

AEL ignite... SAFETY AND HEALTH



DETONATOR PRIMING – IT'S SERIOUS!



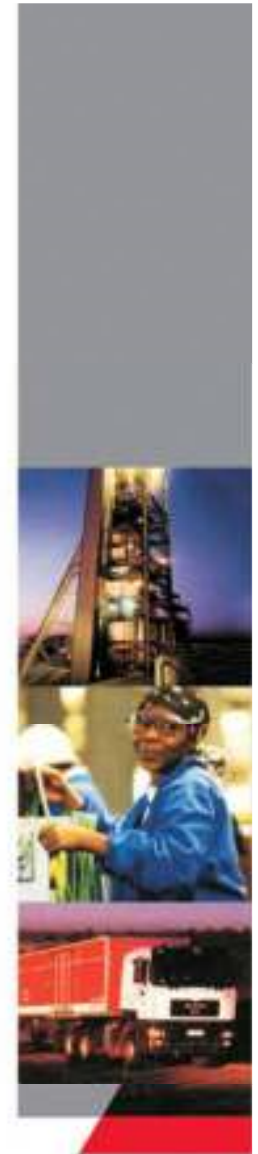
Priming Incident Details

1. Date and Time of the Incident

- On 24 October 2006 at approx.17:55 there was an explosion in a press house number U48.

2. Incident Location

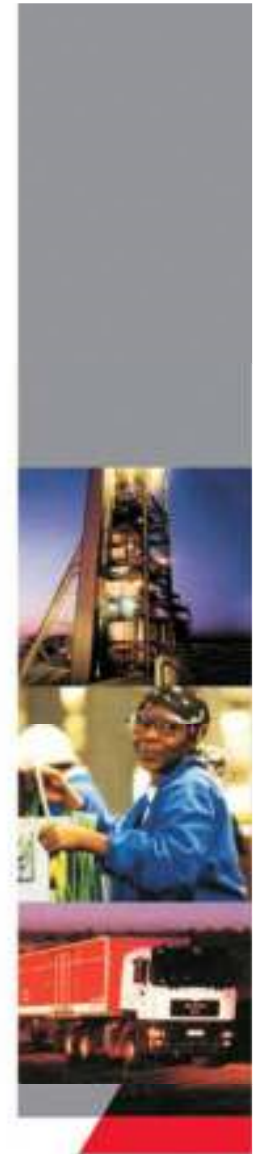
- Detonator Priming, Modderfontein, South Africa



Priming Incident Details

3. Process Outline

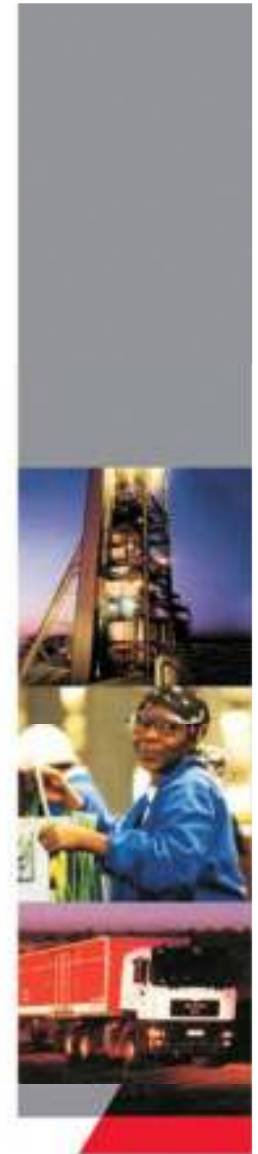
- A tufnol block on an aluminium spoon is plated with 117 aluminium tubes.
- The spoon is primed with the secondary explosive penta erythritol tetra nitrate (PETN).
- The tubes are then primed with a primary explosive which is a mixture of lead azide and lead styphnate (LA/LS).
- The explosives are consolidated in the tubes under high pressure.



