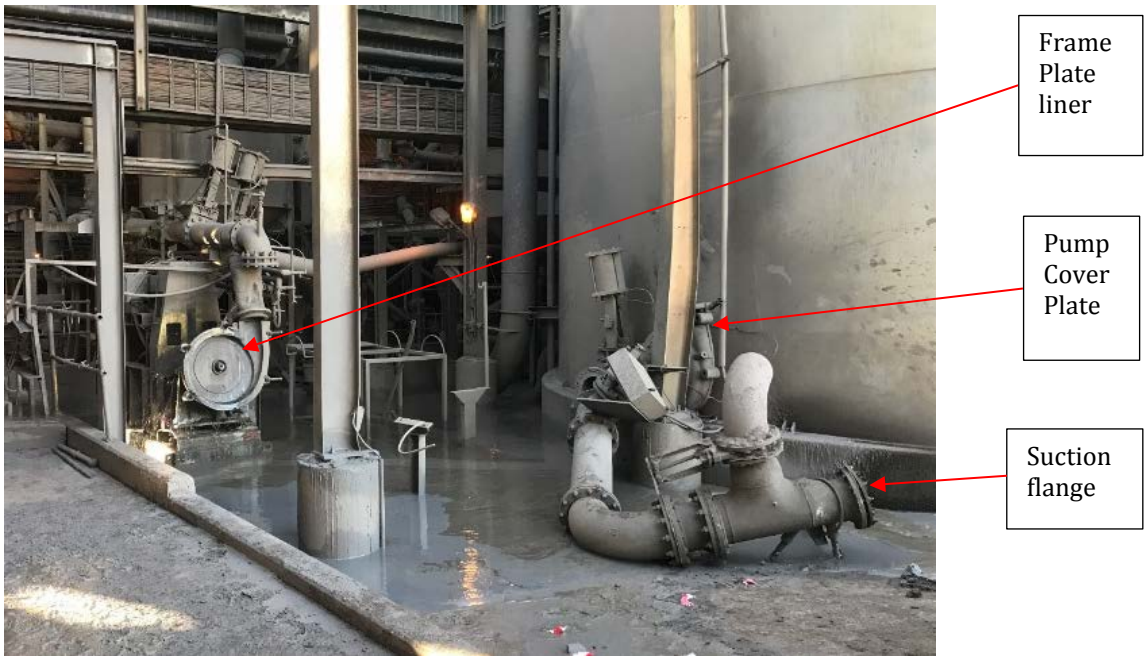
Slurry pump explosion

Mines safety alert no. 346 | 4 August 2017 | Version 1

What happened?



A 10/8 slurry pump has exploded after becoming deadheaded during operation. The explosion propelled the associated suction pipe work several metres together with the cover plate causing significant damage to surrounding structures. There was no worker in the vicinity at the time.

How did it happen?

The investigation identified that a modification to the PLC code incorrectly allowed the pump to continue running outside its designated automatic start/stop sequence with the suction and discharge valves closed. This allowed the slurry inside the pump to become superheated and resulted in the pump explosion. The failure occurred on the pump casing bolts, allowing the impeller and pump casing to remain largely intact.

The modification to the PLC took place five years ago and bridged out the interlock that would have prevented the pump from running with the suction and discharge valves closed.

No change management process had been applied when the bridge was installed.

Comments

This event was able to occur because the engineering control had been bridged out.

The correct sequence of operation is almost entirely dependent on engineering controls because there is no full time monitoring of the circuit by an operator. However the incorrect operating sequence might be noticed by operators if they have a basic understanding of the filter plant circuit and the associated critical controls.

Recommendations:

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Version 1, 4 August 2017

Change management processes should occur whenever a proposed modification to a process may have an impact on the safety and health of workers. The modification should be authorised at an appropriate level of authority, and be documented and understood by operators.

Where critical controls are in place to prevent catastrophic events, a regular check should be carried out to verify that the control is effective.

Operators should have a basic understanding of the process and of the safety critical controls that are in place.