Operational Policy Division

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Principal Inspector
Mr Cameron Adam

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Date: 15 July 2010

Reference Kolmax

Dear Sirs

KOLMAX PLUS MIAMI TRIP RIDES – DESIGN REVIEW

During the HSE investigation into a passenger ejection incident on a 'Kolmax Plus' Miami type ride, a number of matters of concern came to light involving the safety and drive systems on the ride. These were the subject of a Safety Alert that was sent out on 8 July 2010.

It is believed that the ride involved in the incident was the first of its type to be imported into the UK from the Czech Republic and its Design Review (DR) was done by Dr Cheah. Subsequent rides have evolved as they have been produced and some have different drive systems, different end seat restraint bars, different electronic seat restraint systems and different brake systems; it is not clear whether controllers are relying on the same, original DR which may not apply properly to their rides. It may also be that later rides have already addressed some or all of the problems identified during the investigation.

Controllers will appreciate that most of the matters of concern identified refer to 'safety critical' parts of the ride and should have been subject to the normal DR procedures but it is not clear whether this has happened.

The quickest and most reasonable way to address this issue is that Controllers now have an appropriately qualified Design Reviewer inspect their ride. Firstly to ascertain whether the existing DR for their ride actually applies to the systems in place on their rides and secondly, to ensure that the ride conforms to the criteria set out in BS EN 13814. Any necessary work to bring the ride up to standard can then be identified, DR done and the ride modified as required. This needs to be done as soon as possible but in any case before 1 January 2011.

Particular areas to be checked are:

1. End seat restraints. Later examples of the ride were fitted with end seat side restraint bars that gave some protection against passenger ejection from these seats. Because of the sideways forces exerted by the ride some form of restraint is necessary and the Review should consider what form this should take. This will probably require some level of ergonomic and engineering input to ensure that

what is to be fitted, or has been previously fitted by controllers or during manufacture, is both strong enough to restrain a person and does not, by its shape or size, create other hazards to riders.

2. Seat restraint electrical interlocks. On the ride examined the electrical interlocking on the seat restraints was such that the ride could run without the seat restraint latch actually being fully made. This system could also fail to danger in that if the switch spring breaks/fails the ride can run with the restraint bar open. The Review should look at this entire system with the aim of eliminating any negative mode interlock systems and ensuring that the ride cannot start until all of the seat restraint bars are fully down and the mechanical lock catch properly made.

3. Seat restraint bars release pedal. On the ride examined the pedal for the seat restraint bars was released by an operator pressing down on a pedal in the side of the gondola. It was physically possible for a person sitting in the end seat on that side of the ride to reach that pedal and push it down. The Review should look at this to ensure that passengers cannot get access to this pedal.

4. Ride brake system. The air driven disc brake, and any other brakes fitted to the ride, works via the tyre drive system and if either the tyre or the air fails then the operator has no control over the movement of the gondola and its counterweights. This could foreseeably result in a lightly loaded gondola being stranded at the 12 'o'clock position. As well as the low pressure alarm previously referred to in the safety alert, the Review should consider how passengers are to be safely evacuated from the ride in all foreseeable failure modes. This should include the safety of the operators who may have to partly disassemble the drive system in order to get the gondola down to the 6 'o'clock position. It is believed that some rides may have a manufacturer supplied upgraded brake system fitted

If you have any questions about anything in this letter please contact me on the number shown above or on 07527002689.

Yours faithfully

M Sandell
HM Inspector of Health and Safety
Entertainments

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