Priming Incident Details

3. Process Outline

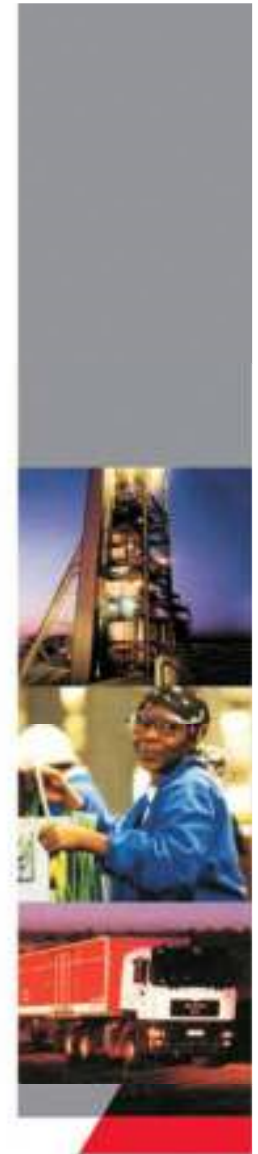
- The detonators are then tipped into a tray for further processing.
- The spoon is introduced into the priming and pressing cubicles by locating it on a pin and sliding it in mechanically on rails.
- A shutter is lowered to provide blast protection and stop shrapnel entering the control room should there be an explosion in the priming cubicle.
- Priming is achieved by means of a sliding dosing plate and a “hammer” ensures all the powder exits the dosing plate.



Priming Incident Details

3. Process Outline

- Powder spillages occur but these are captured on mats, and wet cloths which are replaced daily.
- The introduction rails are cleaned after 40 blocks have been primed.
- The operations are carried out remotely behind blast walls.
- Two blast shields are provided in the control room for operator protection at the primary explosive priming station.



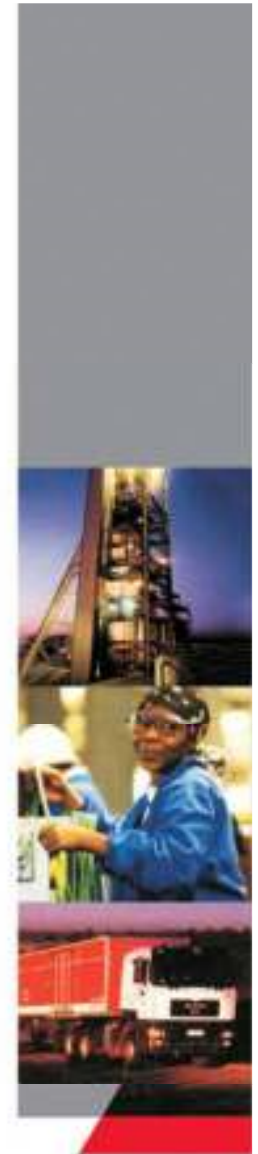
Priming Incident Details



Priming Incident Details

4. What Happened?

- This resulted in the spoon impacting on loose lead azide / lead styphnate (on the base plate) causing it to detonate.
- The detonation propagated to the spoon of tubes and the hopper of lead azide / lead styphnate.
- As the shutter was open the employee was exposed to the blast resulting in his injuries, he lost his arm.
- There is also evidence that the work team were working at an unsafe pace, which is a contributory cause of the incident.



