

Standards & Related Documents Committee

TECHNICAL BULLETIN - JUNE 1998

168. Motion Envelope Clearances

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We have recently withdrawn TB 104 because the testing regime described in that document is no longer current. However, the discussion of required clearances was useful and we are taking this opportunity to repeat and revise its contents.

Every amusement device where passenger units move relative to their surroundings should have a designed clearance between the unit and those surroundings. *n.b. subject to risk.* The principles for and process of risk assessment are well expressed in European Standard EN 1050. Risk reduction measures, such as removing the hazard by ensuring that contact cannot be made with nearby objects, are required by British law when there is an unacceptable risk and where it is reasonably practicable to take such steps.

The hazards that have to be accounted for when providing clearance include passengers or their limbs, etc., being trapped or struck by parts within the ride motion envelope including, where appropriate, the extent to which passengers can reach.

Alterations, or repairs to themeing, supporting structure, falsework or even track re-alignment, sometimes reduce the original design clearance and it is important that those carrying out such work, and ride controllers check that safety critical clearances are maintained. Inspection Bodies may also need to check clearances as a part of their thorough examinations, or on the following occasions :-

- ◆ At Design Review, Assessment of Conformity to Design, or witnessing of Initial Test.
- ◆ At inspections following modification / repairs to themeing, falsework, structure etc.
- ◆ When carrying out a Functional Test

One means of carrying out the check on some rides is to arrange for a template to be constructed (and kept) which is shaped to suit the ride's designed motion envelope. The template can then be mounted at the most suitable position on the passenger unit and travelled through any critical areas to be checked.

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It is essential that the template is rigidly constructed and is firmly secured in position to ensure that its design parameters are maintained and that it does not damage the surrounding structure, themeing etc., when in use.

We are aware of recent new examples of clearance problems on Wild Mouse rides, such as the Maurer Söhne GmbH, and the Reverchon spinning coaster, and on the Mondial Gondola Wheel.

There have been some recent instances of imported ride designs using global arm reach clearances of 500mm irrespective of risk. Please note that, where there is significant risk, this distance is inadequate. The European Standard EN 294 and British Standard BS 5304, for instance, both give arm-pit to fingertip reach of 900mm or 850mm if the shoulder is obstructed. Other clearance distances may be obtained from these Standards or from anthropometric data for the ride's target population.

Technical Bulletin 106 pointed out that the Health & Safety Executive intend to enforce the proper Design Review of passenger containment. This, of course, includes imported rides including, for instance, temporary importations for a single fair.