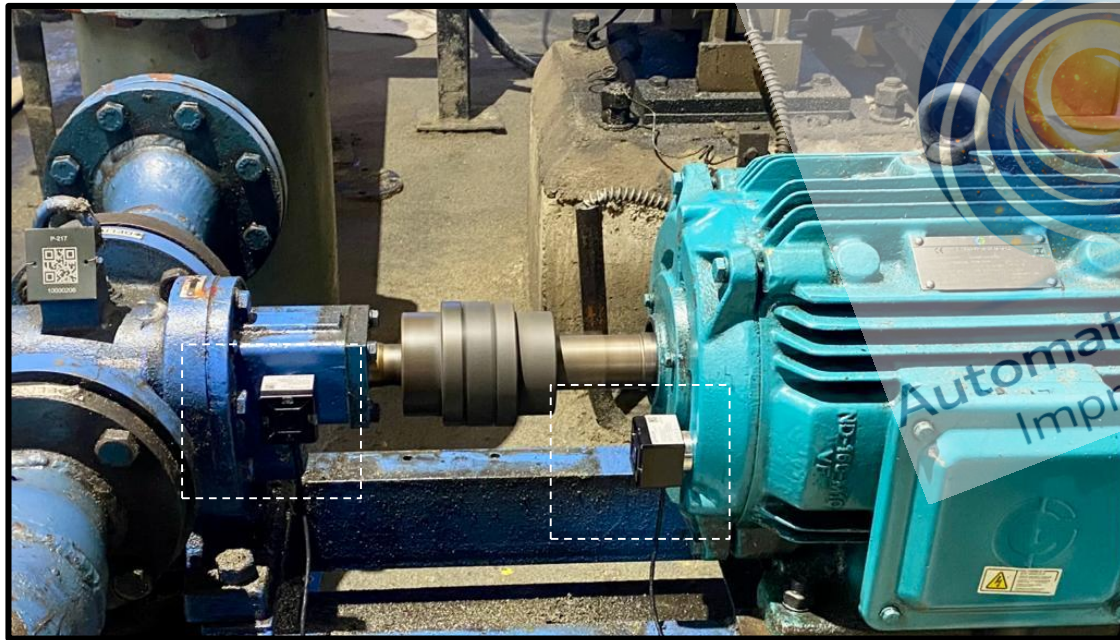


# CASE STUDY OF APAR OIL, RABALE



**Asset Name:** Blender Motor and Pump

**Total Number of Sensors Installed:** 2

**Sensor location:**

Motor Drive End

Pump Drive end

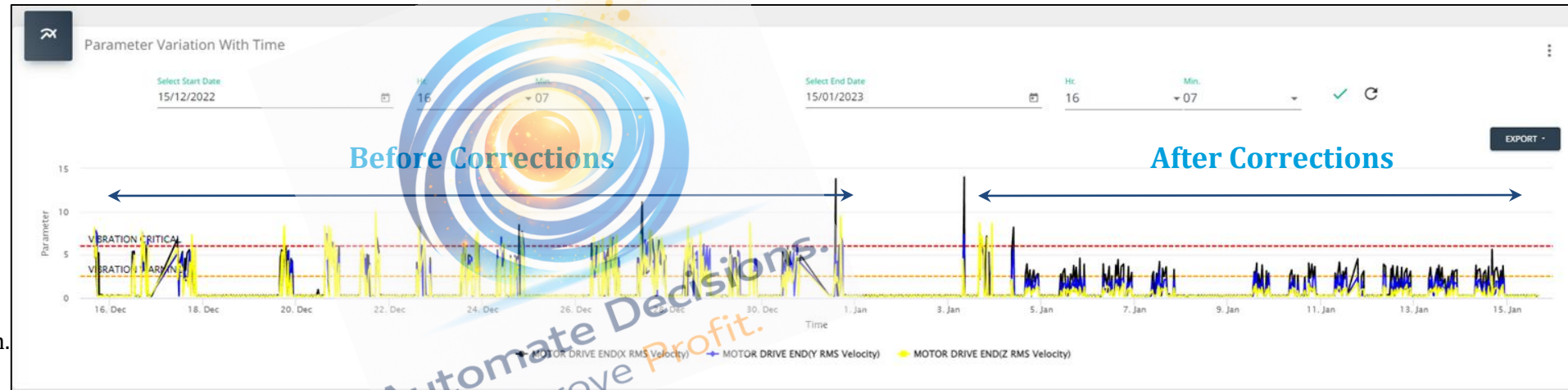
**Fault Diagnosed:** Bearing Outer Race and Inner Race via  
Sensor - Motor Drive End.

