Assessment of Best Practices in Fairgrounds and Amusement Parks in Relation to Safety of Consumers

Final Report

prepared for
European Commission
Health & Consumer Protection Directorate-General

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by

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EXECUTIVE SUMMARY

1. Introduction

A large body of Community legislation has been established in the area of consumer product safety and liability for defective products. However, there is currently no general community legislation to address the safety risks for consumer services, with the exception of the transport sector.

The Directorate-General for Health and Consumer Protection has commissioned Risk & Policy Analysts to undertake a comprehensive assessment of the best practices for consumer safety in fairgrounds and amusement parks in the EU-15.

As set out in the Specification (see Annex 1), the objectives of the study are to undertake:

- an identification and description of existing non-regulatory measures aiming at consumer safety in fairgrounds and amusement parks;
- a comparative analysis of these existing non-regulatory measures, including their effectiveness; and
- a presentation of different options for improvement of existing non-regulatory measures.

2. Amusement Parks and Fairgrounds

During the last 20 years there has been a growth in large amusement parks with ever more extreme rides. There are now rides with speeds of over 170 km/hr and those with falls of over 100 metres. Estimates of the number of amusement parks in the EU range from 180 to 320, depending on the definition, which receive nearly 300 million visitors per year. In addition, there are numerous travelling fairs which, perhaps, involve over 60,000 travelling families.

For the purposes of this study, the term 'amusement park' encompasses theme parks and amusement parks, as well as water parks, unless otherwise specified, and thus refers to fixed sites. The term 'fairground' applies to sites where mobile, travelling fairs set up their rides for a limited amount of time.

The European industry is divided into three key sectors:

- ride manufacturers, represented by the European Association for the Amusement Supplier Industry (EAASI);
- amusement parks, represented by the European Federation of Leisure Parks (Europarks); and
- travelling fairs, represented by the European Showmen's Union (ESU/UFE).

It is of note that these associations do not provide complete coverage of all the EU-15 Member States and broader consultation was undertaken.

3. Risk Assessment

There are a wide range of adverse events and effects which could be associated with activities in fairgrounds and amusement parks. These can be associated with adverse effects under both normal operations (i.e. when the rides are operated as intended) and abnormal operations (i.e. accidents). In relation to normal operations, there is some concern that people may suffer headaches and other effects from extreme 'thrill' rides. In relation to accidents, the adverse effects may range from cuts and bruises to more serious injuries or, exceptionally, death. In practical terms, the focus has been placed on those accidents (and incidents) of sufficient seriousness to be reportable.

Overall, it is estimated that, based on the Euphin data, there are about 19,000 injuries per year across the EU-15 associated with fairgrounds and amusement parks. Of these injuries, about half would be expected to be ride-related.

In relation to the body part injured, the majority (68%) involved arms and legs (including fingers/toes and shoulders/hips) whilst 21% involved the head/face. Most accidents (59%) involve children under 15, particularly those aged 5 to 14 who account for over 40% of all reported accidents.

It is clear that obtaining reliable data on accidents in fairgrounds and amusement parks is very difficult. In particular, data from (a few selected) hospitals cannot be readily linked to data collected by individual facilities (or, indeed, national bodies). This makes comparative analysis of the effectiveness of safety measures over time a very uncertain process.

4. Risk Mitigation Measures

At EU level, there is no legislation governing the safety of the fairground and amusement rides per se, nor is there any legislation to ensure the safe provision of the service to consumers. In the absence of Community provisions, Member States have adopted different approaches and policies to address the safety of consumer services. Many EU-15 countries have introduced some sector specific legislation affecting amusement parks and/or fairgrounds.

Information has been obtained for non-regulatory measures in six countries, three of which are within the context of legal requirements, and two of which are standards based on the draft (now adopted) European standard and thus are due to be revised or replaced in the near future.

The non-regulatory measures identified are:

- ***Fairgrounds and Amusement Parks – Guidance on Safe Practice (HSG175)*** developed by a multi-stakeholder group in the UK and published in 1997. This is supported by the *Amusement Devices Inspection Procedures Scheme* (ADIPS) and industry guidance *Safety of Amusement Devices: Design*;

- ***Guidance on Safe Practice***, developed by the Spanish Association of Amusement and Theme Parks (AEPA) in 1999;

- a **safety certificate** developed by TÜV Süddeutschland in 2003; and

- **national standards** in Italy (UNI 10894) and Spain (UNE 76601:2001) based on prEN 13814.

