Passenger behaviour on amusement rides
Field study report

Prepared by the Health and Safety Laboratory for the Health and Safety Executive 2007
The main aim of this field study was to produce a catalogue of behaviours which passengers exhibit whilst on amusement rides. An additional aim was to provide a benchmark of behaviour incidence levels, with the expectation of making a comparison study in a number years time to identify any changing trends in behaviour. The field study was designed in order to cover a wide range of different ride types under a wide and representative range of conditions as follows:

- Various types of venue; Theme Park, Travelling Fair (Park, Street or Indoor), Pleasure Beach, Music Festival.
- Varied times of year; visits were made throughout the main 2003 season. Some early visits were also made in late 2002 and during the 2002/2003 holiday period.
- A range of areas of the country; visits ranged across the UK in an effort to eliminate any data skewing effects due to regional variations in behaviours.

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ACKNOWLEDGEMENTS

The Showmans Guild and The British Association of Leisure Parks, Piers & Attractions Ltd. (BALPPA) provided valuable help by facilitating contacts with Fairground and Theme Park operators. This enabled the Health & Safety Laboratory (HSL) to make visits to the appropriate sites and carry out filming.

The Showmen and Theme Park operators who allowed us to film at their premises / events were very helpful and supportive of this work. Without their help the work would have been extremely difficult to do.
GLOSSARY

Amusement Industry
This is the term used in this report to refer to Showmen and Theme Park Operators (referred to together as Operators) and their representative bodies (Showmans Guild and BALPPA) when these more specific groups are not individually identified.

Behaviour
A non-passive physical activity or movement made by a passenger during a ride cycle.
- ‘A behaviour’ refers to an instance of one type of behaviour (including the action and the pattern, repetition rate etc.).
- An ‘incidence’ of a behaviour refers to an occurrence of a behaviour.

Car(s)
A structure which passengers sit in (e.g. a spaceship, ladybird, elephant, section of coaster train). Gondola is also a term often used to refer to these items.

Containment / containment system
The seating, handrail, lap bar, foot-well structures which contains the passenger and / or enables them to support themselves and remain stable.

Operator
A showman or Theme park employee who supervise the ingress and egress of passengers, lock containment systems, and operate the ride control system. This term is refers to a person with responsibility for ride maintenance and risk assessments.

Passenger demographics
The gender and age distribution of a group of passengers.

Ride
An Amusement ride e.g. a Coaster or a Waltzer.

Ride cycle
The period during which a group of passengers are sent around a ride in a continuous motion. This is the time between the ride starting to move and then stopping again under normal conditions (i.e. not stopping due to failure or emergency).
# CONTENTS

1.0 Introduction .......................................................................................................................................................... 1

1.1 Background .......................................................................................................................................................... 1

2.0 Aims of the Passenger Behaviour Research ........................................................................................................... 2

3.0 Field Study Method ................................................................................................................................................ 3

3.1 Choosing and setting up visits .............................................................................................................................. 3

3.2 Filming methods ..................................................................................................................................................... 4

3.3 Ethical considerations .............................................................................................................................................. 4

3.4 Venues visited for filming ...................................................................................................................................... 5

4.0 Analysis Methods .................................................................................................................................................... 5

4.1 Behaviour Categories ........................................................................................................................................... 6

4.2 Passenger age groups ............................................................................................................................................. 8

4.3 Behaviour pattern (level of repetition / persistence of behaviour) ........................................................................ 8

4.4 Motives for behaviour .......................................................................................................................................... 9

4.5 Logging non-behavioural information .................................................................................................................. 10

4.6 Logging behavioural information .......................................................................................................................... 11

5.0 Results of Passenger Behaviour analysis .............................................................................................................. 13

5.1 Predicted behaviour incidences per 1000 passengers (Section 1) ........................................................................ 13

5.2 Behaviour properties for multiple ride cases (Section 2) ...................................................................................... 14

5.3 Behaviour properties for single ride cases (Section 3) .......................................................................................... 15

5.4 Behaviours observed across all rides (Section 4) ................................................................................................... 15

6.0 Section 1: Predicted behaviour frequencies per 1000 passengers ........................................................................ 16

6.1 Behaviour frequencies .......................................................................................................................................... 16

6.2 Behaviour descriptions for each ride ..................................................................................................................... 16

7.0 Section 2: Behaviour properties for multiple ride cases ........................................................................................ 23

7.1 Traditional Carousels ........................................................................................................................................... 23

7.2 Jumpers / Grasshoppers .................................................................................................................................... 28

7.3 Bench Rides ......................................................................................................................................................... 32

7.4 Superbobs ............................................................................................................................................................ 38

7.5 Waltzers ............................................................................................................................................................... 41

7.6 Conventional Coasters (non-spinning or looping) ............................................................................................... 46

7.7 Pirate Ships .......................................................................................................................................................... 50

7.8 Superbowls ......................................................................................................................................................... 54

7.9 Twist Rides ......................................................................................................................................................... 56

7.10 Log Flumes ......................................................................................................................................................... 60

7.11 Junior Autodromes (e.g. Ladybirds) .................................................................................................................. 67

7.12 Mini Jets (e.g. Batman, Pirate-raft) ..................................................................................................................... 70

8.0 Section 3: Behaviour Properties for single rides ................................................................................................... 74

8.1 Spinning coaster (e.g. Wild Mouse) ...................................................................................................................... 74
EXECUTIVE SUMMARY

OBJECTIVES

The main aim of this field study was to produce a catalogue of behaviours which passengers exhibit whilst on amusement rides. An additional aim was to provide a benchmark of behaviour incidence levels, with the expectation of making a comparison study in a number years time to identify any changing trends in behaviour.

The field study was designed in order to cover a wide range of different ride types under a wide and representative range of conditions as follows:
• Various types of venue; Theme Park, Travelling Fair (Park, Street or Indoor), Pleasure Beach, Music Festival.
• Varied times of year; visits were made throughout the main 2003 season. Some early visits were also made in late 2002 and during the 2002/2003 holiday period.
• A range of areas of the country; visits ranged across the UK in an effort to eliminate any data skewing effects due to regional variations in behaviours.

MAIN FINDINGS

The age and gender distribution of passengers who exhibit behaviours generally reflect the overall passenger demographics. However, certain age groups do show specific bias towards particular behaviours, possibly due to the association of those behaviours with particular motives. For example relatively high levels of one handed waving from children under 10 reflects their greater need to communicate with adults.

The most commonly observed behaviours were one and two handed waving, turning head / trunk and pointing. The most common motives were communication, exhibitionism, curiosity and thrill enhancement. Standing up was the fifth most common behaviour and occurred on a wide range of ride types. Standing up offers a good example of how the safety implications of a behaviour depends on the design of the ride and the exact actions and motives. For example on Mini Jets passengers were seen standing up in back seats to reach across to controls on the front seats.

Children’s’ behaviours appear to be associated largely with communication and curiosity. Behaviours of older children, teenagers and young adults show lower levels of communicative behaviour and curiosity but increased levels of exhibitionism and thrill enhancement. Communication behaviours increase again in older passengers (age 22 and above).

Behaviours exhibited by females were associated with communication more than the behaviours exhibited by males. Females also showed lower levels of behaviour associated with curiosity. Overall there appeared to be a lower variation in behavioural motives amongst females compared to males.

The relatively infrequent exceptional or ‘risky’ behaviours were as follows:

• Reaching leg out of containment on Pirate ship;
• Climbing between horses on Traditional Carousels;
• Lying back / reclining on horses on Traditional Carousels;
• Standing and reaching forwards on Mini jets;
• Reaching out of side of log flume while it is rocking;
• Standing on log flume or coaster;
• Swinging on Paratrooper chair;

When rides stop mid-cycle passengers begin to move around and there is sometimes potential for them to move into positions of danger.

Passengers appear able to appreciate potential material loss and respond appropriately (securing belongings). However, they may not appreciate potential consequences of not following behavioural instructions.

Behaviour related to exhibitionism and thrill enhancement are likely to increase in frequency amongst passengers who have been drinking alcohol. However, no different types of behaviour were observed in evening / night

MAIN RECOMMENDATIONS

Ensure that operators are aware of the tendency amongst young children to try to remain in good visual contact with parents and to focus on items ‘off the ride’. These tendencies could lead to passengers kneeling on seats, standing up and inappropriately exiting rides.

Ensure adequate audible communication with passengers in the event of mid-cycle stops. This would also allow operators to warn passengers against ‘risky’ behaviours. Operators should also check all passengers are correctly seated before restarting a ride which has stopped mid cycle

On rides where standing occurred during the slow down period, it should be ensured that containments systems do not allow passengers to stand up before it is safe to do so.

There is scope for improvement in warning / behavioural signs. This could involve the design of symbols / graphics which inform passenger more clearly about the potential consequences of particular behaviours. Consideration should be given to research in this area with the aim of standardising signs across the amusement industry. In the meantime operators should ensure that their safety signs refer to / cater for the behaviours identified by this study.

Operators should be vigilant for the exceptional / ‘risky’ behaviours identified above. They should also try to ensure that single or pairs of passengers are seated in the front two seats of mini jets (where the controls are located). This is to prevent passengers standing in the back seats to reach the controls.

Further recommended passenger behaviour studies include:
• Assessments of passenger behaviour on ride types not included this study (e.g. dodgems, inflatables).
• Behavioural surveys of rides by operators if they have concerns about the potential for particular behaviours which were not actually observed in this study.
• Carry out follow-up survey to identify any changing trends in behaviour.
1.0 Introduction

This report describes the background, methods and findings of a field study carried out by the Health & Safety Laboratory to catalogue and benchmark passengers’ behaviour on Amusement Rides.

1.1 Background

For several years there has been increasing concern regarding the behaviour of passengers i.e. members of the public, on amusement rides. The increased attention to passenger behaviour has been primarily within the Amusement Industry, the Health & Safety Executive (HSE) and Local Authorities. The HSE Review of Fairground Safety also highlighted the need for research in this area for the broad reasons outlined below.

There are 2 key reasons for the increase in attention to passengers’ behaviour:

- In certain cases passengers’ behaviour is believed to have been a contributing factor in an incident resulting in serious injury (e.g. a passenger reaching their arm out of a car as they pass a stationary object, resulting in striking and injuring their hand).

- There are also concerns due to an overall impression within the Amusement Industry that certain groups of people (grouped in this study by age and gender) now engage in more risk taking or thrill enhancement behaviours than previously (e.g. compared to 10 years ago or more).

These two factors have generated a potentially increasing requirement for Amusement Ride designers and operators to be aware of the types of behaviours / activities of passengers under specific sets of circumstances. If passenger behaviour can be more accurately predicted, designers may have greater scope to consider it appropriately during the design / testing of safety critical components such as the ride containment systems and operating systems.

If operators are aware of the range of potential passenger behaviours they may be able to use that knowledge in the following ways:

- To make better (or more accurate) risk assessments (i.e. ascertain which behaviours people are more likely to undertake on ‘their ride’ or a specific ride and then determine the consequences of those behaviours). If the foreseeable consequences of predictable behaviours were to be considered dangerous / unsafe, operators could then take steps to prevent the behaviours occurring or at the very least reduce the severity of the consequences.

- To enhance their alertness / attention to specific types of behaviour which may expose passengers to specific risks. It is possible that the outcome of a thorough risk assessment might be to undertake increased specific attention to passengers in order to ‘manage behaviours’. For example halt the ride, speak to passengers and / or make an announcement over a loudspeaker system if a particular person(s) engages in a specific behaviour or appears to be in the early stages of a ‘risky’ activity.

- To help them make appropriate design modifications. Again, it is likely that a thorough risk assessment which takes into account passengers’ potential behaviours (and most importantly, the likely consequences) would be an invaluable step in identifying ways to control / eliminate the risks arising from those behaviours (e.g. raising the side of a seat to prevent passengers from reaching sideways out of the containment system on a fast moving coaster).
• To improve warning signs to increase their effectiveness. It may be possible for operators to use knowledge of which age groups / genders engage in particular behaviours in order to target their signs more accurately towards those groups of passengers. For example they may be able to use that kind of knowledge when considering the height placement of signs in queuing areas, the size, shape and complexity of the wording, the terminology used, possibly even the colours used in order to draw the attention of particular groups / people (whilst still ensuring that the signs remain useful for all potential passengers).

Having recognised the importance of increasing the knowledge of passenger behaviour, the key stakeholders (i.e. the Amusement Industry and HSE) jointly agreed to support a project which would investigate passengers’ behaviour. Following the initial project proposal by HSL, the project specifications were discussed and agreed during meetings of the Fairgrounds Joint Advisory Committee (JAC) Research Working Group attended by representatives of all the key stakeholders.

2.0 Aims of the Passenger Behaviour Research

The main aims of the overall passenger behaviour research were as follows:

• Carry out a critical literature review to present the current level of understanding of risk taking behaviour. This literature review provides a series of in-depth interpretations of psychological literature in terms of how the findings of these previous studies may apply to risk taking / thrill seeking behaviour on amusement rides. The literature review is available to the public (HSL Report: Passenger Behaviour at Fairgrounds: A Literature Review. Author: S Wright)

• Produce a catalogue of passenger behaviours based on HSLs’ extensive observations during 2003 and provide benchmark figures for the incidence levels of behaviours.

Originally the Amusement Industry suggested that it would be useful to make a comparison between current behaviours and behaviours several years ago (in order to establish the facts about whether potentially risky behaviours have actually become more commonplace and / or more extreme). However, this comparison was not possible due to a lack of accurate statistical / comparable information about behaviour in these previous years.

The detailed aims of this study were to identify which groups of passenger are more likely to engage in specific behaviours / physical actions, including the motives and patterns of those behaviours and actions.

The aim of this report is to present the findings of the field study in a format which enables any operator or ride designers to use the information. It is intended to be an accessible and practical document for all the stakeholders in the Amusement Industry.
3.0 Field Study Method

In the planning stages of this project it was decided by HSL that video / filming was the most effective way of gathering information about passenger behaviour. Filming enabled HSL to accurately record behaviour incidence levels and the additional variables (age of person, ride type etc.) which were then analysed in detail and transcribed into spreadsheets for analysis. There were two main stages to the data gathering:

- 4 pilot visits. These were carried out to help identify potential difficulties in the basic techniques and equipment that were intended to be used. Film from these visits was also used in the analysis / catalogue when the images were of a suitable quality for analysis.

- 11 further data gathering visits.

3.1 Choosing and setting up visits

The Showmans Guild and BALPPA were fully co-operative and assisted in setting up visits. In the early stages of the project a number of potential filming venues (Travelling Fairs, Theme Parks, Pleasure Beaches, Music Festivals) were identified:

The Fairs, including pilot visits, were chosen in early 2003 from the continually updated list of events which can be found via the Showmans Guild website: http://www.showmen.co.uk/ and link to http://www.atfotf.com/coming.html or http://www.fun-fairs.co.uk/ (All The Fun of the Fair website).

Theme parks and Pleasure Beaches were selected based on their size and location in the UK. The main aim in selection was to ensure a range of venues of different sizes, spread across the UK.

3.1.1 Protocol for visits

The initial list of Travelling Fairs which HSL wanted to visit for filming was submitted to the Showmans Guild via the JAC. From the feedback received by HSL, it is understood that the Guild contacted the relevant members (i.e. the showmen whose fairs we intended to visit) and advised them that we would contact them about the visit closer to the actual date.

Approximately 2 weeks before each intended visit the following steps were taken by HSL:

- Contact the relevant HSE Inspector to ensure there were no legal restrictions (outstanding business) with visiting a particular venue / showman.

- Contact the regional / section secretary of the Showmans Guild to confirm the visit and obtain contact details for the relevant showman.

- Contact the showman to confirm / agree on the visit (in some cases this meant changing the date or time of the visit).

In some cases local authority organisers and local police forces were contacted in order to help arrange visits and to inform them of HSLs intended presence at a particular venue.

On arrival at all the filming venues the HSL staff contacted the organiser / owner to introduce themselves and explain what they would be doing (unless it had already been agreed that contact was not necessary).
3.2 Filming methods

At least 2 members of staff from the HSL Ergonomics section attended each venue. Each person used a typical domestic digital video camera and recorded footage of rides in operation. The aim was to record a minimum of 20 minutes of footage for each ride. However, this was extended under some situations, for example:

- If there were particularly long empty / loading periods on the ride;
- If the person filming had a good vantage point / clear view of the ride and it was a popular ride, i.e. a lot of people were using it creating a data-rich recording period.

In some cases showmen, organisers or owners of buildings surrounding amusement rides allowed HSL to use vantage points e.g. roof-tops or windows from buildings. This was useful in that it usually allowed better footage to be recorded, as views were not interrupted by people walking in front of the cameras.

3.3 Ethical considerations

HSE Research Ethics Committee raised a number of points, which had to be addressed in relation to the filming of the public, in particular children. From discussions between HSL, HSE and the HSE Ethics Committee the following project methods were agreed:

- All video recording must have the consent of the Theme Park or Fairground Operator;
- Analysis shall not require accurate personal information (e.g. exact age) so there is no requirement for any individual to be approached for information or personal details;
- No instances of behaviour will be traceable back to a single known individual;
- No images of individuals will be used in the project reports;
- All video / image data will be stored as videotape or digital files (mpegs). These shall be stored with information about the venue, date of recording, and rides recorded. Tapes shall be stored in a locked cabinet at HSL (Broad Lane, Sheffield) and only the Project Leader and Ergonomics Section head will have the key to access the videos. Additional people with access to the tapes via the Project Leader and Ergonomics Section head will be members of the HSL research team who assist with the video analysis.
- All videotapes will be destroyed once the final field study report has been reviewed and approved by the HSE and the Amusement Industry.
3.4 Venues visited for filming

Table 1. contains a list of the venues which HSL visited for filming and the dates of the visits.

<table>
<thead>
<tr>
<th>Venue</th>
<th>Date</th>
<th>Additional visit information</th>
</tr>
</thead>
</table>
| Drayton Manor Theme Park, Tamworth | 16 July ‘02 | • Theme park, daytime  
|        |            | • Pilot visit                                   |
| Bottoms Pleasure Beach, Skegness | 24 Aug. ‘02 | • Pleasure Beach, daytime  
|        |            | • Pilot visit                                   |
| Loughborough Fair, Loughborough | 16 Nov. ‘02 | • Street Fair, night time  
|        |            | • Pilot visit                                   |
| Glasgow Irn-Bru Carnival, SECC Glasgow | 09 Jan. ‘03 | • Indoor Fair, night time  
|        |            | • Pilot visit                                   |
| Pinner Fair, Pinner, London | 28 May ‘03 | • Street Fair, daytime  
|        |            | • Main visit                                    |
| Endcliffe Park Fair, Sheffield | 12 June ‘03 | • Park Fair, early evening  
|        |            | • Main visit                                    |
| Bathgate Fair, Bathgate, West Lothian | 08 June ‘03 | • Park Fair, daytime  
|        |            | • Main visit                                    |
| Newcastle Town Moor Fair, Newcastle | 26 June ‘03 | • Park Fair, daytime  
|        |            | • Main visit                                    |
| Legoland, Windsor | 24 July ‘03 | • Theme Park, daytime  
|        |            | • Main visit                                    |
| Chessington World of Adventures, Chessington | 25 July ‘03 | • Theme park, daytime  
|        |            | • Main visit                                    |
| Blackpool Pleasure Beach, Blackpool | 11 & 12 Aug. ‘03 | • Pleasure Beach, daytime  
|        |            | • Main visit                                    |
| Pleasureland Southport, Southport | 13 Aug. ‘03 | • Theme park, daytime  
|        |            | • Main visit                                    |
| V2003 Music Festival, Weston Park, Telford | 16 Aug ‘03 | • Music Festival, daytime & evening  
|        |            | • Main visit                                    |
| Oxford St Giles Fair, Oxford | 08 Sept. ‘03 | • Street Fair, afternoon & evening  
|        |            | • Main visit                                    |
| Stoke Park Fair, Guildford, Surrey | 13 Sept. ‘03 | • Park Fair, afternoon & evening  
|        |            | • Main visit                                    |

4.0 Analysis Methods

A panel of HSL ergonomists reviewed video from the 4 pilot visits. Following this review, a preliminary list of potential / observed behaviour categories was drawn up. A list of additional passenger variables potentially be linked to behaviours was created at the same time. These additional variables (see list below) were noted alongside each occurrence of a behaviour:

- Gender of person exhibiting the behaviour (Male or Female);
- Approximate age of person exhibiting the behaviour (age groups);
- Pattern of repetition or persistence;
- The perceived primary motivation for the behaviour.
These variables and the behaviour categories formed the basis for the video analysis.

The reference lists of behaviours and motivators were open to continual updating as new behaviours were observed. The lists in Tables 2 to 5 are the final categories that were referred to during analysis. The actual reference / crib sheet used during video analysis can be seen in Appendix 1.

The basic analysis strategy was to note the occurrence of each behaviour (and the related variables) each time a passenger exhibited / engaged in a particular behaviour. The data logging method is explained in more detail later (after descriptions of the behaviour categories and the additional variable categories).

4.1 Behaviour Categories

The list of behaviour categories that can be seen in table 2 is intended to be comprehensive, the exact physical actions of a particular behaviour (e.g. reaching out of containment with leg) may vary depending on the ride design, size of person etc., however the activity (behaviour category) remains the same.

The statistics relate to the behaviour categories in table 2. Tables 7a to 7d in section 6 of this report provide the specific actions relating to those behaviours on all of the rides which were analysed; the exact meaning of each behaviour category is provided. For example on Traditional Carousels there are cases of ‘turning around in seat’ behaviours which actually refers to people who were either sitting side-saddle or sitting facing backwards (opposing the direction of travel). However, on a typical seated ride such as a coaster a ‘turning in seat’ behaviour would mean lifting legs up on to the seat and turning the body to face backwards. Table 2 provides some common examples of behaviours, it is not a comprehensive list of behaviours (as stated, that can be found in section 6 of this report).
<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Brief description (&amp; common example where appropriate)</th>
</tr>
</thead>
</table>
| 1 hand waving                                 | Waving one hand in the air  
(e.g. waving to parents or friends watching the ride)                                                                                                                                                                                                         |
| 2 hand waving                                 | Waving two hands in the air  
(e.g. holding both hands in the air during a descent on a coaster)                                                                                                                                                                                                      |
| Turning head / trunk                          | Significant turning of head and trunk originating at the waist  
(e.g. often accompanies one hand waving; as the ride moves a passenger may continue to wave and turns in order to carry on waving in the same direction)                                                                                                       |
| Turning around in seat                        | Turning of head, trunk and legs away from the typical and intended neutral riding posture  
(e.g. sitting facing backwards on carousel horse)                                                                                                                                                                                                                 |
| Kneeling in seat                              | Turning around and kneeling on the seat pan (facing either sideways or backwards)                                                                                                                                                                                                                                      |
| Leaning out of containment                   | Leaning out of the containment system with head and possibly shoulders (e.g. resulting from leaning heavily against the side of a low walled containment system, as found on smaller coasters and children’s rides.)                                                                                              |
| Reaching out of containment (arm(s) only)     | Reaching hand(s) and arm(s) out of the containment system  
(e.g. reaching out to touch a stanchion or rail as a coaster passes by)                                                                                                                                                                                     |
| Reaching out of containment (leg(s) only)     | Reaching foot(pl) and leg(s) out of the containment system  
(e.g. hanging leg out of side of pirate ship)                                                                                                                                                                                                                  |
| Extended reaching out of containment (arm and body part) | Pronounced or extreme reaching out of the containment  
(e.g. moving chest, head, shoulder and arm out of containment in an effort to reach a passing object while riding on a coaster)                                                                                                             |
| Interfering with containment device           | Trying to open or break a part of the containment system  
(e.g. reaching forward to open the locking lever on the front of a twister car)                                                                                                                                                                               |
| Inappropriate exiting of ride                 | Exiting the ride (or trying to exit) while it is still in the middle of a ride cycle / running at normal speed (e.g. exiting a carousel in the middle of a ride cycle)                                                                                                          |
| Inappropriate exiting of ride (related to egress / exiting) | Trying to exit the ride via a route / method which is inappropriate during a scheduled slow-down or stop period. Also exiting a ride too soon during a slow-down period.  
(e.g. exiting towards the inside of a rotating ride such as a Mini jet and walking onto the lifting arms etc.)                                                                 |
| Violent behaviour                             | Any clearly aggressive and physically violent behaviour  
(e.g. striking another passenger, an operator or the ride itself)                                                                                                                                                                                             |
| Boisterous behaviour                          | Aggressive playful behaviour amongst groups of friends  
(e.g. tapping friends on the head)                                                                                                                                                                                                                               |
| Standing up                                   | Standing up at any time when the ride is in motion  
(this is different from inappropriate egress from ride by passengers because it does not imply a continued effort to exit the ride)                                                                                                          |
| Pointing                                      | Pointing towards an object / person outside the containment system  
(e.g. pointing to parents with one hand)                                                                                                                                                                                                                  |
| Interacting with containment system           | Acting upon a part of the containment system in any way other than passive due to weight / ride forces etc.  
(e.g. pulling sideways on handrail on Twister).                                                                                                                                                                                                       |
| Kicking                                       | Kicking legs  
(e.g. kicking while sitting on a bench ride as though swinging in a swing).                                                                                                                                                                                                                          |
4.2 Passenger age groups

The age groups which passengers were allocated to were based primarily on agreement and consensus between the HSL ergonomists carrying out the video analysis. The age groups were decided on as sufficiently broad and identifiable that analysis would typically find it straightforward to select one for a passenger, and that the decision would be consistent between the different analysts reviewing videos. Table 3 contains the age groups to which passengers were allocated if they displayed behaviour.

<table>
<thead>
<tr>
<th>Age group</th>
<th>Description of age group</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 10</td>
<td>Pre to Primary school</td>
</tr>
<tr>
<td>11 to 15</td>
<td>Secondary School</td>
</tr>
<tr>
<td>16 to 21</td>
<td>Adolescent to young adult</td>
</tr>
<tr>
<td>22 to 30</td>
<td>Young Adult (typically young parent etc.)</td>
</tr>
<tr>
<td>30 to 50</td>
<td>Adult (typically older parent)</td>
</tr>
<tr>
<td>Over 50</td>
<td>Older person</td>
</tr>
</tbody>
</table>

4.3 Behaviour pattern (level of repetition / persistence of behaviour)

In order to differentiate between the behaviour of a person who exhibited a single instance of a behaviour and someone who repeatedly exhibited that same behaviour, it was considered necessary to categorise a persons behaviour / activity in terms of how often / for how long they exhibited it. For example, someone who repeatedly holds his or her arms out of the containment for sustained periods of time is behaving differently from someone who moves an arm out of the containment system once for a short period. Table 4 contains the categories for repetition / persistence to which were allocated to each occurrence of a behaviour which was logged.