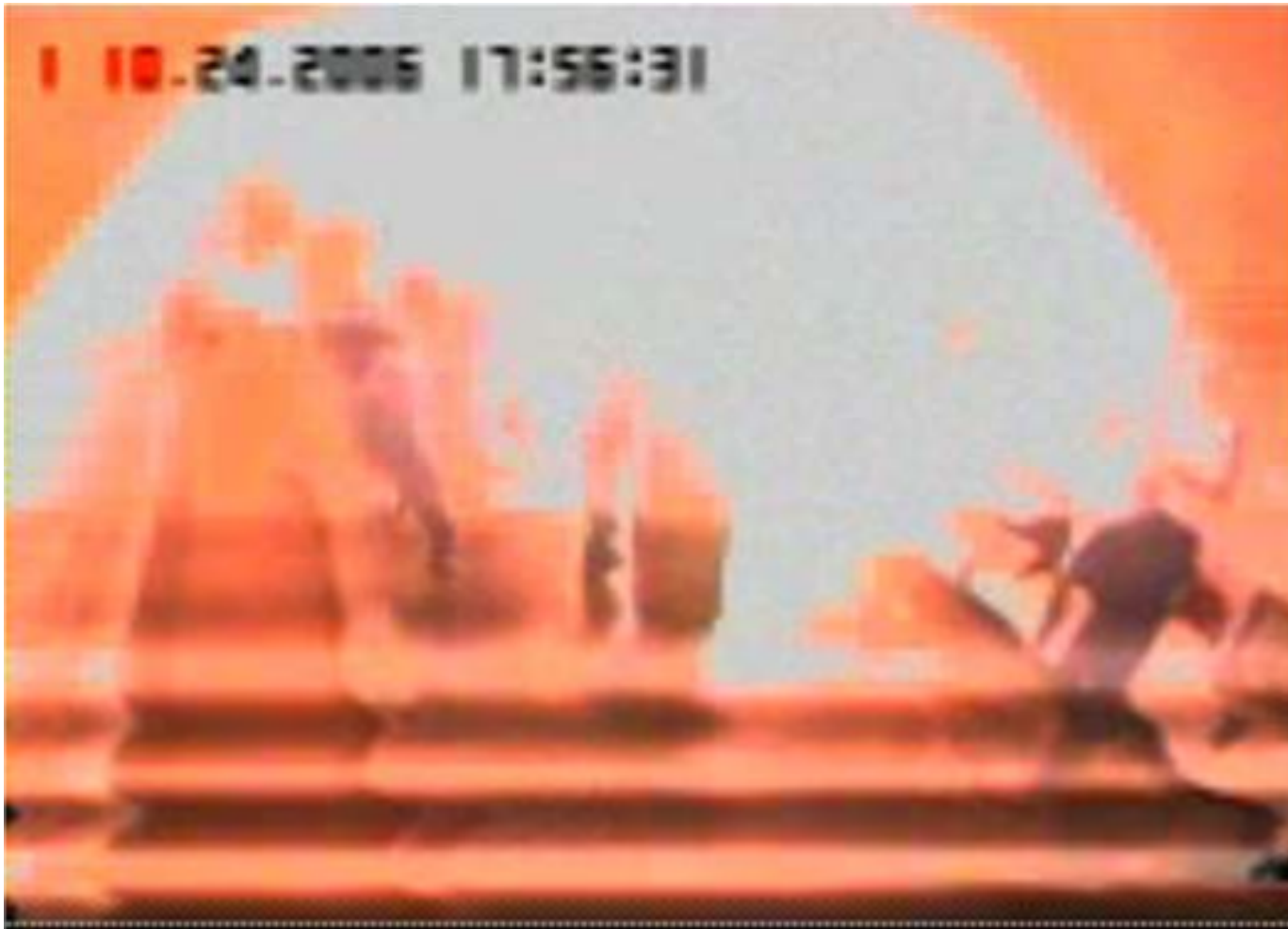
Priming Incident Details – Just Before the Detonation



Priming Incident Details – Employee standing in the blast!



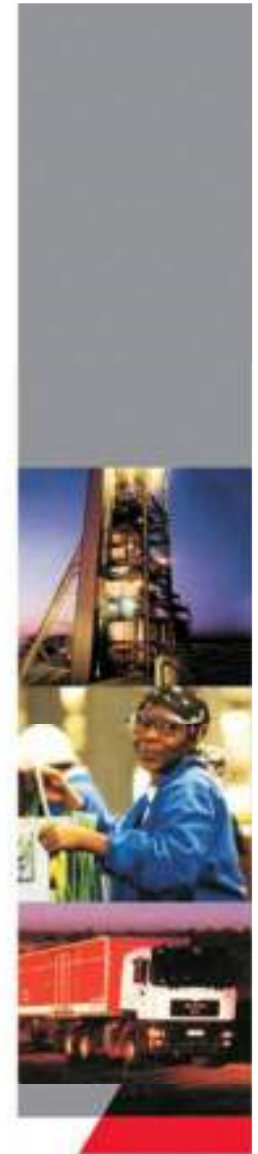
Priming Incident Details – Detonation!



Priming Incident

5. Impact of the Incident

- There was extensive damage to the lead azide / lead styphnate priming cubicle and the employee sustained a severe wound to his left arm requiring his left arm to be amputated.
- He also suffered shrapnel wounds to his left side of his body.



