

NAFLIC

National Association For Leisure Industry Certification

Standards & Related Documents Subcommittee

TECHNICAL BULLETIN - JUNE 1994

089. Roller Coaster Anti-Rollback Equipment

Two incidents on roller coasters in the 1993 season involved anti-rollback equipment. We therefore take this opportunity to write down a few of our thoughts on such components.

Paragraph 20(b)(ii) of "Fairgrounds and Amusement Parks - A Code of Safe Practice" suggests that anti-rollback equipment should be included as part of the design, where necessary. The designer and the Inspection Body carrying out Design Review need to interpret when it is appropriate or necessary.

Paragraph 2.3.4.2.5.5 of the draft European Standard, "Fairground and Amusement Park Machinery and Structures - Safety" deals extensively with anti-rollback equipment. This long paragraph is likely yet to be significantly modified before the Standard becomes fact but some of the main design principles are incorporated.

It is our view that consideration of whether to include anti-rollback devices on ascent ramps or uphill sections should certainly be given when:

- ◆ more than one separate vehicle or train may operate on the same track and failure of the primary haulage machinery could lead to collision;
- ◆ failure of the primary haulage machinery could lead to the vehicle or train rolling back into another vehicle or train in the station and/or the braking area before the station;
- ◆ failure of the primary haulage machinery could lead to the vehicle or train rolling back through the station area at a time when the platforms are not free of people.

and we do not intend this to be an exhaustive list.

The calculations for anti-rollback equipment need to be carefully examined in Design Review as they are often inadequate since it is necessary to look into elastic and plastic energy transfer. Furthermore the designs themselves are often incapable of either satisfactorily catching the vehicle or train or, at least, of doing so within the elastic range of one or more of the components.

Committee Members :- Dr Garry Fawcett (Chairman), Mr Richard Barnes, Mr Bob Nicholls, Mr Les Howson,

Mr Malcolm Tennant, Mr Peter Steffens

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P.O. BOX NO. 9, BUXTON, DERBYSHIRE. SK17 9XF

TEL: (0298) 77468 FAX: (0298) 70784

Design Review should therefore be checking the specification and calculations for the anti-rollback equipment for three distinct possibilities :-

- ◆ that it is unable to satisfactorily stop the vehicle or train;
- ◆ it is able to stop the vehicle or train but one or more components will suffer some plastic deformation;
- ◆ it is able to stop the vehicle or train with all components remaining in their elastic range.

The significance of these three possibilities is obvious. The first means that the design is not satisfactory. The second, that the anti-rollback equipment is to be fully examined and repaired after each use with the appropriate instructions incorporated in the Operating Manual. The third finding would be the most satisfactory, requiring just normal examination and maintenance.

PLEASE NOTE THIS REFLECTOR CODE HS(G)81, NOW SUPERSEDED

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Mr Malcolm Tennant, Mr Peter Steffens

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