<table>
<thead>
<tr>
<th>Persistence / Repetition Category</th>
<th>Definition (&amp; example)</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-off Behaviour</td>
<td>A single instance of a dynamic action from an individual during an entire ride cycle (e.g. a child briefly waving to parent at the side of the ride, once during a ride)</td>
</tr>
<tr>
<td>Repeated Dynamic Action</td>
<td>Repeated cases of the same dynamic action / behaviour (e.g. a child briefly waving to parents each time his / her rotating ride passes by)</td>
</tr>
<tr>
<td>Single Sustained Action</td>
<td>A single instance of an action / behaviour which is held for a substantial period (e.g. a passenger holding two hands in the air during the main drop on a log flume)</td>
</tr>
<tr>
<td>Prolonged Action</td>
<td>A single action which is held for the majority of a ride cycle (e.g. a passenger holding two hands in the air for 2½ minutes during a 3 minute coaster ride)</td>
</tr>
<tr>
<td>Sustained and Repeated Action</td>
<td>Repeated cases of the same sustained action (e.g. a passenger holding two hands in the air during every descent on a coaster)</td>
</tr>
</tbody>
</table>
4.4 Motives for behaviour

The original project specification did not state that potential motives for behaviours would be included in the analysis. However, having reviewed video from the pilot visits it became clear that the same behaviour (physical activity) may be exhibited for different reasons. For example someone may stand up during a ride cycle because they are uncomfortable or alternatively because they want to get off the ride. In each case the motive for the ‘standing up’ behaviour is different. It was therefore felt that that information about possible motives for behaviours could be useful for operators and designers.

In order to try and bring this added information into the statistical analysis, a list of possible motives for behaviours was created (see table 5).

<table>
<thead>
<tr>
<th>Motive for behaviour</th>
<th>Examples of behaviours linked to motives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive social interaction / Communication</td>
<td>Waving at friends / parents</td>
</tr>
<tr>
<td>Peer pressure</td>
<td>Being persuaded by friends to reach out of containment system</td>
</tr>
<tr>
<td>Copying</td>
<td>Child copying a parent who has waved to another adult</td>
</tr>
<tr>
<td>Aggression / competition</td>
<td>Fighting for use of a shared control</td>
</tr>
<tr>
<td>Exhibitionism (showing off)</td>
<td>Waving two hands in the air to ‘show off’</td>
</tr>
<tr>
<td>Encouragement (being encouraged or encouraging others)</td>
<td>Waving hands in the air because of announcement</td>
</tr>
<tr>
<td></td>
<td>over loudspeaker to “wave your hands”.</td>
</tr>
<tr>
<td>Curiosity</td>
<td>Turning around in seat to see what is behind</td>
</tr>
<tr>
<td>Natural comfortable pose / boredom</td>
<td>Leaning / slouching over handrail on bench ride,</td>
</tr>
<tr>
<td></td>
<td>(making an action / assuming a posture in a nonchalant manner)</td>
</tr>
<tr>
<td>Impatience</td>
<td>Standing up on small coaster shortly before it stops</td>
</tr>
<tr>
<td>Lack of information / knowledge</td>
<td>Standing up during a mid-cycle stop (e.g. an ‘emergency’ stop on a juvenile track ride) and trying to get off the ride</td>
</tr>
<tr>
<td>Illness</td>
<td>Leaning forwards over lap-bar due to nausea</td>
</tr>
<tr>
<td>Fear</td>
<td>Trying to get out of a ride because it has caused feelings of fear</td>
</tr>
<tr>
<td>Thrill enhancement / Perceived risk enhancement</td>
<td>Holding two hands in the air during a drop on a coaster – to increase the feeling of danger</td>
</tr>
<tr>
<td>Discomfort</td>
<td>Standing up after a log-flume drop – to avoid sitting in a wet seat</td>
</tr>
<tr>
<td>Excitement</td>
<td>Waving hands in the air due to excitement</td>
</tr>
</tbody>
</table>

When a behaviour was logged during analysis, only the primary motive was estimated and recorded. For example on a Carousel a father may wave to his spouse and this may cause his child to wave also. The motive for the father would be ‘communication’, however the motive for the child would be ‘copying’. It was decided that inclusion of more than one motive per behaviour (e.g. in the children case a secondary motive of communication / social interaction) would create excessive complexity during statistical analysis.

It is important to note that all motivation was judged subjectively by the analysts and, whilst it is considered to be broadly representative of peoples’ motives, there was scope for error in judgement. Careful interpretation is needed of the motive statistics which are presented later in this report.
4.5 Logging non-behavioural information

Prior to logging the actual behaviours of passengers it was necessary to record certain other items of information for inclusion in the later analysis. All of the data for each ride (behaviours and all other information) was recorded in Microsoft Excel spreadsheets. A separate spreadsheet was used for each ride.

4.5.1 General ride information

For each ride (e.g. Pirate Ship at Drayton Manor) the following information was recorded:

- Name of event / park;
- Type of attraction (Travelling Fair, Theme park, Festival etc.);
- Location (area of country);
- Date of visit;
- Event (e.g. whether visit made on special holiday / school holidays etc.);
- Ride Name e.g. Surf Rider;
- Ride Type e.g. Bench Ride;
- Approximate time of day when the ride was filmed;
- Weather conditions at the time of filming;
- Age restrictions / Height restrictions etc.;
- Details of the containment system e.g. does it contain a lap bar / over-shoulder restraint etc.;
- Number of passenger who can sit together e.g. 3 people to a single bench;
- Total number of seats on the ride;
- Total number of staff supervising the ride;
- Total duration of observed ride time;
- Total number of people who used the ride during the observation period;
- Average number of people per ride cycle;
- Overall gender distribution of passengers;

4.5.2 Ride cycle information

For each ride cycle during which behaviours were observed and logged, the following information was also recorded:
• Duration (length of ride cycle in minutes and seconds)
• Number of passengers
• Number of males (to calculate the average gender distribution of passengers).

4.6 Logging behavioural information

Behaviour was logged into the spreadsheets using a 2-stage transcribing process.

4.6.1 Logging stage 1: Video to paper (mapping)

For each ride cycle a ‘map’ of the ride was drawn on paper. This map consisted of the gender, age-group and location of each passenger. A mock-up example of one of these maps can be seen in Appendix 2. Any behaviour exhibited by a passenger was noted down on this map, which allowed the analysts to track whether behaviours were repeated by the same person etc.

This intermediate mapping system was used because of the difficulty of reliably remembering whether an individual had exhibited a behaviour once, or several times. Before using the mapping system, the memory demands of logging directly into the spreadsheets were excessive, particularly when analysing the video of busy, fast rides with large numbers of seats.

4.6.2 Logging stage 2: Paper to spreadsheet (transcribing)

Once a ride cycle was over and its map was completed, the information was transcribed into the ride’s spreadsheet. Figure 1 illustrates the spreadsheet data format, using one-hand waving as an example. Each behaviour from the list in table 2 was recorded in a similar fashion (5 columns). An extended example of a ride’s spreadsheet can be found in Appendix 3.

![Figure 1. Example of data format in spreadsheets](image-url)
The numbers in the cells below the grey area are the actual codes which were entered each time a behaviour was observed (transcribed from the ride ‘map’). Each incidence of a behaviour was noted by a row of codes which relate to the additional variables associated with the behaviour. The codes relate to the categories in tables 2 to 5 (plus gender information where 1 = male and 2 = female). All of the code-category matches can be found in Appendix 1.

For example the first row (2, 2, 2, 3, 1) indicates the following:

- **There were 2 instances** *(Number column = 2)* **of females** *(Gender column = 2)* **aged between 11 and 15** *(Age group = 2)* **who waved one hand for a single sustained period** *(Indv. Freq column = 3)* **in order to communicate** *(Motive column = 1)*.

The grey shaded area contains summary data for the additional variables:

- **Number** *(e.g. 32 in figure 1)* is the total number of instances of a behaviour which were observed.

- **Gender males %** *(e.g. 15.6 in figure 1)* is the percentage of all observed passengers who were male.

- **Age-group** *(e.g. 8 to 28 in figure 1)* is the total number of all observed passengers who were estimated to belong to particular age groups. The position of the number in the greyed column relates directly to the age-group code number. For example number 8 at the top of the column indicates that children aged between 0 and 10 years (age-group 1) exhibited 8 of the behaviours. The number 14 indicates that children aged between 11 and 15 years exhibited 14 of the behaviours etc.

- **Indiv. Freq.** *(e.g. 14 to 1 in figure 1)* is the total number of all observed passengers who performed their behaviour at a certain frequency / incidence level. The column position / code matching is the same as described for age-group. For example throughout the observed ride cycles, 14 of the one-hand waving behaviours were one-off dynamic behaviours. This is shown by the number 14 at the top of the summary column for ‘Indiv. freq’.

4.6.3 Behaviour logging - Important Note

As data from consecutive ride cycles was put in the spreadsheets there was no association made between the ride cycles and specific behaviours i.e. the columns for each behaviour contain a cumulative list of the incidences that were observed throughout all of the ride cycles on that particular ride. It was decided early on in the data entry phase of the work that to differentiate between ride cycles during analysis would create additional complexity, which would not add significantly to the usefulness of this research.
5.0 Results of Passenger Behaviour analysis

The following pages contain the results of statistical analysis of the behaviours which were observed. There are several distinct results sections, these are outlined below:

*Note: Appendix 4 contains images of rides / ride types referred to in this report.

5.1 Predicted behaviour incidences per 1000 passengers (Section 1)

In this section, there are 2 main tables containing predicted incidence levels of behaviours per 1000 passengers on each of the ride types which were filmed. These predicted incidences are based directly on the cumulative incidence of behaviours logged from the video. For example a total of 437 passengers were observed on a total of 5 different bench rides (at separate venues). Out of those 437 passengers a total of 74 one hand waving behaviours were noted. In order to calculate the predicted incidence per 1000 the following calculation is made:

\[(1000/437) * 74 = 169\]

(i.e. the observed frequency of 74 is the equivalent of 169 one hand waves per 1000 passengers)

The advantages of interpreting and presenting the behaviour frequency data as predicted frequencies (per 1000 passengers) are as follows:

- The incidence levels can be more appropriately compared between rides / ride types. For example 113 passengers were observed on Junior Autodromes, however 897 passengers were observed on the Traditional Carousels which would make it difficult to directly compare the raw behaviour incidence levels on these ride types. By calculating the predicted incidence levels into the same range, the field is levelled for more effective comparison.

- A similar levelling effect could have been achieved by calculating the percentage of passengers likely to exhibit a certain behaviour. However, this can create misleading results, for example on a Pirate Ship, it would be calculated (using our frequency data) that 0.36% of passengers may reach their foot out of the containment system (1 observation out of 545 passengers). Low percentage figures such as these are open to some misinterpretation i.e. a reader may briefly see a low percentage figure and consider it to be so low that it is unimportant or may even decide it means that the behaviour will not occur. The reader may not then consider the percentage in terms of the actual behaviour incidence level which it represents.

Using the rationale outlined above, it was decided that the most useful and effective way of presenting the overall behaviour incidence data was to calculate / predict the frequency per 1000 passengers.

There are disadvantages with scaling up behaviour incidence data in this way. One main problem is that between venues, times of day etc, on certain ride types there may be considerable variation in the actual incidences of behaviours. For example video of one bench ride showed over half of the passengers kicking out their legs, whereas video of an identical bench ride at another venue / date showed no passengers kicking out their legs.

Another issue is that some ride data offers only a brief snapshot of behaviours, during which time the behaviour frequencies may have been influenced by certain factors (e.g. address system announcements etc.). Unfortunately this problem can only be overcome by having more raw data.
It should therefore be noted that the ‘frequency per 1000 passenger’ figures are in some cases estimates based on average frequencies across several rides, or in other cases they are based on relatively brief ‘snapshots’ of single rides. In order to allow readers to better understand the accuracy of each estimate, the bottom rows of the 2 frequency tables provide; a) total number of passengers observed on a ride / ride type, and b) the number of rides of the same type which contributed to the total cumulative behaviour frequencies (where more than one ride of the same type was observed).

5.1.1 Quick-Reference Behaviour Catalogue (Section 1)

Tables 7a to 7d contain cross-references between the behaviour categories and particular ride types. For each cell / intersection between behaviour / ride type there are quick-reference details of the specific activities relating to the behaviour category. This is included in a format which broadly matches the predicted incidence tables so that cross-references can quickly be made between behaviour frequencies and the exact nature of those behaviours. These tables are intended as the summary catalogue of all the behaviours which were observed. Behaviours which were not observed, but are considered to be a possibility, are written in italics.

5.2 Behaviour properties for multiple ride cases (Section 2)

This section contains analyses of the behaviour properties on specific ride types (i.e. where more than one ride of the same type was filmed). The analyses for these multiple-case rides are performed on pooled data i.e. the cumulative frequencies for each behaviour type are added together for analysis. The information in this section is intended to provide answers to the following questions:

- **What was done?** (The behaviours which were observed)
- **Who did it?** (The age and gender demographics of passengers exhibiting behaviours)
- **How was it done?** (The repetition rates / patterns of behaviours)
- **Why was it done?** (The motives for different behaviours)

To answer these questions the following information is presented:

- Summary details (number of people observed, number of rides observed, durations of observations, overall proportion of male / female passengers using the ride type, number of ride cycles observed etc.). ‘Total duration of observations’ is the cumulative total of time in which the ride was in use and does not include loading / unloading and empty periods.

- Where more than 20 incidences of a behaviour type were observed, a graph is presented giving details of the age and gender of the passengers, as well as the frequency data for each age / gender group.

- Where more than 20 incidences of a behaviour type were observed, a table is presented allowing for a cross reference of the repetition / frequency properties of a behaviour against the perceived motives for that behaviour.
For behaviours where less than 20 incidences were observed a description is given of the passengers carrying out the behaviour, their potential motives etc.

For some rides the section 2 results also contain additional observations / notes made during analysis and filming. These additional observations are made only where there was considered to be items of significance relating to behaviour on the ride (and where these items are not discussed further in detail in the discussion section).

5.3 Behaviour properties for single ride cases (Section 3)

This section provides the same type of information as outlined above (section 2), for all cases where only one ride of a particular type was observed.

5.4 Behaviours observed across all rides (Section 4)

This section presents descriptive statistics (frequency data) on the overall number of behaviours which were recorded from the video (For example the total number of one hand waving observed across all rides).

Graphs are also presented showing the overall age distribution, gender, behaviour frequency and motives each type of behaviour (For example a graph is presented for one handed waving behaviour which shows the total number of incidences (of that behaviour) which were related to specific motives). These graphs are only presented for behaviours found to have an overall incidence greater than 20.
6.0 Section 1: Predicted behaviour frequencies per 1000 passengers

The following pages contain (in order):

6.1 Behaviour frequencies

**Table 6a.**
Predicted behaviour frequencies per 1000 passengers for:
Traditional Carousels, Bench rides, Coasters, Log flumes, Twist rides, Waltzers, Pirate ships, Jumpers, Superbobs, Superbowls, Junior Autodromes, Mini Jets.

**Table 6b.**
Predicted behaviour frequencies per 1000 passengers for:
Juvenile coaster, Spinning coaster, Jet ride, Tagada, Paratrooper, Juvenile track ride (with elevated sections), Adventurer Wave Surfer, Orbiter, Juvenile toyset roundabout, Pendulum, Superspin, Rodeo, Chairlift.

6.2 Behaviour descriptions for each ride

**Table 7a.**
Ride-specific behaviour descriptions for:
Traditional Carousels, Bench rides, Coasters, Log flumes, Twist rides, Waltzers

**Table 7b.**
Ride-specific behaviour descriptions for:
Pirate ships, Jumpers, Superbobs, Superbowls, Junior Autodromes, Mini Jets.

**Table 7c.**
Ride-specific behaviour descriptions for:
Juvenile coaster, Spinning coaster, Jet ride, Tagada, Paratrooper, Juvenile track ride (with elevated sections).

**Table 7d.**
Ride-specific behaviour descriptions for:
Adventurer Wave Surfer, Orbiter, Juvenile toyset roundabout, Pendulum, Superspin, Rodeo, Chairlift.
Table 6a. Predicted frequencies of behaviours per 1000 passengers based on data from observations
(Additional information in bottom rows = total number of passengers observed and number of different rides observed)

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Traditional Carousel</th>
<th>Bench Ride</th>
<th>Coaster</th>
<th>Log Flume</th>
<th>Twister</th>
<th>Waltzer</th>
<th>Pirate Ship</th>
<th>Jumper</th>
<th>Superbob</th>
<th>Superbowl</th>
<th>Junior Autodrome</th>
<th>Mini jet</th>
</tr>
</thead>
<tbody>
<tr>
<td>One hand waving</td>
<td>76</td>
<td>169</td>
<td>92</td>
<td>95</td>
<td>74</td>
<td>67</td>
<td>55</td>
<td>190</td>
<td>133</td>
<td>111</td>
<td>142</td>
<td>256</td>
</tr>
<tr>
<td>Two hand waving</td>
<td>5</td>
<td>508</td>
<td>287</td>
<td>116</td>
<td>93</td>
<td>340</td>
<td>448</td>
<td>257</td>
<td>288</td>
<td>246</td>
<td>53</td>
<td>33</td>
</tr>
<tr>
<td>Turning head/trunk</td>
<td>33</td>
<td>2</td>
<td>28</td>
<td>101</td>
<td>34</td>
<td>7</td>
<td>40</td>
<td>13</td>
<td>248</td>
<td>331</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turning around in seat</td>
<td>17</td>
<td>7</td>
<td>15</td>
<td>5</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>53</td>
<td>99</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One hand waving</td>
<td>5</td>
<td>508</td>
<td>287</td>
<td>116</td>
<td>93</td>
<td>340</td>
<td>448</td>
<td>257</td>
<td>288</td>
<td>246</td>
<td>53</td>
<td>33</td>
</tr>
<tr>
<td>Turning head/trunk</td>
<td>33</td>
<td>2</td>
<td>28</td>
<td>101</td>
<td>34</td>
<td>7</td>
<td>40</td>
<td>13</td>
<td>248</td>
<td>331</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leaning out of containment</td>
<td>2</td>
<td>34</td>
<td></td>
<td>2</td>
<td></td>
<td>2</td>
<td></td>
<td>24</td>
<td>35</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reaching out of containment (arm only)</td>
<td>15</td>
<td>29</td>
<td>2</td>
<td>7</td>
<td>2</td>
<td>9</td>
<td></td>
<td></td>
<td>80</td>
<td>66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reaching out of containment (leg only)</td>
<td>3</td>
<td>82</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extended reaching out of containment (arm and body part)</td>
<td>7</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>9</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interfering with containment device</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inappropriate exiting of ride</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inappropriate exiting of ride (egress related)</td>
<td>33</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Violent behaviour</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boisterous behaviour</td>
<td>5</td>
<td>3</td>
<td></td>
<td>17</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standing up</td>
<td>8</td>
<td>5</td>
<td>40</td>
<td>2</td>
<td></td>
<td>81</td>
<td></td>
<td></td>
<td>80</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pointing</td>
<td>10</td>
<td>64</td>
<td>15</td>
<td>40</td>
<td>25</td>
<td>2</td>
<td>4</td>
<td>12</td>
<td>8</td>
<td>8</td>
<td>27</td>
<td>99</td>
</tr>
<tr>
<td>Interact with containment device</td>
<td>49</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kicking legs</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total number of passengers on rides</td>
<td>1166</td>
<td>417</td>
<td>739</td>
<td>654</td>
<td>443</td>
<td>406</td>
<td>545</td>
<td>327</td>
<td>399</td>
<td>126</td>
<td>113</td>
<td>121</td>
</tr>
<tr>
<td>Number of different rides observed (at different venues)</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
Table 6b. Predicted frequencies of behaviours per 1000 passengers based on data from observations
(Additional information in bottom rows = total number of passengers observed and number of different rides observed)

| | Juvenile Coaster | Spinning Coaster | Jets | Tagada | Paratrooper | Juvenile Track (Fig 8 with bridge) | Adventurer Wave | Surfer | Orbiter | Juvenile Toyset Roundabout | Pendulum | Superspin | Breakdance | Chairlift |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| One hand waving | 308 | 17 | 87 | 58 | 73 | 75 | 186 | 35 | 50 | 73 | 125 | 89 | 111 | 76 | 41 |
| Two hand waving | 77 | 25 | 35 | 116 | 40 | 12 | 47 | 128 | 140 | 222 | 89 | 19 | 76 | 41 | 76 |
| Turning head/trunk | 77 | 63 | 33 | 64 | 47 | 10 | 350 | 140 | 76 | 41 | 76 | 41 | 76 | 41 | 76 |
| Kneeling in seat | 26 | 6 | 150 | 7 | 77 | 4 | 10 | 66 | 6 | 23 | 3 | 75 | 12 | 14 | 27 | 102 |
| Leaning out of containment | 4 | 7 | 7 | 6 | 75 | 28 | 7 | 75 | 12 | 76 | 41 | 76 | 41 | 76 | 41 |
| Reaching out of containment (arm only) | 14 | 28 | 14 | 7 | 28 | 14 | 28 | 14 | 28 | 14 | 28 | 14 | 28 | 14 | 28 |
| Reaching out of containment (leg only) | 14 | 28 | 14 | 7 | 28 | 14 | 28 | 14 | 28 | 14 | 28 | 14 | 28 | 14 | 28 |
| Interfering with containment device | 7 | 7 | 7 | 125 | 7 | 7 | 7 | 125 | 7 | 7 | 7 | 125 | 7 | 7 | 7 | 125 |
| Violent behaviour | 7 | 7 | 7 | 125 | 7 | 7 | 7 | 125 | 7 | 7 | 7 | 125 | 7 | 7 | 7 | 125 |
| Boisterous behaviour | 7 | 7 | 7 | 125 | 7 | 7 | 7 | 125 | 7 | 7 | 7 | 125 | 7 | 7 | 7 | 125 |
| Standing up | 3 | 281 | 23 | 50 | 3 | 281 | 23 | 50 | 3 | 281 | 23 | 50 | 3 | 281 | 23 | 50 |
| Pointing | 77 | 4 | 10 | 66 | 6 | 23 | 3 | 75 | 12 | 14 | 27 | 102 | 77 | 4 | 10 | 66 |
| Interact with containment device | 14 | 28 | 14 | 7 | 28 | 14 | 28 | 14 | 28 | 14 | 28 | 14 | 28 | 14 | 28 | 14 |
| Kicking legs | 7 | 7 | 7 | 125 | 7 | 7 | 7 | 125 | 7 | 7 | 7 | 125 | 7 | 7 | 7 | 125 |
| Total number of passengers on rides | 13 (note this figure is low) | 239 | 287 | 121 | 151 | 173 | 43 | 289 | 40 | 164 | 72 | 112 | 108 | 239 | 287 | 121 |
| Number of different rides observed (at different venues) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
Table 7a. Specific description of behaviours on rides where appropriate (table contains descriptions of the most common physical acts / behaviours where the generic behaviour category (column 1) may be inadequate / misleading)

<table>
<thead>
<tr>
<th>Category</th>
<th>Traditional Carousel</th>
<th>Bench Rides</th>
<th>Coasters</th>
<th>Log Flumes</th>
<th>Twisters</th>
<th>Waltzers</th>
</tr>
</thead>
<tbody>
<tr>
<td>One hand waving</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
</tr>
<tr>
<td>Two hand waving</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
<td>Usually occurs before and / or during drops</td>
<td>Usually occurs before and / or during drops</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
</tr>
<tr>
<td>Turning head/trunk</td>
<td>Typically accompanies one hand waving (as the carousel rotates during a sustained wave to a stationary friend / parent etc.)</td>
<td>Turning to look at other passengers / surroundings</td>
<td>Looking outside the ride (e.g. as surroundings – using height advantage)</td>
<td>Occurs mostly after the main drop to communicate (exhibited mainly by the passenger in front seat)</td>
<td>Turning to look at other passengers / surroundings</td>
<td>Turning to look at other passengers / surroundings</td>
</tr>
<tr>
<td>Turning around in seat</td>
<td>Sitting side-saddle or facing backwards</td>
<td>N/a</td>
<td>Turning to extent of placing legs / feet on adjacent seat</td>
<td>Turning to extent of placing legs / feet on seat (see also above)</td>
<td>Sitting sideways and bracing against lateral forces with feet</td>
<td>Sitting sideways and bracing against lateral forces with feet</td>
</tr>
<tr>
<td>Kneeling in seat</td>
<td>N/a</td>
<td>N/a</td>
<td>(See above – extreme example)</td>
<td>Leaning head and / or shoulders out over the side of car</td>
<td>Leaning head and / or shoulders out over the side of car</td>
<td>Leaning head and / or shoulders out over the side of car</td>
</tr>
<tr>
<td>Leaning out of containment</td>
<td>Lying back on horse and lifting feet onto its neck</td>
<td>Leaning forwards / slouching over the handrail / lap-bar</td>
<td>Leaning head and / or shoulders out over the side of car</td>
<td>Leaning head and / or shoulders out over the side of car</td>
<td>Leaning head and / or shoulders out over the side of car</td>
<td>Leaning head and / or shoulders out over the side of car</td>
</tr>
<tr>
<td>Reaching out of containment (arm only)</td>
<td>Reaching towards another horse / passenger to make contact with them (i.e. not to wave)</td>
<td>N/a (classed as a wave or pointing behaviour)</td>
<td>• Reaching towards passing structures&lt;br&gt;• Touching the outside of the car (hanging arm over side of car)</td>
<td>• Reaching across to the sides of water channel&lt;br&gt;• Reaching down into the water</td>
<td>• Placing arm over side of car (inner or outer passengers)&lt;br&gt;• Reaching out towards / touching the arm which the car is attached to (inner passengers)</td>
<td>Reaching / Placing arm over the side of the car</td>
</tr>
<tr>
<td>Reaching out of containment (leg only)</td>
<td>See above (using foot)</td>
<td>Holding legs outstretched</td>
<td>Placing leg out through car access gap</td>
<td>Reaching leg over side of log</td>
<td>Reaching arm out – see above</td>
<td>Reaching arm out – see above</td>
</tr>
<tr>
<td>Interfering with containment device</td>
<td>N/a</td>
<td>N/a</td>
<td>Trying to open lap bar or undo strap on containment</td>
<td>Trying to operate the locking lever on front of car</td>
<td>Trying to operate the locking lever on front of car</td>
<td>Trying to operate the locking lever on front of car</td>
</tr>
<tr>
<td>Inappropriate exiting of ride</td>
<td>Exiting the ride before it has begun to slow down</td>
<td>Trying to climb out of car mid-cycle (e.g. on pull-up section)</td>
<td>Trying to climb out of log mid-cycle (e.g. on pull-up section)</td>
<td>Exiting car to the wrong (non-platform) side</td>
<td>Exiting log to the wrong (non-platform) side</td>
<td>Exiting car to the wrong (non-platform) side</td>
</tr>
<tr>
<td>Inappropriate exiting of ride (egress related)</td>
<td>Exiting ride in potentially dangerous manner e.g. jumping and or holding onto upright post for period of time (during low down)</td>
<td>N/a</td>
<td>(some extended reaching which could be considered to be a semi-standing posture on rides which had a floor for bracing feet against)</td>
<td>Standing up before the ride has come to a standstill – could also be classed as inappropriate egress if it is followed by further efforts to climb out of the car</td>
<td>Usually occurs after main drop – to get away from water on seat / brush water off clothes etc.</td>
<td>Standing before ride has slowed down sufficiently for immediate safe egress</td>
</tr>
<tr>
<td>Violent behaviour</td>
<td>Aggressive striking of other person / object</td>
<td>See column 2</td>
<td>See column 2</td>
<td>See column 2</td>
<td>See column 2</td>
<td>See column 2</td>
</tr>
<tr>
<td>Boisterous behaviour</td>
<td>Non-aggressive striking of other person / object</td>
<td>See column 2</td>
<td>See column 2</td>
<td>See column 2</td>
<td>See column 2</td>
<td>See column 2</td>
</tr>
<tr>
<td>Standing up</td>
<td>• Standing up on horses steps during ride&lt;br&gt;• Climbing between horses&lt;br&gt;• Standing up on horses back during ride&lt;br&gt;• Standing on rotating floor during main ride cycle</td>
<td>N/a</td>
<td>Standing up before the ride has come to a standstill – could also be classed as inappropriate egress if it is followed by further efforts to climb out of the car</td>
<td>Usually occurs after main drop – to get away from water on seat / brush water off clothes etc.</td>
<td>Standing before ride has slowed down sufficiently for immediate safe egress</td>
<td>Standing before ride has slowed down sufficiently for immediate safe egress</td>
</tr>
<tr>
<td>Pointing</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
</tr>
<tr>
<td>Interact with containment device</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
<td>N/a</td>
</tr>
<tr>
<td>Kicking legs</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
</tr>
</tbody>
</table>

- N/a indicates behaviour categories which are not considered relevant to a particular ride.
- Blank cells in the table indicate that either further explanation not required (for one, two hand waving, intimate behaviour and pointing) or the behaviour was not observed in video / during visits to that particular ride / ride type. Blank cells do not indicate that some form of these behaviours will not occur on that ride / ride type.
Table 7b. Specific description of behaviours on rides where appropriate (table contains descriptions of the most common physical acts / behaviours where the generic behaviour category (column 1) may be inadequate or misleading). Italics indicates behaviours which were not logged in the video but which are considered physically easy or were observed during visits (but not filmed).

