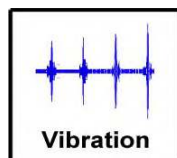


# Primary Air Fan COGA Unit



## Fault Analysis Report

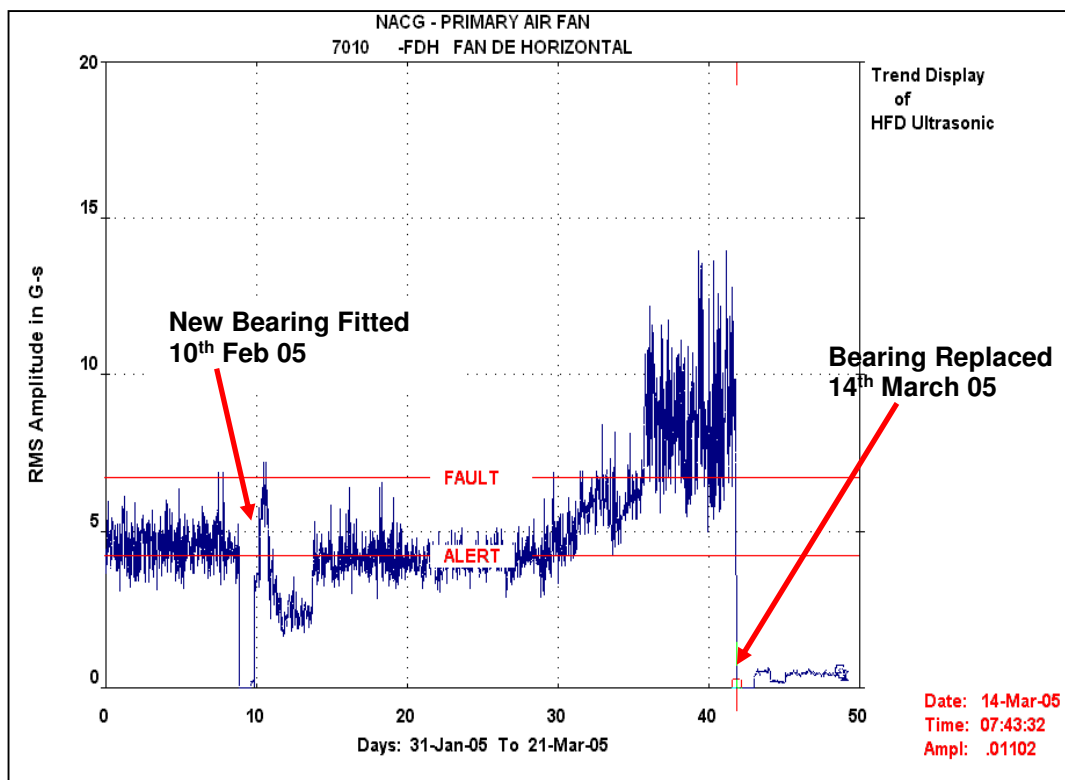


## 5031-7010 Primary Air Fan (Fan DE Bearing Problem)

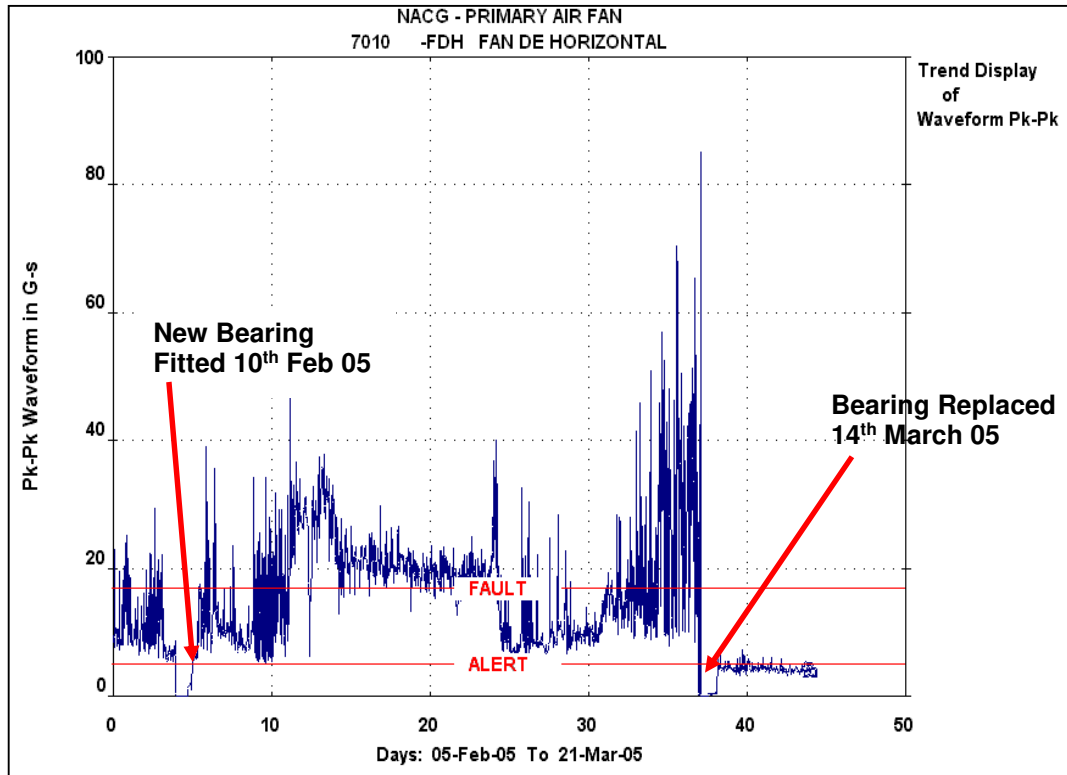
The Primary Air fan is a key part of the COGA Unit; it supplies atmospheric air to the