



**DEPARTMENT OF MINES  
WESTERN AUSTRALIA**

**SIGNIFICANT INCIDENT REPORT NO. 19**

**EXPLOSION OF A DRILL STEEL SUBJECT TO HIGH  
TEMPERATURE**

**INCIDENT**

A boilermaker was killed when a drill steel which he was welding to a front end loader bucket exploded. A length of discarded drill steel (50 mm diameter) was tack welded at one end to the bucket, and the deceased was heating the steel with an oxy-acetylene torch to bend the steel to conform to the bucket shape before further arc welding. The purpose of the drill steel was to act as a wear component, in lieu of hard facing.

There was an explosion and the deceased was struck by shattered pieces of the drill steel.

**CAUSE**

The explosion apparently resulted from a build-up of temperature and pressure which detonated explosive material contained in the hollow core of the drill steel.

A length of drill steel had previously been welded to the other side of the loader bucket in a similar manner, and the first 150 mm of the core was blocked with tightly packed material, which subsequent analysis showed to be ammonium nitrate. It is probable that the length which exploded was cut from the same length of steel as that which was already welded in place. The amount of explosive material in the core of the rod is a matter for speculation, but the steel has been disintegrated for a length almost a metre and it is therefore likely to have contained explosive along much of its length. Only a very small amount of explosive is required to present a critical hazard in such circumstances.

**COMMENTS AND PREVENTATIVE ACTION**

Drill steel (hollow core) which has been in use must be checked before discard or before it is subjected to any process of cutting, heating or hammering, to ensure that it has no blockage in the core, as that blockage may consist of, or contain, explosive material.

If blocked drill steel is to be cleaned out for salvage or re-use, then full precautions must be taken in devising methods to do so. Application of heat, impact, friction or undue pressure may cause any explosive remnants to detonate. If mechanical means are resorted to then the process must be done by remote control with total protection of personnel.

Apart from the hazard potential of explosive remnants in the core, care should be exercised in the re-use of any discarded percussion drill steel, as it becomes embrittled in service. It should never be used for holding staging and securing safety lines, nor in any application where its failure may create a hazard.

Discarded drill steel should never be used to make scaling bars.

J M Torlach  
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**SAFETY AWARENESS SAVES LIVES**