

# NAFLIC

*National Association For Leisure Industry Certification*

## Standards & Related Documents Committee

### TECHNICAL BULLETIN - NOVEMBER 1992

#### 041. Woolls (Tivoli) Orbiter

We have been informed of the following potential problem area that may exist on some Orbiters.

The ride motion may be described as having two separate functions, the raising of the centre, and the spinning of the rotating framework. It is necessary to raise the ride before the rotating framework gains more than a very slow speed in order to prevent the passenger carrying cars from digging into the platform of the ride. Conversely, the rotation of the ride at the end of its cycle must have slowed down sufficiently, and all of the six capstan shafts must have fully retracted, before the ride is finally lowered.

The two motions are hydraulically powered, activated by electrical solenoid valves. There are limit switches, located on three of the six capstan shafts, which monitor the retraction of these shafts. There are also two proximity switches which record the level and height of the lift to detect that the ride is at sufficient height for higher speed rotation to be permitted.

Failure in any of the following ways could cause cars to strike the floor :-

1. Failure of any part of the circuits to the three capstans not fitted with limit switches.
2. Failure (such as seizure) of any of the switches fitted to the other three capstans.
3. Failure of the hydraulic circuit controlling rotation in a way which prevents the ride from slowing down, e.g. spool valve sticking (two are in circuit), sticking solenoid valve, or additional feed given wrongly to solenoid valve.
4. Failure of the control system and hydraulic system retracting the capstan shafts.
5. Failure of the lift control spool valve (two are in circuit). An incident of this type is known to have occurred.
6. Failure of either of the proximity sensors on the lift circuit.

We do not claim that the above is an exhaustive list of ways in which failure may lead to cars colliding with the deck.

We draw the attention of Appointed Persons to the fact that serious incidents of this type may have occurred on more than one Orbiter.