

NAFLIC

National Association For Leisure Industry Certification

Standards & Related Documents Committee

TECHNICAL BULLETIN - NOVEMBER 1992

040. Supercar mini Roller Coaster

The Health & Safety Executive have informed us of the failure of a link rod, connecting together the cars, on this Supercar ride. The letter is appended to this technical bulletin.

The Committee is not sure whether the failure has implications for safety. Nor would we necessarily endorse the modifications described in the letter. We are also aware that the fitting of secondary snatch cables between cars may have been used in a similar device.

From the Health and Safety Executive, Victoria House, Ormskirk Road, Preston PR1 1HH.
(Tel: 0772 59321 Fax: 0772 821807).

The text of the letter was as follows :-

“NAFLIC
PO Box 9
BUXTON
Derbyshire
SK17 9XF

Our Ref : N/SG003/JR

Date 21 October 1992

Dear Mr Miller

STRUCTURAL FAILURE OF LINK ROD ON MINI ROLLER COASTER

I would be grateful if you could circulate among your members the following account of a structural failure of a link rod on a mini roller coaster.

The ride was manufactured by Supercar (telephone: 0926 499435) about 15 years ago, It is a small scale roller coaster on a short left hand track suitable for small children. There are three cars of fibreglass construction on a steel/wooden frame, linked by 3/4 inch rods articulated at both ends. The cars run on metal rails under gravity after the initial haul-up under power. Each double seat - two per car - is fitted with a ratchet lap bar designed to stop passengers from standing up rather than for containment purposes as this is a relatively gentle ride.

The incident in question happened when the link rod between the first and second cars sheared on the first bend of the ride, The second and third cars rolled backwards and stopped, while the first car continued on to the end of the circuit where it was brought to a halt by the braking mechanism. There were no injuries.

The failed rod was made of 3/4 inch steel and had a thread at one end, which was screwed into a bracket. There was a weld at the angle between the rod and the bracket. This made the joint (which is at the front end of the linkage) rigid, whereas that between the rod and the rear bracket allowed for some movement as the cars moved around the curved and undulating track. Compression as well as extension and lateral forces would be applied on the rod, the latter producing a maximum moment just behind the weld, which was the point at which the rod failed. Repeated flexing at this point could have work-hardened the metal, increasing the risk of fatigue failure.

The operator, in consultation with his ride examiner replaced the original rods with new ones made of 5/8" EN16 steel rod with a tensile strength of approximately 16 tonnes. The rods are machined so that they are rigid at both ends, with a wide radius shoulder instead of the right

040. Supercar mini Roller Coaster

Page 3 of 3

angle section where the weld had been made in the failed rod. The ride examiner has recommended that the rods receive NDT during the annual strip down of the ride.

It should be noted that the ride had received a daily visual examination by the operator, was examined annually by an independent competent person and had undergone NDT every two years. However, the link rods are in a position where they cannot be checked on a daily basis so visual inspections can only be done when the ride is stripped down. Hence the importance of NDT at the annual examination.

I trust that the lessons arising from this incident will be borne in mind when planning and carrying out examinations and inspections of rides of this type.

Yours sincerely

[signed by A Peet, per pro]

S G Garsed

Local Government and Entertainment Services National Interest Group”.