Guidance produced in the context of legislation includes:

- ***Guidelines for the Promotion of Safety in Program Services*** (Finnish Consumer Agency, 2003). These guidelines are based on the Finnish Product Safety Act and define minimum safety standards;

- VDFU (German trade association for leisure parks) has commissioned a manual ***Die gerichtsfeste Organisation des Freizeitparks****/Legally Unassailable Organisation of Leisure Parks* to ensure that its members meet all the legal safety requirements; and

- ***Funfair Guidance Document*** supporting the Planning and Development Act, 2000 (Certification of Fairground Equipment) Regulations, 2003, in Ireland.

Measures identified outside the EU are:

- the Australian Amusement, Leisure and Recreation Association Inc (AALARA), introduced a safety support programme, AM-SAFE, in 2002. This is an industry self-regulation initiative providing accreditation for the amusement industry; and

- the Technical Standards and Safety Authority (TSSA) is responsible for regulating the safety of amusement rides in Ontario under the Technical Standards and Safety Act, 2000. It is a legal requirement that amusement rides and ride owners are licensed and monitored under this Act

Given that there are few non-regulatory measures in the EU-15, more detailed case studies were undertaken on the UK and Spanish guidance documents, and the Australian certification approach.

In addition, consideration has been given to some aspects of those regulatory measures where information was readily available, i.e. Belgium, Finland, Ireland and Canada, to provide a comparison for the scope and implementation of non-regulatory measures.

5. Assessment of Non-regulatory Measures

The Commission has identified the following elements as influencing the level of safety:

- technical issues related to design and installation of equipment;
- operation and use of equipment;
- maintenance and inspections of equipment;
- qualifications and training of personnel;

- guidance of visitors and safety information, including the use of signs; and
- emergency procedures and equipment.

Design and Installation

There are essentially two approaches to managing the safety aspects of the design and installation of equipment in fairgrounds and amusement parks. Firstly, operators can request that the equipment they purchase meets a specific standard, or, secondly, an appropriate expert may be employed to inspect all equipment purchased. There does not appear to be any correlation between the approach taken and whether the measure is regulatory or not.

In both cases, costs are likely to be incurred as both approaches will necessarily involve inspection and testing (i.e. to confirm compliance or otherwise), particularly as many amusement rides are unique. These costs will be in the order of tens of thousands of Euro, and will be dependent on the complexity of the ride.

Operation and Use

With regard to the operation and use of equipment, three issues tend to be reflected in the safety measures:

- the provision of an operations manual, providing instructions for the safe operation and use of a ride;
- the level of supervision provided by the ride controller/operator; and
- checking that passengers are safely contained.

Although the importance of a comprehensive operations manual is not disputed, the key issue, in relation to the operation and use of amusement rides, appears to be the number and age of the operating and supervising staff. No measures, whether regulatory or non-regulatory appear to set a minimum staffing level as this is deemed to relate to the complexity of the ride. Indeed, the risk of setting a minimum staffing level would be that more complex rides may become understaffed whilst still being considered 'best practice'. However, there are differences across the EU between the types of ride, if any, that 16 year olds are allowed to operate.

Maintenance and Inspections

Three types of maintenance and inspection activities may be expected:

- daily checks;
- routine maintenance; and
- third party inspections.

These are required by all measures for which such information is available, whether regulatory or non-regulatory. It is also an area where there are significant costs (tens of thousands of Euro per large ride) incurred on a regular basis. Where measures vary is the frequency with which independent, thorough examinations are required. This is one area where it is believed that there are differences of opinion over the CEN standard.

Although the number of accidents related to maintenance issues is low, this is perhaps an indication that the necessary requirements have been implemented in most countries. The extent of agreement between the different safety measures considered would suggest this is the case.

Qualifications and Training

Three categories of personnel can be identified for fairground and amusement parks:

- ride controllers, operators and attendants, who are responsible for the day-to-day operation of amusement rides;
- mechanics who are responsible for the general maintenance of amusement rides; and
- independent inspectors who undertake testing and examination of amusement rides.

Where safety measures have a more technical focus requirements for qualifications and training of personnel receive less consideration. Fawcett (2003) suggests that there remains questions concerning whether there should be further specifications for the competence of particular ride operators or their staff/subcontractors. This is an element which is missing from most of the measures considered. However, both regulatory and non-regulatory measures appear to agree on the need to have registered independent bodies to undertake inspections of amusement rides.

