

DRY GAS SEAL RETROFIT TO AN AMMONIA & WATER VAPOR TURBINE

By Sydney Gross

The reapplication of a surplus steam turbine to a Kalina waste heat recovery cycle in a Pakistan cement plant made use of a dry gas seal system to limit vapor egress.

Steam turbines typically leak a small amount of their working fluid to the environment without any detrimental effects. However, when the working fluid contains ammonia, as in the case of a Kalina cycle application, small amounts of leakage can be toxic and costly to replace, making sealing from the environment a critical task.

More efficient dry gas sealing systems have been in use in compression applications for decades where axial thermal growth, elevated temperatures and integral shaft end features are not concerns. Applying similar technologies to a “steam” turbine requires overcoming these obstacles.

A unique, horizontally split, rugged, high temperature design, circumferential dry gas seal and associated

sealing system was successfully designed and applied to the turbine shaft and is in operation today. Although some initial setbacks were encountered in the commissioning of the plant, the design has performed acceptably well and points toward a wider application in improved turbine shaft sealing.

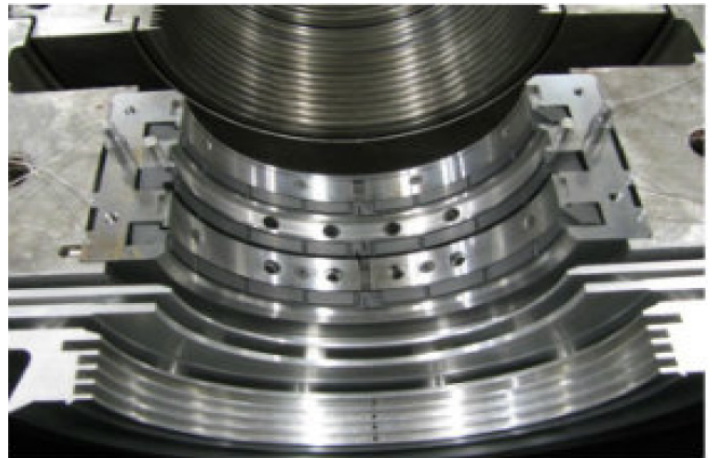


Figure 1

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