

EroSolve Wet Steam: Delivering a Better, More Sustainable World

IMI Critical Engineering is committed to delivering breakthrough engineering for a better world. One of the best examples of this can be seen at a large power plant in India, where our team recently solved a customer's serious steam leakage problem.

By applying its EroSolve-Wet Steam solution, a highly successful technology that effectively manages condensate or wet steam erosion, IMI has made the site more efficient as it generates 4X600MW of power. The solution has also led to significant emissions savings by reducing the site's coal consumption

Leakages and Losses

The customer originally approached IMI in October 2019 after plant managers discovered steam leakages in several of the site's bypass valves. The plant lost over 3.65 tonnes of steam every hour through each of their 1 LP bypass valves, leading to significant production losses and higher coal consumption to make up for the shortfall.

Coal is burned to heat water to produce steam. The steam is then transported to a turbine where it's used to spin rotors that generate electricity. This conventional power plant design is used extensively in India, the second-highest coal consumer in the world.

In 2022, the country's coal-fired power output rose by 12.4%, the biggest year-on-year rise for nearly three decades. As such, efficient use of steam is critical for making the best use of the fuel. While still heavily reliant on fossil fuels, it's important to note that India is a global leader in renewable energy.



Why Wet Steam Matters

It was soon discovered that the site's leakages were caused by wet steam erosion – a chronic and common problem in bypass valves. In these facilities, bypass valves are constantly exposed to challenging operating conditions, which are further magnified by erosive wet steam.

Otherwise known as flashing condensate, wet steam occurs when saturated steam and condensate water molecules combine. There are several causes for this phenomenon, including insufficient plant drain arrangements, incorrect bypass operation, improper valve calibration and inadequate pre-warming processes.

Regardless of origin, wet steam will seriously erode valve trim components if left unchecked and potentially make a site less safe for operators. This is because wet steam erosion results in a downstream temperature rise, which can then lead to more serious issues such as pipe cracking, water hammer, loss of system control and severe damage to downstream critical equipment.

Delivering Breakthrough Engineering

Before the development of the EroSolve Wet Steam solution, businesses had no simple way to manage wet steam and its deleterious effects. Plant managers could either carry out regular checks and maintenance during outages or replace valve trims once leakages became too severe.

The problem is that these replacement trims would only last between three and six months, with long periods in which the customer had to leave the valve leaking until the next outage or shutdown. In March 2021, the IMI team upgraded the bypass valve with the EroSolve Wet Steam solution, which extended the life of the control valve against wet steam erosion, thereby avoiding the need for maintenance during every shutdown period.

The results of this installation have been transformative. By addressing the erosion problem using IMI Critical Engineering's solution, the site could avoid 7500 tonnes of coal being additionally burned, which resulted in an annual saving of £250,000 per valve. This has resulted in full use being made of the steam generated by the site's boilers, ensuring it reaches the turbines without any steam escaping.

The total coal saving equates to roughly 10,000 tonnes of CO₂ removed from the atmosphere. This is just one of the ways in which IMI is able to apply innovative engineering to common challenges in heavy industry, delivering a solution that not only saves business money but also lays the groundwork for a more sustainable world.

For more information on how our team can help you, contact your local IMI Critical Engineering sales team.