Guidance of Visitors and Safety Information

In order for consumers to enjoy fairs and amusement parks safely, it is necessary for:

a) the manufacturer to provide the relevant safety information to the ride controller;
b) the ride controller to communicate safety information to the consumer;
c) the consumer to fully understand the information given; and
d) the ride operator to enforce the safety requirements.

Communication of safety information is a feature of best practice guidance in the UK, Spain and Ontario. In legislation or measures which relate to the mechanical safety of a ride, safety information for consumers plays a much smaller part, if included at all.

There is some concern that consumers are encouraged to believe that amusement rides are safe no matter what, as opposed to the fact that they are safe, provided that the safety information is followed. Amusement ride safety is considered to be the joint responsibility of manufacturers, owner/operators, safety authorities and consumers, and a team approach to safety is advocated.

Emergency Procedures

The requirement to have an emergency plan in place is best practice for all public services, and is generally required by law under health and safety at work legislation. It is therefore not surprising that the majority of the measures considered address emergency procedures. The reporting of accidents is also of concern, for which different requirements exist in EU countries (although it can be assumed that fatalities are reported

to authorities in all EU countries). This is important to provide information on the cause of accidents and therefore to target safety measures more effectively.

6. Options for Improvements of Non-regulatory Measures

Two important gaps were identified in the scope of those regulatory and non-regulatory measures considered, and these relate to the training of staff and the communication of safety information to visitors. Whilst these are both addressed by the UK and Spanish guidance documents they are areas which could be improved, and such improvements could also support more technical or product-based legislation elsewhere in Europe.

The effectiveness of non-regulatory measures depends on the support that they receive from industry, authority and consumer stakeholders, as well as their enforcement. The UK appears to be unique in involving all stakeholders in a joint committee and may provide a model for developing best practice in other countries. In Australia, the industry association have taken best practice guidance a step further, by introducing a voluntary certification scheme, which enables consumers to identify leading facilities, and is comparable with other accreditation schemes in the tourism industry. Similar schemes have been discussed at a European level, although they have not yet been taken forward. Finally, Ontario provides a legally enforceable approach, by requiring all operators to have a licence.

7. Conclusions and Recommendations

Although there is no directly relevant community legislation, there are numerous measures which are applied to fairgrounds and amusement parks to ensure the safety of consumers. These include national legislation, international and national non-regulatory measures as well as local measures.

Within the context of this study, it has not been possible to determine whether the level of safety in fairgrounds and amusement parks is better or worse in those countries where the emphasis is on regulation or in those with an emphasis on non-regulatory measures. This is largely because there is little coherence in the collection of accident statistics across the EU-15 countries. As a consequence, the uncertainties in the data reviewed make it very difficult to draw firm conclusions about the relative levels of safety in different countries. Furthermore, it is difficult to draw conclusions as to whether the overall numbers of injuries are increasing or decreasing in particular countries.

In broad terms, safety measures for fairgrounds and amusement parks are, in many ways, similar to those that would be developed for any facility. The comparative analysis undertaken suggests that, in general terms, there is little to differentiate regulatory measures from non-regulatory measures in terms of their scope or effectiveness.

Areas of improvement have been identified in relation to staff training and the communication of safety information to visitors. This observation applies to both non-regulatory and regulatory regimes.

The first recommendation is that further efforts are made to ensure the continued operation of the EUPHIN database, in order to provide robust information to assist the development of policies for consumer safety.

The second recommendation is that national authorities or consumer organisations should consider obtaining more detailed accident data to allow better targeting of consumer safety programmes.

The third recommendation is that the European trade associations build on their existing work on safety issues and develop better channels of dissemination of safety information and greater collaboration between the relevant associations (taking into account the EU-25 Member States).

The fourth recommendation is that steps be taken to involve key stakeholders (regulators, industry and consumers) in discussing how measures (particularly relating to staff training and provision of safety information) could be developed and applied across the EU-25 Member States.

The fifth recommendation is to consider developing a best practice staff training manual that could be used by individual parks and travelling fairs across the EU. This could build on improved accident data to understand the most likely causes of injury to consumers.

The sixth recommendation is to develop a consistent safety message for consumers that can be promoted by industry and consumer associations alike, throughout the EU, to address aspects of consumer behaviour which may impact on safety.

