Operational Policy Division

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Principal Inspector
Mr Cameron Adam

The Showmen's Guild of Great Britain

Date:

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Dear Sirs

TAGADA FAIRGROUND RIDE

This letter is to inform you of the results of the recent Study conducted at the Health and Safety Laboratory (HSL) into the forces generated on riders by Tagada type machines. The Study was conducted following a spate of recent accidents involving riders, some of which resulted in serious injuries. Our records show you as an owner and/or controller of a Tagada type machine and this letter requires you, as a controller, to take certain actions involving the use and engineering of your machine to ensure that riders are not exposed to uncontrolled risks to their health and safety.

There are two main causes of injury to those riding on Tagada type machines:

- The person is thrown from their seat into the bed of the machine. They are then unable to control their movements on a fast moving, spinning base and evidence exists that they can then impact parts of the ride or other riders causing injuries to one or both parties. This situation has not formed part of the latest work but has been addressed in the past. Advice has previously been given to controllers of Tagada machines about rotational speed/bouncing and about responding to and controlling misbehaviour. I have updated this advice and it is attached to this letter. Operation of Tagada machines will be part of the HSE National Fairground Inspection Team (NFIT) work plan for next year. Given the known risks to riders from unsafe use of this machine, it is highly possible that the NFIT Inspector will decide that such operation is a material breach of the Health and Safety at Work etc Act 1974 and their intervention will be subject to cost recovery.

- Riders are subjected to forces that can cause them to be completely ejected from the ride. This type of accident often results in serious injuries to the rider; this scenario is the one addressed by the Study and will be the focus for the rest of this letter.

The Study concludes that Tagada type rides can generate combination forces that result in downward accelerations able to cause a rider to be lifted away from their seats. As such the European Standard BS EN 13814:2004 requires that individual restraints are required for each passenger. This restraint would have to include automatic control and start inhibition.

It is fully understood by HSE that the Tagada is a lively and popular ride and that fitting such restraints would, even if physically and/or financially possible, take away much of the rides' attraction. Accordingly the Study identifies two other ways that the forces on the riders can be reduced to levels where they could not be ejected (controllers are of course at liberty to put such restraints onto the ride if they wish or to devise another method that will eliminate the ejection forces. This should be discussed with your ride examiner):

- Reduce the rotational speed of the ride. Operators choosing this as an option will probably need to do more work to ensure that such a reduction would not have the effect of reducing the forces holding rides in their seats during bouncing. If not done competently the effect of this option may be to cause more accidents involving riders being thrown into the bed of the machine.

- Reduce the speed the rams can move the drum. The purpose of this would be to prevent the drum from descending any faster than a rider would naturally descend under the gravitational forces acting upon them. This should mean that they remain in their seat albeit that they will feel close to leaving it. Some calculations may be needed to discover the optimum ram speed but this speed can then be engineered into the ride by the use of flow restrictors on the rams.

As both the speed of the drum and the speed of the rams have direct impact upon the passengers ability to remain in their seat these changes should be regarded as safety modifications and subject to design review, conformity to design checks and initial tests in accordance with the ADIPS procedures. It is stressed that any changes to the ride must create or worsen any other hazards.

NAFLIC have procured an accelerometer which they will be making available to ADIPS Ride Inspectors to use as part of the annual test. The run test to be conducted must demonstrate that the machine cannot generate a force that can cause a rider to be ejected. If this is not the case then HSE do not believe that the issue of a Declaration of Compliance (DOC) would be appropriate. A printed trace of the test should be kept in the ride documentation and HSE NFIT Inspectors will be checking these as part of their work in the coming year. Given the proven risk to the health and safety of riders resulting from ejection from the ride, any investigation into machines which can still generate such forces may well be determined a material breach of the HSWA and subject to cost recovery.

Detail of how the test is to be conducted and how the data is to be collected and displayed will be the subject of a separate letter to NAFLIC.

I have enclosed a copy of the Study for your information and can be contacted if necessary on 07527002689.

Yours faithfully

I have included for your information a copy of the Study

M Sandell
HM Inspector of Health and Safety
Entertainments

INFORMATION REGARDING TAGADA RIDES

Introduction

This document provides ride controllers with information on the safe operation of Tagadas. It should be read in conjunction with the HSE publication *Fairgrounds and amusement parks: guidance on safe practice (HSG175)*.

Description

A Tagada generally consists of a dish shaped passenger-seating area mounted slightly off horizontal on a central bearing. A motor rotates the passenger area. There are generally two hydraulic or pneumatic rams (the bump mechanism), which can be activated to cause the passenger car to bump. Most rides do not have any form of passenger restraint.

Causes of Accidents

In common with many other rides, the risk of accidents and injuries can be minimised by employing a safe system of operation and by good maintenance procedures.

Tagadas can present an unacceptable risk of injury if not operated correctly and there have been a number of accidents on them in the past. Generally, these accidents have resulted from two causes:

1) Riders being displaced from their seats towards the centre of the ride, due to the bump mechanism being operated without sufficient rotational speed to ensure centrifugal force retains riders in their seats, or;

2) Riders being ejected from the perimeter of the ride due to the relationship between the centrifugal force resulting from the ride's rotation, the dropping away of the seats when the ram descends and the passenger containment arrangements.

The following recommendations reflect the findings of a number of HSE incident investigations.

All working Tagadas should be modified where necessary, to eliminate passenger ejection forces in accordance with the detail contained in the letter covering this guidance. Work should be done to achieve this prior to the machine's first ADIPS Test conducted after the date of the letter.

In order to reduce the risk of riders being injured when they are thrown from their seat into the centre of the ride, the following operating measures if not already in place, should be implemented immediately on all Tagadas:

- Suitable passenger restrictions should have been specified in the operations manual and should be strictly enforced by appropriate means e.g. signs and or verbal instructions;

- Passengers should be instructed to remain seated at all times during the ride;

- If passengers are seen attempting to stand, or are not correctly seated, bumping should immediately cease and the ride should be brought to a halt in a safe manner;

- The bumping rams should not be operated so that passengers are thrown into the centre of the ride, e.g. at slow rotational speeds;

- Ride attendants should not be on the rotor when it is in motion, unless they are correctly seated;

- Controllers should ensure that operators and attendants are adequately trained and are aware of the above points.

Any questions regarding this note should be addressed to the author of the covering letter.