

# Valve Upgrades Solve Ongoing Passing Issues at Thermal Power Plant

## The challenge

One of eastern India's largest thermal power plants was experiencing repeated passing issues in both high pressure (HP) and low pressure (LP) turbine bypass valves due to trim erosion.

The facility, which has a maximum power output of 1.6GW, had commissioned six IMI Critical Engineering bypass assets in 2008 – two HBSE 280-250 HP and four NBSE 60-500 LP turbine bypass valves. With all six subject to extremely harsh conditions, valve degradation caused by wet steam erosion remained a constant issue that affected the facility's overall efficiency.

To counteract this, plant personnel maintained these components through purchasing follow-on spares from IMI. Yet as the problem persisted, only replacement soft goods such as rings, gaskets and seals were purchased to manage component wear and tear, with valve internals being repaired locally. However, this did not address the ongoing passing issues caused by valve trim erosion and a long-term solution was required to ensure the plant could operate more efficiently.

The plant's operation team contacted IMI Critical Engineering in India to carry out a detailed investigation of the plant. Erosion caused by flashing condensate – otherwise known as wet steam erosion – was consequently identified as the root cause of the problem.



## The solution

The EroSolve Wet Steam solution was developed in 2019 under IMI's Growth Accelerator Programme (GAP). The programme, a forerunner of the IMI Growth Hub, incubates new ideas and technologies created to solve customer problems, accelerating their development through access to the knowledge of other divisions within the wider IMI plc team.

This specific solution was built to address the erosion of trim components on steam valves used in critical service applications caused by flashing condensate. Though damage caused by passing issues could be mitigated by frequently repairing or replacing existing parts – as was the case with this plant – energy losses, increased downtime and OpEx costs could still impact the facility.

By contrast, the EroSolve Wet Steam solution negates passing issues by retrofitting a valve's plug-stem assembly, cage and seat ring with components of differing design and manufactured from more erosion-resistant, hard-facing materials. The specially engineered sealing surfaces also optimise droplet impingement angles to reduce impact on the valve while minimising contact with condensate.



## The benefits

The first EroSolve Wet Steam trim upgrade was ordered in May 2021 installed and commissioned into one of the plant's HP bypass valves in October 2021. Its impact on plant performance was immediate and it successfully completed over a year in operation without the occurrence of any further steam erosion, or unplanned maintenance. Delighted by this success, the customer placed a repeat order to upgrade its other HP bypass valve, which was shipped in September 2022 and is awaiting installation.

The plant's LP bypass valves were similarly overhauled, with a first trim upgrade ordered in June 2021 and installed and commissioned in October 2021, and another EroSolve Wet Steam solution purchased and fitted in July 2022. These components have performed well for over six months, with discussions now underway to upgrade the trim of another LP bypass valve in Q2 2023.

"The successful installation of these EroSolve Wet Steam upgrades has led to no further passing issues at the power plant," says Swopan Chakraborty, Aftermarket Sales Manager at IMI Critical Engineering in India. "By fitting these solutions, we have been able to mitigate the overall impact of wet steam on the facility's turbine bypass systems, which was the key issue here.

"The stabilisation of downstream temperatures at the facility provides further proof that any bypass issues have been eliminated, minimising the risk of unplanned downtime. As a result, the facility has been able to run more efficiently and with marked reductions to the plant's operational expenses. These improvements can be replicated in bypass applications at other power plants, further demonstrating the transformative effect of the EroSolve Wet Stream solution within challenging environments such as these."



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