CONTENTS

ABBREVIATIONS (AND COUNTRY OF ORIGIN)

AALARA	Australian Amusement, Leisure and Recreation Association Inc (Australia)
ACES	Amusement Catering Equipment Society (UK)
ADIPS	Amusement Devices Inspection Procedures Scheme (UK)
AEPA	Asociación Española de Parques de Atracciones (Spain)
AFABE	Asociación de Feriantes Autónomos de Euskadi (Spain)
AFEMO	Spanish Manufacturers Association (Spain)
AFFFEL	Association Française des Fabricants et Fournisseurs d'Equipements de Loisirs (France)
AIS	Association of Independent Showmen (UK)
ANCASVI	Associazione Nazionale Costruttori Attrezzature Spettacoli Viaggianti (Italy)
APPTG	All Party Parliamentary Tourism Group (UK)
ASTM	American Society for Testing and Materials (US)
AT	Austria
AU	Australia
BALPPA	British Association of Leisure Parks, Piers and Attractions (UK)
BARM	Benelux Manufacturers Association (Benelux)
BE	Belgium
BOVAK	Nationale Bond van Kermisbedrijfhouders (Netherlands)
CA	Canada
CEIF	Confederación Española de Industriales Feriantes (Spain)
CEN	Comité Européen de Normalisation / European Committee for Standardisation(EU)
CPSC	Consumer Product Safety Commission (US)
CRIOC	Centre de Recherché et d'Information des Organisations de Consommateurs (Belgium)
DE	Germany
DK	Denmark
DG SANCO	Directorate-General for Health and Consumer Protection (EU)
DIN	Deutsches Institut für Normung (Germany)

DNV	Det Norske Veritas (Norway)
DOC	Declaration of Operational Compliance (UK)
DTI	Department of Trade and Industry (UK)
EAASI	European Association for the Amusement Supplier Industry (EU)
ES	Spain
ESU/UFE	European Showmen's Union / Union Foraine Européenne / Europäische Schaustellerunion (EU)
EU-15	European Union (with 15 Member States, i.e. before 1 May 2004)
Europarks	European Federation of Leisure Parks (EU)
FAAP	Finnish Association of Amusement Parks (Finland)
FFD	Association of Danish Amusement Parks (Denmark)
FI	Finland
FJAC	Fairgrounds Joint Advisory Committee (UK)
FOD	Field Operations Directorate of HSE (UK)
FR	France
GPSD	General Product Safety Directive (EU)
HSC	Health & Safety Commission (UK)
HSE	Health & Safety Executive (UK)
HSG175	Fairgrounds and Amusement Parks – Guidance on Safe Practice (UK)
HSW	Health and Safety at Work (UK)
IAAPA	International Association of Amusement Parks and Attractions
ICRTL	International Consumer Research and Testing Ltd
IE	Ireland
ISO	International Standards Organisation
IT	Italy
LU	Luxembourg
NAFLIC	National Association for Leisure Industry Certification (UK)
NDT	Non-destructive testing
NERB	National Engineering Registration Board (Canada)
NFIT	National Fairgrounds Inspection Team (UK)
NL	Netherlands
NVQ	National Vocational Qualification (UK)
PT	Portugal
RAAPA	Russian Association of Amusement Parks and Attractions (Russia)
RIDDOR	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (UK)
RIDES	Ride Information Depository & Exchange System (US)
RPA	Risk & Policy Analysts Ltd (UK)
RRG	Risk Reduction Group (Canada)
SGGB	Showmen's Guild of Great Britain (UK)
SIRP	Society of Independent Roundabout Proprietors (UK)
SNELAC	Syndicat National des Espaces de Loisirs, d'Attractions et Culturels (France)
SNF	Swedish Association of Amusement Parks
TSSA	Technical Standards and Safety Authority (Ontario, Canada)
TÜV	(Germany)
UK	United Kingdom
VDFU	Verband Deutscher Freizeitparks und Freizeitunternehmen E.V. (Germany)
VDV	Verband der Deutschen Vergnügungsanlagenhersteller E.V. (Germany)

GLOSSARY

Amusement park: a fixed site where consumers either pay separately, either in tokens or with money, for individual rides, or pay a single fee to enter and do not pay any additional fees for individual rides. For the purpose of this study theme parks, water parks and amusement parks fall under this definition.

(Ride) **Attendant**: a person who is employed to assist the ride operator but who does not operate the controls. They may, for example, help passengers to board the rides and provide safety information.

(Ride) **Controller**: a person or company who assumes overall responsibility for one or more rides, and who may or may not physically operate the ride on a day-to-day basis. A ride controller may employ people to operate a ride on their behalf.

Hazard: the potential of a risk source to cause an adverse effect(s)/event(s).

