

VIBRATION ANALYSIS REPORT ON

EXHAUST BLOWER (BPP-FAE-622)

AT AUTO ALLIANCE (THAILAND) CO., LTD.

Condition: Off Load

PREPARED FOR: SWINBURNE ENGINEERING CO., LTD.

ATTENTION: MR. SAKDA LEELASRIBANCHONG

PREPARED BY: MR. SOMMAI TONGPHASOOK

REPORT NO.: P-SWB-06-01

REPORTED DATE: 16/04/06

REPORTED BY: SOMMAI TONGPHASOOK

SIGNED: _____ DATE: _____

APPROVED BY: SOMMAI TONGPHASOOK

SIGNED: _____ DATE: _____

Last Measurement Report

Folder: Swinburne Engineering - Navanakorn - AAT
Machine: BPP-FAE-622

Location	Type	Date	Current
MTR.NDE.BRG1 - Horizontal	Acceleration	10/1/2006	0.04 g rms
	Velocity	10/1/2006	2.017 mm/s rms
MTR.NDE.BRG1 - Vertical	Velocity	10/1/2006	1.998 mm/s rms
MTR.NDE.BRG1 - Axial	Velocity	10/1/2006	6.812 mm/s rms
MTR.DE.BRG2 - Horizontal	Acceleration	10/1/2006	0.049 g rms
	Velocity	10/1/2006	2.408 mm/s rms
MTR.DE.BRG2 - Vertical	Velocity	10/1/2006	6.011 mm/s rms
MTR.DE.BRG2 - Axial	Velocity	10/1/2006	6.775 mm/s rms
FAN.DE.BRG3 - Horizontal	Acceleration	10/1/2006	0.036 g rms
	Velocity	10/1/2006	1.686 mm/s rms
FAN.DE.BRG3 - Vertical	Velocity	10/1/2006	9.644 mm/s rms
FAN.DE.BRG3 - Axial	Velocity	10/1/2006	30.968 mm/s rms
FAN.NDE.BRG4 - Horizontal	Acceleration	10/1/2006	0.038 g rms
	Velocity	10/1/2006	2.105 mm/s rms
FAN.NDE.BRG4 - Vertical	Velocity	10/1/2006	7.474 mm/s rms
FAN.NDE.BRG4 - Axial	Velocity	10/1/2006	33.491 mm/s rms

Machine Severity

Refer to ISO 10816-3; this machine is classified in the machine group 2; flexible foundation, the machine severity is “Inadmissible” ($> 7.1 \text{ mm/s}_{\text{rms}}$ as the above data) condition.

Analyze for

The vibration high at 3A and 4A and they are much more than the other points as called “Directional Vibration”. Main source of these vibrations are only the synchronous speed of the fan speed 17.5 Hz (1050 rpm) as the spectrum attached figure 1. This is the effect of “Resonance” on the machine.

In order to confirm the Resonance Phenomenon, we have performed “Bump Test” on the machine to find out the resonant part and found that the Natural frequency of the Pedestal is 15.25 Hz as the spectrum attachment figure 2. This Natural frequency is close up the main source at 3A and 4A. The excitation force at 17.5 Hz is higher than the Natural frequency at 15.25 only 2.25 Hz or 14.75 % of the Natural frequency. So the “Bump Test” result is confirmed that this is the “Resonance Phenomenon”

Recommendation

Due to the vibration severity for this blower is in “Inadmissible”, it is recommended to solve this vibration problem.

The solution of this vibration high could be done in many methods as the following.

- 1) The first recommendation is solving at the excitation frequency of the fan. Recommend to speed up the fan to be 1200 rpm or slightly more than if this modification is not effect to the production process.
- 2) If the first recommendation could not be done, recommend to trial add the axial direction stiffness of the pedestal. The pedestal ribs are recommended to be added. After the stiffness adding, please confirm the new natural frequency by Bump Test again. This vibration problem will be solved if the new natural frequency is shift up to more than 22.75 Hz.
- 3) If the second recommendation is not work, adding mass to the pedestal is recommended to be done. How ever, in this solution method could be done by adjust the adding mass and try to test run till the system vibration go down. This method will shift the natural frequency of the pedestal down as the figure 3 as attachment.

