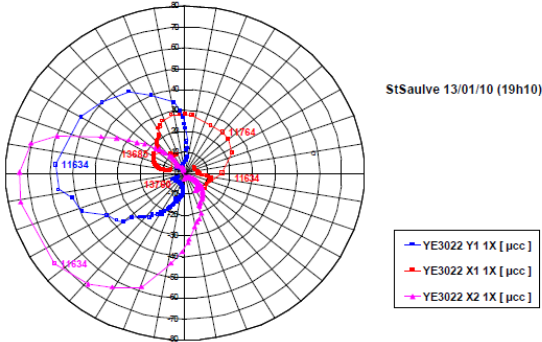
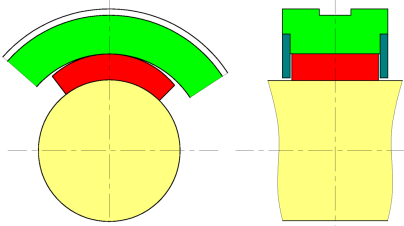
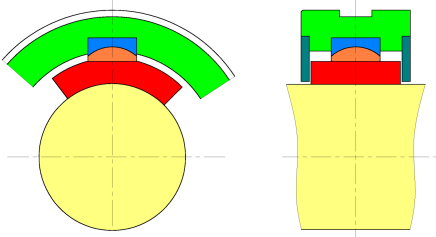


Project	Instability during the run-in phase of the seals
Industry / Asset	Steam turbine
Country	France
Year	2010

The Context	Pictures / Graphs
<p>During the restart of the steam turbine, an instability at the run-in phase of the abrasable seals was identified.</p>	 <p>StSaulve 13/01/10 (19h10)</p> <p>— YE3022 Y1 1X [µcc] — YE3022 X1 1X [µcc] — YE3022 X2 1X [µcc]</p>
<p>Our Solution</p>	
<p>1. Detection of anomaly</p> <ul style="list-style-type: none"> - Installation of vibration sensors on the bearings - Installation of a key phaser - Analysis of turbine drive line 	
<p>2. Diagnosis</p> <ul style="list-style-type: none"> - Root-cause analysis - MORTON phenomenon (Rotational unbalance phenomenon in the pad bearings) detected → Misalignment of the bearings 	
<p>3. Prognosis</p> <p>Reducing the risk of failures by defining solutions to mitigate this critical phenomenon</p>	<p>Palier de 130 sec à 13700rpm</p> <p><i>MORTON phenomenon</i></p>  <p>« oscillating-pads » bearings</p>
<p>4. Intelligence: Machine design modification</p> <ul style="list-style-type: none"> - Replacement of «oscillating-pads » bearings by « spherical pivot-pads » bearings adding one degree of freedom to compensate the misalignment - Installation of a support stand under the protective shutter 	
<p>Benefits</p>	 <p><i>Technology of « spherical-pads » bearings</i></p>
<ul style="list-style-type: none"> - Much higher damping - Significant reduction of the MORTON phenomenon - Increased asset lifetime 	