TECHNICAL BULLETIN - SEPTEMBER 2005

295. Moser Spring Ride

We have been informed, by Tony Mogford Associates, of two issues relating to the Spring Ride manufactured by Moser Rides. They produce 10 and 20 seat versions.

The 20 seat version has a 12m tower and benches that travel up and down on the front and rear faces of the tower. Each seat, on either version, has an independent over-the-shoulder restraint which is adjustable and held in place by a ratchet in the rear of the bench. Two pawls locate in the ratchet and are held there by springs. Limit sensors detect when the restraints are shut and allow the ride to operate. To release the restraints, a bar that runs along the back of the bench is rotated manually and forks welded onto this bar lift the pawls out of the ratchet.

This mechanism calls for some degree of precision in its assembly. If a fork is welded to the bar in a slightly different attitude to its neighbours, there will be different effects on the pawls. Because of the way the ratchet is designed, the level of precision becomes critical on the first 2 or 3 notches of the ratchet (when a larger person is in the seat) but becomes less critical as the restraint is pushed into the seat for the average rider.

During an in-service inspection, TMA discovered that some of the bars were not holding under moderate pressure on the 3rd notch of the ratchet, and that none held on the first notch. We are told that this was resolved in the short term, by grinding away part of the fork that lifted the pawl out of the ratchet. This allowed the pawl to sit fully in the notch and to hold securely. TMA said that this action of removing material was not safety critical, since any failure of the fork would only prevent the restraint bar from opening in the normal way.

However, it was not practical to make all the ratchets effective when the pawl was in the first notch and for that reason the sensors were adjusted so that they only allowed the ride to operate after the pawl located in the third notch. It is likely that this would preclude some large people from riding.

(TMA have since found this defect to be present in two other Moser Drop rides though not to the same degree.)

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The components, and the way in which they are assembled, clearly have a safety-related function. It is not known whether the problem described above results from inadequate manufacturing / assembly specifications by the designer or from manufacturing / assembly errors, i.e. non-compliance with the specification.

The second defect reported by TMA came to light on the same ride. If the operator presses the start button and the ride fails to start the most likely reason will be that one or more of the restraint bars is not shut (there may, for instance, be an empty seat). If he, or an attendant, then goes to the bar and pushes it down, the bench will rise immediately and quickly. This poses significant risk to the operator / attendant, who will be leaning into the bench and could be struck by it.

This is a type of design fault which is found on other similar rides as well as on rides of completely different generic type.