Priming Incident – Damage to Cubicle (Inside)



Priming Incident – Damage to Cubicle (Backside)



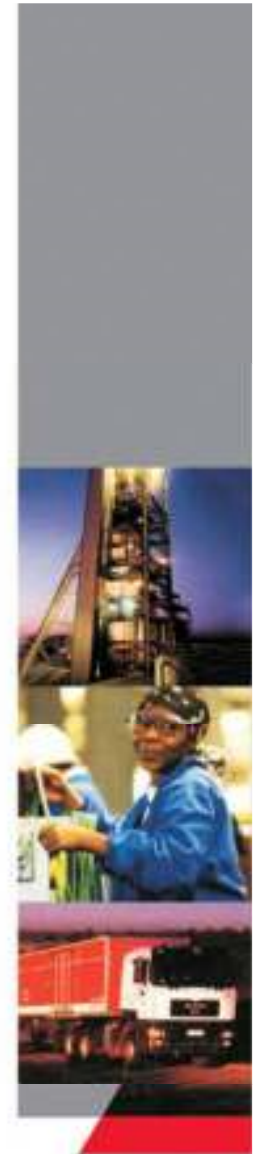
LARGE HOLE CAUSED BY THE EXPLOSION



Priming Incident

6. Likely Cause of the Incident

- Employee was about to prime, accidentally entering the priming cubicle manually and not via the introduction system.
- This resulted in the spoon impacting on loose lead azide/lead styphnate (on the base plate) causing it to detonate.
- The detonation propagated to the spoon of tubes and the hopper of lead azide / lead styphnate.
- As the shutter was open the employee was exposed to the blast resulting in his injuries.



Priming Incident - Investigation

THE RECOVERED PIECES OF THE SPOON REASSEMBLED ON THE RECOVERED BASE PLATE WITH A STANDARD SPOON AS REFERENCE.
(THE BLOCKS ARE PURELY FOR SUPPORT)



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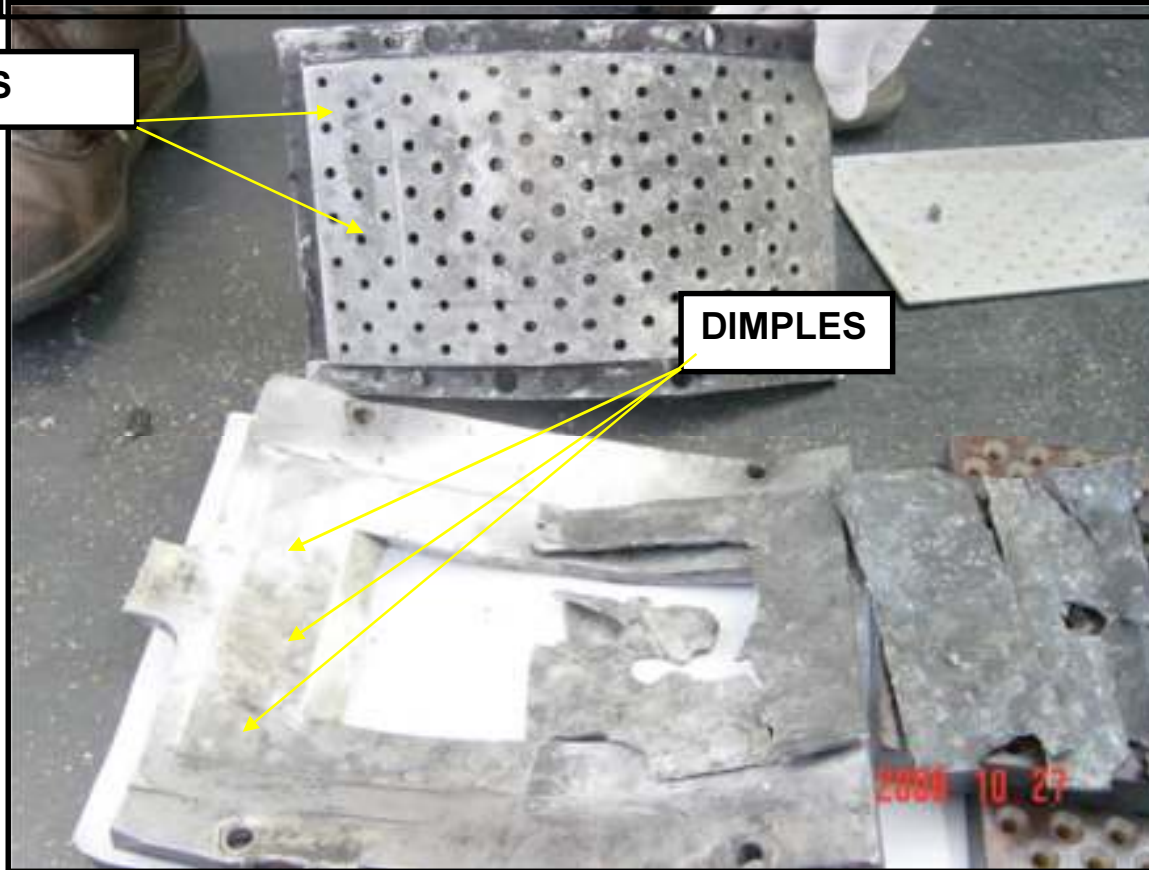