<table>
<thead>
<tr>
<th>Category</th>
<th>Pirate Ship</th>
<th>Jumper</th>
<th>Superbob</th>
<th>Superbowl</th>
<th>Junior Autodrome</th>
<th>Mini Jet</th>
</tr>
</thead>
<tbody>
<tr>
<td>One hand waving</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
</tr>
<tr>
<td>Turning head/trunk</td>
<td>Turning to look at other passengers / surroundings</td>
<td>Turning to look at other passengers / surroundings</td>
<td>Turning to look at other passengers / surroundings</td>
<td>Turning to look at other passengers / surroundings</td>
<td>Turning to look at other passengers / surroundings</td>
<td>Head following parents etc. as the ride moves</td>
</tr>
<tr>
<td>Turning around in seat</td>
<td>Turning to the extent of placing legs / feet on adjacent seat</td>
<td>Turning to the extent of placing legs / feet on adjacent seat</td>
<td>Turning to the extent of placing legs / feet on adjacent seat</td>
<td>Lifting legs onto seat and turning body to look about / behind etc.</td>
<td>Lifting legs onto seat and turning body to look about / behind etc.</td>
<td></td>
</tr>
<tr>
<td>Kneeling in seat</td>
<td>Leaning heads / shoulders out over the side of ship</td>
<td>Leaning forwards over the handrail / lap-bar</td>
<td>Leaning forwards over the handrail / lap-bar</td>
<td>Leaning head / shoulders out over the side of car</td>
<td>Leaning head / shoulders out over the side of car</td>
<td></td>
</tr>
<tr>
<td>Leaning out of containment (arm only)</td>
<td>Extending arm over side of ship (inner or outer passengers)</td>
<td>Extending arm over side of car (inner or outer passengers)</td>
<td>Extending arm over side of car (outer passengers)</td>
<td>Extending arm over side of car</td>
<td>Extending arm over side of car</td>
<td></td>
</tr>
<tr>
<td>Reaching out of containment (leg only)</td>
<td>Placing leg / foot out through seating access gap</td>
<td>Holding legs outstretched</td>
<td>Placing leg / foot out through seating access gap</td>
<td>Placing leg / foot out through seating access gap</td>
<td>Placing leg / foot out through seating access gap</td>
<td></td>
</tr>
<tr>
<td>Extending reaching out of containment (arm and body part)</td>
<td>Extreme example of reaching with arm</td>
<td>Extreme example of reaching with arm</td>
<td>Extreme example of reaching with arm</td>
<td>Extreme example of reaching with arm</td>
<td>Extreme example of reaching with arm</td>
<td></td>
</tr>
<tr>
<td>Interfering with containment device</td>
<td>Trying to open a handrail which is locked</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inappropriate exiting of ride</td>
<td>Exiting ship to the wrong (non-platform) side</td>
<td>Exiting car to the wrong (non-platform) side onto tarpaulin covering machinery</td>
<td>Trying to exit the car before the ride has stopped or exiting car to the centre of the ride</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Violent behaviour</td>
<td>Aggressive striking of other person / object</td>
<td>See column 2</td>
<td>See column 2</td>
<td>See column 2</td>
<td>See column 2</td>
<td>See column 2</td>
</tr>
<tr>
<td>Boisterous behaviour</td>
<td>Non-aggressive striking of other person / object (e.g. reaching forward and tapping friend on head)</td>
<td>See column 2</td>
<td>See column 2</td>
<td>See column 2</td>
<td>Non-aggressive striking of other person / object</td>
<td>See column 2</td>
</tr>
<tr>
<td>Standing up</td>
<td>Standing up against the handrail at highest extent of ships swing (often exhibited by passengers sitting at the ends of ship)</td>
<td>N/a</td>
<td>Standing before ride has slowed down sufficiently for immediate egress</td>
<td></td>
<td></td>
<td><strong>Standing in back seat to operate controls (in front seat)</strong>  <strong>Standing before ride has slowed down sufficiently for immediate egress</strong></td>
</tr>
<tr>
<td>Pointing</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
<td>Occurred on this ride type</td>
</tr>
<tr>
<td>Interact with containment device</td>
<td>Pushing with unnecessary force against lap-bar / handrail</td>
<td>Exerting significant force on lap-bar / handrail</td>
<td>Pushing with unnecessary force against lap-bar / handrail</td>
<td>Pushing with unnecessary force against lap-bar / handrail</td>
<td>Pushing with unnecessary force against lap-bar / handrail</td>
<td></td>
</tr>
<tr>
<td>Kicking legs</td>
<td>Occurred on this ride type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 7c. Specific description of behaviours on rides where appropriate (table contains descriptions of the most common physical acts / behaviours where the generic behaviour category (column 1) may be inadequate or misleading. Italics indicates behaviours which were not observed from in video but which are considered physically easy or were observed during visits (but not filmed).  

<table>
<thead>
<tr>
<th>Juvenile Coaster (e.g. Crazy Crocs)</th>
<th>Spinning Coaster (e.g. Wild Mouse)</th>
<th>Jets</th>
<th>Tagada</th>
<th>Paratrooper</th>
<th>Juvenile Track (Fig. 8 with bridge)</th>
</tr>
</thead>
<tbody>
<tr>
<td>One hand waving</td>
<td>Occurred on this ride</td>
<td>Occurred on this ride</td>
<td>Occurred on this ride</td>
<td>Occurred on this ride</td>
<td>Occurred on this ride</td>
</tr>
<tr>
<td>Two hand waving</td>
<td>Occurred on this ride</td>
<td>Occurred on this ride</td>
<td>Occurred on this ride</td>
<td>Occurred on this ride</td>
<td>Occurred on this ride</td>
</tr>
<tr>
<td>Turning head/trunk</td>
<td>Turning to look at other</td>
<td>Turning to look at other</td>
<td>Turning to look at other</td>
<td>Turning to look at other</td>
<td>Head following parents etc. as</td>
</tr>
<tr>
<td></td>
<td>passengers / surroundings</td>
<td>passengers / surroundings</td>
<td>passengers / surroundings</td>
<td>passengers / surroundings</td>
<td>the ride moves</td>
</tr>
<tr>
<td>Turning around in seat</td>
<td>Lifting legs onto adjacent seat</td>
<td>Lifting legs onto adjacent seat</td>
<td>Lifting legs onto adjacent seat</td>
<td>Lifting legs onto adjacent seat</td>
<td>Lifting legs onto seat and turning</td>
</tr>
<tr>
<td>and turning body to look about /</td>
<td>and turning body to look about /</td>
<td>and turning body to look about /</td>
<td>and turning body to look about /</td>
<td>and turning body to look about /</td>
<td></td>
</tr>
<tr>
<td>behind etc.</td>
<td>behind etc.</td>
<td>behind etc.</td>
<td>behind etc.</td>
<td>behind etc.</td>
<td></td>
</tr>
<tr>
<td>Kneeling in seat</td>
<td>Turning (see above) followed by</td>
<td>Kneeling facing along bench or</td>
<td>Turning (see above) followed by</td>
<td>Turning (see above) followed by</td>
<td></td>
</tr>
<tr>
<td>kneeling on seat looking about /</td>
<td>facing backwards out of ride</td>
<td>kneeling on seat looking about /</td>
<td>kneeling on seat looking about /</td>
<td></td>
<td></td>
</tr>
<tr>
<td>behind etc.</td>
<td></td>
<td>behind etc.</td>
<td>behind etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leaning out of containment</td>
<td>Leaning head / shoulders out</td>
<td>Leaning forwards / slouching</td>
<td>Leaning head / shoulders out</td>
<td>Leaning head / shoulders out</td>
<td></td>
</tr>
<tr>
<td>over the side of car</td>
<td>over the handrail / lap-bar</td>
<td>over the side of car</td>
<td>over the side of car</td>
<td>over the side of car</td>
<td></td>
</tr>
<tr>
<td>Reaching out of containment (arm</td>
<td>Extending arm over side of car</td>
<td>Extending arm over side of car</td>
<td>Extending arm backwards over</td>
<td>Extending arm over side of car</td>
<td></td>
</tr>
<tr>
<td>only)</td>
<td>(outer passengers)</td>
<td>(outer passengers)</td>
<td>top rail (out of the main disc)</td>
<td>(dependent on vehicle)</td>
<td></td>
</tr>
<tr>
<td>Reaching out of containment (leg</td>
<td>Placing leg / foot out through</td>
<td>Placing leg / foot out through</td>
<td>Placing leg / foot out through</td>
<td></td>
<td></td>
</tr>
<tr>
<td>only)</td>
<td>seating access gap</td>
<td>seating access gap</td>
<td>seating access gap</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extended reaching out of</td>
<td>Extreme example of reaching with</td>
<td>Extreme example of reaching with</td>
<td>Extreme example of reaching with</td>
<td></td>
<td></td>
</tr>
<tr>
<td>containment (arm and body part)</td>
<td>arm</td>
<td>arm</td>
<td>arm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interfering with</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>containment device</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inappropriate exiting of ride</td>
<td>Trying to exit ride mid-cycle</td>
<td>Trying to exit the car before</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inappropriate exiting of ride</td>
<td></td>
<td>the ride has stopped</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(egress related)</td>
<td></td>
<td>• Trying to exit the ride before</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>the ride has stopped</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Exiting car to the inside</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(centre) of the ride</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Violent behaviour</td>
<td>Aggressive striking of other</td>
<td>See column 2</td>
<td>See column 2</td>
<td>See column 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>person / object</td>
<td>See column 2</td>
<td>See column 2</td>
<td>See column 2</td>
<td></td>
</tr>
<tr>
<td>Boisterous behaviour</td>
<td>Non-Aggressive striking of other</td>
<td>See column 2</td>
<td>See column 2</td>
<td>See column 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>person / object</td>
<td>See column 2</td>
<td>See column 2</td>
<td>See column 2</td>
<td></td>
</tr>
<tr>
<td>Standing up</td>
<td>Standing before ride has slowed</td>
<td>Standing before ride has slowed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>down sufficiently for immediate</td>
<td>Standing during slow rotation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>egress</td>
<td>bumping motion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pointing</td>
<td>Occurred on this ride</td>
<td>Occurred on this ride</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interact with</td>
<td>Pushing with unnecessary force</td>
<td>Pushing with unnecessary force</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>containment device</td>
<td>against lap-bar / handrail</td>
<td>against lap-bar / handrail</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kicking legs</td>
<td></td>
<td>Kicking legs to make the car /</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(e.g. Crazy Crocs)
(e.g. Wild Mouse)
(Fig. 8 with bridge)
Table 7d. Specific description of behaviours on rides where appropriate (table contains descriptions of the most common physical acts / behaviours where the generic behaviour category (column 1) may be inadequate or misleading) Italics indicates behaviours which were not observed in the video but which are considered physically easy or were observed during visits (but not filmed).

| One hand waving | Occurred on this ride | Occurred on this ride | Occurred on this ride | Occurred on this ride | Occurred on this ride | Occurred on this ride | Occurred on this ride | Occurred on this ride |
| Two hand waving | Occurred on this ride | Occurred on this ride | Occurred on this ride | Occurred on this ride | Occurred on this ride | Occurred on this ride | Occurred on this ride | Occurred on this ride |
| Turning head/trunk | Turning to look at other passengers / surroundings | Turning to look at other passengers / surroundings | Head following parents etc. as the ride moves | Turning to look at other passengers / surroundings | Turning to look at other passengers / surroundings | Turning to look at other passengers / surroundings | Turning to look at other passengers / surroundings | Turning to look at other passengers / surroundings |
| Turning around in seat | N/a (No seat) | Lifting legs onto adjacent seat and turning body to look about / behind etc. | N/a | N/a | Lifting legs onto adjacent seat and turning body to look about / behind etc (talk to friends in chairs behind etc.) |
| Kneeling in seat | N/a (No seat) | Turning (see above) followed by kneeling on seat looking about / behind etc. | N/a | N/a | Turning (see above) followed by kneeling on seat looking about / behind etc. |
| Leaning out of containment | Leaning head / shoulders out over the side of car | Leaning forwards over the handrail / lap-bar and / or leaning over side of car (passengers at sides of car) | Leaning head / shoulders out over the side of car | Leaning forwards over the handrail / lap-bar and / or leaning over side of car (passengers at sides of car) | Leaning forwards over the handrail / lap-bar and / or leaning over side of chair |
| Reaching out of containment (arm only) | Extending arm over side of car (e.g. reaching towards access ramps as they are lowered and raised) | Extending arm over side of car (passengers at sides of car) | Extending arm over side of car (non-waving) | Extending arm over side of car (passengers at sides of car) | Extending arm over side of car (passengers at sides of car) |
| Reaching out of containment (leg only) | | | | Feet hang freely anyway |
| Extended reaching out of containment (arm and body part) | Extreme example of reaching with arm | Extreme example of reaching with arm | Extreme example of reaching with arm | Extreme example of reaching with arm |
| Interfering with containment device | Trying to unlock the handrail / lap bar | Trying to open handrail / lap bar | Lifting up the handrail mid ride-cycle |
| Inappropriate exiting of ride | Exiting / trying to exit during main ride cycle | Climbing out of seat during main ride cycle (not in station area) |
| Inappropriate exiting of ride (egress related) | Exiting too soon during slow-down period | Lifting up handrail and climbing / jumping from chair too early ( before station) |
| Violent behaviour | Aggressive striking of other person / object | See column 2 | See column 2 | See column 2 | See column 2 | See column 2 |
| Boisterous behaviour | Non-Aggressive striking of other person / object | See column 2 | See column 2 | See column 2 | See column 2 | See column 2 |
| Standing up | Standing is the normal posture on this ride | Standing before ride has slowed down sufficiently for immediate / safe egress | Standing during mid-cycle stop | See inappropriate egress |
| Pointing | Occurred on this ride | Occurred on this ride | Occurred on this ride | Occurred on this ride | Occurred on this ride | Occurred on this ride |
| Interact with containment device | Pushing with unnecessary force against lap-bar / handrail | Pushing with unnecessary force against lap-bar / handrail | Exerting unnecessary force on over-shoulder restraints | Exerting unnecessary force on over-shoulder restraints | Pushing with unnecessary force against lap-bar / handrail |
| Kicking legs | Kicking / holding legs out | Kicking / holding legs out | | | Kicking / holding legs out |
7.0 Section 2: Behaviour properties for multiple ride cases

7.1 Traditional Carousels

Five Traditional Carousels were observed at various sites. Table 8 contains the summary details for all of these. The graphs of behaviour frequency etc. are for the pooled data from all of these rides.

Table 8. Traditional Carousels’ Summary Details

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total duration of observation (min:sec)</td>
<td>48:04</td>
<td>16:36</td>
<td>15:02</td>
<td>22:19</td>
<td></td>
</tr>
<tr>
<td>Total number of ride cycles</td>
<td>7</td>
<td>12</td>
<td>7</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Total number of passengers observed</td>
<td>45</td>
<td>431</td>
<td>268</td>
<td>153</td>
<td>269</td>
</tr>
<tr>
<td>Overall gender split (%Male : %Female)</td>
<td>33% : 67%</td>
<td>25% : 75%</td>
<td>35% : 65%</td>
<td>41% : 59%</td>
<td>40% : 60%</td>
</tr>
<tr>
<td>Average ride cycle duration (min:sec)</td>
<td>4:00</td>
<td>2:22</td>
<td>2:30</td>
<td>3:11</td>
<td></td>
</tr>
<tr>
<td>Average number of passengers per ride cycle</td>
<td>6</td>
<td>36</td>
<td>38</td>
<td>26</td>
<td>38</td>
</tr>
</tbody>
</table>

![Traditional Carousels Total Behaviour Incidences](image)

Figure 2. Total number of observed behaviours on all Traditional Carousels
7.1.1 One hand waving

**One Hand Waving (total = 89)**

Traditional Carousels

![Bar chart showing age & gender distribution of Traditional Carousel passengers exhibiting one hand waving behaviour.](chart.png)

*Figure 3. Age & gender distribution of Traditional Carousel passengers exhibiting one hand waving behaviour.*

**Table 9. Traditional Carousels: Motives for one hand waving (number of incidences).**

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Communicate</th>
<th>Copy</th>
<th>Exhibit’n (show off)</th>
<th>Natural pose</th>
<th>Thrill enhance</th>
<th>Excitement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>34</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>11</td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
7.1.2 Turning head / trunk

Figure 4. Age & gender distribution of Traditional Carousel passengers exhibiting turning head / trunk behaviour.

Table 10. Traditional Carousels: Motives for turning head / trunk (number of incidences).

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Communicate</th>
<th>Exhibitionism</th>
<th>Curiosity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>3</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1-off sustained</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>11</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1-off sustained</td>
<td>6</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td><strong>27</strong></td>
<td><strong>2</strong></td>
<td><strong>10</strong></td>
</tr>
</tbody>
</table>
7.1.3 Turning around in seat

![Graph showing the distribution of Traditional Carousel passengers who turned around in their seat based on age and gender.]

**Figure 5. Age & gender distribution of Traditional Carousel passengers who turned around in their seat.**

**Table 11. Traditional Carousels: Motives for turning around in seat (number of incidences).**

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Exhibitionism</th>
<th>Curiosity</th>
<th>Natural pose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16</strong></td>
<td><strong>1</strong></td>
<td><strong>3</strong></td>
</tr>
</tbody>
</table>

7.1.4 Traditional Carousels – Summary of low incidence behaviours

**Table 12. Traditional Carousels: Summary of low incidence behaviours (<20 observed)**

<table>
<thead>
<tr>
<th>Genders of passengers</th>
<th>Ages of passengers</th>
<th>Frequency (number if &gt;1)</th>
<th>Main motives for behaviour (number if &gt;1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two hand waving</td>
<td>50% female</td>
<td>0 to 10 (2) 11 to 15 (4)</td>
<td>1-off sustained (3) 1-off dynamic (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rpt. sustained (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Exhibitionism (5) Communication (1)</td>
</tr>
<tr>
<td>Leaning out of containment</td>
<td>50% female</td>
<td>0 to 10 (all)</td>
<td>1-off dynamic (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-off sustained (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Exhibitionism (all)</td>
</tr>
<tr>
<td>Reaching out of containment (leg only)</td>
<td>67% female</td>
<td>11 to 15 (all)</td>
<td>1-off sustained (all)</td>
</tr>
</tbody>
</table>
7.1.5 Traditional Carousels - Additional observations

On carousels, one hand waving (the most frequent behaviour) was observed more frequently than two hand waving. This appeared to be in most cases because passengers wanted to maintain a grip on the pole in front of them. One hand waving was typically combined with passengers turning their head / torsos to look behind them and to one side (most often to see / communicate with by-standers and other passengers). Parents with very young children (sitting together on a horse) were occasionally seen to wave and actively encourage the child with them to wave as well.

In the statistical analysis, ‘Turning around in seat’ refers to passengers who sat on the horses facing backwards or rode side-saddle. This was typically done by females aged approximately 12 to 16, however some younger passengers (including males) also exhibited this behaviour.

Most passengers apart from the very young or elderly, tended to stand up and climb off their horses before the ride has stopped completely (during its deceleration phase). In one case the operator walked across the ride (to organise the exit) from the central control station once the slow down was activated. This appeared to act as a signal for passengers to begin exiting the ride. Climbing off the horses etc. while the ride is still moving but has slowed down is not considered a significant risk and was not noted as ‘standing’ or ‘inappropriate egress’ in the statistical analysis (mainly because of its widespread occurrence).

Standing which was noted in the statistics refers to passengers standing on the step up to the horse or climbing between adjacent horses.

Exaggerated reclining (sometimes releasing one or both hands from the pole) and / or placing both feet on the horses’ neck were observed twice (classed as ‘leaning out of containment’). This is a ride specific behaviour which passengers can exhibit due to the design of the horses / ride.

<table>
<thead>
<tr>
<th>Inappropriate exiting of the ride</th>
<th>75% female</th>
<th>0 to 10 (1, male) 11 to 15 (3)</th>
<th>1-off dynamic (all)</th>
<th>Impatience (all)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standing up</td>
<td>67% male</td>
<td>0 to 10 (3) 11 to 15 (6)</td>
<td>1-off sustained (4) 1-off dynamic (2) Prolonged (1) Rpt. dynamic (1)</td>
<td>Natural pose (3) Exhibitionism (3) Curiosity (2) Impatience (1)</td>
</tr>
<tr>
<td>Pointing</td>
<td>67% female</td>
<td>0 to 10 (6) 11 to 15 (4) 16 to 21 (1) 22 to 30 (1)</td>
<td>1-off dynamic (10) Rpt. dynamic (2)</td>
<td>Communication (11) Exhibitionism (1)</td>
</tr>
</tbody>
</table>
7.2 Jumpers / Grasshoppers

Three Jumpers were observed at various sites. Table 13 contains the summary details for all three rides. The graphs of behaviour frequency etc. are for the pooled data from all of these rides.

### Table 13. Jumpers’ Summary Details

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total duration of observation (min:sec)</td>
<td>24:09</td>
<td>17:19</td>
<td>17:24</td>
</tr>
<tr>
<td>Total number of ride cycles</td>
<td>4</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Total number of passengers observed</td>
<td>68</td>
<td>96</td>
<td>163</td>
</tr>
<tr>
<td>Overall gender split (%Male : %Female)</td>
<td>29% : 71%</td>
<td>21% : 79%</td>
<td>33% : 67%</td>
</tr>
<tr>
<td>Average ride cycle duration (min:sec)</td>
<td>6:02</td>
<td>5:46</td>
<td>2:54</td>
</tr>
<tr>
<td>Average number of passengers per ride cycle</td>
<td>17</td>
<td>32</td>
<td>27</td>
</tr>
</tbody>
</table>

![Jumpers Total Behaviour Incidences](image)

Figure 6. Total number of observed behaviours on all Jumpers
7.2.1 One hand waving

![Graph showing age and gender distribution of Jumper passengers exhibiting one hand waving behaviour.](image)

**Figure 7.** Age & gender distribution of Jumper passengers exhibiting one hand waving behaviour.

**Table 14.** Jumpers: Motives for one hand waving (number of incidences).

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Communication</th>
<th>Copying</th>
<th>Exhibitionism</th>
<th>Thrill enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>7</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>12</td>
<td>1</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>9</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1-off sustained</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>5</td>
<td>1</td>
<td>26</td>
</tr>
</tbody>
</table>
7.2.2 Two hand waving

**Figure 8.** Age & gender distribution of Jumper passengers exhibiting two hand waving behaviour.

**Table 15.** Jumper: Motives for two hand waving (number of incidences).

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Communication</th>
<th>Copying</th>
<th>Exhibitionism</th>
<th>Thrill enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td>2</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>1</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td></td>
<td>24</td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4</strong></td>
<td><strong>7</strong></td>
<td><strong>3</strong></td>
<td><strong>70</strong></td>
</tr>
</tbody>
</table>
7.2.3 Jumpers – Summary of low incidence behaviours

Table 16. Jumpers: Summary of low incidence behaviours (<20 observed)

<table>
<thead>
<tr>
<th></th>
<th>Genders of passengers</th>
<th>Ages of passengers</th>
<th>Frequency (number if &gt;1)</th>
<th>Main motives for behaviour (number if &gt;1)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Turning head / trunk</strong></td>
<td>69% female</td>
<td></td>
<td>1-off dynamic (8)</td>
<td>Communication (7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11 to 15 (4)</td>
<td>Rpt. dynamic (3)</td>
<td>Curiosity (5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16 to 21 (1)</td>
<td>1-off sustained (2)</td>
<td>Encouragement (1)</td>
</tr>
<tr>
<td><strong>Reaching out of containment (arm only)</strong></td>
<td>All female</td>
<td>0 to 10 (1)</td>
<td>1-off dynamic (2)</td>
<td>Thrill enhancement (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11 to 15 (2)</td>
<td>Rpt. dynamic (1)</td>
<td>Exhibitionism (1)</td>
</tr>
<tr>
<td><strong>Extended reaching out of containment (arm and body part)</strong></td>
<td>Male</td>
<td>11 to 15</td>
<td>1-off sustained</td>
<td>Exhibitionism</td>
</tr>
<tr>
<td><strong>Pointing</strong></td>
<td>75% male</td>
<td>0 to 30 (1 in each age group)</td>
<td>1-off dynamic (all)</td>
<td>Communication (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Curiosity (1)</td>
</tr>
<tr>
<td><strong>Kicking</strong></td>
<td>75% female</td>
<td>0 to 10 (1)</td>
<td>Rpt. dynamic (2)</td>
<td>Exhibitionism (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11 to 15 (2)</td>
<td>1-off sustained (1)</td>
<td>Thrill enhancement (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22 to 30 (1)</td>
<td>Rpt. sustained (1)</td>
<td>Natural pose / boredom (1)</td>
</tr>
</tbody>
</table>

7.2.4 Jumpers – Additional observations

On these rides passengers who waved tended to wave with one hand only and hold onto the handrail with their other hand. This could be because of the vigorous ride motion; in certain modes of operation the ride gives people the impression that they will start to ‘lift off’ at the top of a lift movement, and this could be making passengers feel they must hang on to avoid being ejected.

