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ELIMINATING DAMAGE BY USING ANTI-VORTEX VANES

SIEMENS

TURBOMACHINERY LABORATORY
TEXAS A&M ENGINEERING EXPERIMENT STATION

TEXAS A&M UNIVERSITY

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Mr. Silvaggio is a member of Sigma Tau and Pi Tau Sigma. He is also an active member of ASME and has held several offices in the Trenton, New Jersey, section. At present, he is on two ASME Performance Test Code Committees and is a member of the Board on Performance Test Codes.

Mr. Silvaggio holds both B.S. and M.S. degrees (Mechanical Engineering) from the University of Pennsylvania. He has written and coauthored numerous technical publications, and is a member of the International Pump Users Symposium Advisory Committee.

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Problem Statement

- Damage to the end head was observed on boiler feed pumps that were running for up to 20 years with reliable service.
- These boiler feed pumps are high speed, high pressure pumps that supply water to the boilers of power plants of 500 to 800 megawatts.
- The damage prevented accurate assembly of the seal housing to the end head.
- The method applied to prevent this damage is the subject of this case study.

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Pump Type

- The type of pump for this case study is a high pressure double case type pump. It is a high speed, turbine driven boiler feed pump in power plants of 500 to 800 megawatts.

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Case Study Outline

- Pump Description
- Background
- Example of the damage observed
- Hypothesis of the root cause of the damage
- Incorporating Anti-Vortex vanes to eliminate the damage
- Conclusions

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Pump Description

- Speed: 5850 RPM
- Capacity: 5300 GPM
- Total Developed Head: 11,685 FT.
- Temperature: 374 degrees F
- Suction Pressure: 320 PSIA
- Discharge Pressure: 4760 PSIA

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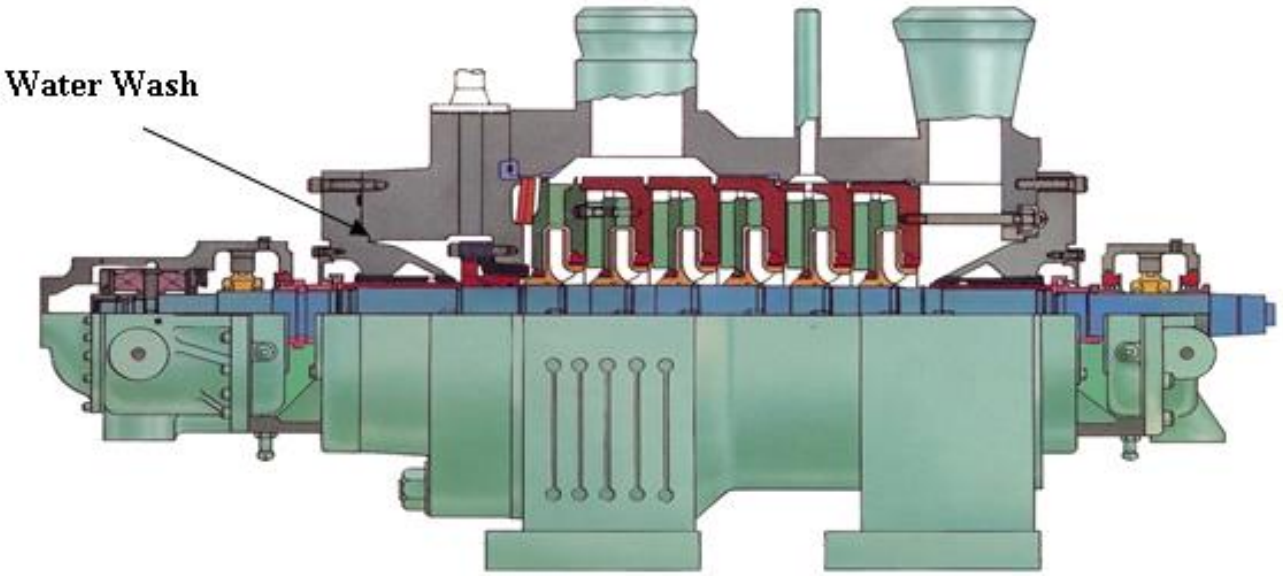
Background – Pump Assembly
(high speed, multistage, turbine driven)