Priming Incident - Investigation

THE RECOVERED PIECES OF THE SPOON AND BASE PLATE WITH THE PRIMING PLATE. THE DIMPLES ON THE BASE PLATE CORRESPOND WITH THE HOLES IN THE PRIMING PLATE.

HOLES

DIMPLES



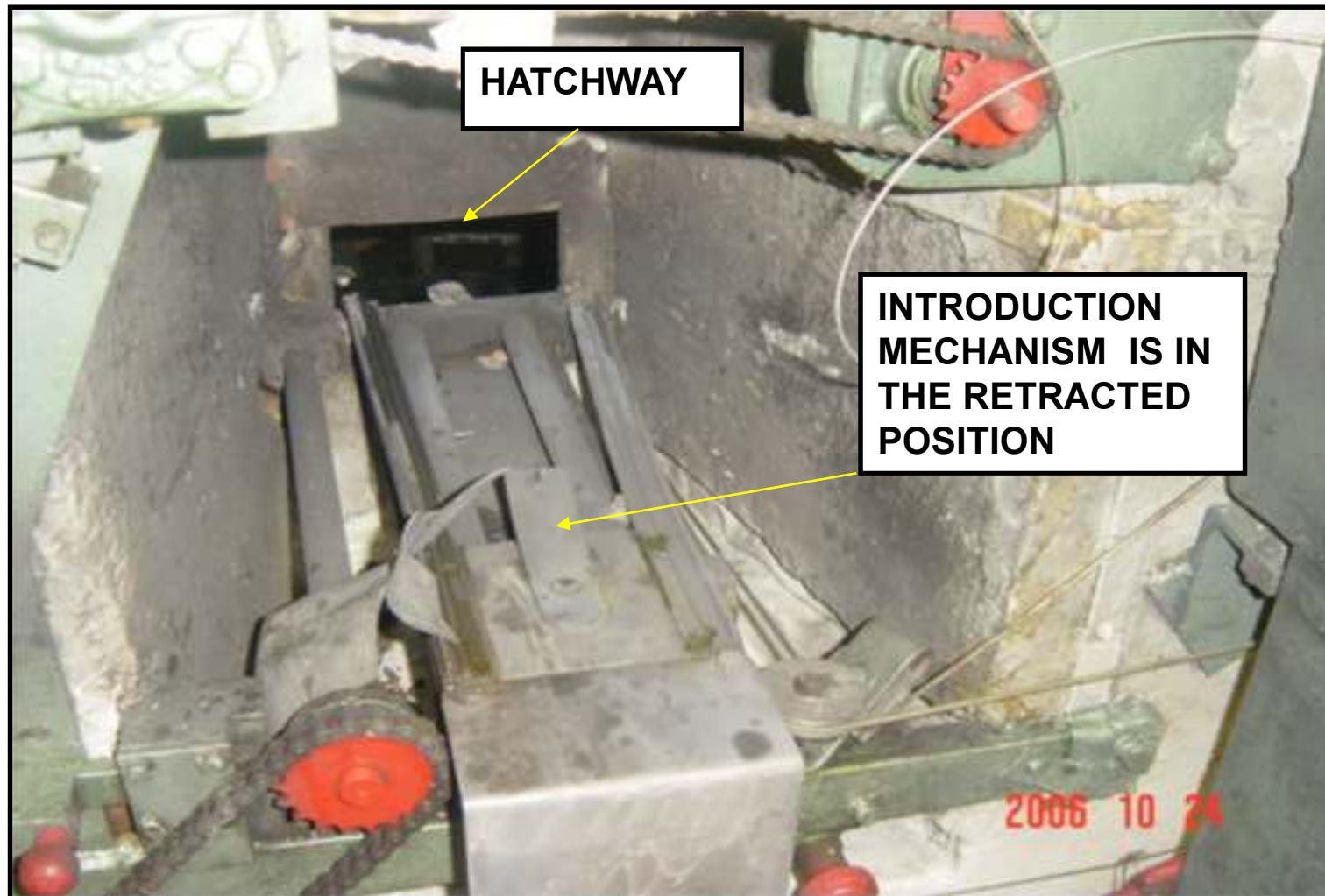
THE PIECES OF SPOON WITH THE PRIMING PLATE ON TOP AND A STANDARD SPOON AS A REFERENCE



