NAFLIC

National Association For Leisure Industry Certification

Standards & Related Documents Committee

TECHNICAL BULLETIN - SEPTEMBER 1999

187. Sobema Matterhorn Tram Breakage

NAFLIC member I G Grant informs us that, in a recent well published accident in the South West of England, one of the main tram (i.e. rail) members of a Matterhorn ride, manufactured in Belgium by Sobema, partially collapsed due to failure of a butt weld in one of the hill sections of the tram. Another NAFLIC member, Wilson Consultants, has pointed out that this was a known limitation of the Sobema tram design. Sobema are no longer in business but there are a number of their rides still in action.

In this ride, as in many others, the tram consists of lengths of T-section rolled steel. However, this is one of those cases where, to achieve sufficient vertical curvature of the tram, there are butt-welded joints in some of the tram sections.

The fatigue strength of welded trams is significantly less than non-welded construction. Where this reduction causes the endurance limit to be less than the most significant applied stress range magnitudes, fatigue cracking will, sooner or later, occur. If not detected by subsequent monitoring, with repair / replacement when necessary, breakage will occur. The toe of the weld at the junction with the heat affected zone is the normal region from which cracking initiates.

We consider it to be important, in this device and in others having welded trams, to monitor (using NDT as appropriate) the highest loaded welded connections unless design calculations, properly design reviewed, have shown that fatigue will not occur.

Butt welds in trams are also features of some other rides e.g. Super Bobs, Waltzers, Ski Jump Coasters, Caterpillars etc.

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