Fairground: a site where mobile, travelling fairs set up their rides for a limited amount of time.

(Ride) **Inspector:** a competent person with appropriate qualifications, experience and training, who is independent of the designer, manufacturer or controller of an amusement ride, and who undertakes specified checks on a commercial basis.

Inspection body: an organisation offering a commercial service and employing ride inspectors (although some small inspection bodies are one-person businesses).

Kiddie rides: slow moving rides designed for small children.

(Ride) **Operator**: the person who physically operates the ride on a day-to-day basis, who may either be the ride controller or a person employed by the ride controller.

Risk: the probability and severity of an adverse effect/event occurring to man or the environment following exposure, under defined conditions, to a risk source(s)

Theme park: a fixed site where consumers pay a single fee to enter a theme park and do not pay any additional fees for individual rides.

1. INTRODUCTION

1.1 Background to Study

A large body of Community legislation has been established in the area of consumer product safety and liability for defective products. However, there is currently no general community legislation to address the safety risks for consumer services, with the exception of the transport sector.

The European Parliament and the Council, in the context of the revision of the General Product Safety Directive (GPSD), requested the Commission to identify the needs, possibilities and priorities for Community action on the safety of services and to submit to the European Parliament and the Council a report, accompanied by proposals on the subject, as appropriate. A consultation exercise (CEC, 2002) was carried out as part of the preparatory work for this report. The main finding of the report was that there exists a substantial lack of data and information on the factual aspects of risks and safety aspects of services. The report was adopted in June 2003 (CEC, 2003), and fairgrounds and amusement parks were identified as consumer services of particular interest.

1.2 Scope of Study

The Directorate-General for Health and Consumer Protection (hereafter referred to as DG SANCO) has commissioned Risk & Policy Analysts (RPA) to undertake a comprehensive assessment of the best practices for consumer safety in fairgrounds and amusement parks in the European Union (EU-15).

As set out in the Specification (see Annex 1), the objectives of the study are to undertake:

- an identification and description of existing non-regulatory measures aiming at consumer safety in fairgrounds and amusement parks;
- a comparative analysis of these existing non-regulatory measures, including their effectiveness; and
- a presentation of different options for improvement of existing non-regulatory measures.

In addition, the results of an earlier report (ICRTL, 1995) prepared for the European Commission are to be taken into account.

1.3 Structure of Report

This Final Report represents the formal output from the study. A Progress Report was submitted in March 2004, an Interim Report was submitted in June 2004 and a Draft Final Report was submitted in November 2004. This Final Report addresses the comments received from the Commission.

Section 2 of this Report provides an overview of the nature of amusement parks and fairgrounds across the EU Member States together with estimates of the numbers of parks, rides and visitors. Section 3 provides a review of accident data (and accident rates) at both EU and national levels together with an indication of recent trends - where this has been provided in a risk assessment framework. A key part of this analysis is the identification of high risk activities and high risk groups.

Section 4 outlines the measures (both regulatory and non-regulatory) which apply to amusement parks and fairgrounds within the EU-15. It is of note that non-regulatory measures (at national level) have only been identified in six countries. Most of the remaining EU-15 countries have some form of legislation regulating the safety of fairgrounds and amusement parks.

Section 5 brings together the findings of the previous sections in an analysis of the likely effectiveness of non-regulatory measures in minimising the risks to consumers. This Section provides a detailed comparison of the non-regulatory measures identified, where relevant information was available. Section 6 considers the options for improvements in non-regulatory measures.

The overall conclusions and recommendations of the Study are presented in Section 7 with references provided in Section 8.

2. AMUSEMENT PARKS AND FAIRGROUNDS

2.1 Overview

During the last 20 years there has been a growth in large amusement parks with ever more extreme rides. There are now rides with speeds of over 170 km/hr and those with falls of over 100 metres. Estimates by Europarks suggest that a total of 225 leisure parks within the EU-15 attract nearly 200 million visitors annually with a turnover in excess of two billion euros. In addition, there are numerous travelling fairs which, perhaps, involve over 60,000 travelling families. In Germany alone, travelling fairs are reported to have attracted 170 million visitors in 2000 (ESU/UFE, 2004), however comparative figures are not available for other EU-15 countries.