It appeared in some cases that when a passenger held two hands in the air, and realised he / she would not be ejected, this behaviour was sustained for a significant period. A motivating factor in this type of situation may be a desire to deliberately exhibit an apparently risky behaviour, in the knowledge that it is actually safe to do so.
7.3 Bench Rides

Five Bench Rides (e.g. Miami) were observed at various venues. Table 17 contains the summary details for all of these. The graphs of behaviour frequency etc. are for pooled data from all of these rides.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total duration of observation (min:sec)</td>
<td>36:52</td>
<td>17:13</td>
<td>17:51</td>
<td>11:15</td>
<td>30:05</td>
</tr>
<tr>
<td>Total number of ride cycles</td>
<td>8</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Total number of passengers observed</td>
<td>161</td>
<td>61</td>
<td>53</td>
<td>45</td>
<td>117</td>
</tr>
<tr>
<td>Overall gender split (%Male : %Female)</td>
<td>48% 52%</td>
<td>36% 64%</td>
<td>25% 75%</td>
<td>29% 71%</td>
<td>48% 52%</td>
</tr>
<tr>
<td>Average ride cycle duration (min:sec)</td>
<td>4:36</td>
<td>3:26</td>
<td>4:27</td>
<td>3:45</td>
<td>3:45</td>
</tr>
<tr>
<td>Average number of passengers per ride cycle</td>
<td>20</td>
<td>12</td>
<td>13</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

### Figure 9. Total number of observed behaviours on all Bench rides
### 7.3.1 One hand waving

![Chart showing age and gender distribution of Bench Ride passengers exhibiting one hand waving behaviour.](chart)

**Figure 10.** Age & gender distribution of Bench Ride passengers exhibiting one hand waving behaviour.

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Communicate</th>
<th>Copy</th>
<th>Exhibit’n (show off)</th>
<th>Encouragement</th>
<th>Curiosity</th>
<th>Thrill enhance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>7</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>1-off sustained</td>
<td>3</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>17</td>
<td></td>
<td>1</td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>6</td>
<td>1</td>
<td>2</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>4</td>
<td></td>
<td></td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td>4</td>
<td></td>
<td>3</td>
<td></td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

| Total               | 42          | 3    | 7                    | 1             | 3         | 17             |

**Table 18.** Bench Rides: Motives for one hand waving (number of incidences).
7.3.2 Two hand waving

Figure 11. Age & gender distribution of Bench Ride passengers exhibiting two hand waving behaviour.

Table 19. Bench Rides: Motives for two hand waving (number of incidences).

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Communicate</th>
<th>Peer pressure</th>
<th>Copy</th>
<th>Exhibit’n (show off)</th>
<th>Encouragement</th>
<th>Curiosity</th>
<th>Thrill enhance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td></td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>9</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td>1</td>
<td>4</td>
<td>7</td>
<td>2</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>1</td>
<td>12</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td></td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>6</td>
<td>3</td>
<td>4</td>
<td>19</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>7</td>
<td>5</td>
<td>1</td>
<td>58</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>20</strong></td>
<td><strong>15</strong></td>
<td><strong>25</strong></td>
<td><strong>50</strong></td>
<td><strong>1</strong></td>
<td></td>
<td><strong>110</strong></td>
</tr>
</tbody>
</table>
7.3.3 Reaching out of containment (leg only)

Figure 12. Age & gender distribution of Bench Ride passengers reaching their leg(s) out of the containment.

Table 20. Bench Rides: Motives for reaching leg out of containment (number of incidences).

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Communicate</th>
<th>Exhibitionism</th>
<th>Encouragement</th>
<th>Natural pose</th>
<th>Thrill enhance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Male</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>1</td>
<td>10</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2</td>
<td>3</td>
<td>10</td>
<td>5</td>
<td>16</td>
</tr>
</tbody>
</table>
7.3.4 Pointing

![Pie chart showing the distribution of pointing behaviors by gender and age.]

**Figure 13.** Age & gender distribution of Bench Ride passengers exhibiting pointing behaviour.

**Table 21.** Bench Rides: Motives for pointing behaviour (number of incidences).

<table>
<thead>
<tr>
<th>Genders of passengers</th>
<th>Ages of passengers</th>
<th>Frequency (number if &gt;1)</th>
<th>Main motives for behaviour (number if &gt;1)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Male</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td></td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>27</td>
<td>1</td>
</tr>
</tbody>
</table>

7.3.5 Bench Rides – Summary of low incidence behaviours

**Table 22.** Bench Rides: Summary of low incidence behaviours (<20 observed)

<table>
<thead>
<tr>
<th>Genders of passengers</th>
<th>Ages of passengers</th>
<th>Frequency (number if &gt;1)</th>
<th>Main motives for behaviour (number if &gt;1)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Turning head / trunk</strong></td>
<td>Female</td>
<td>11 to 15</td>
<td>Rpt. dynamic</td>
</tr>
<tr>
<td><strong>Extended reaching out of containment (arm and body part)</strong></td>
<td>All female</td>
<td>11 to 15 (2) 16 to 21 (1)</td>
<td>Rpt. sustained (2, the younger passengers) 1-off sustained (1)</td>
</tr>
<tr>
<td><strong>Violent behaviour</strong></td>
<td>All male</td>
<td>11 to 15 (all)</td>
<td>1-off sustained (all)</td>
</tr>
<tr>
<td><strong>Boisterous behaviour</strong></td>
<td>All male</td>
<td>11 to 15 (all)</td>
<td>1-off sustained (all)</td>
</tr>
</tbody>
</table>
### 7.3.6 Bench Rides – Additional observations

These rides were associated with high levels of waving and pointing behaviours. The relatively high levels and proportions of these behaviours may be because of the ride’s design i.e. people are sitting facing forwards with a clear open view of the crowd / fair / park. The statistical analysis indicates that many of the waving and pointing behaviours on these rides are due to communication and exhibitionism / showing off to friends etc.

The following ride-specific behaviours were observed:

- **Leaning forwards over handrail / lap-bar**
  This was noted in the analysis / statistics as ‘leaning out of containment’. Although it could be argued that exaggerated hunching forwards does not technically involve leaning out of the containment system, the action / posture were noticeable enough to be logged. It was also believed that under certain conditions (e.g. sudden ride breakdown or emergency stop during a fast downwards motion) the posture could result in some discomfort (winding, bruised ribs, sore neck / back etc).

- **Kicking legs**
  Passengers were often seen to repeatedly kick / hold their legs out horizontally, in a similar fashion that someone would kick on a traditional swing. This is not believed to present any risk other than the possibility of a passenger kicking off a shoe and the chance of it striking a bystander.

- **Exaggerated two-hand waving / semi-standing postures**
  Several bench rides were observed where the operators encouraged people to wave their hands in the air. This may also help account for the high proportion of passengers on these rides who exhibited hand waving behaviour.
7.4 Superbobs

Two Superbobs were observed at 2 different venues. Table 23 contains the summary details for both of these. The graphs of behaviour frequency etc. are for pooled data from both of these rides.

<table>
<thead>
<tr>
<th>Venue</th>
<th>Newcastle Town Moor Fair</th>
<th>St Giles Fair, Oxford</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2003</td>
<td>2003</td>
</tr>
<tr>
<td>Total duration of observation</td>
<td>11:12</td>
<td>13:21</td>
</tr>
<tr>
<td>(min:sec)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total number of ride cycles</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Total number of passengers</td>
<td>148</td>
<td>251</td>
</tr>
<tr>
<td>observed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall gender split (%Male :%Female)</td>
<td>46% : 54%</td>
<td>35% : 65%</td>
</tr>
<tr>
<td>Average ride cycle duration</td>
<td>3:44</td>
<td>2:40</td>
</tr>
<tr>
<td>(min:sec)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average number of passengers</td>
<td>49</td>
<td>50</td>
</tr>
<tr>
<td>per ride cycle</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

![Figure 14. Total number of observed behaviours on all Superbob rides](image)

Table 23. Superbobs’ Summary Details
7.4.1 One hand waving

![One Hand Waving (total = 68) Superbobs]

Figure 15. Age & gender distribution of Superbob passengers exhibiting one hand waving behaviour.

Table 24. Superbobs: Motives for one hand waving (number of incidences).

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Frequency</th>
<th>Communication</th>
<th>Copy</th>
<th>Exhibit’n</th>
<th>Thrill enhancement</th>
<th>Excitement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male 1-off dynamic</td>
<td>5</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>2</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Female 1-off dynamic</td>
<td>12</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
<td>3</td>
<td>2</td>
<td>23</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

39
7.4.2 Two hand waving

![Two Hand Waving (total = 212) Superbobs](image)

Figure 16. Age & gender distribution of Superbob passengers exhibiting two hand waving behaviour.

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Communication</th>
<th>Copying</th>
<th>Exhibit’n</th>
<th>Thrill enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1-off sustained</td>
<td>1</td>
<td>3</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td>1</td>
<td></td>
<td>19</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>3</td>
<td>1</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td>1</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Prolonged</td>
<td>3</td>
<td></td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td>1</td>
<td></td>
<td>37</td>
</tr>
<tr>
<td>Total</td>
<td>5</td>
<td>5</td>
<td>7</td>
<td>98</td>
</tr>
</tbody>
</table>

7.4.3 Superbobs – Summary of low incidence behaviours

<table>
<thead>
<tr>
<th>Genders of passengers</th>
<th>Ages of passengers</th>
<th>Frequency (number if &gt;1)</th>
<th>Main motives for behaviour (number if &gt;1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turning head / trunk</td>
<td>60% male</td>
<td>0 to 10 (3) 11 to 15 (1) 30 to 50 (1)</td>
<td>1-off dynamic (4) 1-off sustained (1)</td>
</tr>
<tr>
<td>Pointing</td>
<td>All female</td>
<td>0 to 10 (2) 22 to 30</td>
<td>1-off dynamic (2) Rpt. sustained (1)</td>
</tr>
</tbody>
</table>
7.4.4 Superbobs – Additional observations

These rides provide an illustration of how young children, aged approximately 5 to 8 years, do in some cases engage in exhibitive and thrill enhancement behaviour (2 hand waving). These behaviours appeared to be spontaneous or copying. Two handed waving was the most common behaviour and was exhibited by people of both genders and across most age groups.

The Superbob was also a ride on which the mix of passengers appeared to have some influence on the general behaviours displayed. On one ride cycle 24 behaviours were noted including sustained, repeated and prolonged waving. However on the next, equally full, ride cycle only 5 behaviours were observed. No obvious change was noted in the passenger demographics which coincided with these different levels of behaviour (e.g. there were no greater number of groups of unaccompanied younger passengers on the first ride cycle).

7.5 Waltzers

Three Waltzer rides were observed at various sites. Table 27 contains the summary details for all 3 Waltzers. The graphs of behaviour frequency etc. are for pooled data from all of these rides.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total duration of observation (min:sec)</td>
<td>18:15</td>
<td>12:40</td>
<td>51:06</td>
</tr>
<tr>
<td>Total number of ride cycles</td>
<td>6</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Total number of passengers observed</td>
<td>192</td>
<td>42</td>
<td>172</td>
</tr>
<tr>
<td>Overall gender split (%Male : %Female)</td>
<td>56% : 44%</td>
<td>31% : 69%</td>
<td>34% : 66%</td>
</tr>
<tr>
<td>Average ride cycle duration (min:sec)</td>
<td>3:02</td>
<td>4:13</td>
<td>5:06</td>
</tr>
<tr>
<td>Average number of passengers per ride cycle</td>
<td>32</td>
<td>14</td>
<td>17</td>
</tr>
</tbody>
</table>
7.5.1 One hand waving

Figure 17. Total number of observed behaviours on all Waltzers

Figure 18. Age & gender distribution of Waltzer passengers exhibiting one hand waving behaviour.
Table 28. Waltzers: Motives for one hand waving (number of incidences).

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Communication</th>
<th>Copying</th>
<th>Exhibit’n</th>
<th>Excitement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>1</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
<td>3</td>
<td>5</td>
<td>11</td>
</tr>
</tbody>
</table>

7.5.2 Two hand waving

Figure 19. Age & gender distribution of Waltzer passengers exhibiting two hand waving behaviour.

Table 29. Waltzers: Motives for two hand waving (number of incidences).

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Communicate</th>
<th>Peer Pressure</th>
<th>Copy</th>
<th>Exhibit’n</th>
<th>Thrill Enhance</th>
<th>Excite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>1</td>
<td></td>
<td></td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td>4</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
<td>46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>17</td>
<td>2</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td>4</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7.5.3 Interaction with containment device

Figure 20. Age & gender distribution of Waltzer passengers interacting with containment device.

Table 30. Waltzers: Motives for interacting with the containment device (number of incidences).

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Thrill enhancement</th>
<th>Discomfort</th>
<th>Natural pose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

7.5.4 Waltzers – Summary of low incidence behaviours

Table 31. Waltzers: Summary of low incidence behaviours (<20 observed)

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Genders of passengers</th>
<th>Ages of passengers</th>
<th>Frequency (number if &gt;1)</th>
<th>Main motives for behaviour (number if &gt;1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reaching out of containment (arm only)</td>
<td>All male</td>
<td>22 to 30 (all)</td>
<td>Prolonged (all)</td>
<td>Discomfort (1) Natural pose (1) Copy (1)</td>
</tr>
<tr>
<td>Extended reaching out of containment (arm and body part)</td>
<td>Female</td>
<td>16 to 21</td>
<td>1-off sustained</td>
<td>Exhibitionism</td>
</tr>
<tr>
<td>Pointing</td>
<td>Male</td>
<td>22 to 30</td>
<td>1-off dynamic</td>
<td>Communication</td>
</tr>
</tbody>
</table>
7.5.5 Waltzers – Additional observations

There is one ride-specific behaviour which was observed on waltzers; lying down in the seat. A number of passengers (typically a pair of passengers in an otherwise empty car) were seen lying down on the seats. This was presumed to be a thrill enhancement behaviour with 2 main consequences;

- The spinning motion of the car is translated into / sensed by the passengers as a tumbling motion.
- There is a reduction in the external visual cues available to passengers.

Both of these factors are likely to combine to increase the levels of dizziness / disorientation which the passengers experience and this may be why people were lying down. This is an example of passengers making a conscious effort to enhance or modify the sensations provided by the ride. It may also be an example of a ‘skilled’ ride behaviour i.e. a behaviour only shown by people who tend to use amusement rides more frequently than the average passenger, and who have learned ways of interacting with the rides movements.
7.6 Conventional Coasters (non-spinning or looping)

Three conventional coasters were observed at various sites. Table 32 contains the summary details for all of these. The graphs of behaviour frequency etc. are for pooled data from all of these rides.

Table 32. Coasters’ Summary Details

<table>
<thead>
<tr>
<th>Venue</th>
<th>Bottoms Pleasure Beach, Skegness</th>
<th>Drayton Manor Theme Park</th>
<th>Southport Pleasureland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total duration of observation (min:sec)</td>
<td>27:07</td>
<td>30:01</td>
<td>41:41</td>
</tr>
<tr>
<td>Total number of ride cycles</td>
<td>13</td>
<td>17</td>
<td>57 (x4 person cars)</td>
</tr>
<tr>
<td>Total number of passengers observed</td>
<td>178</td>
<td>372</td>
<td>189</td>
</tr>
<tr>
<td>Overall gender split (%Male : %Female)</td>
<td>46% : 54%</td>
<td>32% : 68%</td>
<td>53% : 47%</td>
</tr>
<tr>
<td>Average ride cycle duration (min:sec)</td>
<td>2:05</td>
<td>1:45</td>
<td></td>
</tr>
<tr>
<td>Average number of passengers per ride cycle</td>
<td>14</td>
<td>22</td>
<td>3.3 (out of possible 4)</td>
</tr>
</tbody>
</table>

Figure 21. Total number of observed behaviours on all Coasters
7.6.1 One hand waving

![Figure 22. Age & gender distribution of coaster passengers exhibiting one hand waving behaviour.](image)

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Communicate</th>
<th>Copying</th>
<th>Exhibit’n</th>
<th>Thrill enhance</th>
<th>Excitement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>22</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>21</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>51</td>
<td>3</td>
<td>6</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

*Note: Some coaster behaviour incidences were not assigned motives due to uncertainty / video quality, this note applies to one / two hand waving and turn head / trunk behaviours.*
7.6.2 Two hand waving

![Figure 23. Age & gender distribution of Coaster passengers who exhibited two hand waving behaviour.](image)

**Table 34. Coasters: Motives for two hand waving (number of incidences).**

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Communication</th>
<th>Copying</th>
<th>Exhibitionism</th>
<th>Thrill enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>1</td>
<td>2</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>1</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td>24</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>1-off sustained</td>
<td>1</td>
<td>6</td>
<td>3</td>
<td>27</td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td>2</td>
<td>4</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4</strong></td>
<td><strong>22</strong></td>
<td><strong>13</strong></td>
<td><strong>165</strong></td>
</tr>
</tbody>
</table>
7.6.3 Turning head & trunk

Figure 24. Age & gender distribution of Coaster passengers who exhibited head / trunk turning behaviour.

Table 35. Coasters: Motives for head / trunk turning behaviour (number of incidences).

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Communication</th>
<th>Copying</th>
<th>Curiosity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>1</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>5</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>1</td>
<td>9</td>
</tr>
</tbody>
</table>

7.6.4 Coasters – Summary of low incidence behaviours

Table 36. Coasters: Summary of low incidence behaviours (<20 observed)

<table>
<thead>
<tr>
<th></th>
<th>Genders of passengers</th>
<th>Ages of passengers</th>
<th>Frequency (number if &gt;1)</th>
<th>Main motives for behaviour (number if &gt;1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turning around in seat</td>
<td>60% male</td>
<td>0 to 10 (all)</td>
<td>1-off dynamic (4)</td>
<td>Communication (4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-off sustained (1)</td>
<td>Curiosity (1)</td>
</tr>
<tr>
<td>Reaching out of containment (arm only)</td>
<td>82% male</td>
<td>0 to 10 (5)</td>
<td>1-off dynamic (7)</td>
<td>Curiosity (7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11 to 15 (5)</td>
<td>1-off sustained (3)</td>
<td>Copying (4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30 to 50 (1)</td>
<td>Rpt. dynamic (1)</td>
<td>Communication (2)</td>
</tr>
<tr>
<td>Extended reaching out of containment (arm and body part)</td>
<td>All male</td>
<td>0 to 10 (all)</td>
<td>1-off dynamic (all)</td>
<td>Curiosity (all)</td>
</tr>
</tbody>
</table>
7.7 Pirate Ships

Two Pirate Ships were observed at various sites. Table 37 contains the summary details for both Pirate Ships. The graphs of behaviour frequency etc. are for pooled data from all of these rides.

<table>
<thead>
<tr>
<th>Venue</th>
<th>Drayton Manor Theme Park</th>
<th>Chessington World of Adventures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total duration of observation</td>
<td>25:05</td>
<td>12:52</td>
</tr>
<tr>
<td>(min:sec)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total number of ride cycles</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>Total number of passengers observed</td>
<td>403</td>
<td>142</td>
</tr>
<tr>
<td>Overall gender split (%Male : %Female)</td>
<td>33% : 67%</td>
<td>51% : 49%</td>
</tr>
<tr>
<td>Average ride cycle duration</td>
<td>2:16</td>
<td>2:08</td>
</tr>
<tr>
<td>(min:sec)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average number of passengers per</td>
<td>37</td>
<td>27</td>
</tr>
<tr>
<td>ride cycle</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 37. Pirate Ships’ Summary Details

![Figure 25. Total number of observed behaviours on all Pirate Ships](image-url)

<table>
<thead>
<tr>
<th>Boisterous behaviour</th>
<th>All female</th>
<th>11 to 15 (all)</th>
<th>1-off dynamic (all)</th>
<th>Exhibitionism (all),</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standing up</td>
<td>All female</td>
<td>11 to 15 (all)</td>
<td>1-off dynamic (all)</td>
<td>Impatience (all)</td>
</tr>
<tr>
<td>Pointing</td>
<td>73% female</td>
<td>0 to 10 (5)</td>
<td>1-off dynamic (8)</td>
<td>Communication (all)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11 to 15 (3)</td>
<td>Rpt. dynamic (2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>22 to 30 (2)</td>
<td>1-off sustained (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>30 to 50 (1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7.7.1 One hand waving

![One Hand Waving (total = 30) Pirate Ships](image)

**Figure 26.** Age & gender distribution of Pirate Ship passengers who exhibited one hand waving behaviour.

**Table 38.** Pirate Ships: Motives for one hand waving (number of incidences).

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Communicate</th>
<th>Copying</th>
<th>Exhibitionism</th>
<th>Thrill enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>3</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td>1</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>9</td>
<td>1</td>
<td>2</td>
<td>18</td>
</tr>
</tbody>
</table>
7.7.2 Two hand waving

![Graph showing age and gender distribution of Pirate Ship passengers who exhibited two hand waving behaviour.](image)

Figure 27. Age & gender distribution of Pirate Ship passengers who exhibited two hand waving behaviour.

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Frequency</th>
<th>Communicate</th>
<th>Exhibitionism</th>
<th>Encouragement</th>
<th>Thrill enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Male</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>1</td>
<td></td>
<td></td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td>5</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Prolonged</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>74</td>
<td></td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>1</td>
<td></td>
<td>3</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>3</td>
<td></td>
<td>1</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td>1</td>
<td></td>
<td></td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td>1</td>
<td>1</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4</td>
<td>12</td>
<td>2</td>
<td>226</td>
<td></td>
</tr>
</tbody>
</table>

Table 39. Pirate Ships: Motives for two hand waving (number of incidences).
7.7.3 Standing up

Figure 28. Age & gender distribution of Pirate Ship passengers who exhibited standing behaviour.

Table 40. Pirate Ships: Motives for standing up (number of incidences).

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Communicate</th>
<th>Copy</th>
<th>Exhibit'n</th>
<th>Curiosity</th>
<th>Impatience</th>
<th>Thrill enhance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Male</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1</td>
<td>9</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>27</td>
</tr>
</tbody>
</table>
7.7.4 Pirate Ships – Summary of low incidence behaviours

Table 41. Pirate Ships: Summary of low incidence behaviours (<20 observed)

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Genders of passengers</th>
<th>Ages of passengers</th>
<th>Frequency (number if &gt;1)</th>
<th>Main motives for behaviour (number if &gt;1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turn head / trunk</td>
<td>All female</td>
<td>11 to 15 (all)</td>
<td>1-off dynamic (1)</td>
<td>Communication (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rpt. dynamic (1)</td>
<td>Curiosity (2)</td>
</tr>
<tr>
<td>Turning around in seat</td>
<td>Female</td>
<td>11 to 15</td>
<td>1-off dynamic</td>
<td>Curiosity</td>
</tr>
<tr>
<td>Reaching out of containment (arm only)</td>
<td>Female</td>
<td>11 to 15</td>
<td>1-off dynamic</td>
<td>Curiosity</td>
</tr>
<tr>
<td>Extended reaching out of containment (leg)</td>
<td>Male</td>
<td>11 to 15</td>
<td>1-off sustained</td>
<td>Natural pose</td>
</tr>
<tr>
<td>Boisterous behaviour</td>
<td>Female</td>
<td>11 to 15</td>
<td>1-off dynamic</td>
<td>Aggression / competition</td>
</tr>
<tr>
<td>Pointing</td>
<td>All female</td>
<td>11 to 15 (1)</td>
<td>1-off dynamic (1)</td>
<td>Communication (all)</td>
</tr>
<tr>
<td></td>
<td>22 to 30 (1)</td>
<td></td>
<td>Rpt. dynamic (1)</td>
<td></td>
</tr>
</tbody>
</table>

7.8 Superbowls

Two Superbowls were observed at 2 different venues. Table 42 contains the summary details for both of these. The graphs of behaviour frequency etc. are for pooled data from both of these rides.

Table 42. Superbowls’ Summary Details

<table>
<thead>
<tr>
<th>Venue</th>
<th>Newcastle Town Moor Fair</th>
<th>St Giles Fair, Oxford</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total duration of observation (min:sec)</td>
<td>18:13</td>
<td>2003</td>
</tr>
<tr>
<td>Total number of ride cycles</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Total number of passengers observed</td>
<td>73</td>
<td>53</td>
</tr>
<tr>
<td>Overall gender split (%Male : %Female)</td>
<td>32% : 68%</td>
<td>28% : 72%</td>
</tr>
<tr>
<td>Average ride cycle duration (min:sec)</td>
<td>3:02</td>
<td></td>
</tr>
<tr>
<td>Average number of passengers per ride cycle</td>
<td>12</td>
<td>27</td>
</tr>
</tbody>
</table>
7.8.1 Two hand waving

![Figure 29. Total number of observed behaviours on all Superbowls](image)

![Figure 30. Age & gender distribution of Superbowl passengers who exhibited two hand waving behaviour.](image)

**Table 43. Superbowls: Motives for two hand waving (number of incidences).**

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Communication</th>
<th>Exhibitionism</th>
<th>Thrill enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>
### 7.8.2 Superbowls – Summary of low incidence behaviours

**Table 44. Superbowls: Summary of low incidence behaviours (<20 observed)**

<table>
<thead>
<tr>
<th>Genders of passengers</th>
<th>Ages of passengers</th>
<th>Frequency (number if &gt;1)</th>
<th>Main motives for behaviour (number if &gt;1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>One hand waving</td>
<td>57% female</td>
<td>0 to 10 (1) 11 to 15 (8)</td>
<td>1-off dynamic (9) Rpt. dynamic (4)</td>
</tr>
<tr>
<td>Leaning out of containment</td>
<td>Male</td>
<td>11 to 15</td>
<td>1-off dynamic</td>
</tr>
<tr>
<td>Pointing</td>
<td>Female</td>
<td>0 to 10</td>
<td>1-off dynamic</td>
</tr>
</tbody>
</table>

### 7.8.3 Superbowls – Additional observations

Most behaviour occurred during the start of a ride cycle i.e. during stationary loading and in the early slow stages of a ride. Most of the communication behaviour appeared to be between groups of friends. On this ride the cars and seating arrangements are such that when stationary, passengers tend to face inwards / towards other cars which appears to naturally encourage communication (calling and waving etc.). Generally there were fewer behaviours during the full speed / full tilt period of the ride cycles. This is a reasonably vigorous ride and most people can be expected to grip the handrail and brace themselves against the seat back.

### 7.9 Twist Rides

Two Twister or ‘Twist’ rides were observed at various sites. Table 45 contains the summary details for both Twisters. The graphs of behaviour frequency etc. are for pooled data from all of these rides. The detailed behaviour frequencies for each ride can be found in Appendix ..