**Final Action** - Bearing Replaced by the Client

**Savings:** Reduced Maintenance cost of further damages that could have happened in Motor Stator/Rotor if not intervened in time.

DIRECTION	BEFORE	AFTER
HORIZONTAL	6.6	3.1
VERTICAL	6.7	2.9
AXIAL	4.9	1.7

Before - Error Reporting - 16th Dec- 4th Jan.  
 After - After Correction - 5th Jan- 15th Jan.



Motor Drive END - Velocity

DIRECTION	BEFORE	AFTER
HORIZONTAL	13.6	4.5
VERTICAL	10.7	4.1
AXIAL	11.1	3.7

Before - Error Reporting - 16th Dec- 4th Jan.

After - After Correction - 5th Jan- 15th Jan.



**Motor Drive END - Acceleration**

Automate Decisions.  
Improve Profit.

<p> <b>Fault Type:</b>                      Bearing Fault BPFO,Bearing Fault BPFI  <b>Status:</b>                      High Risk  <b>Time:</b>                      01/01/2023 @ 05:30 am                 </p>	<p> <b>Motor Drive end</b>                      Bearing Fault BPFO  <b>Risk Level:</b>High                      Significant high amplitude of Outer Race Bearing fault detected. The Non-synchronous energy at ball pass frequency in outer race upto 3xBPFO are increased, most likely bearing fault stage 3 is diagnosed                 </p> <p> <b>Motor Drive end</b>                      Bearing Fault BPFI  <b>Risk Level:</b>Medium                      Low amplitude of Inner Race Bearing defect detected. The Non-synchronous energy at ball pass frequency in inner race upto 3xBPFI are increased, most likely bearing fault stage 2 or 3 is diagnosed.                 </p>	<p> <b>Motor Drive end</b>                      Bearing Fault BPFO                      Plan for bearing inspection on following activities at earliest opportunity and plan for replace the bearing, if required. Bearing outer race abnormalities and check if lubrication is adequate.                 </p> <p> <b>Motor Drive end</b>                      Bearing Fault BPFI                      Plan for bearing inspection on following activities in next opportunity. Bearing Inner race abnormalities and check if lubrication is adequate.                 </p>
<p> <b>Fault Type:</b>                      Bearing Fault BPFI  <b>Status:</b>                      Medium Risk  <b>Time:</b>                      31/12/2022 @ 05:30 am                 </p>	<p> <b>Motor Drive end</b>                      Bearing Fault BPFI  <b>Risk Level:</b>Medium                      Low amplitude of Inner Race Bearing defect detected. The Non-synchronous energy at ball pass frequency in inner race upto 3xBPFI are increased, most likely bearing fault stage 2 or 3 is diagnosed.                 </p>	<p> <b>Motor Drive end</b>                      Bearing Fault BPFI                      Plan for bearing inspection on following activities in next opportunity. Bearing Inner race abnormalities and check if lubrication is adequate.                 </p>
<p> <b>Fault Type:</b>                      Bearing Fault BPFO,Bearing Fault BPFI  <b>Status:</b>                      Medium Risk  <b>Time:</b>                      30/12/2022 @ 05:30 am                 </p>	<p> <b>Motor Drive end</b>                      Bearing Fault BPFO  <b>Risk Level:</b>Medium                      Low amplitude of Outer Race Bearing defect detected. The Non-synchronous energy at ball pass frequency in outer race upto 3xBPFO are increased, most likely bearing fault stage 2 or 3 is diagnosed.                 </p> <p> <b>Motor Drive end</b>                      Bearing Fault BPFI  <b>Risk Level:</b>Medium                      Low amplitude of Inner Race Bearing defect detected. The Non-synchronous energy at ball pass frequency in inner race upto 3xBPFI are increased, most likely bearing fault stage 2 or 3 is diagnosed.                 </p>	<p> <b>Motor Drive end</b>                      Bearing Fault BPFO                      Plan for bearing inspection on following activities in next opportunity. Bearing outer race abnormalities and check if lubrication is adequate.                 </p> <p> <b>Motor Drive end</b>                      Bearing Fault BPFI                      Plan for bearing inspection on following activities in next opportunity. Bearing Inner race abnormalities and check if lubrication is adequate.                 </p>

