

Technical Ceramics helps improve Industrial Boilers Efficiency

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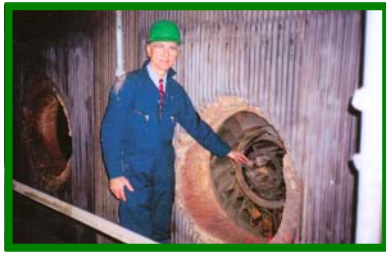
The use of technical ceramics in Industrial Boilers at Power Plants and Sugar Mills are proving to be helpful in increasing their working efficiency. To understand better one needs to know what are Technical Ceramics. Briefly: Technical Ceramics consist of inorganic compounds consisting of metallic and non-metallic elements chemically bonded together. They have superior mechanical properties, corrosion/oxidation resistance, and thermal, electrical, optical or magnetic properties.

With research and development by ceramic engineer Feriz Delkic of International Technical Ceramics Inc. they have been tried on critical areas where equipment and parts exposed to extreme temperature and harsh environments are creating maintenance problems.

This report is based on some of the comparison results from use of technical ceramics in industrial boilers in power plants using coal as their fuel and sugar mill boilers using bagasse as their fuel. Both these fuels create ash and slag build-up. The main reason for the use of technical ceramics was high ash erosion and boiler tube overheating. Both these factors lead to frequent shutdowns. Now with the increasing use of furnace oil in industrial boilers there is similar problem.

At a power plant in USA Technical Ceramics from ITC were used on Foster Wheeler Supercritical Units with 24 burners on each boiler. The boiler's 12 burners on one side were repaired and coated with ITC 100HT, ITC 213, ITC 296A and the other side of burners were cleaned and repaired but no technical ceramics were applied.

The following are pictures of some of the results after the boiler had been in operation for over 8 months.



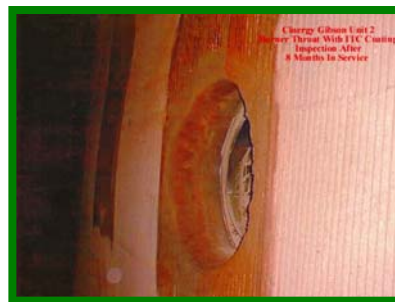
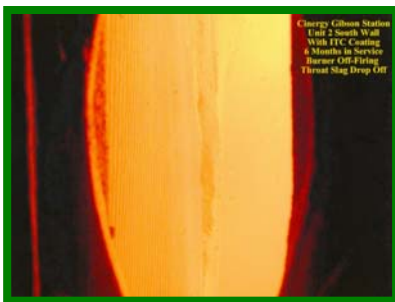
These are the burner throat and water wall before and after coating with technical ceramic materials.

The burner throat, water-wall side that had no ceramic coating was found to have over 22 inches of slag build-up and was continuing to build-up after being in operation for 6 months (pictures on right).

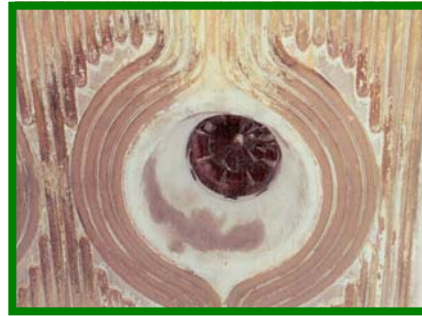


This when compared to the side that was coated with technical ceramics had about 4 inches of slag and that too came off during burner off firing. See picture below (left)

Burner throat close-up area after 8 months in operation (middle and right).



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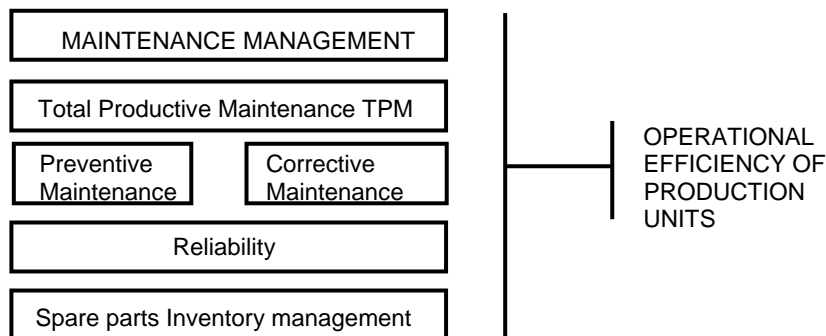
The burner throat condition when generally used with no additional protective coating of technical ceramic material (above picture on left). When the burner throat was coated with technical ceramics developed by International Technical Ceramics Inc., USA the condition of the burner throat (above picture on right). There are more references to the use of technical ceramics use, one such reference is Nils Lou Professor at Linfield College USA in his book "The Art of Firing". It has also been written about ITC Technical Ceramics in the books like "The Art Of Firing". The materials being used in this report have been developed by International Technical Ceramics Inc who do not want to disclose the ingredients, but their results do prove to be highly efficient.

CONCLUSION:

In evaluating economics one needs to look into the following of plant and equipment working.

- What governs plant operating costs in production:
- How long does the equipment work i.e. number of hours, days, months.
- Cost of replacing it when it is damaged or in non-workable condition.
- Cost of production loss when the plant is stopped.
- Quality of product - rejects, seconds.
- Additional energy required to compensate heat losses.
- Required additional energy at every restart.

If we use the following operational efficiency in manufacturing and production figure, the use technical ceramics or any specialised material is directly related to the reduction in operating costs, a factor every production unit management looks for.



References:

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- Kane, Pat, Vesuvius USA presentation at US Steel "The Isolator Energy Saving Cost Effective Choice of Ceramic Coatings"
- Delkic, Feriz (2003) The History of I. T. C.