

Dropped object as a result of a glass reinforced epoxy (GRE) joint failure

SAFETY ALERT

Description of incident:

Toward the completion of a firewater pump (FWP) performance test, a section of 12" Glass Reinforced Epoxy (GRE) weighing ~260kg, fell 4 metres after its bonded taper fit connections failed.

One person was in the room at the time of the incident looking at the engine gauges - he shut down the FWP engine after the failure occurred and left the room with no physical harm. The individual could have been in the line of fire of the dropped spool had they been standing in their normal location whilst carrying out the test.

Findings:

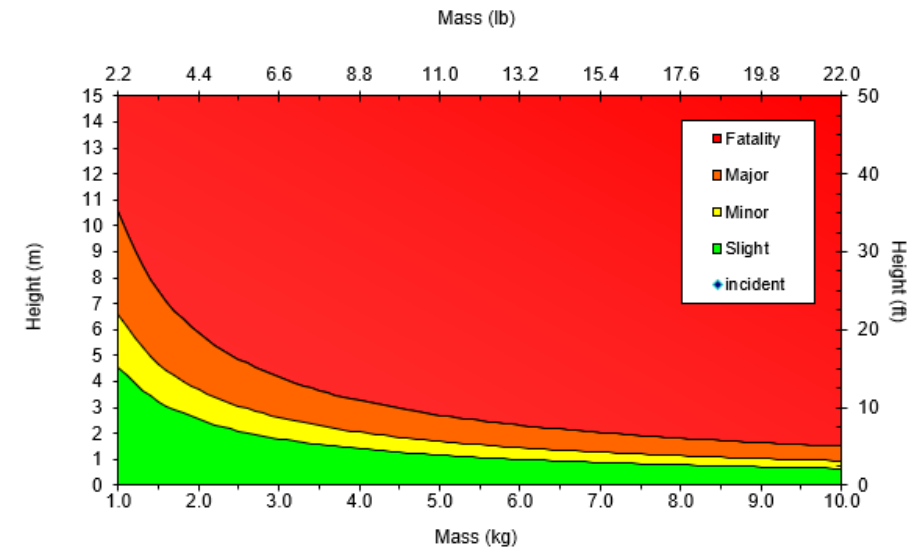
The GRE taper joint failure was most likely caused by inadequate surface preparation of the joints female taper surface, during bonding of the joint while the asset was being constructed in 1995.

The joint surface should have been roughened before the epoxy bonding took place to ensure adequate joint strength but this did not occur on one of the joints.

Potential Consequence:



Outcome Calculator			
Height	4	m	
Mass	260	kg	
Outcome	Fatality	10198.86	Joules



Good practice:

Good integrity of GRE systems can be achieved, providing a number of simple rules are followed:

1. The piping has been designed properly, leading to acceptable stress from static and dynamic loads to achieve the design life of the installation of GRE piping.
2. Close quality control has been followed by competent personnel for the manufacturing of the piping and joints to ensure they meet or exceed the minimum requirement of the manufacturing specification and standards.
3. Close quality control has been followed by competent personnel for the assembly of the adhesive joints of the piping and joints to ensure they meet or exceed the minimum requirement of the assembly procedures and manuals.
4. The installation and operation of the piping system stays within the design requirements to ensure it successfully achieves the design life.

Where problems have been encountered with GRE joints, this has invariably been the result of ignoring or missing one or more of the above.