

NAFLIC

National Association For Leisure Industry Certification

Standards & Related Documents Committee

TECHNICAL BULLETIN - FEBRUARY 2003

257. Spin Out Accident

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On 2 January 2003, at the "Fair2000" carnival in San Juan, Puerto Rico, four people were injured on a 3 year old Spin Out ride when one of the radial arms broke off. The injured persons had been riding in the car that was attached to the end of the arm that broke. The car fell about 12 feet onto the platform. Two of the passengers suffered serious injuries and the other two received treatment. Twenty-one other passengers were left stranded on the ride for about thirty minutes.

The Spin Out involved in the accident was owned and operated by Amusements of America. It was manufactured by Tivoli Enterprises Ltd of Canterbury, England. However, we understand that it was built under licence from KMG of the Netherlands and that it is identical to the "Move It" (of which there are 24 and 32 seat versions, only one of the latter in existence). The Spin Out has six radial arms, each carrying four dangling-leg seats, attached to a central hub which rotates at 15 rpm. The original arm design dating from about 1995 is of a fabricated box construction, varying in depth along its length. (A more recent version uses 300 x 200 x 5 RHS). There are top and bottom cover plates welded to the box near the inner end.

Photographs of the broken arm, which failed near the inner end, seem to show that a fatigue crack had been developing for some time and had propagated around almost 50% of the periphery of the box before the final sudden failure. As one might expect, the cracking seems to have developed from the lower surface of the arm at the toe of the fillet welded connection of the bottom cover plate to the box. There also appeared to be fatigue cracking of lesser extent from the corresponding location on the top surface of the arm. The photographs show that the cracks may have been normally out of sight behind lighting panels.

There are thought to be over 20 of these rides in the USA, which were shut down following the accident. There are probably only 3 (i.e. Tivoli and KMG) in the UK. Tivoli say that they should not be operated until inspections have been made and risks reviewed, etc.

KMG have been aware of the possible failure of the seat arm following identification of cracks on rides in Europe. There has also been cracking at the same location on the arm on the Frisbee, which seems to be an identical design, although the forces to which it is exposed will be different. Lighting panels also obscure the area of interest on some of these rides.

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Prior to the Puerto Rican accident, attempts were made to strengthen the arms on some of the rides by welding additional plates top and bottom. It is thought that one ride in the UK may have been modified.

We have not seen the original fatigue life calculations and we are told that there are not yet any available for the modification. At the moment, then, it is not clear whether the modification reduces the problem and, if so, to what extent. Regular inspection and NDT of this and other regions of stress concentration on the arms are likely to be necessary in both cases.

We are told that Tivoli sent out Safety Bulletins on the basis of advice from KMG in July 2000 and July 2001 informing owners that cracks had been detected on sweeps of rides operating in Europe and that they should inspect the area of possible failure. Repair procedures and gusset kits were said to be available from Tivoli. We are also told that a further Safety Bulletin was sent out on 3 January 2003 after the accident, stating that all rides should be shut down until inspections had been carried out. Tivoli recommended that the inspection should include NDT by MPI which should be repeated every 60 days until further action could be taken.