2.2 Nature and Numbers of Facilities

It is appropriate to start with a definition of the services being considered. The Commission has defined the scope of this work as being:

"... limited to fairgrounds and amusement parks. These are premises or part of premises where services offered to consumers against a fee mainly include the use of fairground equipment or amusement rides designed to be in motion for entertainment purposes with members of the public on or inside it. It also refers to any plant which is designed to be used by consumers for entertainment purposes, for example as a slide or for bouncing upon, and includes swings, dodgems and other plant which is designed to be in motion wholly or partly under the control of, or to be put in motion by, a member of the public. The definition includes coin-operated children's rides, but not non-powered children's playground equipment (playgrounds)" (from the Specification, see Annex 1).

Further discussion with the Commission has clarified that water parks are also to be included within this definition. It is noted that industry representatives may make a further distinction between theme and amusement parks as follows:

- theme parks – a fixed site where consumers pay a single fee to enter a theme park and do not pay any additional fees for individual rides; and

- amusement parks – a fixed site where consumers pay separately, either in tokens or with money, for individual rides.

For the purposes of this study the term 'amusement park' will encompass theme parks and amusement parks as defined above, as well as water parks, unless otherwise specified, and thus refers to fixed sites. The term 'fairground' applies to sites where mobile, travelling fairs set up their rides for a limited amount of time.

Table 2.1 provides some estimates of the numbers of amusement parks and travelling fairs in the EU by country. For amusement parks, a range of values has been presented (based on two main sources) since it would appear that different definitions are in use. Information on travelling fairs is sparse. It is of note that in the UK, it is estimated that

there are approximately 1 billion rides undertaken annually by consumers which are split equally between fixed and mobile rides (Tilson & Butler, 2001).

Table 2.1: Estimates of Amusement Parks and Fairgrounds in the EU by Member State

Country	Theme Parks[1]	Water Parks[2]	Fairgrounds[3]
Austria	1 - 6	-	?
Belgium	6 - 14	2	1,200 families
Denmark	8 - 12	2	?
Finland	5	2	?
France	26 -53	14	30,000 families
Germany	23 - 54	2	10,000 families
Greece	0 - 4	-	600 families
Ireland	1	-	90 families
Italy	7 - 15	6	15,000 families
Luxembourg	0 -1	-	50 families
Netherlands	10 - 18	1	1,200 families
Portugal	3 - 5	13	?
Spain	5 - 12	9	3,500 families
Sweden	9 -11	-	?
United Kingdom	26 - 65	2	Estimates of 4,000 fairs per year provided by 300 travelling groups
EU Total	**130 - 266**	**53**	**more than 60,000 families**

Sources:
1) For theme parks, range based on data provided by www.infoparks.com, and www.rcdb.com
2) For water parks, numbers from www.infoparks.com except for Portugal for which the information was provided by the Portuguese Institute of Sports.
3) Data primarily drawn from Efecot (nd)

2.3 Nature and Numbers of Visitors

Table 2.2 provides some estimates of the numbers of visitors to amusement parks in the EU by country for 2002. It is likely that the figures would need to increase by up to a factor of two to account for attendance at travelling fairs.

About 20 parks attract more than a million visitors per year (Vaknin, 2003). Several parks attract several million visitors per year including:

- Disneyland, France - 11 million/year;
- Blackpool Pleasure Beach, UK - 6.2 million/year;
- Tivoli Gardens, Denmark - 4 million/year;
- De Efteling, the Netherlands - 3.4 million/year;
- Liseberg, Sweden - 3.1 million/year;
- Europa Park, Germany - 3 million/year;
- Gardaland, Italy - 3 million/year;
- Port Aventura, Spain - 3 million/year;
- Alton Towers, UK - 2.7 million/year;
- Phantasialand, Germany - 2 million/year; and
- Pleasureland, UK – 1.1 million/year.

Table 2.2: Visitors to Parks by Country		
Country	**No. of Visitors (millions)**	**Source**
Austria	few	4
Belgium	c5	2
Denmark	c8	4
Finland	few	4
France	34.4	1
Germany	21	5
Greece	few	4
Ireland	<1	4
Italy	7	5
Luxembourg	<1	4
Netherlands	c6	3
Portugal	few	4
Spain	12	5
Sweden	c5	4
United Kingdom	42.5	1
Sources: *1) www.euromonitor.com* *2) www.pretparken.be* *3) Dutch Tourism Office as reported by IAAPA* *4) RPA estimate based on various internet sources* *5) Consultation responses*		

2.4 Organisation of the Industry

The European industry is divided into three key sectors:

- ride manufacturers, represented by the European Association for the Amusement Supplier Industry (EAASI);
- amusement parks, represented by the European Federation of Leisure Parks (Europarks); and
- travelling fairs, represented by the European Showmen's Union (ESU/UFE).