**Table 45. Twist Rides’ Summary Details**

<table>
<thead>
<tr>
<th>Venue</th>
<th>Total duration of observation (min:sec)</th>
<th>Total number of ride cycles</th>
<th>Total number of passengers observed</th>
<th>Overall gender split (%Male : %Female)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stoke Park Fair, Guildford 2003</td>
<td>23:47</td>
<td>5</td>
<td>102</td>
<td>30% 70%</td>
</tr>
<tr>
<td>Pinner Fair London, 2003</td>
<td>7:08</td>
<td>3</td>
<td>77</td>
<td>70% 30%</td>
</tr>
<tr>
<td>St Giles Fair, Oxford, 2003</td>
<td>8:22</td>
<td>5</td>
<td>134</td>
<td>36% 64%</td>
</tr>
<tr>
<td>Bottons, Skegness, 2002</td>
<td>6:40</td>
<td>2</td>
<td>50</td>
<td>64% 36%</td>
</tr>
<tr>
<td>Southport Pleasureland, 2003</td>
<td>6:41</td>
<td>3</td>
<td>80</td>
<td>36% 64%</td>
</tr>
</tbody>
</table>
### Average ride cycle duration (min:sec)

<table>
<thead>
<tr>
<th></th>
<th>4:45</th>
<th>2:22</th>
<th>1:40</th>
<th>3:20</th>
<th>2:13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average number of passengers per ride cycle</td>
<td>20</td>
<td>26</td>
<td>27</td>
<td>25</td>
<td>27</td>
</tr>
</tbody>
</table>

---

Figure 31. Total number of observed behaviours on all Twist Rides

#### 7.9.1 One hand waving

Figure 32. Age & gender distribution of Twist passengers who exhibited one hand waving behaviour.
Table 46. Twist Rides: Motives for one hand waving (number of incidences).

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Communication</th>
<th>Exhibitionism</th>
<th>Thrill enhancement</th>
<th>Discomfort</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>3</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>10</td>
<td>1</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>4</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
<td>2</td>
<td>7</td>
<td>5</td>
</tr>
</tbody>
</table>

7.9.2 Two hand waving

![Two hand waving behaviour distribution](image)

Figure 33. Age & gender distribution of Twist passengers who exhibited two hand waving behaviour.

Table 47. Twist Rides: Motives for two hand waving (number of incidences).

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Communication</th>
<th>Copy</th>
<th>Exhibit’n</th>
<th>Thrill enhance</th>
<th>Excitement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>2</td>
<td></td>
<td>4</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>2</td>
<td></td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>1</td>
<td>2</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>1</td>
<td>2</td>
<td>18</td>
<td>14</td>
</tr>
</tbody>
</table>

58
7.9.3 Twist Rides – Summary of low incidence behaviours

<table>
<thead>
<tr>
<th>Table 48. Twist Rides: Summary of low incidence behaviours (&lt;20 observed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genders of passengers</td>
</tr>
<tr>
<td>Turning head / trunk</td>
</tr>
<tr>
<td>Turning around in seat</td>
</tr>
<tr>
<td>Leaning out of containment</td>
</tr>
<tr>
<td>Reaching out of containment (arm only)</td>
</tr>
<tr>
<td>Interfering with containment device</td>
</tr>
<tr>
<td>Standing up</td>
</tr>
<tr>
<td>Pointing</td>
</tr>
</tbody>
</table>

7.9.4 Twist Rides – Additional observations

As with other vigorous spinning rides (e.g. Superbowl) the majority of all the behaviours were observed during the start up period i.e. once the ride cycle has begun but the ride was not up to maximum speed. Compared to other (non-spinning, slower) rides there was not as much thrill enhancement activity observed such as waving two hands in the air. On Twisters people appeared to be ‘trying out’ a behaviour (waving hands in the air) just once during the main, fast ride motion and seemingly deciding not to repeat the action, possibly because they found it was not particularly comfortable.

Potential discomfort is a particularly important factor influencing / restricting behaviour where more than one person was seated in a car. In this situation the ride forces press central and / or inner occupants onto the outer occupant (i.e. the person seated on the outer seat). This may influence behaviour in two ways:

- Inner / central occupants may be disinclined to release their grip on the handrail because they know it will cause them to press against the outer occupant (and cause them discomfort).
- Outer occupants may be disinclined to release their grip because it would expose the side of their torso / rib cage to the pressure of the inner / central occupants.

Conversely, a potential behaviour which we were unable to effectively log / observe (due to the restrictions in what can be seen from video) is inner or central occupants deliberately allowing themselves to press against the outer occupant with the intention of causing discomfort. There is a possibility that some passengers may also act to increase these forces.
7.10 Log Flumes

Three Log Flumes were observed at various sites. Table 49 contains the summary details for all of these. The graphs of behaviour frequency etc. are for pooled data from all of these rides.

Table 49. Log Flumes’ Summary Details

<table>
<thead>
<tr>
<th>Venue</th>
<th>Southport Pleasureland 2003</th>
<th>Blackpool Pleasure Beach (Chewits log flume) 2003</th>
<th>Drayton Manor Theme Park 2002</th>
<th>Legoland, Windsor 2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total duration of observation (min:sec)</td>
<td>7:17</td>
<td>26:52</td>
<td>42:00</td>
<td>24:45</td>
</tr>
<tr>
<td>Total number of logs observed</td>
<td>11</td>
<td>36</td>
<td>35</td>
<td>69</td>
</tr>
<tr>
<td>Total number of passengers observed</td>
<td>29</td>
<td>119</td>
<td>259</td>
<td>247</td>
</tr>
<tr>
<td>Overall gender split (%Male : %Female)</td>
<td>38% : 62%</td>
<td>53% : 47%</td>
<td>% : %</td>
<td>50% : 50%</td>
</tr>
<tr>
<td>Average number of passengers per ride cycle</td>
<td>2.6</td>
<td>3.3</td>
<td>7.4</td>
<td>3.6</td>
</tr>
</tbody>
</table>

![Log Flumes Total Behaviour Incidences](image)

Figure 34. Total number of observed behaviours on all Log Flumes
7.10.1 One hand waving

Figure 35. Age & gender distribution of Log Flume passengers who exhibited one hand waving behaviour.

Table 50. Log Flumes: Motives for one hand waving (number of incidences).

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Communicate</th>
<th>Copying</th>
<th>Thrill enhance</th>
<th>Discomfort</th>
<th>Excitement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>12</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>13</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>3</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>37</td>
<td>4</td>
<td>13</td>
<td>1</td>
<td>7</td>
</tr>
</tbody>
</table>
7.10.2 Two hand waving

Figure 36. Age & gender distribution of Log Flume passengers who exhibited two hand waving behaviour.

Table 51. Log Flumes: Motives for two hand waving (number of incidences).

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Communicate</th>
<th>Copy</th>
<th>Exhibit'n enhance</th>
<th>Thrill enhance</th>
<th>Discomfort</th>
<th>Excitement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>1</td>
<td>3</td>
<td>11</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>2</td>
<td>1</td>
<td></td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>11</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>5</td>
<td>7</td>
<td>33</td>
<td>1</td>
<td>26</td>
</tr>
</tbody>
</table>
7.10.3 Turning head / trunk

Figure 37. Age & gender distribution of Log Flume passengers who exhibited head / trunk turning behaviour.

Table 52. Log Flumes: Motives for head / trunk turning behaviour (number of incidences).

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Communicate</th>
<th>Curiosity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>1-off sustained</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>23</td>
<td>6</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>46</td>
<td>20</td>
</tr>
</tbody>
</table>
7.10.4 Standing up

Figure 38. Age & gender distribution of Log Flume passengers who exhibited standing behaviour.

Table 53. Log Flumes: Motives for standing up (number of incidences).

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Communication (show off)</th>
<th>Copy</th>
<th>Exhibit’n</th>
<th>Curiosity</th>
<th>Natural pose</th>
<th>Thrill enhance</th>
<th>Discomfort</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>1-off dynamic</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>7</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
7.10.5 Pointing

![Graph of Pointing (total = 26) Log Flumes]

Figure 39. Age & gender distribution of Log Flume passengers who exhibited pointing behaviour.

Table 54. Log Flumes: Motives for pointing behaviour (number of incidences).

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Communicate</th>
<th>Curiosity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>1</td>
</tr>
</tbody>
</table>

7.10.6 Log Flumes – Summary of low incidence behaviours

Table 55. Log Flumes: Summary of low incidence behaviours (<20 observed)

<table>
<thead>
<tr>
<th>Turning around in seat</th>
<th>Genders of passengers</th>
<th>Ages of passengers</th>
<th>Frequency (number if &gt;1)</th>
<th>Main motives for behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>70% male</td>
<td>0 to 10 (2)</td>
<td>1-off sustained (8)</td>
<td>Communication (5) Curiosity (3) Exhibitionism (1) Aggression / competition (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11 to 15 (8)</td>
<td>1-off dynamic (2)</td>
<td></td>
</tr>
<tr>
<td>Reaching out of containment (arm only)</td>
<td>58% male</td>
<td>0 to 10 (5)</td>
<td>Rpt. dynamic (12)</td>
<td>Exhibitionism (9) Aggression / competition (8) Natural pose (1) Excitement (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11 to 15 (12)</td>
<td>1-off dynamic (6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>30 to 50 (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boisterous behaviour</td>
<td>55% male</td>
<td>0 to 10 (2)</td>
<td>Rpt. dynamic (10)</td>
<td>Aggression / competition (8) Exhibitionism (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11 to 15 (8)</td>
<td>1-off sustained (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>30 to 50 (1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7.10.7 Log Flumes – Additional observations

Passengers were seen standing several times on various log flumes (e.g. Chewitts log Flume). Some instances were recorded on video and some were noted by HSL observers during data gathering sessions (the latter examples were not included in the statistical analyses).

Standing occurred both during the relatively calm travelling sections of the flumes and immediately following the main drop.

- **Standing during calm travel**
  During the calm travelling section one passenger who stood was male aged approximately 5 / 6 years. Because he was fairly short and the sides of the log were quite high, he seemed to stand up in order to gain a better view. He appeared to be curious about the path of the ride and simply wanted to ‘look around’.

- **Standing immediately after the drop**
  A number of passengers who stood up after the drop seemed to want to get off the wet seat and to brush off excess water (i.e. they stood up for comfort reasons). One female passenger aged approximately 13 / 14 remained standing immediately after the drop for a relatively long time (approximately 7 or 8 seconds) and appeared to be disoriented during this period. Some standing was also seen when a log flume was halted for a period of time. This occurred when the logs were stopped on a raised section of track / channel.

In a number of cases, passengers reached out of the containment in order to reach into the channel and splash water over their friends. The main safety concern with this behaviour is the risk of entrapment between the log and the sides of the channel. This entrapment risk may be increased if other passengers begin to rock the log from side to side.
7.11 Junior Autodromes (e.g. Ladybirds)

Two Junior Autodromes were observed at 2 different venues. Table 56 contains the summary details for both of these. The graphs of behaviour frequency etc. are for pooled data from both of these rides.

Table 56. Junior Autodromes’ Summary Details

<table>
<thead>
<tr>
<th>Venue</th>
<th>Pinner Fair, London</th>
<th>Irn-Bru Carnival, SECC Glasgow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total duration of observation (min:sec)</td>
<td>18:10</td>
<td>15:02</td>
</tr>
<tr>
<td>Total number of ride cycles</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Total number of passengers observed</td>
<td>81</td>
<td>32</td>
</tr>
<tr>
<td>Overall gender split (%Male : %Female)</td>
<td>51% : 49%</td>
<td>50% : 50%</td>
</tr>
<tr>
<td>Average ride cycle duration (min:sec)</td>
<td>2:01</td>
<td>2:30</td>
</tr>
<tr>
<td>Average number of passengers per ride cycle</td>
<td>9</td>
<td>5</td>
</tr>
</tbody>
</table>

Figure 40. Total number of observed behaviours on all Junior Autodromes
7.11.1 Turning head / trunk

Figure 41. Age & gender distribution of Junior Autodrome passengers who exhibited head / trunk turning behaviour.

Table 57. Junior Autodromes: Motives for head / trunk turning behaviour (number of incidences).

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Communicate</th>
<th>Copying</th>
<th>Curiosity</th>
<th>Natural pose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>3</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>4</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>3</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td>7</td>
<td>6</td>
<td>1</td>
</tr>
</tbody>
</table>
### 7.11.2 Junior Autodromes – Summary of low incidence behaviours

#### Table 58. Junior Autodromes: Summary of low incidence behaviours (<20 observed)

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Genders of passengers</th>
<th>Ages of passengers</th>
<th>Frequency (number if &gt;1)</th>
<th>Main motives for behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>One hand waving</td>
<td>56% female</td>
<td>0 to 10 (14)</td>
<td>1-off dynamic (7)</td>
<td>Communication (17) Coping (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22 to 30 (2)</td>
<td>Rpt. dynamic (5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-off sustained (3)</td>
<td></td>
</tr>
<tr>
<td>Two hand waving</td>
<td>50% female</td>
<td>0 to 10 (6)</td>
<td>Rpt. dynamic (3)</td>
<td>Exhibitionism (4, incl. all males) Thrill enhancement (1) Communication (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-off sustained (2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Prolonged (1)</td>
<td></td>
</tr>
<tr>
<td>Turning around in seat</td>
<td>67% male</td>
<td>0 to 10 (4)</td>
<td>1-off dynamic (1)</td>
<td>Communication (3, all young male) Discomfort (2, older females) Curiosity (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22 to 30 (2)</td>
<td>1-off sustained (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Prolonged (2)</td>
<td></td>
</tr>
<tr>
<td>Kneeling in seat</td>
<td>Male</td>
<td>0 to 10</td>
<td>1-off dynamic</td>
<td>Curiosity</td>
</tr>
<tr>
<td>Leaning out of containment</td>
<td>75% male</td>
<td>0 to 10 (all)</td>
<td>1-off sustained (2)</td>
<td>Natural pose (2) Curiosity (1) Excitement (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-off dynamic (1)</td>
<td></td>
</tr>
<tr>
<td>Reaching out of containment</td>
<td>57% male</td>
<td>0 to 10 (all)</td>
<td>1-off sustained (6)</td>
<td>Natural pose (2) Curiosity (1) Communication (1)</td>
</tr>
<tr>
<td>(arm only)</td>
<td></td>
<td></td>
<td>1-off dynamic (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rpt. dynamic (1)</td>
<td></td>
</tr>
<tr>
<td>Extended reaching out of containment (arm &amp; body part)</td>
<td>Female</td>
<td>0 to 10</td>
<td>1-off sustained</td>
<td>Communication</td>
</tr>
<tr>
<td>Boisterous behaviour</td>
<td>Female</td>
<td>0 to 10</td>
<td>Rpt. dynamic</td>
<td>Exhibitionism</td>
</tr>
<tr>
<td>Standing up</td>
<td>56% male</td>
<td>0 to 10 (all)</td>
<td>1-off dynamic (6)</td>
<td>Impatience (4) Excitement (2) Curiosity (2) Communication (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rpt. dynamic (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-off sustained (1)</td>
<td></td>
</tr>
<tr>
<td>Pointing</td>
<td>All male</td>
<td>0 to 10 (all)</td>
<td>1-off dynamic (2)</td>
<td>Communication (all)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-off sustained (1)</td>
<td></td>
</tr>
</tbody>
</table>
7.12 Mini Jets (e.g. Batman, Pirate-raft)

Two Mini Jets were observed at 2 different venues. Table 59 contains the summary details for both of these. The graphs of behaviour frequency etc. are for pooled data from both of these rides. These rides are also known as ‘Kiddie Copters’.

<table>
<thead>
<tr>
<th>Venue</th>
<th>Drayton Manor Theme Park</th>
<th>Irn-Bru Carnival, SECC Glasgow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total duration of observation (min:sec)</td>
<td>25:50</td>
<td>2003</td>
</tr>
<tr>
<td>Total number of ride cycles</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Total number of passengers observed</td>
<td>102</td>
<td>19</td>
</tr>
<tr>
<td>Overall gender split (%Male : %Female)</td>
<td>38% : 62%</td>
<td>35% : 65%</td>
</tr>
<tr>
<td>Average ride cycle duration (min:sec)</td>
<td>2:35</td>
<td></td>
</tr>
<tr>
<td>Average number of passengers per ride cycle</td>
<td>10</td>
<td>5</td>
</tr>
</tbody>
</table>

**Figure 42. Total number of observed behaviours on all Mini Jets / Kiddie Copters**
7.12.1 One hand waving

Figure 43. Age & gender distribution of Mini Jet passengers who exhibited one hand waving behaviour.

Table 60. Mini Jets: Motives for one hand waving behaviour (number of incidences).

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Communicate</th>
<th>Copying</th>
<th>Exhibitionism</th>
<th>Thrill enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>7</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>15</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
7.12.2 Turning head / trunk

![Graph showing the age and gender distribution of Mini Jet passengers who exhibited head / trunk turning behaviour.](image)

Figure 44. Age & gender distribution of Mini Jet passengers who exhibited head / trunk turning behaviour.

**Table 61. Mini Jets: Motives for head / trunk turning behaviour (number of incidences).**

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Communicate</th>
<th>Copying</th>
<th>Natural pose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>1</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>8</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>7</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
<td>16</td>
<td>1</td>
</tr>
</tbody>
</table>

7.12.3 Mini Jets – Summary of low frequency behaviours

**Table 62. Mini Jets: Summary of low incidence behaviours (<20 observed)**

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Genders of passengers</th>
<th>Ages of passengers</th>
<th>Frequency (number if &gt;1)</th>
<th>Main motives for behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two hand waving</td>
<td>50% female</td>
<td>0 to 10 (4)</td>
<td>1-off sustained (3)</td>
<td>Exhibitionism (all)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-off dynamic (1)</td>
<td></td>
</tr>
<tr>
<td>Turning around in seat</td>
<td>58% female</td>
<td>0 to 10 (5)</td>
<td>1-off dynamic (4)</td>
<td>Curiosity (7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11 to 15 (7)</td>
<td>1-off sustained (4)</td>
<td>Communication (5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rpt. dynamic (3)</td>
<td></td>
</tr>
<tr>
<td>Kneeling in seat</td>
<td>All male</td>
<td>0 to 10 (all)</td>
<td>1-off dynamic (all)</td>
<td>Communication (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Natural pose (1)</td>
</tr>
<tr>
<td>Leaning out of containment</td>
<td>All female</td>
<td>0 to 10 (all)</td>
<td>1-off dynamic (1)</td>
<td>Communication (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-off sustained (1)</td>
<td>Communication (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Curiosity (1)</td>
</tr>
<tr>
<td>Reaching out of</td>
<td>75% male</td>
<td>0 to 10 (6)</td>
<td>1-off dynamic (6)</td>
<td>Communication (4)</td>
</tr>
<tr>
<td>containment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>Gender</td>
<td>Duration</td>
<td>Type</td>
<td>Motives</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>--------</td>
<td>----------</td>
<td>-----------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>Containment (arm only)</td>
<td>Female</td>
<td>11 to 15</td>
<td>1-off sustained</td>
<td>Curiosity (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Exhibitionism (1)</td>
</tr>
<tr>
<td>Reaching out of containment (leg only)</td>
<td>Female</td>
<td>11 to 15</td>
<td>1-off sustained</td>
<td>Discomfort</td>
</tr>
<tr>
<td>Extended reaching out of containment (arm &amp; body part)</td>
<td>Male</td>
<td>0 to 10</td>
<td>1-off dynamic</td>
<td>Natural pose</td>
</tr>
<tr>
<td>Interfering with containment device</td>
<td>67% male</td>
<td>0 to 10 (all)</td>
<td>1-off dynamic (all)</td>
<td>Impatience (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Curiosity (1)</td>
</tr>
<tr>
<td>Inappropriate exiting of the ride (egress related)</td>
<td>75% male</td>
<td>0 to 10 (all)</td>
<td>1-off dynamic (all)</td>
<td>Impatience (all)</td>
</tr>
<tr>
<td>Standing up</td>
<td>Male</td>
<td>0 to 10</td>
<td>1-off dynamic</td>
<td>Exhibitionism</td>
</tr>
<tr>
<td>Pointing</td>
<td>58% female</td>
<td>0 to 10 (8)</td>
<td>1-off dynamic (12)</td>
<td>Communication (11)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11 to 15 (4)</td>
<td></td>
<td>Copying (1)</td>
</tr>
</tbody>
</table>
8.0 Section 3: Behaviour Properties for single rides

8.1 Spinning coaster (e.g. Wild Mouse)

Observed at St Giles Fair, Oxford (2003).

Table 63. Spinning Coaster Summary Details

<table>
<thead>
<tr>
<th>Total duration of observation (min:sec)</th>
<th>22:56</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of cars observed</td>
<td>69</td>
</tr>
<tr>
<td>Total number of passengers observed</td>
<td>239</td>
</tr>
<tr>
<td>Overall gender split (%Male : %Female)</td>
<td>41.8%</td>
</tr>
<tr>
<td>Average number of passenger per car</td>
<td>3.5</td>
</tr>
</tbody>
</table>

![Figure 45. Number of observed behaviours on Spinning Coaster](image)

Table 64. Spinning Coaster: Summary of low incidence behaviours (<20 observed)

<table>
<thead>
<tr>
<th></th>
<th>Genders of passengers</th>
<th>Ages of passengers</th>
<th>Incidence</th>
<th>Main motives for behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>One hand waving</td>
<td>All female</td>
<td>11 to 15 (3)</td>
<td>1-off dynamic (all)</td>
<td>Thrill enhancement (2) Exhibitionism (1) Copying (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16 to 21 (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two hand waving</td>
<td>All female</td>
<td>11 to 21 (3)</td>
<td>Rpt. sustained (in younger passengers) 1-off sustained (in older passengers)</td>
<td>Thrill enhancement (all)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16 to 21 (3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leaning out of containment</td>
<td>Male</td>
<td>16 to 21</td>
<td>1-off sustained</td>
<td>Apparent nausea</td>
</tr>
<tr>
<td>Pointing</td>
<td>Male</td>
<td>22 to 30</td>
<td>Rpt. dynamic</td>
<td>Communication</td>
</tr>
</tbody>
</table>

8.2 Spinning coaster – additional observations

Relatively few behaviours were observed on this ride, however those which occurred (one and two hand waving) tended to be amongst groups of females towards the top end of the 11 to 15 age group (i.e. around 14 or 15 years old).
Although this is a fairly fast ride in some places and combines track movement with spinning cars, on the basis of the observations it could reasonably be expected that as passenger demographics shift towards older group 2 and younger group 3 passengers (perhaps in the evening), there may be an increase in hand waving. The reason for the relatively low levels of observed behaviour (i.e. hand waving, reaching out of containment) may have been the passenger demographics that were observed (primarily a mix of parents with young children aged approximately 4 to 7, and mixed gender groups aged approximately 21 to 30).

8.3 Juvenile Coaster

Observed at Endcliffe Park Fair, Sheffield (2003).
Note the particularly low total number of passengers observed on this ride. This was due to a low overall number of people at the venue during filming.

<table>
<thead>
<tr>
<th>Table 65. Juvenile Coaster Summary Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total duration of observation (min:sec)</td>
</tr>
<tr>
<td>Total number of ride cycles</td>
</tr>
<tr>
<td>Total number of passengers observed</td>
</tr>
<tr>
<td>Overall gender split (%Male : %Female)</td>
</tr>
<tr>
<td>Average ride cycle duration (min:sec)</td>
</tr>
<tr>
<td>Average nr. passengers per ride cycle</td>
</tr>
</tbody>
</table>

| Figure 46. Number of observed behaviours on Juvenile Coaster |

![Graph showing observed behaviours on Juvenile Coaster](image)

| Table 66. Juvenile Coaster: Summary of low incidence behaviours (<20 observed) |
|-------------------------------|--------|----------------|----------------|
|                              | Genders of passengers | Ages of passengers | Frequency (number if >1) | Main motives for behaviour |
| One hand waving              | 75% female           | 0 to 10 (3) 11 to 15 (1) | 1-off dynamic (2) Rpt. sustained (2) | Mainly communication, Some exhibitionism (in older passenger) |
| Two hand waving              | Male               | 0 to 10 | 1-off sustained | | Thrill enhancement |
| Turning head /               | Female             | 0 to 10 | 1-off dynamic | Communication |
Juvenile coaster – Additional observations

Only a small number of passengers were observed on this ride. It is likely that over a substantial period / with more passengers, the range of observed behaviours would be similar to those seen on conventional coasters e.g. boisterous behaviour, reaching out of containment with arm and standing up.

8.4 Jets

Observed at Drayton Manor Theme Park, Tamworth (2002).

Jets is the generic term used to describe rides consisting of 12 to 16 high lifting cars / gondolas positioned on the ends of arms which rotate and tilt upwards from a central column. The actual design of the cars varies widely and in this case they were elephants, see appendix 4 for picture.