The other solutions may be adding “Dynamics absorber” or get rid off the excitation for 1x is not recommended because it is not effectiveness to solve this problem.

Attachment
Spectrum Analysis

Of
EXHAUST BLOWER (BPP-FAE-622)

Fig. 1 Spectrum Signature at 3A. And 4A.

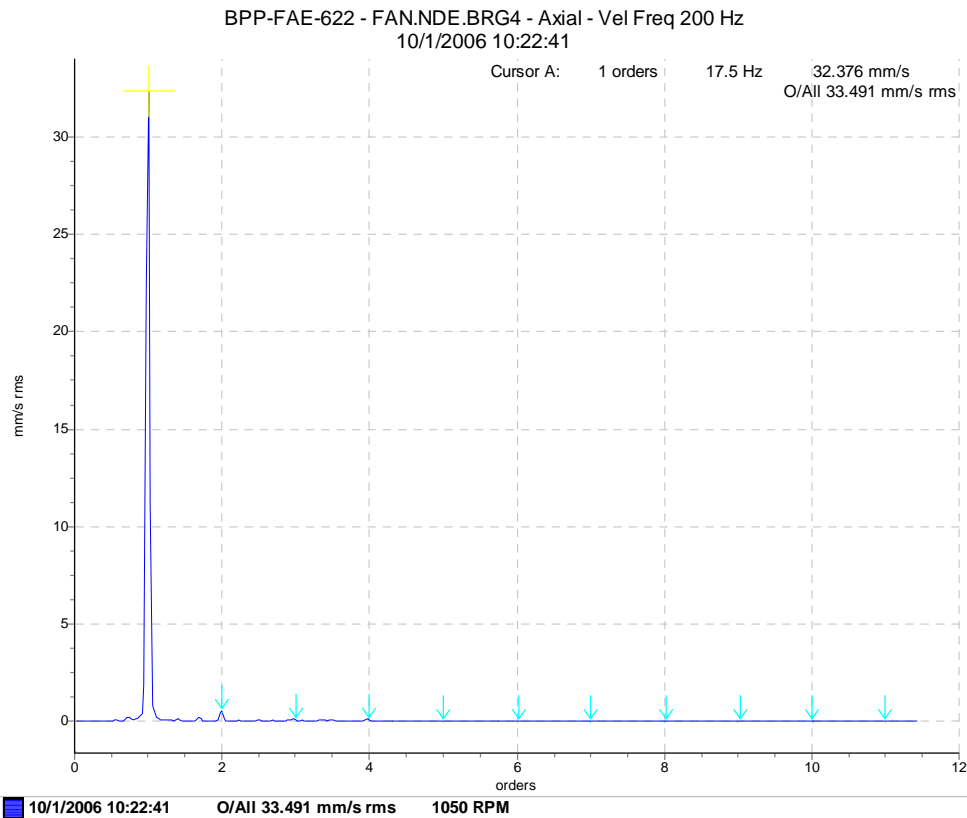
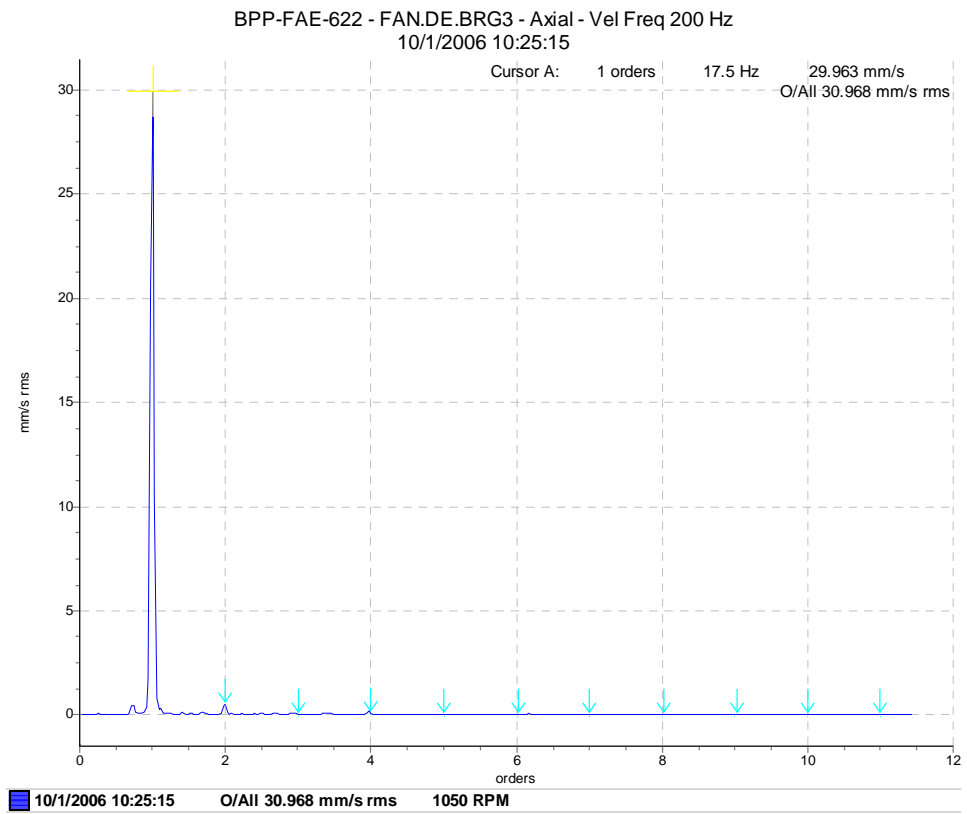


