Furnace maintenance provides sustainable stability

Michael Horsfield reflects on the importance of furnace maintenance in sustaining energy efficiency, structural stability and extended furnace designed campaign life.

A significant and important capital investment for any glass production company, the glass melting furnace should command care and attention throughout its life. Care and attention is best achieved by scheduled and pro-active maintenance, which can be endorsed by furnace refractory structure audits.

It can be said that providing scheduled and pro-active maintenance can lead towards sustaining energy efficiency, structural stability and extended furnace life if planned and carried out correctly.

MAINTENANCE CATEGORIES

Three categories of maintenance are considered in this article, namely:

- Scheduled.
- Pro-active.
- Firefighting.

SCHEDULED MAINTENANCE

Day-to-day or weekly maintenance work can be termed scheduled maintenance. Such maintenance is normally carried out by the plant engineering department and includes for mechanical and electrical equipment checks, cleaning of furnace crowns from batch dust and carryover and cleaning of the regenerator base.

PRO-ACTIVE MAINTENANCE

This type of maintenance falls into the category of addressing identified potential problem conditions, either by plant engineering personnel or auditing of the furnace refractory structure, mechanical and electrical systems by an external service supplier. This approach can be termed the 'Check, Act, Plan, Do' approach to maintenance.

The auditing service may include for visual, thermography and in the case of the furnace refractory structure, endoscopy if images of the internal areas are required. This service is a significant and important 'pro-active' tool in identifying potential problems at an early stage, prior to such problems becoming major or catastrophic and requiring significant attention.

Moreover, the auditing service and pro-active maintenance should run in parallel to provide sustainable stability throughout a furnace campaign life and an extended furnace designed campaign life. Also, this type of maintenance minimises the risk of reduced structural stability and a major unforeseen problem occurring for which the glass producing company will be faced with a significant cost to rectify.

A small cost at the early stages of a potential identified problem equates to a significant reduced risk of adopting firefighting maintenance and high costs in the future.

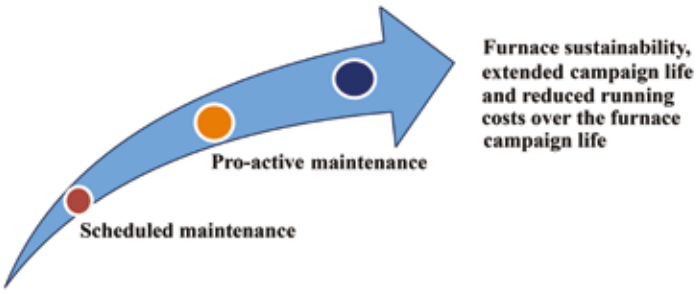
FIREFIGHTING MAINTENANCE

Maintenance of this kind generally arises if scheduled and pro-active maintenance are not implemented throughout a given furnace campaign life or an abnormal circumstance is experienced. This type of maintenance is not ideal as it adopts 'panic' planning and high capital cost.

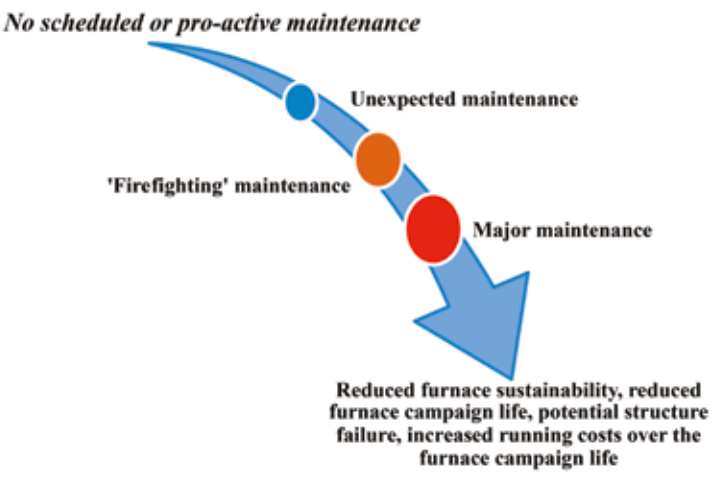
MAINTENANCE EXECUTION

All types of maintenance should be carried out by competent, trained, experienced and skilled personnel in the required discipline to ensure that work is carried out correctly and to a high standard. If work is carried out to sub-standard levels, the risk of major maintenance being required in the future becomes high and the possibility of firefighting maintenance needed.

Maintenance work executed under both the scheduled and pro-active categories allows time



The benefits of scheduled and pro-active glass melting furnace maintenance.



The outcome of no scheduled or pro-active glass melting furnace maintenance.

for optimum planning of the works, sourcing of the correct materials and equipment parts, scheduling the works to be executed at a time to suit production criteria, complying with commercial budgets and reaching a high standard of workmanship meeting optimum health and safety requirements.

MAINTENANCE RISK

Scheduled and pro-active maintenance work generally involves small jobs with low-to-medium risk to both the personnel completing the work and the glass production company.

Firefighting maintenance work generally involves large jobs, with high risk to both the personnel executing the work and the glass production company. In addition, the company is left to find unexpected capital to meet financial needs.

CONCLUSIONS

It is essential to carry out scheduled and pro-active maintenance on the glass melting furnace during the furnace campaign life to sustain energy efficiency, structural stability and achieve an extended furnace designed campaign life.

Any required maintenance should be carried out at the earliest time after requirements have been identified to minimise the risk of a minor potential problem expanding into a major and costly problem.

A set-in-place scheduled and pro-active maintenance plan following good engineering practices reduces the risk of a firefighting maintenance approach having to be taken to address an unexpected furnace structure condition or problem and the need to obtain funds needed to execute the required scope of work.

The subject of furnace maintenance should not be taken as a second level subject in any glass producing company. If it is, the matter should be promoted to premier level to assist with budgeting, future planning of company strategy and sustainability of the glass melting furnace throughout its campaign life.

Scheduled and pro-active maintenance minimises the overall furnace campaign life capital budget by minimising the need for major problems to be addressed and provides added value throughout the campaign life.

All maintenance should be executed by competent, trained, experienced and skilled personnel in the required disciplines.

Scheduled and pro-active maintenance generally meets the criteria of low-to-medium risk to personnel and the owner and firefighting maintenance falls into the category of high risk to both.

In summary, a pro-active approach towards furnace maintenance and the endorsement to this of the auditing service provides sustainable stability over the furnace design campaign life and beyond. Being pro-active simplifies the management of maintenance as it allows time to schedule, plan and execute, together with creating safer maintenance and commercial savings for the owner. ■

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