furnace to allow the combustion process to take place. Failure of this asset will result in COGA shutdown, and heavy plant losses.



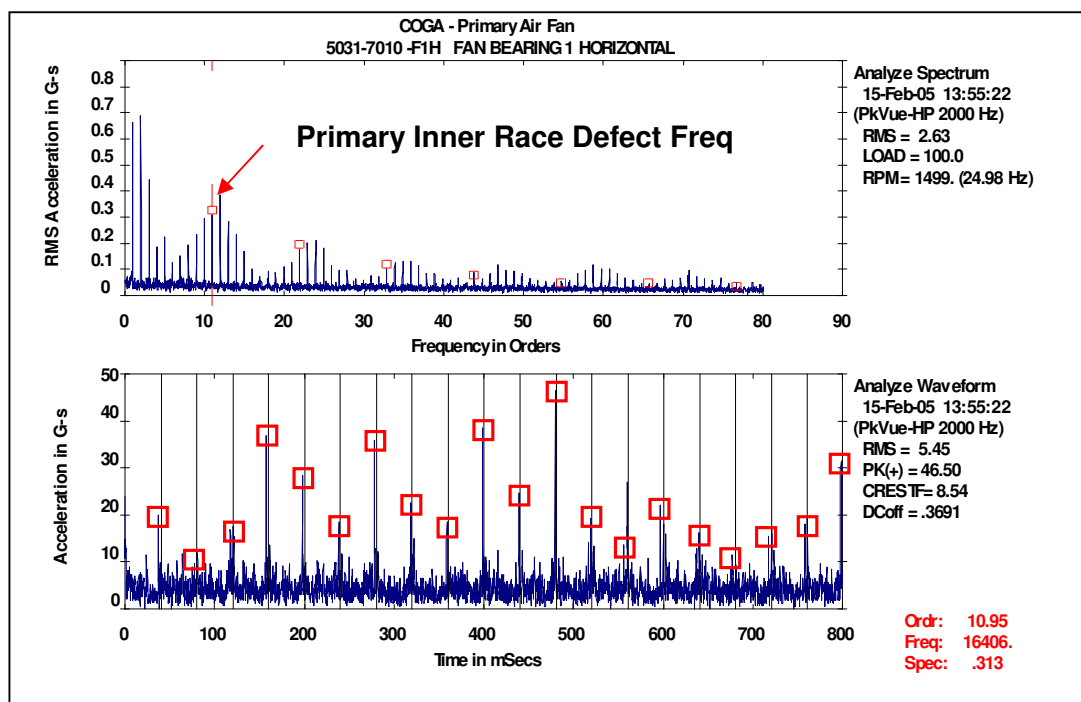
The fan has four fixed vibration sensors which are wired into the 6500 Online System, the data is sent back to a PC where trending & analysis takes place.