Fig. 2 Spectrum Signature at 3A. as "Bump Test" at the top of Pedestal

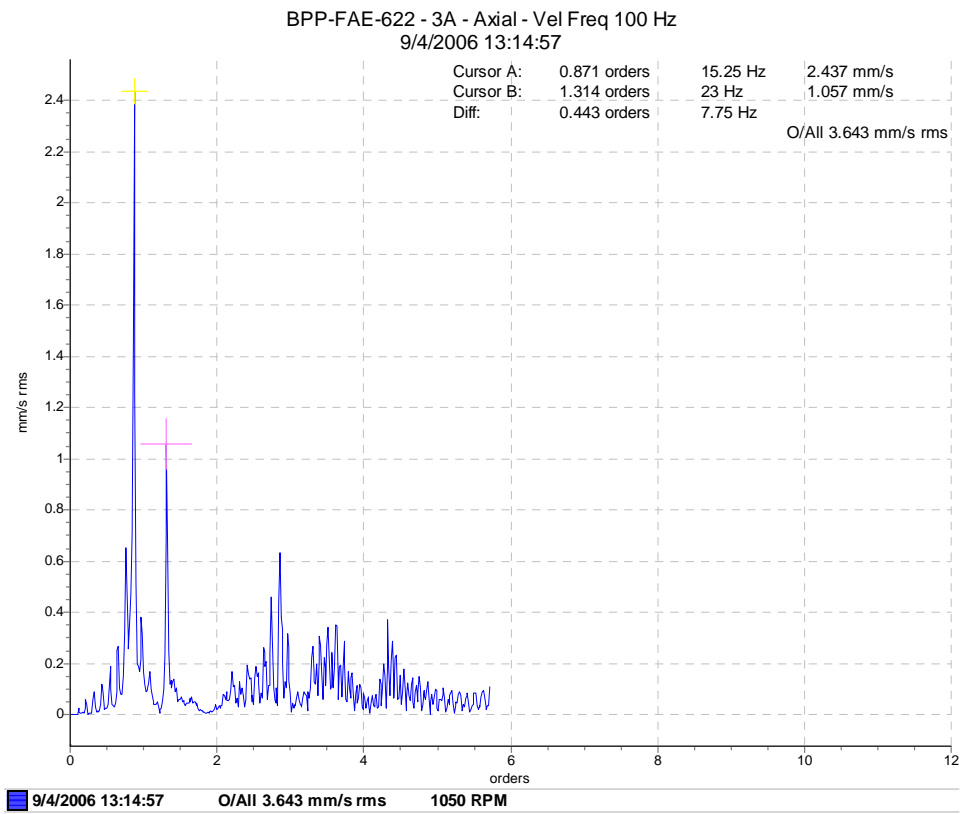


Fig. 3 Spectrum Signature at 3A. as "Bump Test" at the top of Pedestal with added mass ~100 kg. at the Pedestal

