



# Hydrogen embrittlement – a serious risk to lifting chain integrity

## Background

Lifting chains and their associated components (hooks, shackles, links etc) are used widely across a variety of industries to lift and move loads and includes Grade T (8, 80, 800) and Grade V (10, 100, 1000) lifting chains and associated components.

A current investigation into an incident in which lifting chains failed during a crane lift is examining the possibility of a phenomenon known as hydrogen embrittlement being involved, contributing to lifting chain failure.

## Possible contributing factors in incidents of this type

Grade T and Grade V lifting chains and associated components may not be suitable for use where acid or alkaline corrosive conditions are present.

The steel from which these chains and components are made is susceptible to hydrogen cracking under these conditions. Hydrogen embrittlement requires both a corrosive environment and tensile stresses. It can take place in high-tensile steel without any appreciable visual change to the material's surface.

These corrosive environments are typically found in radiator repair workshops, electroplating workshops, galvanizing workplaces or any other industries where items are placed in corrosive tanks to clean or treat materials.

Lifting chains can also be affected if they are used or stored near such corrosives, because of corrosive fumes in the atmosphere.

## Managing this hazard

Grade T and V lifting chains and components should not be used or stored where there are corrosive environments due to the presence of acid or alkaline products.

If there is any doubt about the suitability of a chain or other lifting component, users should ensure the chains and components are removed from service immediately and seek advice from a competent person.

## Further information

- Guidance Note PM39: Hydrogen Cracking of grade T and grade 8 chain and components – published by Health and Safety Executive (HSE), United Kingdom.
- Australian Standard AS2321: 2014 – Short-link chain for lifting purposes
- Australian Standard AS3775.1:2014 – Chain slings for lifting purposes – Grade T(80) and V(100) Part 1: Product Specification
- Australian Standard AS3775: 2014 – Chain slings for lifting purposes – Grade T(80) and V(100), Part 2: Care and use

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### Regional Offices