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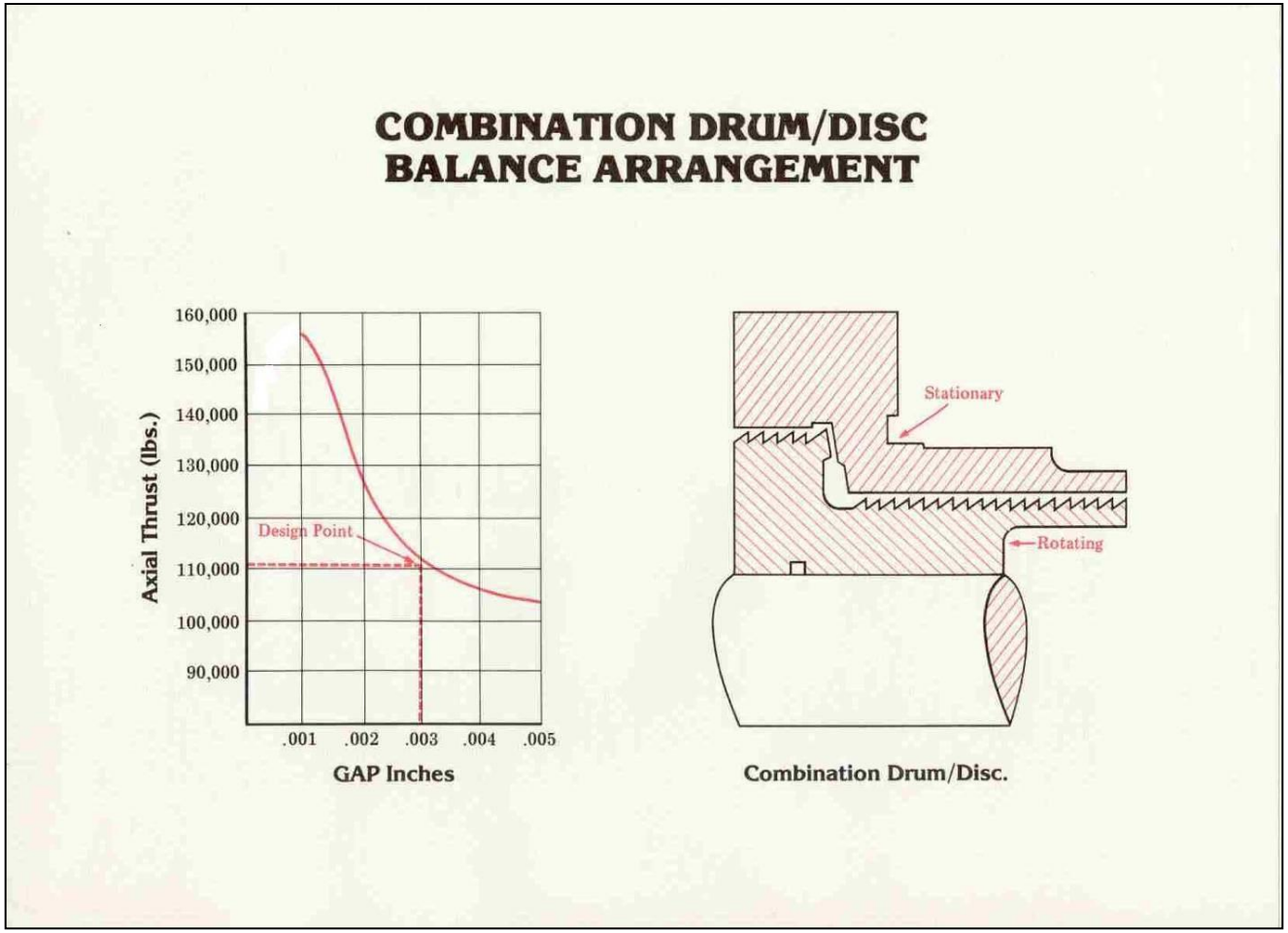
Axial Thrust Balancing