The EAASI[1] was established in 2000 and was formed to represent the European ride manufacturers. Its goals include raising the industry profile, addressing such matters as safety standards and European legislation and forming alliances with other international associations in the industry. An issue high on EAASI's agenda is to work with Europarks and ESU to re-launch the profile of park and carnival entertainment, as well as to upgrade the industry's image with the public authorities. It is not clear what proportion of European manufacturers are represented by EAASI, but Roberts (2001) suggests that there are around 100 ride manufacturers internationally, while EAASI suggest that it represents approximately 100 European manufacturers. It can therefore be assumed that a significant proportion of European manufacturers are represented at a European level.

[1] EAASI website: www.eaasi.org

An amusement ride in the EU can be sourced in various ways, including:

- manufactured in an EU country, where it is then used;
- have a design which is imported from either an EU or other country and manufactured in another EU country where it is then used;
- be designed and manufactured in an EU or other country and be imported into another EU country by an agent;
- be designed and manufactured in an EU or other country and be imported into another EU country by a ride controller; or
- the ride controller temporarily brings in a ride to a particular fair.

There is also a thriving second-hand trade, and rides typically change hands many times during their lives. Table 2.3 indicates the number of new rides compared to second-hand rides at a sample of UK amusement parks. Whilst this may not be representative of the European sector, it would be expected that it is the less expensive, more portable rides such as those designed for children (kiddie rides) which may more often be sourced second-hand.

Table 2.3: Number of New Rides Bought Compared to Rides Bought Second-hand in the UK

	New Rides	**Second-hand**
Suspended Roller Coasters	1	0
Traditional Roller Coasters	22	8
Other Thrill Rides (not Roller Coasters)	26	15
Water Splash Rides	14	2
Dark Rides with Audio Visual Effects	10	3
Kiddie Rides	58	45
Other, including Family Rides	37	38
Source: Consultation Responses (14 parks)		

Europarks[2] was founded in 1981 by the British association BALPPA and the German association VDFU. It currently represents two individual parks (in Italy and Norway) and nine national associations. Altogether, Europarks represents more than 225 leisure parks, although these may not all be amusement parks as defined for this study. However, it is fair to assume that a significant proportion of European amusement parks are represented. One of the goals of Europarks is to improve the safety reputation of the industry in any possible way.

Data on ESU[3] is limited, although it appears to have members in Austria, the Netherlands, Ireland, Belgium and Germany. It is not clear what proportion of travelling ride controllers are represented at a European level.

Table 2.4 below summarises national membership of these key European associations. As can be seen, membership obviously reflects the numbers given in Table 2.1 (i.e. few parks means a country is less likely to represented) and the general structure of the industry, but it is of note that Greece and Portugal appear to receive no European

[2] Europarks website: www.europarks.org

[3] ESU website: www.esu-ufe.com

representation, while there is little on behalf of Austria, Denmark, Finland, Ireland and Sweden.

Table 2.4: Member State Representation by European Industry Associations			
EU-15	**EAASI**	**Europarks**	**ESU/UFE**
Austria			Yes
Belgium	BARM	Belgoparks	Yes
Denmark		FFD	
Finland		FAAP	
France	AFFFEL	SNELAC	
Germany	VDV	VDFU	Yes
Greece			
Ireland			Yes
Italy	ANCASVI	Yes	
Luxembourg	BARM		
Netherlands	BARM	De Club van Elf	BOVAK
Portugal			
Spain	AFEMO	AEPA	
Sweden		SNF	
UK	ALES	BALPPA	
Other	RAAPA	Norway	
Source: Association websites			

2.5 Summary of Consultation

Consultation undertaken for this study included questionnaires to competent authorities, consumer organisations and European trade associations. A good response rate was received from these organisations. Other national associations (not included in Table 2.4) and a large number of individual amusement parks were also contacted for more detailed information on the practical application of safety procedures and local measures. This questionnaire was initially circulated to individual parks via Europarks and the national trade association members. The questionnaire is reproduced in Annex 3 and was made available in English, French, German, Italian, Portuguese and Spanish. Confirmation was received from the national associations in Belgium, Denmark, Finland, Italy, Spain and the UK that the questionnaire was indeed circulated to individual members. However, the initial response rate was low and, therefore, the questionnaires were circulated by email directly to parks in all EU-15 Member States. A total of 14 responses were received from the UK, two from Denmark and one each from Belgium, France, Germany and Spain. Furthermore, consultation with travelling showmen has proved difficult, and contact was only been made with the national associations in the Netherlands, Spain and the UK.