<table>
<thead>
<tr>
<th>Table 67. Jets Summary Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total duration of observation (min:sec)</td>
</tr>
<tr>
<td>Total number of ride cycles</td>
</tr>
<tr>
<td>Total number of passengers observed</td>
</tr>
<tr>
<td>Overall gender split (%Male : %Female)</td>
</tr>
<tr>
<td>Average ride cycle duration (min:sec)</td>
</tr>
<tr>
<td>Average nr. passengers per ride cycle</td>
</tr>
</tbody>
</table>

Figure 47. Number of observed behaviours on Jets type ride
8.4.1 One hand waving

![One Hand Waving (total = 25)]

Figure 48. Age & gender distribution of Jet passengers who exhibited one hand waving behaviour.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Communication</th>
<th>Copying</th>
<th>Exhibitionism</th>
<th>Curiosity</th>
<th>Excitement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td></td>
<td></td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td>6</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1-off dynamic</td>
<td></td>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

8.4.2 Jets – Summary of low incidence behaviours

Table 69. Jets: Summary of low incidence behaviours (<20 observed)

<table>
<thead>
<tr>
<th>Two hand waving</th>
<th>Genders of passengers</th>
<th>Ages of passengers</th>
<th>Frequency (number if &gt;1)</th>
<th>Main motives for behaviour (number if &gt;1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>90% female</td>
<td>11 to 15</td>
<td>1-off dynamic (4)</td>
<td>Mainly exhibitionism</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rpt. sustained (2)</td>
<td></td>
</tr>
<tr>
<td>Turning head / trunk</td>
<td>65% female</td>
<td>33% 0 to 10</td>
<td>Rpt. sustained (8)</td>
<td>Communication (11)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>66% 11 to 15</td>
<td>1-off dynamic (5)</td>
<td>Curiosity (6)</td>
</tr>
<tr>
<td>Leaning out of containment</td>
<td>50% female</td>
<td>11 to 15 (male)</td>
<td>1-off sustained (2)</td>
<td>Natural pose (male), Curiosity (female)</td>
</tr>
<tr>
<td>Reaching out of containment (arm only)</td>
<td>75% female</td>
<td>11 to 15</td>
<td>1-off dynamic (4)</td>
<td>Curiosity (3), Exhibitionism &amp; Natural pose (2 males),</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sustained (1 of each category)</td>
<td>Communication</td>
</tr>
<tr>
<td>Standing up</td>
<td>Male</td>
<td>11 to 15</td>
<td>1-off sustained</td>
<td>Exhibitionism</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Pointing</th>
<th>66% female</th>
<th>33% 0 to 10 66% 11 to 15</th>
<th>1-off sustained (male) 1-off dynamic (females)</th>
<th>Communication (all 3)</th>
</tr>
</thead>
</table>

8.5 Tagada

Ride observed at Bathgate Fair, West Lothian (2003)

Table 70. Tagada Summary Details

| Total duration of observation (min:sec) | 16:21 |
| Total number of ride cycles | 4 |
| Total number of passengers observed | 121 |
| Overall gender split (%Male : %Female) | 35% : 65% |
| Average ride cycle duration (min:sec) | 4:05 |
| Average nr. passengers per ride cycle | 30 |

![Figure 49. Number of observed behaviours on Tagada](image)

78
8.5.1 Standing

![Standing (total = 34) Tagada](image)

Figure 50. Age & gender distribution of Tagada passengers who exhibited standing behaviour.

| Table 71. Tagada: Motives for standing up (number of incidences). |
|-------------------|------------------|------------------|
| Behaviour frequency | Copying | Thrill enhancement |
| Male | 1-off dynamic | 1 |
| Rpt. dynamic | | |
| 1-off sustained | 10 |
| Prolonged | | |
| Rpt. sustained | 6 |
| Female | 1-off dynamic | 4 |
| Rpt. dynamic | | |
| 1-off sustained | 11 |
| Prolonged | | |
| Rpt. sustained | 2 |
| Total | 4 | 30 |

8.5.2 Tagada – Summary of low incidence behaviours

| Table 72. Tagada: Summary of low incidence behaviours (<20 observed) |
|-------------------|------------------|------------------|
| Genders of passengers | Ages of passengers | Frequency (number if >1) | Main motives for behaviour (number if >1) |
| One hand waving | 57% male | 11 to 15 (5) 16 to 21 (2) | 1-off sustained (5) Dynamic (1 of each category) | Thrill enhancement (6) Communication (1) |
| Two hand waving | 50% female | 11 to 15 (4) 16 to 21 (5) | 1-off sustained (7) Rpt. sustained (5) | Thrill enhancement (11) Exhibitionism (2) Copying (1) |
8.6 Paratrooper

Ride observed at Bottons Pleasure Beach, Skegness (2002)

Table 73. Paratrooper Summary Details

<table>
<thead>
<tr>
<th>Details</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total duration of observation (min:sec)</td>
<td>24:07</td>
</tr>
<tr>
<td>Total number of ride cycles</td>
<td>8</td>
</tr>
<tr>
<td>Total number of passengers observed</td>
<td>151</td>
</tr>
<tr>
<td>Overall gender split (%Male : %Female)</td>
<td>47%</td>
</tr>
<tr>
<td>Average ride cycle duration (min:sec)</td>
<td>3:23</td>
</tr>
<tr>
<td>Average nr. passengers per ride cycle</td>
<td>19</td>
</tr>
</tbody>
</table>

![Figure 51. Number of observed behaviours on Paratrooper](image)

Table 74. Paratrooper: Summary of low incidence behaviours (<20 observed)

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Genders of passengers</th>
<th>Ages of passengers</th>
<th>Frequency (number if &gt;1)</th>
<th>Main motives for behaviour (number if &gt;1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>One hand waving</td>
<td>64% female</td>
<td>0 to 10 (2)</td>
<td>1-off dynamic (7)</td>
<td>Communication (10)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11 to 15 (4)</td>
<td>1-off sustained (2)</td>
<td>Thrill enhancement (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22 to 30 (3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>30 to 50 (2)</td>
<td>Rpt. dynamic (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1 each)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two hand waving</td>
<td>All female</td>
<td>0 to 10 (1)</td>
<td>1-off dynamic (2)</td>
<td>Exhibitionism (4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11 to 15 (4)</td>
<td>All other categories</td>
<td>Thrill enhancement (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22 to 30 (1)</td>
<td>(1 each)</td>
<td></td>
</tr>
<tr>
<td>Turning head / trunk</td>
<td>80% male</td>
<td>0 to 10 (3)</td>
<td>1-off sustained (4)</td>
<td>Curiosity (the sustained behaviours),</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11 to 15 (2)</td>
<td>1-off dynamic (1)</td>
<td>Communication (the 1-off dynamic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1 each)</td>
<td></td>
<td>behaviour)</td>
</tr>
<tr>
<td>Turning around in seat</td>
<td>50% female</td>
<td>0 to 10 (1)</td>
<td>1-off sustained (4)</td>
<td>Curiosity (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11 to 15 (1)</td>
<td></td>
<td>Communication (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22 to 30 (1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

80
Leaning out of containment | Male | 30 to 50 (1) | 1-off sustained | Communication
Inappropriate exiting of ride (egress related) | Male | 11 to 15 | 1-off dynamic | Impatience
Pointing | 60% female | 0 to 10 (5) | 1-off dynamic (all) | Communication (7) Curiosity (2) Exhibitionism (1)
Kicking | 80% female | 0 to 10 (3) | Rpt. sustained (4) Boredom (3) Exhibitionism (1) | Excitement (1)

8.7 Juvenile Track Ride (Figure of 8 track with bridge & raised section)

Ride observed at Bathgate Fair, West Lothian (2003)

Table 75. Juvenile Track Ride Summary Details

| Total duration of observation (min:sec) | 13:06 |
| Total number of ride cycles | 8 |
| Total number of passengers observed | 173 |
| Overall gender split (%Male : %Female) | 58% : 42% |
| Average ride cycle duration (min:sec) | 3:23 |
| Average nr. passengers per ride cycle | 19 |

Juvenile Track Ride (Fig. of 8 with bridge)
Bathgate Fair, West Lothian, 2003

Figure 52. Number of observed behaviours on Juvenile Track Ride
Table 76. Juvenile Track Ride: Summary of low incidence behaviours (<20 observed)

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Genders of passengers</th>
<th>Ages of passengers</th>
<th>Frequency (number if &gt;1)</th>
<th>Main motives for behaviour (number if &gt;1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>One hand waving</td>
<td>62% male</td>
<td>0 to 10 (all)</td>
<td>1-off sustained (5)</td>
<td>Communication (12)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rpt. dynamic (4)</td>
<td>Exhibitionism (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-off dynamic (3)</td>
<td></td>
</tr>
<tr>
<td>Two hand waving</td>
<td>50% female</td>
<td>0 to 10 (all)</td>
<td>1-off sustained (1)</td>
<td>Exhibitionism (all)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-off dynamic (1)</td>
<td></td>
</tr>
<tr>
<td>Turning head / trunk</td>
<td>55% male</td>
<td>0 to 10 (all)</td>
<td>1-off dynamic (5)</td>
<td>Communication (8)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-off sustained (4)</td>
<td>Curiosity (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rpt. dynamic (1)</td>
<td></td>
</tr>
<tr>
<td>Turning around in seat</td>
<td>Male</td>
<td>0 to 10</td>
<td>1-off dynamic</td>
<td>Curiosity</td>
</tr>
<tr>
<td>Leaning out of containment</td>
<td>Male</td>
<td>0 to 10</td>
<td>1-off sustained</td>
<td>Natural pose</td>
</tr>
<tr>
<td>Reaching out of containment (arm only)</td>
<td>All male</td>
<td>0 to 10 (all)</td>
<td>1-off sustained (all)</td>
<td>Natural pose, Curiosity</td>
</tr>
<tr>
<td>Inappropriate exiting of ride</td>
<td>Female</td>
<td>0 to 10</td>
<td>1-off dynamic</td>
<td>Lack of information / knowledge etc.</td>
</tr>
<tr>
<td>Standing up</td>
<td>75% male</td>
<td>0 to 10 (all)</td>
<td>1-off dynamic (2)</td>
<td>Curiosity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-off sustained (2)</td>
<td>Exhibitionism</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Copying</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Communication (1 of each)</td>
</tr>
<tr>
<td>Pointing</td>
<td>Female</td>
<td>0 to 10</td>
<td>1-off dynamic</td>
<td>Communication</td>
</tr>
</tbody>
</table>
8.8 Adventurer Wave Surfer

Ride observed at Legoland, Windsor (2003).

Table 77. Adventurer Wave Surfer Summary Details

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total duration of observation (min:sec)</td>
<td>24:45</td>
</tr>
<tr>
<td>Total number of ride cycles</td>
<td>5</td>
</tr>
<tr>
<td>Total number of passengers observed</td>
<td>43</td>
</tr>
<tr>
<td>Overall gender split (%Male : %Female)</td>
<td>56% : 44%</td>
</tr>
<tr>
<td>Average ride cycle duration (min:sec)</td>
<td>4:50</td>
</tr>
<tr>
<td>Average nr. passengers per ride cycle</td>
<td>8</td>
</tr>
</tbody>
</table>

Figure 53. Number of observed behaviours on Adventurer Wave Surfer Ride

Table 78. Adventurer Wave Surfer: Summary of low incidence behaviours (<20 observed)

<table>
<thead>
<tr>
<th></th>
<th>Genders of passengers</th>
<th>Ages of passengers (number if &gt;1)</th>
<th>Frequency (number if &gt;1)</th>
<th>Main motives for behaviour (number if &gt;1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>One hand waving</td>
<td>65% female</td>
<td>0 to 10 (1) 11 to 15 (2) 22 to 30 (2) 30 to 50 (3)</td>
<td>1-off dynamic (5) 1-off sustained (3)</td>
<td>Communication (7) Discomfort (1)</td>
</tr>
<tr>
<td>Two hand waving</td>
<td>50% female</td>
<td>11 to 15 (all)</td>
<td>1-off sustained (all)</td>
<td>Discomfort, Thrill enhancement</td>
</tr>
<tr>
<td>Turning head / trunk</td>
<td>All male</td>
<td>11 to 15 (all)</td>
<td>1-off sustained (all)</td>
<td>Communication (all)</td>
</tr>
<tr>
<td>Pointing</td>
<td>Female</td>
<td>30 to 50</td>
<td>1-off dynamic</td>
<td>Communication</td>
</tr>
</tbody>
</table>
8.8.1 Adventurer Water Ride – Additional observations

Very few behaviours were observed on this ride. There was very occasional hand waving but the frequencies were extremely low compared to most other ‘adult’ type rides. This may have been due to 2 factors:

- The passengers were given considerable amount of control over the boats (i.e. how near or far from the central island they were during the ride). This appeared to motivate passengers to use the controls and focus on them rather than wave etc.

- The ride is fairly vigorous (quick and with some bouncing over the uneven water) and the passengers are always standing up. This meant that generally passengers held onto the side rails of the boats to stay upright.

8.9 Orbiter

Ride observed at Pinner Fair, London (2003).

<table>
<thead>
<tr>
<th>Table 79. Orbiter Summary Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total duration of observation (min:sec)</td>
</tr>
<tr>
<td>Total number of ride cycles</td>
</tr>
<tr>
<td>Total number of passengers observed</td>
</tr>
<tr>
<td>Overall gender split (%Male : %Female)</td>
</tr>
<tr>
<td>Average ride cycle duration (min:sec)</td>
</tr>
<tr>
<td>Average nr. passengers per ride cycle</td>
</tr>
</tbody>
</table>

![Figure 54. Number of observed behaviours on Orbiter Ride](image)
8.9.1 Two hand waving

Figure 55. Age & gender distribution of Orbiter passengers who exhibited two hand waving behaviour.

Table 80. Orbiter: Motives for two hand waving (number of incidences).

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Copying</th>
<th>Exhibitionism</th>
<th>Thrill enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td>1</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td>1</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>1</td>
<td>2</td>
<td>34</td>
</tr>
</tbody>
</table>

8.9.2 Orbiter – Summary of low incidence behaviours

Table 81. Orbiter: Summary of low incidence behaviours (<20 observed)

<table>
<thead>
<tr>
<th>Genders of passengers</th>
<th>Ages of passengers (number if &gt;1)</th>
<th>Frequency (number if &gt;1)</th>
<th>Main motives for behaviour (number if &gt;1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>One hand waving</td>
<td>70% female</td>
<td>0 to 10 (3) 11 to 15 (7)</td>
<td>1-off dynamic (6) 1-off sustained (3) Rpt. dynamic (1)</td>
</tr>
<tr>
<td>Turning head / trunk</td>
<td>66% male</td>
<td>11 to 15 (all)</td>
<td>1-off dynamic (all)</td>
</tr>
<tr>
<td>Reaching out of containment (arm only)</td>
<td>50% female</td>
<td>0 to 10 (1) 11 to 15 (1)</td>
<td>1-off dynamic (1)</td>
</tr>
<tr>
<td>Pointing</td>
<td>Male</td>
<td>11 to 15</td>
<td>1-off dynamic</td>
</tr>
</tbody>
</table>
8.10 Juvenile Toyset Roundabout

Ride observed at Irn-Bru Carnival, SECC Glasgow (2003)

Table 82. Juvenile Toyset Roundabout Summary Details

<table>
<thead>
<tr>
<th>Segment</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total duration of observation (min:sec)</td>
<td>10:50</td>
</tr>
<tr>
<td>Total number of ride cycles</td>
<td>5</td>
</tr>
<tr>
<td>Total number of passengers observed</td>
<td>40</td>
</tr>
<tr>
<td>Overall gender split (%Male : %Female)</td>
<td>70% : 30%</td>
</tr>
<tr>
<td>Average ride cycle duration (min:sec)</td>
<td>2:10</td>
</tr>
<tr>
<td>Average nr. passengers per ride cycle</td>
<td>8</td>
</tr>
</tbody>
</table>

Figure 56. Number of observed behaviours on Juvenile Toyset Roundabout.

Table 83. Juvenile Toyset Roundabout: Summary of low incidence behaviours (<20 observed)

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Genders of passengers</th>
<th>Ages of passengers</th>
<th>Frequency (number if &gt;1)</th>
<th>Main motives for behaviour (number if &gt;1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>One hand waving</td>
<td>50% female</td>
<td>0 to 10 (all)</td>
<td>1-off sustained (all)</td>
<td>Communication (all)</td>
</tr>
<tr>
<td>Turning head / trunk</td>
<td>65% female</td>
<td>0 to 10 (all)</td>
<td>1-off dynamic (11)</td>
<td>Communication (9)</td>
</tr>
<tr>
<td>Turning around in seat</td>
<td>66% Male</td>
<td>0 to 10 (all)</td>
<td>1-off sustained (1)</td>
<td>Communication (3)</td>
</tr>
<tr>
<td>Leaning out of containment</td>
<td>66% Male</td>
<td>0 to 10 (all)</td>
<td>1-off sustained (2)</td>
<td>Curiosity (all)</td>
</tr>
<tr>
<td>Reaching out of containment (arm only)</td>
<td>Male</td>
<td>0 to 10</td>
<td>1-off dynamic</td>
<td>Communication</td>
</tr>
<tr>
<td>Inappropriate exiting of ride (egress related)</td>
<td>60% Female</td>
<td>0 to 10 (all)</td>
<td>1-off dynamic (all)</td>
<td>Impatience (all)</td>
</tr>
<tr>
<td>Standing up</td>
<td>All male</td>
<td>0 to 10 (all)</td>
<td>1-off dynamic (all)</td>
<td>Communication, Curiosity (1 of each)</td>
</tr>
<tr>
<td>Pointing</td>
<td>67% Female</td>
<td>0 to 10 (all)</td>
<td>1-off dynamic (all)</td>
<td>Communication (all)</td>
</tr>
</tbody>
</table>
8.11 Pendulum


Table 84. Pendulum Summary Details

| Total duration of observation (min:sec) | 31:29 |
| Total number of ride cycles           | 12    |
| Total number of passengers observed   | 164   |
| Overall gender split (%Male : %Female)| 47% : 53% |
| Average ride cycle duration (min:sec) | 2:37  |
| Average nr. passengers per ride cycle | 14    |

Figure 57. Number of observed behaviours on Pendulum Ride

8.11.1 Two hand waving

Figure 58. Age & gender distribution of Pendulum passengers who exhibited two hand waving behaviour.
Table 85. Pendulum: Motives for two hand waving (number of incidences).

<table>
<thead>
<tr>
<th>Behaviour frequency</th>
<th>Copying</th>
<th>Exhibitionism</th>
<th>Thrill enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td>3</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off dynamic</td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Rpt. dynamic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-off sustained</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Rpt. sustained</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4</td>
<td>1</td>
<td>18</td>
</tr>
</tbody>
</table>

8.11.2 Pendulum – Summary of low incidence behaviours

Table 86. Pendulum: Summary of low incidence behaviours (<20 observed)

<table>
<thead>
<tr>
<th></th>
<th>Genders of passengers</th>
<th>Ages of passengers</th>
<th>Frequency (number if &gt;1)</th>
<th>Main motives for behaviour (number if &gt;1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>One hand waving</td>
<td>60% male</td>
<td>16 to 21 (all)</td>
<td>Rpt dynamic (6)</td>
<td>Thrill enhancement (5 – mainly the repeated cases)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-off dynamic (4)</td>
<td>Communication (4 – all 1-off dynamic cases)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Prolonged (2)</td>
<td>Exhibitionism (1 - prolonged)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Excitement (1)</td>
</tr>
<tr>
<td>Pointing</td>
<td>All male</td>
<td>16 to 21 (all)</td>
<td>1-off dynamic</td>
<td>Communication</td>
</tr>
</tbody>
</table>
8.12 Superspin


<table>
<thead>
<tr>
<th>Table 87. Superspin Summary Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total duration of observation (min:sec)</td>
</tr>
<tr>
<td>Total number of ride cycles</td>
</tr>
<tr>
<td>Total number of passengers observed</td>
</tr>
<tr>
<td>Overall gender split (%Male : %Female)</td>
</tr>
<tr>
<td>Average ride cycle duration (min:sec)</td>
</tr>
<tr>
<td>Average nr. passengers per ride cycle</td>
</tr>
</tbody>
</table>

![Superspin V2003, Telford, 2003](image)

**Figure 59. Number of observed behaviours on Superspin Ride**

<table>
<thead>
<tr>
<th>Table 88. Superspin: Summary of low incidence behaviours (&lt;20 observed)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Genders of passengers</strong></td>
</tr>
<tr>
<td>--------------------------------</td>
</tr>
<tr>
<td><strong>One hand waving</strong></td>
</tr>
<tr>
<td><strong>Two hand waving</strong></td>
</tr>
<tr>
<td><strong>Pointing</strong></td>
</tr>
</tbody>
</table>
8.13 Breakdance

Ride observed at Chessington World of Adventures, Surrey (2003)

<table>
<thead>
<tr>
<th>Table 89. Breakdance Ride Summary Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total duration of observation (min:sec)</td>
</tr>
<tr>
<td>Total number of ride cycles</td>
</tr>
<tr>
<td>Total number of passengers observed</td>
</tr>
<tr>
<td>Overall gender split (%Male : %Female)</td>
</tr>
<tr>
<td>Average ride cycle duration (min:sec)</td>
</tr>
<tr>
<td>Average nr. passengers per ride cycle</td>
</tr>
</tbody>
</table>

![Figure 60. Number of observed behaviours on Rodeo Ride](image)

| Table 90. Breakdance: Summary of low incidence behaviours (<20 observed) |
|-----------------------------|-----------------------------|-----------------------------|----------------------------|
| Genders of passengers      | Ages of passengers          | Frequency (number if >1)    | Main motives for behaviour (number if >1) |
| One hand waving            | 60% female                  | 11 to 15 (7)                | Rpt. dynamic (5)           |
|                            |                             | 22 to 30 (1)                | Rpt. sustained (3)         |
|                            |                             | 30 to 50 (2)                | 1-off dynamic (2)          |
|                            |                             |                             | Communication (7)          |
|                            |                             |                             | Thrill enhancement (3)     |
| Two hand waving            | 80% male                    | 11 to 15 (2)                | 1-off dynamic (3)          |
|                            |                             | 16 to 21 (7)                | Prolonged (3)              |
|                            |                             | 22 to 30 (1)                | 1-off sustained (2)        |
|                            |                             |                             | Rpt sustained (2)          |
|                            |                             |                             | Thrill enhancement (7)     |
|                            |                             |                             | Communication (3)          |
| Pointing                   | 50% female                  | 11 to 15 (all)              | Rpt. dynamic (all)         |
|                            |                             |                             | Communication              |
8.14 Chairlift

Ride observed at Pleasureland, Southport (2003)

<table>
<thead>
<tr>
<th>Table 91. Chairlift Ride Summary Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total duration of observation (min:sec)</td>
</tr>
<tr>
<td>Total number of ride cycles</td>
</tr>
<tr>
<td>Total number of passengers observed</td>
</tr>
<tr>
<td>Overall gender split (%Male : %Female)</td>
</tr>
<tr>
<td>Average ride cycle duration (min:sec)</td>
</tr>
<tr>
<td>Average nr. passengers per ride cycle</td>
</tr>
</tbody>
</table>

**Figure 61. Number of observed behaviours on Chairlift**

<table>
<thead>
<tr>
<th>Table 92. Chairlift: Summary of low incidence behaviours (&lt;20 observed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genders of passengers</td>
</tr>
<tr>
<td>-----------------------</td>
</tr>
<tr>
<td>One hand waving</td>
</tr>
<tr>
<td>Two hand waving</td>
</tr>
<tr>
<td>Turning head/trunk</td>
</tr>
<tr>
<td>Turning around in seat</td>
</tr>
<tr>
<td>Leaning out of</td>
</tr>
</tbody>
</table>
### 9.0 Section 4: Behaviour patterns across all rides

This section presents the overall incidences of behaviour across all the rides and passengers who were observed. This data gives an overview of the types of behaviour which all of the ride users exhibited. However, it is of limited use in terms of making an informed risk assessment on a particular ride (i.e. the behaviour patterns on particular rides may be significantly different from the overview patterns due to specific features of the ride designs). The more detailed ride type / ride specific information from the previous sections would need to be used to perform risk assessments or to inform design decisions etc.

#### 9.1 Summary Statistics

- Total number of passengers who were observed on rides (all passengers whether they exhibited a behaviour or not): **7096 passengers**
- Total number of behaviours observed: **2872 behaviours**
- Gender distribution of passengers who exhibited behaviour: **59.4% female : 40.6% male**
- Total number of different rides observed: **51 rides**
- Total number of different ride types observed: **25 types**

<table>
<thead>
<tr>
<th>Age group</th>
<th>Number of behaviours exhibited by passengers in specific age groups</th>
<th>Percentage of behaviours exhibited by passengers in specific age groups</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>949</td>
<td>33%</td>
<td>33</td>
</tr>
<tr>
<td>11-15</td>
<td>1388</td>
<td>48%</td>
<td>81</td>
</tr>
<tr>
<td>16-21</td>
<td>308</td>
<td>11%</td>
<td>92</td>
</tr>
<tr>
<td>22-30</td>
<td>118</td>
<td>4%</td>
<td>96</td>
</tr>
<tr>
<td>31-50</td>
<td>105</td>
<td>4%</td>
<td>100</td>
</tr>
<tr>
<td>50+</td>
<td>4</td>
<td>0%</td>
<td>100</td>
</tr>
</tbody>
</table>

The following two graphs (figures 62 and 63) show the total number of behaviours observed in each category.
Overall Behaviour Incidence
(where total >=20)

- One hand waving: Male 200, Female 206
- Two hand waving: Male 380, Female 309
- Turning head/trunk: Male 200, Female 206
- Turning around in seat: Male 67, Female 38
- Leaning out of containment: Male 126, Female 41
- Reaching out of containment (arm only): Male 126, Female 41
- Reaching out of containment (leg only): Male 20, Female 41
- Standing up: Male 81, Female 38
- Pointing: Male 81, Female 38
- Interact with containment device: Male 81, Female 38

Total number of observed behaviours

Figure 62. Overall number of behaviours observed in each category (where total >= 20)
9.2 Summary of specific behaviours (>=20 incidences)

The following pages (95 to 98) contain graphs which show in more detail the age distribution, behaviour patterns and motives for all behaviours where more than 20 incidences were observed.
One handed waving – Behaviour summary graphs across all rides
(Figs 64 to 66)

Two handed waving – Behaviour summary graphs across all rides
(Figs 67 to 69)

Turning head / trunk – Behaviour summary graphs across all rides
(Figs 70 to 72)

One hand waving: Behaviour patterns

Two hand waving: Behaviour patterns

Turning head / trunk: Behaviour patterns

One hand waving: Ages of passengers

Two hand waving: Ages of passengers

Turning head / trunk: Ages of passengers

One hand waving: Motives

Two hand waving: Motives

Turning head / trunk: Motives

One hand waving: Ages of passengers

Two hand waving: Ages of passengers

Turning head / trunk: Ages of passengers

Female
Male

Number of observed cases

0-10 11-15 16-21 22-30 31-50 50+

Female
Male

Number of observed cases

0-10 11-15 16-21 22-30 31-50 50+

Female
Male

Number of observed cases

0-10 11-15 16-21 22-30 31-50 50+

Female
Male

Female
Male

Female
Male

Female
Male

Female
Male

Female
Male

Communication
Copy
Exhibition
Encouragement
Curiosity
Thrill
Enhancement
Discomfort
Excitement

Communication
Copy
Exhibition
Encouragement
Curiosity
Boredom / natural pose

95
Turning around in seat – Behaviour summary graphs across all rides (Figs 73 to 75)

Leaning out of containment – Behaviour summary graphs across all rides (Figs 76 to 78)

Reaching out of containment (arm only) – Behaviour summary graphs across all rides (Figs 79 to 81)

**Turning around in seat: Ages of passengers**

- Ages: 0-10, 11-15, 16-21, 22-30, 31-50
- Bars for Female and Male

**Leaning out of containment: Ages of passengers**

- Ages: 0-10, 11-15, 16-21, 22-30
- Bars for Female and Male

**Reaching out of containment (arm only): Ages of passengers**

- Ages: 0-10, 11-15, 16-21, 22-30, 31-50
- Bars for Female and Male

**Turning around in seat: Behaviour patterns**

- Patterns: one-off, repeated, single sustained, prolonged, sustained and repeated
- Bars for Female and Male

**Leaning out of containment: Behaviour patterns**

- Patterns: one-off, single sustained, prolonged, sustained and repeated
- Bars for Female and Male

**Reaching out of containment (arm only): Behaviour patterns**

- Patterns: one-off, repeated, single sustained, prolonged, sustained and repeated
- Bars for Female and Male

**Turning around in seat: Motives**

- Motives: communication, copying, aggression/competition, exhibitionism, curiosity, boredom/natural pose, discomfort, excitement
- Bars for Female and Male

**Leaning out of containment: Motives**

- Motives: communication, copying, aggression/competition, exhibitionism, curiosity, boredom/natural pose, discomfort, excitement
- Bars for Female and Male

**Reaching out of containment (arm only): Motives**

- Motives: communication, copying, aggression/competition, exhibitionism, curiosity, boredom/natural pose, self enhancement, discontent, excitement
- Bars for Female and Male
Reaching out of containment (leg only) –
Behaviour summary graphs across all rides (Figs 82 to 84)

Standing up – Behaviour summary graphs across all rides
(Figs 85 to 87)

Pointing – Behaviour summary graphs across all rides
(Figs 88 to 90)
Interact with containment device –
Behaviour summary graphs across all rides (Figs 91 to 93)

**Interact with containment device: Ages of passengers**

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Number of Observed Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-15</td>
<td>Female: 2 Male: 0</td>
</tr>
<tr>
<td>16-21</td>
<td>Female: 6 Male: 6</td>
</tr>
</tbody>
</table>

**Interact with containment device: Behaviour patterns**

<table>
<thead>
<tr>
<th>Behaviour Type</th>
<th>Number of Observed Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-off behaviour</td>
<td>Female: 1 Male: 0</td>
</tr>
<tr>
<td>Repeated action</td>
<td>Female: 2 Male: 0</td>
</tr>
<tr>
<td>Single sustained action</td>
<td>Female: 0 Male: 0</td>
</tr>
<tr>
<td>Prolonged action</td>
<td>Female: 0 Male: 0</td>
</tr>
</tbody>
</table>

**Interact with containment device: Motives**

<table>
<thead>
<tr>
<th>Motive</th>
<th>Number of Observed Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural pose</td>
<td>Female: 8 Male: 0</td>
</tr>
<tr>
<td>Thrill</td>
<td>Female: 9 Male: 0</td>
</tr>
<tr>
<td>Enhancement</td>
<td>Female: 4 Male: 0</td>
</tr>
<tr>
<td>Discomfort</td>
<td>Female: 1 Male: 0</td>
</tr>
</tbody>
</table>
9.2.1 Standing up

Passengers’ apparent motives for standing during ride cycles depends to a large extent on the type of ride they are on. For example on Pirate Ships standing up is one of the key thrill enhancement behaviours, whereas on small coasters and juvenile autodromes it tends to occur due to impatience at the end of a ride cycle. Table 94 is intended give a summary of the ride – standing behaviour interaction.