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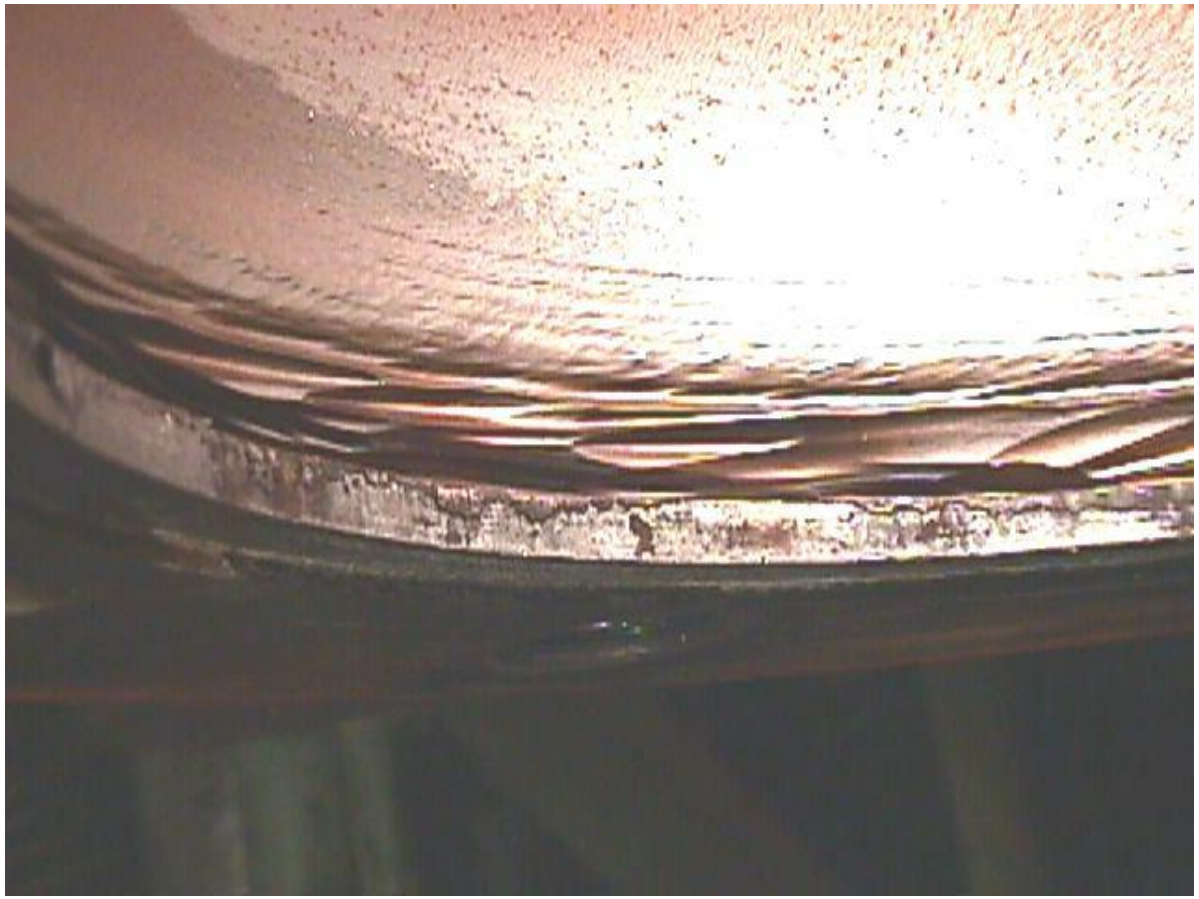
Example of the Damage Observed
(Water Wash and Erosion)



