



STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Department of Administration DIVISION OF CAPITAL PROJECTS AND PROPERTY MANAGEMENT BUILDING CODE COMMISSION

Amusement Ride Safety Program

One Capitol Hill

Providence, RI 02908-5859

(401)-222-6330, (401) 487-9928, FAX 222-2599

An Open Letter to: ASTM F-24 Committee, USCPSC,

And to: Advantage Rides (for "Sellner"), A.R.M (US), Chance Rides,
Dartron Industries, Mulligan, and Wisdom Industries,

And to: All Domestic and Foreign Ride Manufacturers

As the primary prerequisite for proper maintenance, it is evident that Visual Inspection is the most basic, compelling, and indispensable tool to ensure Ride Safety. The ASTM F-24 Standards, as well as virtually every Amusement Ride Safety Statute in the United States of America, mandate visual inspections of rides. Visual Inspection of a ride can only mean visual inspection of the entire ride without exception. However, it is possible to cite numerous examples, of which some are detailed later herein, and in which many parts and sometimes whole sections of rides are practically inaccessible for visual inspection. The Rhode Island perspective on the responsibility to ensure the positive satisfaction of the Visual Inspection mandate as it applies to permanently inaccessible ride sections is the subject of this communication.

The consequences of whether or not a structure underwent a visual inspection can never be overstated. There is a long history of accidents caused by damaged parts that had somehow escaped visual inspection. Among the most widely known is the accident of the Boeing 737 Aloha Flight 243 in April 1988 (miraculously resulting in a single fatality). The NTSB report (available on "Google") indicates that during boarding of the flight, a passenger observed a crack along a rivet line in the fuselage, as she was walking towards the aircraft through the access tube; but failed to report her observation to the flight crew. The NTSB report implied that the aforementioned observed crack was apparently the reason why part of the fuselage was torn away in-flight. The report also alludes to the fact that this same crack somehow escaped visual inspection by the aircraft maintenance crew.

In Rhode Island, a citizen passing under a bridge during the 1990s noticed a one inch wide crack in a main beam. The citizen later received an award from the governor of Rhode Island.

In both of the aforementioned examples, injuries to structures were observed by lay citizens while escaping the observation of professional maintenance crews. Those examples clearly demonstrate that attentiveness and a good pair of eyes are all that is needed for performing a thorough visual inspection. Consequently, there is no acceptable excuse for not performing visual inspection. As a logical corollary, a design which hinders visual inspection must incorporate other maintenance tools equivalent to visual inspection to be considered in compliance with ASTM and/or local statutes.

Although the enclosed environment in the case of covered parts can trap moisture and make metal parts more susceptible to corrosion, damage can happen without any extraneous triggering conditions, to enclosed as well as to exposed parts. It is well known, for instance, that no mill in the world can produce metal components that are consistently 100% free from material flaws. There is no doubt that some flawed parts can sometimes escape quality control measures which test only a specified percentage of each product. To sum up, visual inspection is indispensable for all parts, metallic or not, be they a part of a structural, mechanical, hydraulic, pneumatic, electrical, or any other kind of system, according to ASTM and virtually all state ride safety statutes.

One incidence of satisfactory resolution of this issue was in the case of the Eyerly Spider. In September 1994, the CPSC issued a Safety Alert regarding the "Eyerly" Spider and Octopus, in which inspection of hidden metal frames by NDT or through destructive tests were required. Corrosion as a result of moisture trapped in enclosed fiberglass covered parts was cited as the basis of the requirement.

The ARM Skymaster provides another example where this issue was addressed with regards to a specific problem area. In February 2007, ARM issued Bulletin SB 013007 which instructed owners to replace the Skymaster over the shoulder restraints that are "five years old or more". This action was required because

ARM learned that some Skymaster over the shoulder restraints "have become heavily corroded under the foam padding at a critical weld location". The Bulletin thus implied that the foam padding covering the weld contributed to the heavy corrosion by maintaining a moist environment for a longer time, and by rendering the weld unavailable for visual inspection, which would have triggered corrective action/maintenance. It is worth noting here that the Commonwealth of Massachusetts had issued a Notice about this problem approximately six months before the date of issue of the above mentioned ARM Skymaster Bulletin.

In August 2007 an inspector (also in Massachusetts) noticed excessive play in a locked Chance Pharo's Fury restraint. After removing a fiberglass panel, the hidden components were visually inspected and the root cause of the excessive play was determined to be "severe corrosion in the bolts holding the lap bars to the frame of the Pharo's Fury", according to the Massachusetts Memo issued at that time. Excessive corrosion here too was apparently caused by the enclosed environment created when steel frame components are enclosed/hidden under cover, which traps moisture and allows corrosion to progress out of sight. Again, the inability to perform visual inspection precluded timely detection and resulted in failure to enact timely corrective measures.

In March 2005, helped by a Commonwealth of Pennsylvania initiative, Wisdom Industries issued a Service Bulletin regarding the "foot-tub bolt on plate assembly" for their Sizzler. The original Sizzler design supported the tub on the seat by the means of a main bolt. The main bolt bears on laminated reinforcing plates embedded into the foot-tub fiberglass body, which spread the main bolt load to a larger area of the fiberglass foot-tub by bond. A few years ago, Pennsylvania inspectors uncovered laminated plates that were completely destroyed by corrosion. Based on this, Wisdom issued the aforementioned Service Bulletin to replace the laminated fiberglass embedded plates with outside plates that spread the main bolt load to the foot-tub body by direct bearing through a set of bolts, secured with nuts, which are readily accessible to visual inspection. Nonetheless, the laminated plates problem was not radically resolved because only deteriorated laminated plates were replaced at that time. Laminated plates which were not deteriorated at that time were unfortunately re-fiber-glassed over. Since then some of those plates must have deteriorated out of sight.

Therefore, in consideration of the above-cited examples for this widely prevalent condition of inaccessibility to visual inspection, the State of Rhode Island is asking Manufacturers to address such condition by either mandating periodic NDT (every 3, 4, or 5 years as the manufacturer deems appropriate for each specific ride), periodic non-destructive dismantling of covers over inaccessible parts (every 3, 4 or five years, as the manufacturer deems appropriate for each specific ride), destructive removal of fiberglass if necessary (e.g. in the case of the Wisdom Gravitron panels), cutting up coverable inspection ports (windows), or by any other means the Manufacturer deems proper.

If a Manufacturer decrees that owners must address the issue of inspection of permanently inaccessible ride parts by any of the above means, or by a combination thereof, or by whatever other means the Manufacturer deems appropriate, the state of Rhode Island would consider such manufacturer mandated action as satisfying the ASTM as well as the statutory requirements of visual inspection.

Thank you very much for your consideration of this request.

Sincerely,

(Mr.) Magdy A. Guirguis, PE
Supervising Structural Engineer-Ride Safety
State of Rhode Island Building Code Commission
One Capitol Hill
Providence, RI 02908-5859
Tel: (401) 222-6330
Fax: (401) 222-2599 (Attention: MAG)
e-mail: magdyg@gw.doa.state.ri.us
State Cell Phone: 401-487-9928