

# SAFETY ALERT

## Inappropriate maintenance practices and fire protection lead to major plant fire

### INCIDENT

An excavator operating at an above ground mine was removing overburden from the ore body. A dump truck driver waiting to be loaded observed flames in the excavator engine bay and alerted the excavator operator by radio. The fire erupted from the engine bay momentarily engulfing the excavator cabin before retreating to the engine bay where it remained well alight. The operator subsequently evacuated the excavator by jumping 3.5 metres to the ground and was not injured.

Attempts to control the fire with hand held extinguishers were unsuccessful and the excavator was destroyed, refer photo 1.



*Photo 1 - Excavator after fire was extinguished.*

## CIRCUMSTANCES

The excavator operator was competent on this type of machine. He completed mine excavator training and assessment three months prior to the incident and held over two thousand hours operating experience. The excavator had recently been overhauled and fitted with a new engine. It appeared to be well maintained and in good operational order.

The excavator was not fitted with an automatic fire suppression system. It was equipped with two 9 kg fire extinguishers, one located on the side of the engine bay and one located at the front of the excavator on the opposite side to the cabin. Neither fire extinguisher could be accessed to fight the fire.

## INVESTIGATION

A detailed inspection of the excavator was conducted by a consulting forensic fire investigator who concluded that *'the fire originated from a cracked aluminium alloy hydraulic oil filter housing that allowed an escape of oil that ignited on contact with hot engine components'*.

The oil filter housing was designed to be installed with a socket or ring spanner applied to a cast nut at the bottom of the housing, refer photo 2.

Numerous sharp tool marks on the oil filter housing recovered from the excavator after the fire suggested the housing was installed with a stillson wrench or other similar tool and most likely over tightened, refer photo 3. The investigator concluded that *'cracking of the housing originated at the tool marks'*.



Photo 2 – Oil filter housing cast removal nut.

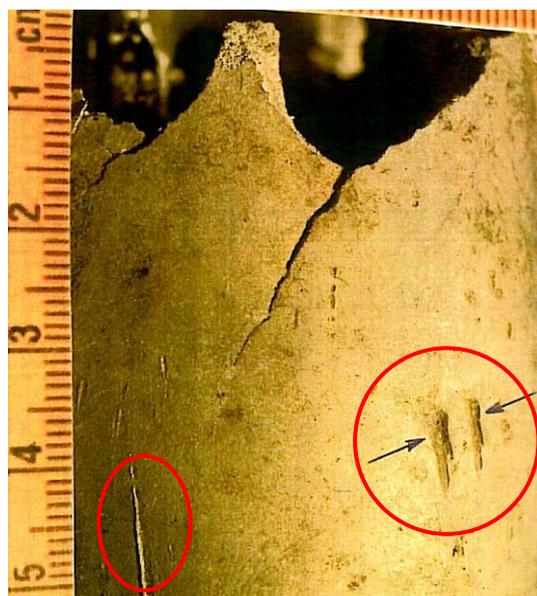


Photo 3 – Stillson marks and cracks on filter housing.

The investigator also noted that *'an effective automatic fire suppression system would almost certainly have contained the fire at an early stage'*, and recommended that *'automatic fire suppression systems be fitted to all heavy mobile equipment at mines'*.

## RECOMMENDATIONS

### Maintenance

- Maintenance activities should always be undertaken in accordance with the manufacturer's recommendations.
- Maintenance people should be competent for the task they carry out and should always use the correct tool for the job. Maintainers should not improvise by using inappropriate tools
- Equipment components should be carefully inspected before being installed; damaged or worn components should always be replaced.

### Fire Control Systems

- Mine Operators should undertake a rigorous fire risk assessment to determine the appropriate fire risk controls, fire protection systems and means for emergency escape.
- Fire risk assessments and fire protection systems on mobile plant should be carried out and installed with consideration to AS 5062 and MDG 15.  
**Note:** Automatic fire suppression systems are strongly recommended for all mobile plant at mines, particularly heavy equipment that may carry large fuel and oil loads, and where access and egress may be difficult.
- Fire extinguishers of a suitable type and capacity should be installed on all mobile plant at a location that is least likely to catch fire and that is readily accessible to the operator and to a person at ground level.

## REFERENCES

- *AS 5062, Fire protection for mobile and transportable equipment*
- *MDG 15 Guideline for Mobile and Transportable Equipment for Use in Mines.* Available for free download at:  
[www.dpi.nsw.gov.au/minerals/safety/publications/mdg](http://www.dpi.nsw.gov.au/minerals/safety/publications/mdg)

**NOTE:** Please ensure all relevant people in your organisation receive a copy of this Safety Alert, and are informed of its content and recommendations. This Safety Alert should be processed in a systematic manner through the mine's information and communication process. It should also be placed on the mine's notice board.

Signed



**Rob Regan**  
**DIRECTOR**  
**MINE SAFETY OPERATIONS BRANCH**  
**NSW TRADE AND INVESTMENT**