



*vibration - thermography - oil analysis - laser alignment - in-situ balancing*

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**vibration Analysis Report**  
**NUOVO PIGNONE MASSA**  
**'A' 30MW Turbine, GEARBOX &**  
**GENERATOR**  
**5<sup>th</sup> April 2007**

**Introduction**

A Vibration Analysis was requested by an OEM, on the 'A' 30 MW Turbine, Gearbox & Generator set, at Nuovo Pignone Massa Site in Italy, to validate the Generator balance.

**Equipment**

The following equipment was used to carry out this analysis:

SKF Microlog: CMVA60. Serial No 602995

Accelerometers:

Monitran 1100c 2-10Khz 100mv/g

Number: 1 Serial No 258476

Number: 2 Serial No 258477

Dell Notebook Computer

SKF Prism4 Vibration Analysis Software.

Analyst:

Mr A Analyst.

**Report**

**Introduction**

At the request of an OEM, a Vibration Analysis Survey was carried out on the 'A' 30MW Generator Set at the Nuovo Pignone Massa Site in Italy. The survey was to assess the level of vibration on the generator during the 'string test' and carry out an in-situ balance of the generator if the vibration was above acceptable limits.

Note:

**All quoted velocity amplitudes are mm/s RMS.**

**Thursday 5<sup>th</sup> April**

After arriving at site the required familiarisation procedures were completed.

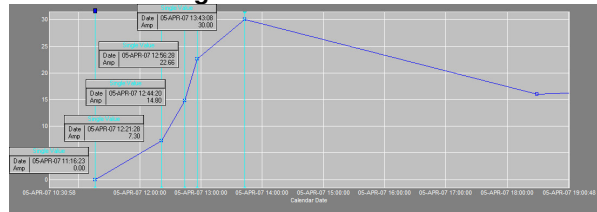
A meeting was then held with the Nuovo Pignone personnel where a plan of action was discussed to run the generator set at full speed with no load, then the load would be increased to 7mw, 14mw, 22mw and 30mw, see **Fig 1**.

At each different load a full set of vibration data was collected from the generator drive end and non drive end bearings, in the horizontal, vertical and axial directions.

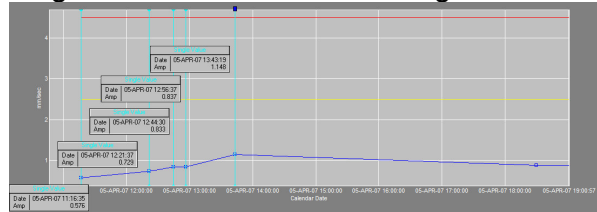
**Generator Drive End Bearing Trends**  
**Fig 2, 3, & 4**

**Figs 2, 3 & 4** show the generator drive end bearing vibration trends in the horizontal, vertical and axial directions. Although the amplitudes steadily increase with load the highest recorded reading from the drive end bearing was in the vertical direction at 30mw, with an overall level of 1.71 mm/s. **Fig 5** shows the waterfall spectrum from the generator drive end vertical position showing the 1<sup>st</sup> order at 30mw has an amplitude of 1.691 mm/s, within an acceptable level for this class of machine.

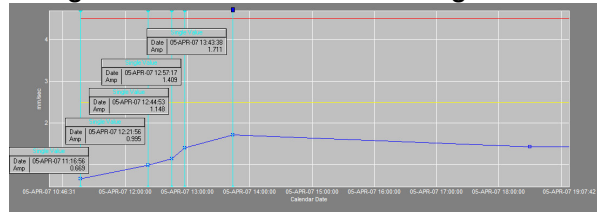
**Fig. 1. Generator Load**



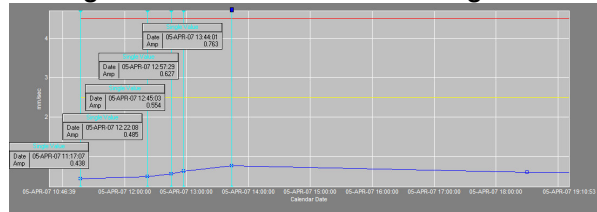
**Fig. 2. Generator Drive End Bearing Horizontal**



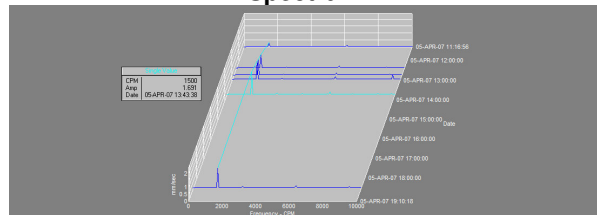
**Fig. 3. Generator Drive End Bearing Vertical**



**Fig. 4. Generator Drive End Bearing Axial**



**Fig. 5. Generator Drive End Vertical Waterfall Spectrum**



**Report**

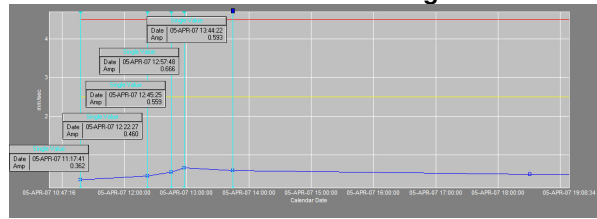
**Generator Non Drive End Bearing Trends**  
**Fig 6, 7, & 8**

**Figs 6, 7 & 8** show the generator non drive end bearing vibration trends in the horizontal, vertical and axial directions. Again the amplitudes steadily increase with load and the highest recorded reading from the non drive end bearing was in the vertical direction at 30mw, with an overall level of 1.825 mm/s. Fig 9 is the waterfall spectrum from the generator non drive end vertical position showing the 1<sup>st</sup> order at 30mw has an amplitude of 1.787 mm/s, within an acceptable level for this class of machine.

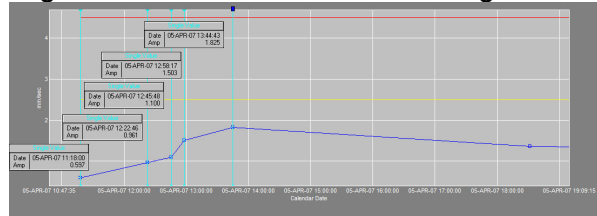
**Conclusion**

The vibration on the generator was found to be within acceptable limits using the ISO standard 10816-1 so there wasn't a need to perform a trim balance.

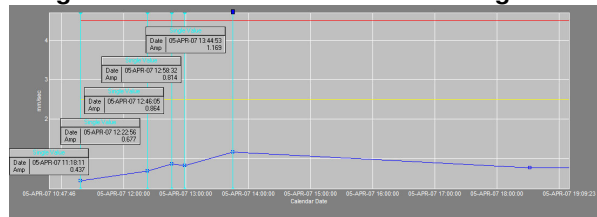
**Fig. 6**  
**Generator Non Drive End Bearing Horizontal**



**Fig. 7. Generator Non Drive End Bearing Vertical**



**Fig. 8. Generator Non Drive End Bearing Axial**



**Fig. 9. Generator Non Drive End Vertical Waterfall Spectrum**

