

Introduction

On 4th January 2014 at 23.25pm the smoke detectors in the Ruabon factory were activated. It was reported to the on-call key holder that there was potentially a fire at the Ruabon site.

On arrival at site by the key holder it was noted that a haze was coming from the kiln area within the Medical Cell. A call was put through to the Fire and Rescue Service who attended site.

There was no fire and the smoke haze seen was coming from one of the kilns used as part of our normal firing process.

Investigation

The kiln area within the Medical Cell contains three kilns, all venting to the one extraction system. One kiln was sintering products, one kiln was not in use and the kiln that caused the issue was in a binder burn off phase of the process.

Binder burn off is a normal part of the process, where the organic material that is added to a powder to enable extrusion of the required parts is slowly removed from the parts to dry them out.

The kiln programme for this particular part was:

- 5 hrs to 100°C, 2hrs dwell
- 20 hrs to 200°C,
- 10 hrs to 300°C, 2hrs dwell
- Natural cool

The binder is removed very slowly in a controlled manner to prevent the parts cracking.

Under normal operating conditions the organic binder burn off vapours would be extracted through a bifurcated fan system. However, it was found during this incident that the fan motor had ceased which prevented the vapours from being extracted. The vapours exited the kiln and activated the nearest smoke detectors which are highly sensitive to smoke and vapours.

Conclusions

From the investigation it was found:-

Good Points

- The fire alarm system activated effectively – as the alarms worked
- The Morgan Fire and Security Systems (MFS) monitoring system was effective – as they received the signal from the activated alarm signal
- Call out of the on-call key holder was effective – MFS were able to inform the on call key holder
- Investigating the failed fan motor was carried out in a controlled manner – Engineering Manager and the electrician used a mobile elevated working platform (MEWP) to look at the extraction system from a distance to ensure it was safe to go near the fan motor. The MEWP was used to remove panels from the suspended ceiling and the fan motor was checked to see if it was running. It was found not to be. An ammeter was used to check if

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there was power to the fan motor and it was found to be pulling 4 amps. The fan motor had ceased.

- The area was isolated effectively to ensure no-one could use any of the kilns extracting to the failed system
- The log book for the maintenance team was used effectively to ensure the fan motor was removed on the Monday morning following the incident

Areas for Improvement

- The call out system to key personnel from the on-call key holder could be improved as it took a few phone calls before a response was obtained
- The log book for the kiln could contain an entry for the time the kiln programme was started (this is logged electronically but for an initial check to see what phase of the programme the kiln was in would be useful)

Actions from the Incident

- Investigate why the extract system was not working – the fan motor was pulling power but the motor had ceased which can happen as they have a limited life time. **Completed**
- Remove the fan motor and send off site for it to be rewound - **Completed**
- Add the fan motor to a preventative maintenance schedule to have the motor maintained on an annual basis – **in progress**
- Investigate interlocking the fan motor to the kilns to ensure the motor is running when the kilns are used – however, in this case the motor would have been shown as running as it was pulling power but in effect it had ceased – **in progress**
- Add a column to the log book to include the time a process is started – **in progress**
- Strengthen the call out process for key personnel – **in progress**