Priming Incident - Investigation



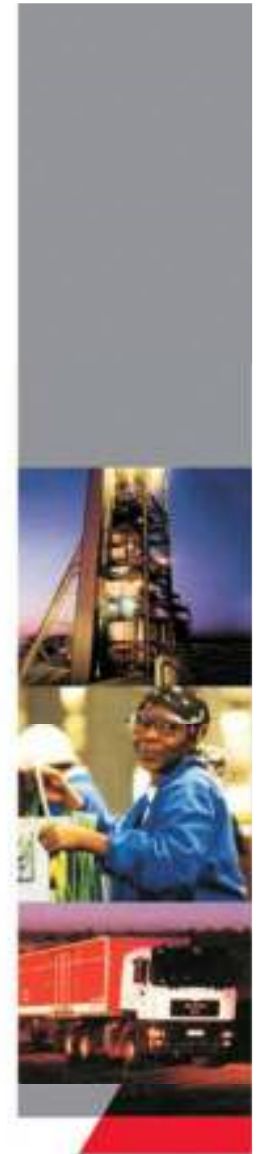
Priming Incident - Investigation



Priming Incident

6. Learning Points

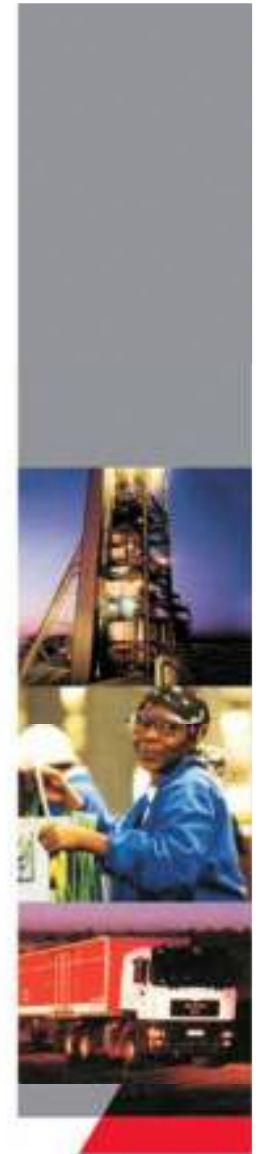
- A log sheet to be drawn up and introduced for the tipper operator to sign after each run with the time the run was completed. To be countersigned by Team Manager when visiting the house.
- Snapshot video footage of operations in the house and cubicles to be audited by supervision every day.
- Video cameras to be installed in the press house control rooms overlooking the azide / styphnate priming operator, and also in the PETN priming cubicles.



Priming Incident

6. Learning Points

- Investigate and risk assess placing the spoon onto the introduction mechanism while the shutter is closed for lead azide / lead styphnate priming.
- Priming operators to clean the rails and hatchways after every run.
- Change OI's to reflect new changes to procedures.
- The digital recording system to be changed to continuous monitoring.
- Team Managers to be more visible in their work areas, particularly during night shifts.



Thank you



QUESTIONS?