<table>
<thead>
<tr>
<th>Ride Type</th>
<th>Main reasons for standing / Standing behaviours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional Carousels</td>
<td>• Assuming a non seated comfortable posture (standing up on horses steps)</td>
</tr>
<tr>
<td></td>
<td>• Thrill enhancement &amp; exhibitionist behaviour (standing and climbing between horses)</td>
</tr>
<tr>
<td></td>
<td>• Eagerness / impatience to exit ride during main ride cycle (i.e. before the ride has begun to slow significantly)</td>
</tr>
<tr>
<td>Coasters</td>
<td>• Eagerness / impatience to exit ride before it has come to a standstill</td>
</tr>
<tr>
<td>Log Flumes</td>
<td>• Discomfort – wanting to get off the wet seat and brush off water</td>
</tr>
<tr>
<td></td>
<td>• Curiosity – trying to see over the top / side of the log</td>
</tr>
<tr>
<td>Pirate Ship</td>
<td>• Thrill enhancement – standing up (as much as possible given the containment systems restrictions) during the peak movements</td>
</tr>
<tr>
<td>Junior Autodromes / Juvenile Tracks / Toyset Roundabouts</td>
<td>• Eagerness / impatience to exit ride before it has come to a stop</td>
</tr>
<tr>
<td>Jets / Mini Jet / Kiddie Copter</td>
<td>• Eagerness / impatience to exit ride before it has come to a stop</td>
</tr>
<tr>
<td>Tagada</td>
<td>• Thrill enhancement – meeting the perceived challenge of trying to stand during slow bouncing movements</td>
</tr>
</tbody>
</table>

As table 94 illustrates, motives for standing (and therefore the types of passengers likely to stand) vary between rides. Overall, for juveniles (up to age 7 / 8) standing tends to occur towards the end of ride cycles and can commonly be linked to impatience or a eagerness to get out of the ride and move on to a new attraction. Amongst this low age group standing also occurs if a ride stops mid-cycle. From a design aspect it may be important to consider how standing during a mid-cycle-stop could be eliminated (e.g. additional restraints or containment modifications). It is important for operators to be aware that people may be standing once the ride starts up again after a mid-cycle-stop. If operators look for people who stand under these conditions, they should be able to ensure that anyone who does stand up is seated again before the ride re-starts.
9.3 Summary of specific behaviours (<20 incidences)

9.3.1 Kneeling on seat

Only 3 passengers were observed turning and then kneel on their seat. All of these passengers were male and in the 0 to 10 years age group. In all three cases the behaviour was a one-off dynamic action and the perceived motives were; communication (turning to talk to parents), curiosity (taking a look around) and moving into a natural / comfortable pose (e.g. moving from a standing posture). Kneeling was only seen on the Junior Autodromes and the Mini jets (i.e. juvenile rides).

9.3.2 Extended reaching out of containment (arm and body part)

On bench rides extended reaching (3 cases) comprised of an exaggerated two hand wave, where the passenger strained upwards and forwards out of the seat / containment as much as it would allow (all females aged approximately 14 to 17, apparently motivated by exhibitionism and thrill enhancement).

On coasters (3 cases), the extended reaching which was noted, was an exaggerated act of reaching out of containment towards passing structures (all males aged approximately 10, they appeared to be motivated by curiosity i.e. trying to see if they can reach passing structure).

There were single cases of extended reaching on;
Waltzers (Female, aged 16 to 21, 1-off sustained action, exhibitionism),
Junior Autodrome (Male, aged 0 to 10, 1-off sustained action, communication),
Mini Jets (Male, 0 to 10, 1-off, natural pose / nonchalance) and
Jumpers (Male, 11 to 15, 1-off sustained, exhibitionism).

9.3.3 Interfering with containment system

Only 4 cases of interfering with containment were observed. One of these was a young male (0 to 10 age group) on a Twist ride who tried to unlock the handrail / lap bar (using the lever on the front of the car) before the ride had stopped sufficiently to exit safely.

The three remaining interfering behaviours took place on a mini-jet ride which had a lap bar. All three cases involved passengers (one female and male, all age group 0 to 10) trying to open the lap-bar, each for apparently different reasons; impatience, curiosity and lack of information (i.e. believing that he was meant to be trying to exit the ride himself).

9.3.4 Inappropriate exiting from ride

This behaviour category is different from ‘standing up’ because it represents standing, followed by a continued effort to exit the ride (which may involve some climbing or walking / running).

All four cases of inappropriate exiting from the ride occurred on Traditional Carousels. The behaviour itself involved standing up and trying to exit / climb down from the rotating disc during the main ride cycle (during full speed rotation). Three passengers were male and one was female (all were estimated as age group 0 to 10). Two males appeared to exit the ride because of impatience, another because of lack of knowledge / appearing to exit the ride as though it was an expected behaviour. The female appeared to exit the ride out of curiosity (because of having focused attention on events / items off the ride).
These behaviours were not noted as egress related because they were not behaviours / activities which occurred during the scheduled egress period (in the case of Traditional Carousels, as the ride is beginning to slow down or has stopped).

9.3.5 Inappropriate exiting from ride (egress related)

The main differences between ‘inappropriate exiting from ride’ and the same behaviour ‘egress related’ are as follows:

- Egress related refers to inappropriate behaviours which occurred as a ride was slowing down or had stopped for the passengers to get out.
- Egress related is also used with reference to rides which have a seating arrangement, lap bar, hand rail or shoulder restraints etc. which passengers must make some effort to open / overcome during the inappropriate exiting behaviour.

Inappropriate egress was observed on three types of ride; Paratroopers (1 case), Juvenile Toyset Roundabouts (5 cases) and Mini Jets (4 cases).

On the Paratrooper, a male passenger between 11 and 15 was observed jumping from the chair before the ride it stopped moving. This appeared to be due to impatience to exit the ride.

On the Juvenile Toyset Roundabout the 5 passengers (3 female, 2 male, all age group 0 to 10) begun to exit the cars etc. at the very early stage of the ride slowing down. This meant that they were standing but unable to exit the roundabout safely. All four passengers appeared to be anxious / impatient to get off the ride.

On the Mini Jets the 4 passengers (1 female, 3 male, all age group 0 to 10) began to try and exit the ride at an early stage of slowing down. As with the Toyset Roundabout, this meant they could not exit the ride safely, and the passengers tended to stand up then lean against the side of the car in anticipation of exiting. It appeared that the main motivation for this behaviour was impatience to get off the ride.

9.3.6 Violent behaviour

All 3 cases of violent behaviour occurred on a Bench ride and involved a group of males aged between 11 and 15. As the passengers appeared to know each other however, the incidence was judged as more than boisterousness (i.e. it appeared to involve some conflict). The physical actions involved passengers leaning forwards and striking sideways / backwards at another passenger.

9.3.7 Boisterous behaviour

A total of 17 boisterous behaviours were observed across all rides. These were roughly devided equally between males and females. The majority of passengers who displayed boisterous behaviours were in the age group 11 to 15 and their motives tended to be competition / aggression (although little aggression was in fact evident).

The majority of boisterous behaviours (11 in total) were observed on Log Flumes. This is because splashing water from the channel over other passengers was classed as a boisterous behaviour (6 males, 5 females, primarily a repeated dynamic behaviour).
Two occurrences of boisterous behaviours were observed on coasters. These involved two females in the 11 to 15 age group engaging in a 1-off dynamic ‘pretend fight’ (i.e. an exhibitionist non-aggressive behaviour).

On bench rides two males, also in the 11 to 15 age group engaged in similar boisterous behaviour, the motive was classed as competition / aggression.

Single instances of boisterous behaviour occurred on Pirate Ships (female, 11 to 15, 1-off sustained, competition / aggression) and Junior Autodrome (female, age group 0 to 10, exhibitionism). Both of these involved passengers tapping or gently striking other passengers (siblings etc.).

### 9.3.8 Kicking legs

Kicking was observed on Bench rides (10 cases) and Jumpers (4 cases), both types of ride where legs can hang freely.

On both rides the kicking was primarily a repeated dynamic behaviour (9 out of 14 cases) and tended to be due to a combination of excitement, thrill enhancement and exhibitionism. In three cases kicking appeared to occur as a natural nonchalant action. Passengers who exhibited kicking behaviour were mainly from age groups 0 to 10 (7 cases) and 11 to 15 (4 cases).
10.0 Discussion

The types of behaviour which were observed on the various rides, and the behaviour incidence levels ranged widely between rides. In order to use this report for risk assessment or design purposes the reader would need to look at the results section for particular rides / ride types. A reiteration of the results of the video analysis for each ride is considered to be beyond the scope of this discussion. For an overview of the types of behaviour / incidence levels, the reader should refer back to tables 6a and 6b.

In general, faster rides such as Twists, Waltzers, Superbowls, Spinning coasters and Breakdance (and to a lesser extent Jumpers) showed proportionally lower overall levels of behaviours. The primary behaviours on these rides were one and two hand waving. As discussed earlier in this report, on vigorous rides many passengers may be discouraged by the ride motion or feel physically unable to engage in other behaviours.

In general, slower rotating rides such as Traditional Carousels, Toyset roundabouts, Junior Autodromes and Mini Jets were associated with relatively high levels of one hand waving in comparison to the other behaviours which were observe on those rides. This tended to be due to younger passengers waving to adults (e.g. parents) standing at the sides of the rides. The data reveals that roughly the same number of one and two hand waves were exhibited by passengers aged 0 to 10 years. However, almost three times as many two hand waves (than one hand waves) were shown by passengers aged 11 to 15. Two hand waves tended to be primarily motivated by thrill enhancement and exhibitionism, whereas one hand waves were mainly actions of communication. Table 95 below allows a direct comparison of the different levels of the 4 main motives, between the lowest three age groups. The four main motives were associated with 82% of all the observed behaviours.

| Table 95. Number of behaviours attributed to the 4 main motives (as % of all the motives within each age group) |
|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|
| Number of behaviours expressed as % of overall motives for passengers aged 0 to 10 | Number of behaviours expressed as % of overall motives for passengers aged 11 to 15 | Number of behaviours expressed as % of overall motives for passengers aged 16 to 21 |
| Communication | 40 | 19 | 16 |
| Exhibitionism | 3 | 11 | 13 |
| Curiosity | 12 | 5 | 1 |
| Thrill enhancement | 26 | 48 | 50 |

The percentages in table 95 indicate that younger passengers maintain a strong focus on items off the ride (perhaps because more children of that age are accompanied), and it indicates a desire amongst younger passengers to remain in contact with parents / older siblings etc. This is supported by younger passengers also trying to exit rides early and standing up when rides stop mid-cycle. The design and movement of these slower rotating rides make waving to people off the ride a natural thing for any passengers to do and also tend to result in a large proportion of passengers being in the younger age groups. The majority of the head / trunk turning behaviours were the result of continued one hand waving on rotating rides (i.e. as the passenger is moved around they have to turn to continue waving in the same direction).
The percentages support findings that a relatively large number of turning head / trunk, turning in seat and kneeling in seat behaviours exhibited by younger age groups were also associated with curiosity. This supports the notion that younger children (up to age 10) may focus on items / people off the ride and move into positions which afford them better views. It is possible that young children may focus off the ride to the extent that they move into positions of danger without giving thought to the safety risks to themselves. It is also possible that if these passengers find themselves in a position of danger (i.e. kneeling on a seat and leaning forwards against the seat back) when the ride makes a sudden movement (starts or stops suddenly) they may become physically unbalanced or may become scared and make further inappropriate actions (e.g. trying to climb off the ride).

Table 95 also shows that behaviours motivated by exhibitionism and thrill enhancement are noticeably higher amongst older children, teenagers and young adults. This supports a general impression that passengers in these age groups (11 to 15 and 16 to 21) focus more on their own experience / the ride and presenting themselves in ways that they consider appropriate or socially beneficial amongst their peers. There may be three key reasons for the changing motives (and different levels / types of behaviour) exhibited by these 11 to 21 age groups:

- **Absence of parents / adults as inhibiting influence**
  Most children of these age groups (above age 13 / 14) appeared to be with groups of friends / with siblings rather than adults.

- **Presence of peers**
  This may be an underlying factor which encourages / leads passengers in these age groups to engage in more behaviours due to exhibitionism and thrill enhancement. However, copying in its most rigid sense was not noted to be higher amongst these age groups.

- **Underlying developmental factors**
  Older children, teenagers and younger adults may develop increased ability and tendency to actively engage with the ride i.e. to use the ride as a platform for showing off and / or enhancing the physical and psychological experience.

Behaviours motivated by communication increase again in the older age groups (46% of behaviours exhibited by 22 to 30 year olds, 65% of behaviours exhibited by 31 to 50 year olds and 75% of behaviours exhibited by passengers over 50 years old were associated with communication). There is a concurrent decrease in behaviours motivated by thrill enhancement amongst these older passengers (only 17% of 22 to 30 year olds behaviours, 15% of 31 to 50 year olds behaviours and none of the behaviours exhibited by passengers over 50 were associated with thrill enhancement). It is possible that this increase in ‘responsible’ behaviours amongst older passengers was due to their relatively low number within the overall passenger population. Under these circumstances adults may be more inclined to try and set examples or may be more preoccupied with their childrens comfort etc. Without these potentially inhibiting factors it is possible that older passengers would show similar levels of exhibitionist and thrill enhancement behaviours.

Although only a relatively low number of young passengers (aged up to 10 / 11) were seen trying to get off rides before they had stopped, the subjective impression from visits is that a group of passengers who are particularly likely to engage in this activity are children aged up to approximately 11, who are perhaps slightly ‘too old’ for the ride. These passengers often give the impression of becoming over-familiar or bored with the ride which leads them to stand up to exit.
It would be difficult and financially unreasonable to expect operators of juvenile rides to set an age limit which is particularly low / specific. However, they should ensure that ‘older’ passengers are monitored to ensure that they do not try to exit rides before it is safe to do so.

The safety implications of behaviours, in particular standing up and trying to exit the ride inappropriately, vary depending upon which ride the behaviours occur. On certain rides such as log flumes and Mini jets it is clear that there could be serious consequences if passengers stand up and fall out of the log / car while the ride is in motion. However, on other rides such as carousels the behaviour does not present such a high risk. This variation in behaviours and consequences is the basis for the importance of considering rides / types of ride individually. If a risk assessment is carried out on a ride, the behaviour catalogue and predicted behaviour frequencies (Section 1 results) should be a useful starting point for considering passengers behaviour. If a behaviour is considered to represent a potential risk to passengers, it would then be worthwhile the assessor looking at the ride / behaviour (Section 2 or 3 results).

None of the behaviour types revealed a strong bias towards males or females. Certain behaviours did show higher levels of males or females having exhibited them, however the number of incidences of those behaviours is invariably too small to allow any conclusions about gender bias. Although the total behaviour incidence data for more common behaviours does show higher numbers of females exhibiting the behaviours this is believed to reflect the overall gender split (59% females to 41% males) of passengers who exhibited behaviour. The 3:2 ratio is itself believed to closely reflect the gender distribution of all 7096 observed passengers (although this was not formally recorded). Table 96 shows the percentage of male and female behaviours that were associated with the 4 main motive categories.

Table 96. Percentage of behaviours attributed to the 4 main motives
(as % of all the motives for males or females)

<table>
<thead>
<tr>
<th></th>
<th>% of overall motives for Males (n=1166)</th>
<th>% of overall motives for Females (n=1708)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>25</td>
<td>31</td>
</tr>
<tr>
<td>Exhibitionism</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Curiosity</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Thrill enhancement</td>
<td>36</td>
<td>41</td>
</tr>
<tr>
<td>Total</td>
<td>79% of all male behaviours were</td>
<td>85% of all female behaviours were</td>
</tr>
<tr>
<td></td>
<td>associated with main 4 motives</td>
<td>associated with main 4 motives</td>
</tr>
</tbody>
</table>

Table 96 indicates that females tend to engage in behaviours as a way of communicating, more than males (behaviours such as one hand waving and pointing). Females may also engage in more behaviours as a means of enhancing the ride experience. Males appeared to engage in more curiosity driven behaviours compared to females (e.g. reaching out of side of coasters, log flumes, turning head / trunk). There was less overall variation in females motives (i.e. fewer females behaviours were attributed to motives other than the main 4). This may account partially for the higher female communication and thrill enhancement percentages.

Overall only a relatively low number of behaviours were observed which were considered to present passengers with a significant risk of injury. This is perhaps to be expected given the relatively low accident rate for the Amusement Industry (i.e. if the ‘risky’ behaviours are uncommon, there will be a similarly reduced level of injuries occurring because of them). Behaviours which were considered to present a significant risk of injury are discussed in the next section of this discussion.
The following discussion sub-sections consider:

- Less common ‘risky’ behaviours;
- Effects of providing passengers with ride controls;
- Behavioural responses to written signs;
- Summary of NAFLIC bulletins relating to passenger behaviour.
- Future and continuing research on passenger behaviour;
- Limitations of this field study;

10.1 Observed behaviours which present significant risk

- **Sticking leg out of side of pirate ship**
  This behaviour was only observed once however, it is also noted in a NAFLIC bulletin (105) as a behaviour which will occur from time to time. The bulletin outlines ways that operators should consider modifying the ride / platforms / barriers if testing reveals a shear trap. Briefly, these modifications could involve lowering guard rails once all passengers are loaded, retracting the loading platform away from the ship after loading, fitting doors to entrance gaps on the ship, and as an additional measure ensuring visible and readable signs warning passengers to keep ‘all parts of their body’ inside the ship at all times.

- **Climbing between horses on Traditional Carousel**
  This behaviour was exhibited once by a young male passenger. The passenger climbed and stood on the back of his horse, he then reached across to an adjacent horses pole, gripped it and then placed a foot on the back of the adjacent horse. The passenger then swung himself over to stand with both feet on the back of the second horse. Because of the height, rotation and vertical movement of the horses there is a risk that passengers who climb between horses in this way may fall and sustain injuries. NAFLIC bulletin 078 refers to an incident where an elderly male fell while attempting to change horses. This bulletin is not believed to refer to the climbing behaviour described above, however the evidence indicates that the idea of changing horses may occur to someone of almost any age group (except toddlers with parents) and that passengers will attempt to change horses in a variety of ways, each with different levels of associated risk. A less extreme version of this behaviour would be to climb between adjacent horses standing on their steps (rather than their backs). This was not observed but it is believed to be a potential behaviour.

The traditional design of these carousels means it is not feasible to fit a restraint system such as a lap belt. It is therefore important that operators are aware of the potential for this behaviour and are vigilant so that they can try to warn passengers to remain seated if they believe they are starting to climb between horses. Signs should also warn passengers specifically not to climb or move between horses while the ride is in motion.

- **Lying back on Traditional Carousel horses**
  Two young female passengers were seen lying back on their horses and lifting their feet onto the horses’ heads. Although both passengers appeared to continue to grip the upright pole there is a possibility that they (or anyone engaged in the same behaviour) could fall off the horse and almost inevitably land on their head / neck. The likely head-first posture upon impact and the
height of the fall could result in a serious injury. Although both passengers who exhibited this behaviour were young females, it is possible that any normally fit passenger could lie back on a horse if they wanted to. Subjectively, it is believed that this behaviour will mainly occur spontaneously amongst young passengers (up to age 16 / 17). However, it is possible that older passengers (in particular parents accompanying young children / teenagers) may also try to copy those children when / if they lie back on horses.

As with ‘climbing between horses’ it is important for operators to be vigilant and actively discourage / warn passengers who exhibit this behaviour. Similarly, signs could also be used to warn passengers not to lie back on horses.

- **Reaching / leaning forwards for controls on Mini Jet / Kiddie Copter**
Several young passengers on Mini Jets were observed to stand and reach forwards from the rear seating and try to operate the controls at the front seats. This behaviour is discussed in more detail in relation to the effects of providing ride (height variation) controls. This behaviour occurred because young children tended to climb into the rear seats on the ride (possibly because they are used to sitting in the rear of a car and are slightly conditioned to sit in the rear of a vehicle). Once they were sitting in the rear seats and the ride started moving, the children realised that the controls could be used to alter the height of the car and made an effort to reach them.

Operators should ensure that children riding on their own or in pairs, sit in the front of the cars. This will eliminate the need for them to stand in order to reach the controls. Operators should also look out for any passengers who stand up and possibly even climb across into the front seats during the main ride cycle. If these behaviours occur the operator should warn the passengers to remain seated, and if necessary stop the ride.

- **Standing up on Juvenile Track (Figure of 8 with bridge).**
Standing occurred for two main reasons on this ride; standing astride toy motorbikes and standing to begin exiting the ride during a mid-cycle stoppage. Standing astride the toy motorbikes is considered to represent some risk if it is combined with waving and occurs on elevated ride sections. Injury would almost certainly result if a passenger fell from a motorbike and then fell to the ground.

The single case of inappropriate exiting of the ride (involving standing) occurred during a stoppage. The passenger was unaware that the ride was about to start again and began to disembark. Fortunately the passenger’s parents were close by and she was not on an elevated section of track. If a similar event occurred and a passenger stood up whilst on an elevated section and not clearly visible to the operators it is possible that he / she may be struck by a toy as the ride began to move again and this could result in injury / falling from the ride.

It is important that operators are aware of this behaviour and try to ensure that passengers remain seated and reassured in the event of stoppages (particularly because of the higher tendency for juvenile rides to be stopped mid-cycle to allow passengers to get off). To achieve this it is important that the operator has good sightlines throughout the ride.

- **Reaching out of side on log flume**
On log flumes passengers reach out to touch the water in the channel and / or touch the side of the channel. There may be a risk of entrapment between the log and the side of the channel. Under normal conditions entrapment is unlikely to occur, however if other passengers begin to rock the log from side to side, it is possible that someone’s arm may be trapped and crushed as the gap between log and channel wall is closed.
Increased operator vigilance for this combination of behaviours is difficult because areas of log flume channel are often concealed from the operating station. If visibility is poor, operators may require CCTV to monitor behaviour. If operators observed any potentially dangerous scenarios involving passengers reaching out / rocking the log, they could either stop the ride or warn the passengers over a loudspeaker system etc. It may also be possible to design log flumes so that the logs can only be rocked from side to side a certain amount (always leaving sufficient clearance for a large adult male arm). It is considered likely that wider channels would result in more adventurous passengers making extended reaches to the channel sides, possibly resulting in them falling or being pushed out of the log.

- **Standing on log flume**
  Passengers were observed standing in log flumes for 4 main reasons; discomfort following the main drop, curiosity / looking around, exhibitionism and communication (with people on and off the ride). Often the passengers stood up for a sustained period. There is a risk that passengers who stand up may fall out of the log (a risk which would be increased if other passengers rock the log from side to side or if the ride stops suddenly). If a passenger fell out of a log the consequences would depend largely on the design of the ride and the section where the incident occurred. Depending on these factors, passengers could fall several feet onto hard surfaces, into shallow water with a hard surface underneath or into deeper water. Any of these three scenarios could result in substantial injury. Finally a passenger may also fall into the gap between the log and the channel. If the log continued to move with the passenger trapped in the gap he / she could sustain injuries.

Operator vigilance, CCTV monitoring if necessary and loudspeaker / communication systems are all steps which could be taken to try and prevent incidents occurring as a result of passengers standing up. Additional steps would include restraint systems such as lap belts, or appropriate barriers / fencing to prevent passengers from falling outside the channel at areas where a fall may have serious consequences (e.g. clear perspex screens etc.)

- **Reaching out of side on coasters**
  A number of passengers were seen reaching out of coasters towards stationary railings / mouldings. These passengers tended to be young males reaching out of curiosity (or copying their peers who were reaching out). This behaviour could result in injury if passengers hands encountered a sharp edge, if rings or jewellery caught on rough protrusions etc. or if the speed of the ride was sufficient to cause a blunt impact injury.

Operators should ensure that sharp edges and protrusions are removed from stationary items which moving passengers can touch. If passengers moving at speed (e.g. at the bottom of a drop) can reach out and touch stationary items, operators should consider whether those stationary items can be moved or modified (e.g. cushioned or provided with a gradual-onset deflecting barrier). Alternatively it may be necessary to modify the cars themselves to prevent passengers reaching as far outside (e.g. increasing the height of the sides of chairs).

- **Swinging on paratrooper**
  A pair of passengers were seen swinging their paratrooper chair forwards and backwards to the extent that it may have struck and injured any other passengers who passed in its line of motion. This occurred during a stationary loading period (and was therefore not logged for analysis even though it involved kicking with legs). This is unlikely to cause a serious injury to an adult however, a small child is more likely to be struck on the head by the swinging chair / car and this could result in a more serious injury.
Similarly to other ‘risky’ behaviours described above, operator vigilance and specific signs / warnings would be useful steps to take to prevent this behaviour. It is also possible that an engineering solution could be found to lock the chairs’ movement and prevent them swinging freely until the ride cycle begins. It is acknowledged that this kind of engineering solution may be expensive and difficult to retrofit.

10.2 Effects of giving passengers ride-controls

On rides which offered passengers’ controls (e.g. levers to move cars up / down such as on lifting carousels, or wheels to move boats in / out of the water area on the Adventurers Wave Surfer) there appeared to be a level of concentration on operating these controls which reduced the frequency of other behaviours (waving and communication etc.). This can largely be seen as a useful behaviour influencing factor because it helps maintain passengers’ focus within the ride / car (particularly on high-lifting childrens rides). However there are also two potential behaviour-related problems with passenger-operated-controls which should be taken into account by operators and ride designers:

- Passengers who cannot reach control(s) effectively whilst seated may stand up, reach across or kneel on seats etc. in order to operate them. This behaviour was seen on a Mini Jet ride consisting of ‘spaceship’ cars with a front and rear benches (2 people seated on each bench). On this ride only the front passengers in each car had a height control in front of them. This resulted in young children climbing into the rear benches and then standing up / reaching across the front seats to reach the control once the ride had started. It is possible that in some cases children may actually climb from the rear to the front bench, thus effectively climbing outside the containment system (however this more extreme behaviour was not observed during the relatively brief filming period).

- Active controls could be a potential source of conflict between some children. This could result in fighting for control which may cause passengers to stand up and fall / be pushed outside the containment system.