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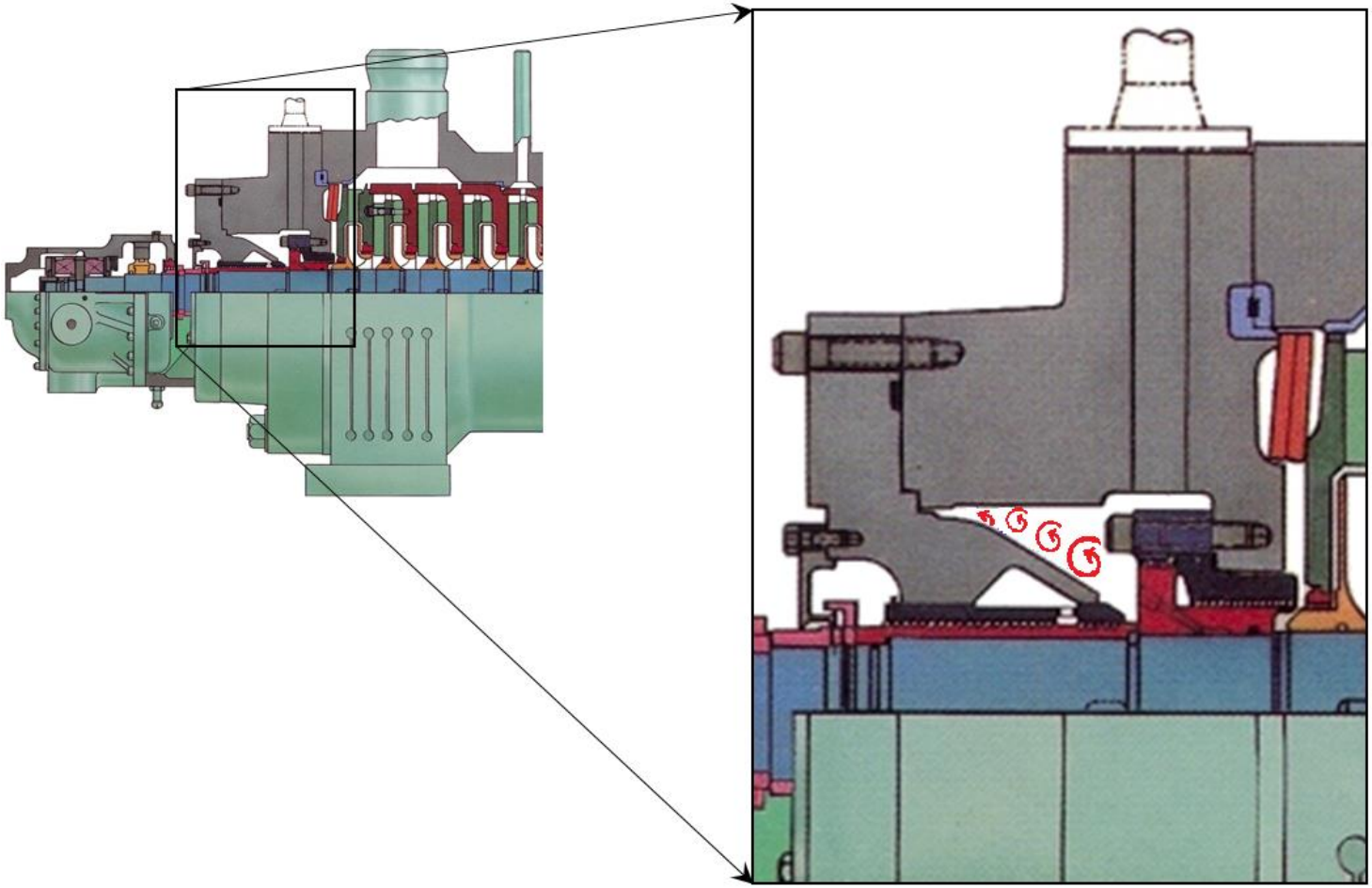
Hypothesis of the Root Cause of the Damage



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Incorporating Anti-Vortex Vanes to Eliminate the Damage

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Conclusions

- Using the anti-vortex vanes eliminated the water wash and erosion damage.

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