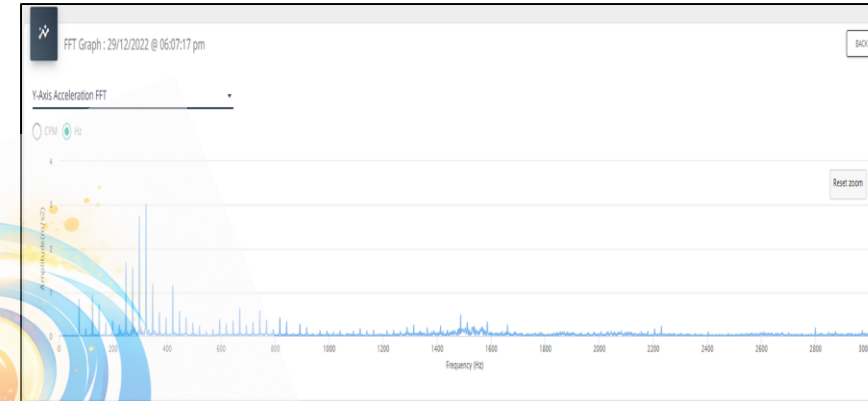
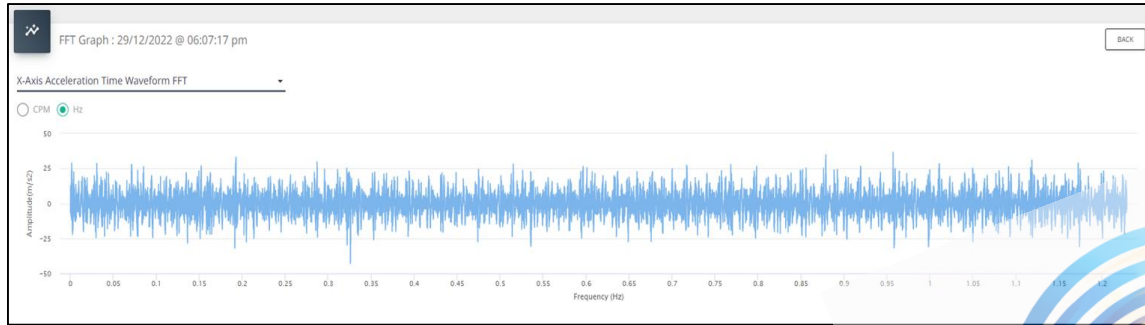
**Error Reporting by Auto Diagnostic and Recommendation algorithm Before Replacement of Bearings.**

# APAR OIL RABALE | Autodiagnostic Fault Reporting After Correction

Fault Type: <b>No Fault</b> Status: <b>Low Risk</b> Time: <b>11/01/2023 @ 05:30 am</b>	No Significant Fault diagnosed that needs Immediate Action	Continue Monitor Vibration Trend
Fault Type: <b>No Fault</b> Status: <b>Low Risk</b> Time: <b>10/01/2023 @ 05:30 am</b>	No Significant Fault diagnosed that needs Immediate Action	Continue Monitor Vibration Trend
Fault Type: <b>No FFT Data Found</b> Status: <b>N/A</b> Time: <b>09/01/2023 @ 05:30 am</b>	<b>Motor Drive end</b> No FFT Data was found in the last 24 Hrs. 1) Please check if the device is live. 2) Please check if machine was non-operational	
Fault Type: <b>No Fault</b> Status: <b>Low Risk</b> Time: <b>08/01/2023 @ 05:30 am</b>	No Significant Fault diagnosed that needs Immediate Action	Continue Monitor Vibration Trend
Fault Type: <b>No Fault</b> Status: <b>Low Risk</b> Time: <b>07/01/2023 @ 05:30 am</b>	No Significant Fault diagnosed that needs Immediate Action	Continue Monitor Vibration Trend
Fault Type: <b>No Fault</b> Status: <b>Low Risk</b> Time: <b>06/01/2023 @ 05:30 am</b>	No Significant Fault diagnosed that needs Immediate Action	Continue Monitor Vibration Trend
Fault Type: <b>No Fault</b> Status: <b>Low Risk</b> Time: <b>05/01/2023 @ 05:30 am</b>	No Significant Fault diagnosed that needs Immediate Action	Continue Monitor Vibration Trend

Automate Decisions.  
Improve Profit.

**Auto Diagnostic and Recommendation algorithm After Replacement of Bearings.**



BLENDER MOTOR

## ❑ Observation for BLENDER MOTOR:

- As per ISO-10816 standard Vibration level are in the **Warning** condition.
- Rotating Looseness & Impacting has been Observed in the Machine and as per the Auto Recommendation and further spectral analysis we found that there is a issue in the Bearings.
- Grease went into Stator and Rotor too(Client Observation on site) which started Initial damage in the Rotor Bar & Stator Slots. Because of vibration sensors machine saved from severe damage.

## ❑ Recommendations for BLENDER MOTOR :

- Kindly Inspect the Bearing on Priority basis.
- After above action has been taken we'll monitor the Machine again for further improvement, Keep machine under Observation.