Provision of controls or ‘something to do’ and the way this effects behaviour is a complex issue, particularly where more than one person has access to the controls. One possibility to consider is a provision of identical dummy controls for all passengers, with the active control either being fixed in one passenger area or being allocated randomly for set periods to different controls (e.g. one person has control for 30 seconds and another has control for the next 30 seconds etc.). Another possibility would be to make all controls sensitive to movement, so that when someone tries to use them it causes activation (i.e. active status is only given to controls which sense that someone is trying to use them). However, there would then be design challenges to be overcome when considering two or more people trying to use the same control system in opposing ways at the same time.

In summary, passenger controls are considered have some scope for effecting / modifying behaviour however the current issues (moving about the ride, fighting for control etc.) could largely be overcome by effective supervision. In due course, as new rides are designed and introduced it would be useful for designers to consider how the controls could effect passengers behaviour.
10.3 Behavioural responses to written signs

A number of the rides had signs near the queuing areas which contained information / requirements that were intended to influence people’s behaviour. Figure 94 shows some examples of these signs.

![Figure 94. Examples of signs used at fairs and theme parks](image)

Signs at amusement rides often contain the following types of information:

- Minimum height / unaccompanied age restriction;
- Warnings to secure or remove all loose items (glasses, mobile phones, wallets, coins, keys, jewellery etc.);
- Warnings to avoid certain types of behaviour;
- Advice to hold onto handrail, or to remain seated while the ride is in motion.

It is not possible from the video or the statistics to determine what proportion of people / type of person pay heed to the direct behavioural advice (bullet points 3 and 4 above). This is because there is no means to use the data to directly compare the behaviour of a single large group of people in; a) a situation where there was no behavioural advice, and b) the same situation where advice was presented. There are many confounding variables such as learning effects, which would undermine the validity of this type of assessment, even in a controlled situation.
Some passengers were seen to remove or secure jewellery and leave loose items with friends or to one side before getting on certain rides (Superbowl, Pirate Raft etc.). These passengers (aged between approximately 8 and 16, male and female) behaved in a way which indicated that they had read the warning signs asking them to remove these items and were obeying them. This can be taken as evidence that some passengers do read warning signs and obey them. However, it would be unwise to conclude that warning signs have a similar significant influence on risk taking or thrill enhancement behaviours (including behaviours such as 2 handed waving and reaching out of containment). People may find it easy to visualise / imagine possible consequences of not securing loose items (i.e. they can relate to personal material loss). However, it may not be as easy for people to predict the possible safety consequences of active behaviours whilst on rides. Those safety consequences may often be more complex than material loss, and may be dependent on a wide range of factors unknown to the person (e.g. frictional qualities of seating / flooring, size of gaps in containment systems, constantly changing speed / direction / ride forces etc.).

If a passenger can be prompted to accurately visualise or appreciate the adverse consequences of their action / inaction, they may be more likely to follow instructions advising them to avoid those actions / inactions. However, there may be a fine line between advising people effectively and instilling in them a mistaken belief that a ride is unsafe (which could have serious financial consequences for ride operators). It may be possible to create stylised symbols (in the same style as the top left and bottom right signs in figure 94) which contain this type of information e.g. a symbol which represents a persons arms intercepting a stanchion or an overhead beam (and indicating that it would damage someone’s arm), as opposed to a symbol which simply tells people to keep their hands in the car. It may be feasible to develop a standardised set of behavioural warning symbols for use across the Amusement Industry. Operators could decide which symbols to display based on the potential passenger behaviours on a particular ride.

### 10.4 NAFLIC Technical Bulletins regarding passenger behaviour

NAFLIC (the National Association For Leisure Industry Certification) issues technical bulletins to the Amusement Industry following incidents on amusement rides. When passenger behaviour was recognised to be a factor in an incident, this is outlined in the bulletins. In order to ensure that all these behaviours were taken into account in the main behaviour catalogue in this report (tables 7a to 7d) recent NAFLIC bulletins were assessed to determine which contained information / observations regarding passenger behaviour. Table 97 summarises information on passenger behaviour contained in these NAFLIC technical bulletins.

<table>
<thead>
<tr>
<th>Bulletin Reference</th>
<th>Acknowledged behaviour / potential behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB 246</td>
<td>Allegedly unlatching seatbelt restraint system.</td>
</tr>
<tr>
<td>TB 245</td>
<td>Standing up or kneeling (floor or seat?) on Ferris Wheel</td>
</tr>
<tr>
<td>TB 242</td>
<td>Deliberate self-bouncing off an inflatable slide (due to having stopped because of friction with the slide)</td>
</tr>
<tr>
<td>TB 221</td>
<td>Placing foot outside a containment system</td>
</tr>
<tr>
<td>TB 220</td>
<td>Children trying to get off juvenile rides before it has stopped</td>
</tr>
<tr>
<td></td>
<td>Exiting on wrong (non-platform) side of a car</td>
</tr>
<tr>
<td></td>
<td>Holding child on lap whilst lowering / setting lap bar</td>
</tr>
<tr>
<td>TB 181</td>
<td>Deliberately colliding into other go-karts (whilst on go kart track)</td>
</tr>
<tr>
<td>TB 164</td>
<td>Climbing out of the log on log flume escalator</td>
</tr>
<tr>
<td>TB 119</td>
<td>Reaching leg through gap in containment system and contacting the loading platform</td>
</tr>
<tr>
<td>TB 105</td>
<td>Placing foot outside containment system (on Pirate Ship)</td>
</tr>
</tbody>
</table>

111
Many of the behaviours in table 97 were observed during this field study. Obvious exceptions are the behaviours relating to go-karts and inflatable slides (i.e. rides which were not filmed). For further information see: www.naflic.org.uk

10.5 Future and continuing research on behaviour

Dark rides / low intensity lighting
Limitations with the filming equipment meant that no observations were made of dark rides (ghost houses, dark coasters etc.). It would be interesting to note whether passengers on these rides display similar behaviour types / frequencies to similar rides operating under light conditions. It is possible that some passengers would ‘keep their hands in’ in the belief that they may accidentally strike some unseen obstruction if they hold them outside the containment envelope. Behaviours such as waving to bystanders or motivated by exhibitionism may be expected to be significantly lower in artificially darkened conditions.

It is also possible that mischievous / boisterous behaviours may increase amongst groups of friends on ghost trains etc. (e.g. tapping on the heads of passengers seated in front or trying to increase their fright by shouting etc.). In some cases this could cause passengers to reach outside the containment system and possibly lean out of their seat / out of the containment.

Dodgem cars
Dodgem cars are another type of ‘ride’ which were not logged / analysed. Some video was gathered of Dodgems however the practical difficulties of tracking individuals and interpreting behaviours and movements would have made analysis of the video extremely time consuming and costly. For example having to determine who collided with who, each persons’ intentions, levels of purposeful control over the vehicle at the time of collision etc. The potential complexities of logging and interpreting behaviour on Dodgems mean that a specific project would be necessary in order to arrive at useful findings.

Inflatables
Although no inflatable slides / castles etc. were observed in this study, it is likely that users show particular kinds of behaviour that occur less, or never, on other rides. For example jumping and bouncing are behaviours will occur on inflatables because of their unique structure. It is also possible that there is a relatively high level of boisterous behaviour and direct physical interaction between users. Fun houses present similar unique possibilities for user behaviour which may warrant further study. It would be relatively inexpensive and straightforward to carry out scoping studies to establish the additional types of behaviour which may occur on these rides.

10.6 Practical limitations of field study

The scope of this study meant there was a limited period of observation for each ride (in order to be able to film a wide range of rides under different conditions). Filming for each ride took place over approximately 20 to 25 minutes although if a good vantage point was found and the ride was busy, this observation period was prolonged. This means that on each ride / ride type a
relatively brief period of passengers’ behaviour was obtained. In some cases this will be a full
and accurate representation of the types of behaviour that occur on that ride. However in some
cases it is acknowledged that the passenger demographics were not sufficiently representative of
the range of potential passengers to gain a full impression of the behaviours that might occur on
a ride. This raises the possibility that a ‘snapshot’ may either exaggerates or understates the
levels and types / ranges of behaviour. However, having issued this caution, the common
patterns of behaviour across all the rides suggest that the findings of this study give a reasonable
overall representation of the passenger behaviours, which ride designers / operators can expect.

Another practical filming / data gathering problem was that at any one time, the video of a ride
was being recorded from a single point. This meant that on some rides (particularly carousels
and some coasters) passengers were shielded from view for substantial periods. It is therefore
important that a similar fixed point filming technique is used in a similar follow-up study to
compare behaviour levels with the benchmark figures in this report. If improved multi-point
filming techniques were used it is possible that the behaviour incidence levels would look
higher when they may actually be unchanged or even lower.

A limitation in the statistical analysis is that, in order to avoid excessive and unnecessary
complexity, there was no mechanism used to differentiate between incidences of different types
of behaviour displayed by a single individual and instances of those same behaviours displayed
by a number of different individuals. This means that in some cases the implied likelihood of
behaviours ‘per passenger’ is skewed towards a higher figure than was in fact the case.

The equipment used to film rides (standard Digital Video cameras) meant that it was difficult to
film in dark conditions. This meant that only a small amount of late evening / night time footage
was captured. One of the concerns raised by the Amusement Industry and the critical review of
literature within this project was the potential effects of alcohol on passengers behaviour (HSL
Report JR67158 – Available to the public). The late footage which was captured did not appear
to show any different behaviours that may have been contributed to by alcohol. It is reasonable
to expect the same behaviours as during the day however the behaviours may be more
widespread, slightly exaggerated at night / under the influence of alcohol. This could be
expected as a direct result of reduced inhibition (and increased exhibitionism), increased
excitement, increased willingness to copy or be led into a behaviour / action. Given that all
these motivating factors were observed to be associated with behaviours, it is likely that
increases in the strength of these factors (due to alcohol consumption) will cause a concurrent
increase in the number of behaviours that are exhibited. Low levels of risk are associated with
the typical hand waving and pointing behaviours whether influenced by alcohol or not. It is
therefore likely that passenger who have been drinking alcohol may be at a greater risk of injury
from tripping or falling over as they exit a vigorous ride which has caused some disorientation
rather than from risks due to their behaviours whilst on the ride / in the cars themselves.

The main problem with assessments of passengers motives for behaviour (subjective
assessments) have already been discussed in the field study method section of this report. It is
worth noting that motives for even very simple actions / behaviours can be influenced by a wide
range of factors. This study assigned a single primary motive / cause to each behaviour
incidence, however it is acknowledged that behaviours will often be the result of a combination
of motivators (For example many waving behaviours could be the result of combined
communication, exhibitionism and excitement). Due to the complexity of behaviour motives, it
would only be possible to gather more detailed information by using more intrusive measures
(i.e. carrying out careful detailed video assessments of individuals and discussing their actions
and motives with them – questionnaire or interview). Gathering information at this level of
detail was not within the scope of this project either financially or ethically. The assessments of
motives in this study are therefore intended as general overall indicators.
11.0 Conclusions

- Approximately 92% of observed behaviours were exhibited by passengers aged 21 or younger (this broadly reflects the overall age distribution of all passengers who were observed).

- The gender distribution of passengers who exhibited behaviour was 3:2 in favour of females. This is believed to reflect the overall gender distribution of ride users who were observed.

- The most common behaviours were one and two handed waving, turning head / trunk and pointing. All 4 of these behaviours occurred on nearly all rides that were observed.

- The four most common motives were communication, exhibitionism, curiosity and thrill enhancement.

- Behaviour of young children (10 years and below) appears to be associated with communication and curiosity more than older children. Behaviour exhibited by older children, teenagers and young adults show lower levels of communicative behaviour and curiosity but increased levels of exhibitionism and thrill enhancement.

- Behaviours motivated by communication increase again amongst older passengers (age 22 and above). However, behaviours motivated by thrill enhancement and exhibitionism drop to low levels in these older age groups.

- The lower levels of behaviours motivated by thrill enhancement and exhibitionism amongst older passengers may be due to social inhibitive factors (low number of peers, presence of their own children etc.) as much as an increased awareness of potential risks.

- Young children's tendency to communicate results in relatively high levels of one handed waving. They also frequently turn and move in their seats to maintain visual focus on items off rides as they rotate (motivated mainly by curiosity).

- No evidence was found of a strong gender bias in any of the observed behaviour types.

- Behaviours exhibited by females were associated with communication more than the behaviours exhibited by males. Females also showed lower levels of behaviour associated with curiosity (focusing on items off the ride). Overall there was a lower variation in motives (motives outside the main 4) amongst females compared to males.

- Standing up on a ride was the fifth most common behaviour. The risk associated with standing, the motives for standing and the physical activity varies widely between rides. For example it may represent a significant risk on a log flume or Twist ride, and a lesser risk on a Traditional Carousel.
• A relatively small number of ‘exceptional’ behaviours were observed (i.e. behaviours and actions which, in combination with the ride design, were believed to represent a significant risk to the passenger). These behaviours were as follows:
  - Reaching leg out of containment on Pirate ship
  - Climbing between horses on Traditional Carousels
  - Lying back / reclining on horses on Traditional Carousels
  - Standing and reaching forwards on Mini jets
  - Reaching out of side of log flume while it is rocking
  - Standing on log flume or coaster
  - Swinging on Paratrooper chair

• Parents were seen copying their children and visa versa. This two way effect was seen particularly with waving / holding two hands in the air. However, due possibly to adults typically possessing more effective risk perception, parents were also observed discouraging their children from certain more risky behaviours such as standing while rides were in motion (seen on log flume).

• If a ride stops at an unscheduled point (e.g. emergency stop or power failure) it is likely that some passengers will begin to move around (e.g. kneel on seats, stand up) which may result in their moving into positions of danger. This typically will occur on juvenile rides when children are not aware that the ride will restart.

• Passengers appear able to respond to the consequences of not securing their belongings (physical material loss) and act to prevent them. However, it was not possible from the data to establish whether signs had a significant effect on passenger behaviour whilst on rides (e.g. signs to maintain a grip on the handrail etc.). It is believed that if passengers can be assisted to properly appreciate potential consequences of not following behaviour instructions on signs, the instructions may be more effective.

• Behaviour related to exhibitionism and thrill enhancement are likely to increase in frequency amongst passengers who have been drinking alcohol. Alcohols widely accepted inhibition-reducing effect may also increase incidences of behaviour due to increased copying and peer pressure effects. Observations of rides in the evening / night time did not indicate any physically different behaviours due (potentially) to alcohol. However, only a small number of rides were filmed at night and further study may be useful in this area. It is possible that alcohol may contribute to passengers being dizzy and disoriented after having been on a vigorous spinning ride. This could cause passengers to fall during egress from cars or on the steps from a ride platform.

• Providing passengers with ride controls (e.g. height controls on Mini Jets) has the benefit of focusing younger passengers attention ‘in’ the ride. However, some children stand up to reach them. It is possible that in extreme cases some children may attempt to climb from the back seats to the front seats to use the controls. Controls may also be a source of conflict. Physical conflict may result in passengers moving into positions of danger. Control design is an area that needs careful attention to avoid these problems in the future.

• Potential for the ‘risky’ behaviours identified by this study is acknowledged in NAFLIC technical bulletins released prior to this study. The bulletins discuss the design and operation implications of those behaviours.
• The motives for behaviours discussed and analysed in this report may present a simplified view of the reasons for behaviour. It is acknowledged that many behaviours have more than one motive. However, it was not considered to be within the scope of this study to attribute more than one motive to each instance of a behaviour.

• Practical limitations of this study include:
  o Relatively short / narrow snapshot of behaviours on rides (compared to the total passenger population across the UK);
  o Areas of several rides were shielded from view due to using single fixed-point filming;
  o Filming equipment was largely unsuitable for night time filming;
  o No differentiation is made between different behaviours observed in the one individual and different behaviours made by a number of individuals.
12.0 Recommendations

- **Carry out specific surveys for potential behaviours**
  If a ride operator is concerned about the potential consequences of certain behaviours which were not observed in this study but are nevertheless possible (see italics in tables 7a to 7d), it may be worthwhile for the operator to carry out their own survey of behaviours to try and establish whether those behaviours do occur and the frequency of occurrence.

- **Ensure good audible communication with passengers**
  Due to the tendency for passengers to begin moving around or stand up if a ride is halted before a scheduled stop / a system failure halts progress, operators may benefit from having a means of communicating quickly with passengers (e.g. loudspeaker, intercom or loud-haler) to ask them to remain seated. This is particularly important on larger rides with sections some distance away from the operator, which also give passengers scope to move into positions of danger e.g. elevated sections of log flumes, chairlifts, coasters. It is also important that operators of Juvenile tracks with raised sections (bridges and upper levels) anticipate that some passengers on elevated sections may begin moving around / try to exit the ride during unscheduled stops.
  Good communication (possibly using loudspeakers etc) may also be necessary to warn / discourage passengers who are engaged / are starting to show signs of risky behaviours.

- **Check passengers following stoppages**
  Following any unscheduled / unexpected stop, operators should check that all passengers are properly secure / seated etc. before the ride recommences.

- **Check the speed and timing of containment / restrain opening**
  A relatively high number of passengers were observed standing, and in some cases beginning to exit rides while there was still significant ride motion. This occurred on a range of rides such as Twists, Coasters and Mini jets. It should be ensured that passengers cannot stand and begin exiting the ride until the ride has slowed sufficiently for safe egress or until it has stopped completely.

- **Ensure signs relate to potential behaviours**
  Signs should be checked to ensure they warn against the actual / potential behaviours identified in this report (see tables 7a to 7d). Signs should make specific reference to any potential ‘high risk’ behaviours such as climbing between horses on Traditional Carousels, lying back on horses, swinging chairs on Paratroopers, standing up in Log flumes etc.

- **Improved warning / behavioural signs**
  An important step would be to consider ways of effectively showing the potential physical consequences of ‘risky’ behaviours, ideally in a quickly interpretable, stylised format similar to many current safety instruction signs. For example, a graphic showing a persons arm intercepting a stanchion and being damaged, or a person falling over the side of a log flume. It would be useful to investigate the potential for a standardised set of signs across the Amusement Industry (to supplement any themed signs currently in use).

- **Control risk of injury from reaching out of containment with arm**
  Coasters and Log Flumes may present potential for injury to passengers who reach out of the containment.
  Coaster operators should ensure that there are no sharp edges on stationary surfaces outside the car which passengers can touch as they pass by. Any protrusions which could catch on jewellery (rings, bracelets etc.) should also be removed. If both these hazards are removed but there is still
potential for injury due to the speed of the ride, further steps should be taken to prevent passengers from reaching stationary structures.

On Log flumes increased operator vigilance is difficult because sections are often not visible from the operating station. If arm entrapment is considered likely operators may find it useful to install CCTV to monitor the sections of water channel where these events may occur.

- **Mini Jets: Ensure single passengers or pairs are seated at front**
  To avoid passengers standing and reaching forwards from the back seats to operate controls on the front seats, operators should try to ensure that single or pairs of passengers are seated in the front two seats (where the controls are located).

- **Operator vigilance for specific behaviours**
  Operators should be particularly vigilant for the following behaviours:
  
  - Reaching legs out of containment on Pirate ship;
  - Climbing between horses on Traditional Carousels;
  - Lying back / reclining on horses on Traditional Carousels;
  - Standing and reaching forwards on Mini jets;
  - Reaching out of side of log flume while it is rocking from side to side;
  - Standing on log flume or coaster;
  - Swinging on Paratrooper chair;

- **Ensure operator awareness of children’s behaviours**
  Operators should be aware of children’s strong need to maintain regular or constant visual contact with their parents or accompanying adults (the strength of this requirement is expected to be greater amongst younger children). This motive or drive could lead children to various behaviours if they lose visual contact with parents, the most obvious reaction would be to try and exit the ride. Children also show tendencies to maintain a focus on items off the ride. This leads them to shift postures and kneel on seats and operators should look out for these behaviours.

- **Carry out additional passenger behaviour surveys**
  Behaviour should be surveyed on rides which were not looked at in this study. The rides / attractions which were not investigated include; dark rides, dodgems, inflatables, and fun houses. All these rides have potential for specific behaviours which may warrant further study (e.g. bouncing off an inflatable – see NAFLIC technical bulletin 242). Further study may be required to identify the effects of alcohol on passenger behaviour.

- **Carry out follow-up survey**
  This study provides a benchmark of passengers’ behaviour in 2002 / 2003. In order to identify changing trends in behaviour it would be necessary to do a similar study in several years and compare the results. Follow-up surveys could be performed across a similar range of rides, or on a particular type(s) of ride depending on the needs of the Amusement Industry.
13.0 References and further information

All the Fun of the Fair website: www.fun-fairs.co.uk

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Balppa House, 57-61 Newington Causeway, London SE1 6BD.
www.balppa.org

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HSE Books, PO Box 1999, Sudbury, Suffolk, CO10 2WA.
www.hse.gov.uk

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prEN 13814. Fairground and amusement park machinery and structures – Safety.
British Standards Institute (BSI)

NAFLIC, PO Box 752, Sunderland, SR3 1XX.
www.naflic.org.uk

The Showmans Guild of Great Britain
151A King Street, Drighlington, DB11 1EJ.
www.showmensguild.com
# 14.0 Appendices

## Appendix 1. Reference sheet used during video analysis: Codes for Behaviour Categories and Variables

Amusement Ride Passenger Behaviour: Analysis Codes  
HSL project Number: JR67158

<table>
<thead>
<tr>
<th>cell location</th>
<th>Behaviour category</th>
</tr>
</thead>
<tbody>
<tr>
<td>ac</td>
<td>One hand waving</td>
</tr>
<tr>
<td>ag</td>
<td>Two hand waving</td>
</tr>
<tr>
<td>ak</td>
<td>Turning head/trunk</td>
</tr>
<tr>
<td>ao</td>
<td>Turning around in seat</td>
</tr>
<tr>
<td>as</td>
<td>Kneeling in seat</td>
</tr>
<tr>
<td>aw</td>
<td>Leaning out of containment</td>
</tr>
<tr>
<td>ba</td>
<td>Reaching out of containment (arm only)</td>
</tr>
<tr>
<td>be</td>
<td>Reaching out of containment (leg only)</td>
</tr>
<tr>
<td>bi</td>
<td>Extended reaching out of containment (arm and body part)</td>
</tr>
<tr>
<td>bm</td>
<td>Interfering with containment device</td>
</tr>
<tr>
<td>bq</td>
<td>Inappropriate exiting of ride</td>
</tr>
<tr>
<td>bu</td>
<td>Inappropriate exiting of ride (egress related)</td>
</tr>
<tr>
<td>by</td>
<td>Violent behaviour</td>
</tr>
<tr>
<td>cc</td>
<td>Boisterous behaviour</td>
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<td>cg</td>
<td>Intimate behaviour</td>
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<td>ck</td>
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<tr>
<td>co</td>
<td>Pointing</td>
</tr>
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<td>Interact with containment device</td>
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<tr>
<td>cw</td>
<td>Kicking legs</td>
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<table>
<thead>
<tr>
<th>code</th>
<th>behaviour frequency</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1-off dynamic</td>
<td>A single dynamic action</td>
</tr>
<tr>
<td>2</td>
<td>Repeated dynamic</td>
<td>A dynamic action repeated several times</td>
</tr>
<tr>
<td>3</td>
<td>1-off sustained</td>
<td>A single sustained action</td>
</tr>
<tr>
<td>4</td>
<td>Prolonged</td>
<td>Travelling entire ride or major duration while exhibiting behaviour</td>
</tr>
<tr>
<td>5</td>
<td>Repeated sustained</td>
<td>A sustained action repeated several times</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>male</th>
<th>female</th>
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<table>
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</tr>
<tr>
<td>11-15</td>
<td>2</td>
</tr>
<tr>
<td>16-21</td>
<td>3</td>
</tr>
<tr>
<td>22-30</td>
<td>4</td>
</tr>
<tr>
<td>30-50</td>
<td>5</td>
</tr>
<tr>
<td>50+</td>
<td>6</td>
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<table>
<thead>
<tr>
<th>code</th>
<th>Motivators</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Communication / Positive social interaction (e.g. waving at parent)</td>
</tr>
<tr>
<td>2</td>
<td>Peer pressure</td>
</tr>
<tr>
<td>3</td>
<td>Copying</td>
</tr>
<tr>
<td>4</td>
<td>Aggression/competition</td>
</tr>
<tr>
<td>5</td>
<td>Exhibitionism / 'showing off'</td>
</tr>
<tr>
<td>6</td>
<td>Encouragement (giving or having received)</td>
</tr>
<tr>
<td>7</td>
<td>Curiosity</td>
</tr>
<tr>
<td>8</td>
<td>Natural pose / nonchalance / boredom</td>
</tr>
<tr>
<td>9</td>
<td>Impatience / over-eagerness</td>
</tr>
<tr>
<td>10</td>
<td>Lack of knowledge / mistaken belief</td>
</tr>
<tr>
<td>11</td>
<td>Illness</td>
</tr>
<tr>
<td>12</td>
<td>Overly excessive stimulation (fear fuelled response)</td>
</tr>
<tr>
<td>13</td>
<td>Thrill enhancement (perceived risk enhancement)</td>
</tr>
<tr>
<td>14</td>
<td>Discomfort</td>
</tr>
<tr>
<td>15</td>
<td>Excitement</td>
</tr>
</tbody>
</table>
Loughborough Fair
Traditional Dawson.

Start time 05:38
Stop time 06:43 (awake 03:05)

The cycle

<--- direction of movement --->
Appendix 3. Extended example of a ride’s spreadsheet

<table>
<thead>
<tr>
<th>Total duration of ride (min)</th>
<th>No of people on the ride</th>
<th>Gender distribution of passengers (% males)</th>
<th>One hand waving</th>
<th>Two hand waving</th>
<th>Turning head/trunk</th>
<th>Turning around in seat</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Gender % males</td>
<td>Age group</td>
<td>Indv freq</td>
<td>Motiv</td>
<td>Gender % males</td>
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<tr>
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<td></td>
<td>12.4</td>
<td>17.0</td>
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<td>4</td>
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<td>2</td>
<td>5</td>
</tr>
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<td>2</td>
<td>6</td>
</tr>
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<td>1</td>
<td>1</td>
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<td>23</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
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<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
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<tr>
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<td>11</td>
<td>1</td>
<td>2</td>
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<td>3</td>
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<td>1</td>
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<td>2</td>
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</table>
Appendix 4. Example pictures of rides / ride types

Traditional Carousel  Bench Ride

Coaster  Log Flume

Twist Ride  Waltzer
Juvenile Coaster
Spinning Coaster
Jets
Tagada
Paratrooper
Juvenile Track Ride (with upper deck)
Chairlift
Passenger behaviour on amusement rides

Field study report

The main aim of this field study was to produce a catalogue of behaviours which passengers exhibit whilst on amusement rides. An additional aim was to provide a benchmark of behaviour incidence levels, with the expectation of making a comparison study in a number years time to identify any changing trends in behaviour. The field study was designed in order to cover a wide range of different ride types under a wide and representative range of conditions as follows:

- Various types of venue: Theme Park, Travelling Fair (Park, Street or Indoor), Pleasure Beach, Music Festival.

- Varied times of year: visits were made throughout the main 2003 season. Some early visits were also made in late 2002 and during the 2002/2003 holiday period.

- A range of areas of the country; visits ranged across the UK in an effort to eliminate any data skewing effects due to regional variations in behaviours.

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