Charge Gas Compressor
Fourth Stage Vibration

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Problem

- Radial Vibration Spiked to 4 mils Upon Start-up from 2/3 Stage Outage
- Internal Fouling was the Suspected Cause
GB201 Compressor Train
4th Stage Vibration Trend
4th Stage Orbit
Wash Oil Flush

- Attempted to Remove Suspected Fouling by High Volume Oil Flush
- 8000 Gallons Used
- No Effect on Vibration
Shutdown/Overhaul

- Opened Case and Found Indications of a Watermark on Rotor and Diaphragms
- Close Examination Showed Top Layer of Antifoulant Coating was Missing
As-Found Rotor Balance Check

Balance Procedure:
- Full Assembly Bal. □
- Check Bal. □
- Individual Bal. □
- Progressive Bal. □

Type of Rotor:
- Turbine □
- Compressor □
- Other □

Wheel/Disk Number: Shaft only □

Balance Machine Used: 5000 lb. TRD

Balance Tolerance: 2.7 Total oz-in

Rotor Weight: 1409 lbs

Correction Radius:
- 6.0 Inch(es) Coupling End
- 6.5 Inch(es) Thrust End

Initial Balance Machine Readings:
- 19.167 oz./gr. at 242 Degrees on Coupling End
- 91.481 oz./gr. at 241 Degrees on Thrust End

Static Corrections:
- oz./gr. at Degrees on End oz-in/gr-in
- oz./gr. at Degrees on End oz-in/gr-in

Required Information:
- AS RECEIVED
- AFTER REPAIR
- NEW
- FINAL

Balance Speed: 700 RPM
API Specifications
Operating Speed: 7287 RPM

Oz-in/gr-in
As-Found Rotor Balance Check

<table>
<thead>
<tr>
<th>Distance a</th>
<th>15.750 inch</th>
<th>Distance b</th>
<th>42.500 inch</th>
<th>Distance c</th>
<th>61.250 inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left Radius</td>
<td>6.000 inch</td>
<td>Right Radius</td>
<td>6.500 inch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balancing speed</td>
<td>705 RPM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left Tolerance</td>
<td>14.770 g-inch</td>
<td>Right Tolerance</td>
<td>15.791 g-inch</td>
<td></td>
<td></td>
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</tbody>
</table>

**INITIAL RESULT:**
Correction Weight: 49.167 g at 242°
Unbalance: 295.005 g-inch
Reject (19.97 x Tol)

**CURRENT RESULT:**
Correction Weight: 47.117 g at 242°
Unbalance: 282.702 g-inch
Reject (19.14 x Tol)
Balance Check of Rotor

- 585 Gram-inches Unbalance on Suction End of Rotor
- 283 Gram-inches Unbalance on Discharge End of Rotor
- Phase Angle Essentially Identical
- 2560 Pounds of Force at 7000 rpm (Rotor Weighs 1409 Pounds)
What Caused the Coating Loss?

- Misvalving Caustic Wash System Backed Caustic Water into Fourth Stage Compressor Case
- Case Drains Plugged
Summary

- High Vibration Due to Rotor Unbalance from Loss of Antifoulant Coating

- Coating Loss due to Caustic Water Filling Casing While Charge Gas Compressor Train Down for 2/3 Stage Overhaul

- Procedures and Check-sheet have been Revised to Prevent Recurrence