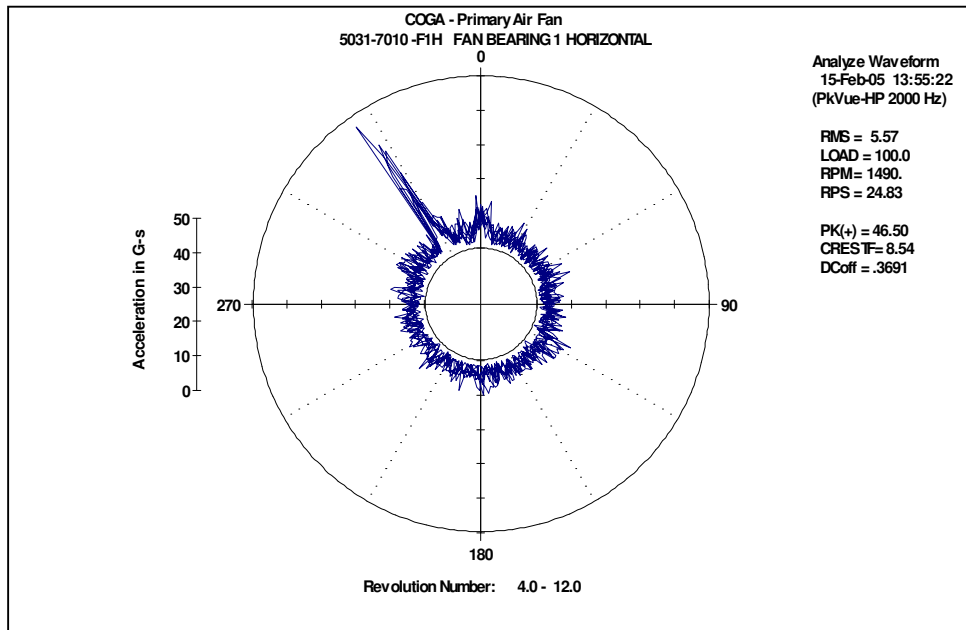
The above online trend is taken off the Fan DE bearing; the HFD levels were increasing steadily until the bearing was replaced on the 14<sup>th</sup> March 2005. HFD levels respond to bearing distress and lubrication problems.



The above online trend is also taken from the Fan DE bearing, this is a different parameter, the PK-PK Waveform level measured in G's, this responds more to impacting problems such as bearing defects, note how the levels increased sharply before the bearing was replaced



Analysis of spectral and waveform data from the Fan DE bearing clearly showed a severe impacting problem, a dominant once per rev impact was present on the waveform, these graphs were typical of an inner race defect in a localised defect site.



Further Analysis of the waveform using the rotational plot clearly shows the impacting was localised in one position on the inner race.



Upon inspection of the fan drive end bearing, a clear crack across the full width of the race was found, this was the source of the high G' impacting levels. The sharp spikes seen on the data were the bearing rollers impacting the crack.



Further examination of the bearing also revealed deformation of the outer race roller path surface and scoring to the rollers (loaded side). It was also noted the condition of the grease within the bearing was poor, indicating a potential lubrication issue as well as the cracked inner race.

## **Estimated Cost Savings**

**(Using Invista Best Practice)**

### **Actual Costs (Action Taken)**

Parts : New Bearings Exp/Carb x 2  
= £ 500

Labour : 2 men , 6 hours @ £ 30/ hour  
+ Crane = £ 610

Production Losses: £111,000 due slow ramp  
up of COGA Unit.  
(Fig based Polymer Sales)

Total Cost = £ 112,110

### **Costs (No Action Taken)**

40% of ERV (Estimated replacement value)  
0.40 x £ 32000 (Cost of New Fan)  
= £ 12800

Labour : 2 men, 48 hours @ £30 /hour  
= £3500

Environmental Effect (Fines)  
3 Days to remove/repair/replace primary air fan  
Production Loss / Based on 3 Days down  
£ 330,000 (Fig based Polymer Sales)

Total Cost = £ 349,300

**Estimated Avoided Cost = £ 237,190**

### **Root Cause – Analysis**

Excessive tightening of the lock nut upon assembly is the most likely caused of the cracked inner race, however a manufacturing fault cannot be ruled out, having the cracked inner race examined should reveal the root cause. Poor lubrication of the fan bearing is also a potential issue and this should be addressed.