Boiler tube protection supports plant availability

Snapshot

Client
Biomass power plant

Challenge
Boiler furnace wall tubing in a wood-fired power plant suffered from fireside corrosion and required replacement. Could the installation of a corrosion-resistant weld overlay extend boiler tube life and provide a positive financial return?

Solution
After developing a business case for an Alloy 625 weld overlay to protect the replacement tubing, we developed the technical specification for the material and provided QA oversight.

Benefits
The overlay we recommended will protect against tube leaks – each could cost a potential €330k – and avoid the need for a protracted future outage to replace boiler tubing, saving more than €1.1m.

When damage to furnace wall tubing presented a continuing threat to the availability and reliability of our client's plant, we used our boiler tube know-how and knowledge of coating systems to show how future plant reliability could be maximized and significant costs avoided.

Action against corrosion

The boiler in our client's wood-fired power plant had operated nearly continuously for eight years and its furnace wall tubing was due to be replaced on reaching the end of its operating life.

It had suffered increasing tube failures in recent years, caused by fireside corrosion, and our client needed our expert input to develop a business case for upgrading the furnace wall tubing through the installation of corrosion-resistant Alloy 625 weld overlay protection.

Our operational insight

We used our knowledge of boiler tube life, based on decades of operational experience, combined with insight into corrosion-resistant coatings for biomass and waste-fired boilers, to consider the alternatives for our client.

We supported initial development of the business case for the use of a protective weld overlay when the furnace wall tubing was replaced. We developed the specification for the cladding to be applied to the tubing and provided quality assurance during the thickness assessment of the weld overlay.

€1.1m+

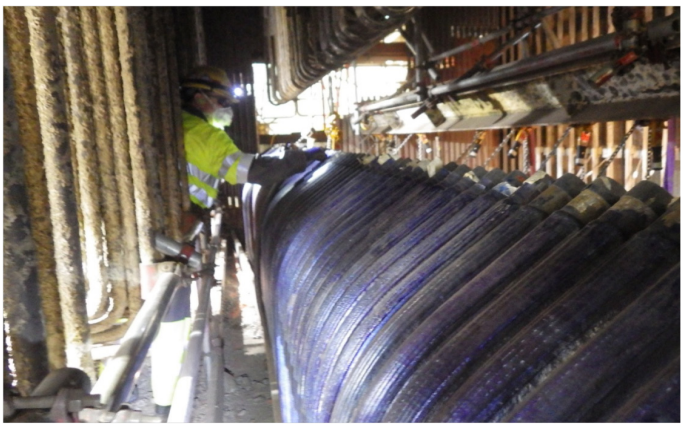
saved by reducing length of a future outage

Benefits in detail

As a result of applying overlay protection, the tube operating life has been extended by many years, potentially for the remaining life of the boiler.

Although several tube leaks were suffered in the year prior to the tube replacement, in the year following application of the overlay there were no boiler tube failures – a single tube leak can necessitate a three-day outage with lost availability and costs of €330k.

At least one protracted future outage, involving large-scale replacement of boiler tubing, has been avoided. This will shorten by several weeks the statutory overhaul outage after eight years, saving in excess of €1.1m.



Application of Alloy 625 overlay has extended the boiler tube operating life by many years

We gave our client confidence in selecting a weld overlay to protect boiler tubing and prevent a recurrence of past tube failures. Our experience helped to ensure the proper installation of a measure which will protect the plant's availability and reliability.

Advising the best option

Replacement of large areas of furnace wall tubing is a costly, large-scale and protracted process, requiring an extended outage of many weeks with teams working round-the-clock.

In this case, because of the likelihood of fireside corrosion, using boiler tubing of the original specification would have required further replacement in eight years' time and hence another lengthy outage with resulting cost and lost availability.

Replacement with tubing of the same material but a greater wall thickness would give a marginal, pro-rata increase in tube life, but the gain would not justify this approach.

We advised that a 2mm thick Alloy 625 weld overlay applied to the replacement tubes would extend the operating life of the tubes by many years, outweighing initial cost of application.

Experienced and independent

- We have an in-depth understanding of the factors affecting boiler tubing operating life.
- We understand the consequences of boiler tubing failures and how to avoid them.
- We are independent of original equipment manufacturers and of coating applicators and contractors.
- We are impartial in recommending the most appropriate system and advising on those which are not suitable.

Fireside corrosion

Biomass combustion environments can be particularly aggressive due to the fuel chemistry. Alkali (sodium and potassium) and heavy metals (lead and zinc) combine with chlorine in the fuel to produce ash deposits that disrupt the normally protective iron oxides that would otherwise form on the boiler tube surface.

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