Additional information (i.e. not completed questionnaires) has been obtained from discussions held with key stakeholders from industry, competent authorities and consumer organisations. A review of relevant literature and the Internet has also informed this study, as indicated in the following Sections.

3. RISK ASSESSMENT

3.1 Overview

In essence, the purpose of this study is to examine three issues:

- the potential of fairgrounds and amusement parks to be the cause of adverse effects amongst consumers;
- the probability and severity of adverse effects occurring amongst consumers using such facilities; and
- the effectiveness of non-regulatory measures in minimising such occurrences.

The first two issues represent the 'hazard' and the 'risk' associated with fairgrounds and amusement parks respectively and the procedure by which these issues will be examined is a 'risk assessment'. In a comprehensive report on these issues, DG SANCO (European Commission, 2000) has adopted the following definitions:

- ***Hazard*** – the potential of a risk source to cause an adverse effect(s)/event(s);
- ***Risk*** – the probability and severity of an adverse effect/event occurring to man or the environment following exposure, under defined conditions, to a risk source(s); and
- ***Risk Assessment*** – a process of evaluation including the identification of the attendant uncertainties, of the likelihood and severity of an adverse effect(s)/event(s) occurring to man or the environment following exposure under defined conditions to a risk source(s).

As can be seen, a risk assessment involves analysis of the hazard and derivation of the associated risk. The DG SANCO report further defines a risk assessment as comprising hazard identification, hazard characterisation, exposure assessment and risk characterisation (as illustrated in Table 3.1, overleaf) and it is this broad approach which has been followed in this Section.

It should be noted that the framework presented in Table 3.1 is generic in nature and has been adapted as appropriate for this study. By way of example, this study is not concerned with the potential impacts on the environment of fairgrounds and amusement parks.

Table 3.1: Stages of Risk Assessment	
Stage	***Definition (from EC, 2000)***
Hazard Identification	*The identification of a risk source(s) capable of causing adverse effect(s)/event(s) to humans or the environment, together with a qualitative description of the nature of these effect(s)/event(s).*
Hazard Characterisation	*The quantitative or semi-quantitative evaluation of the nature of the adverse health effects to humans and/or the environment following exposure to a risk source(s). This must, where possible, include a dose response assessment.*
Exposure Assessment	*The quantitative or semi-quantitative evaluation of the likely exposure of man and/or the environment to risk sources from one or more media.*
Risk Characterisation	*The quantitative or semi-quantitative estimate, including attendant uncertainties, of the probability of occurrence and severity of adverse effect(s)/event(s) in a given population under defined exposure conditions based on hazard identification, hazard characterisation and exposure assessment.*

3.2 Hazard Identification - Nature of Accidents

3.2.1 Introduction

Hazard identification is defined as the identification of a risk source(s) capable of causing adverse effect(s)/event(s) to humans, together with a qualitative description of these effect(s)/event(s). Hazard identification is conventionally regarded as the first step in risk assessment, and it defines the issues of concern for subsequent analysis.

3.2.2 The Risk Source

As can be seen from the specification (see Annex 1), the scope is limited to activities taking place within fairgrounds and amusement parks. As indicated in Section 2.2, these include water parks and travelling fairs but not children's playgrounds.

Although the focus of the study is on the risks associated with powered rides, consideration should also be given to the use of slides, 'bouncy castles', etc.

3.2.3 Risk Population

The risk population comprises the consumers of the services provided by fairgrounds and amusement parks. As such, the safety of workers is outside the scope of this study.

3.2.4 Nature of Accidents

There are a wide range of adverse events and effects which could be associated with activities in fairgrounds and amusement parks. These can be associated with adverse effects under both normal operations (i.e. when the rides are operated as intended) and abnormal operations (i.e. accidents). In relation to normal operations, there is some concern that people may suffer headaches and other effects from extreme 'thrill' rides. In relation to accidents, the adverse effects may range from cuts and bruises to more serious injuries or, exceptionally, death. In practical terms, the focus has been placed on those accidents (and incidents) of sufficient seriousness to be reportable. Examples of

more serious recent accidents (primarily in the UK) are listed in Table 3.2. It should be noted that given the large numbers of visitors to fairgrounds and amusement parks, there will be a number of accidents (for example slips, trips and falls) which occur irrespective of the design and operation of the rides.

Table 3.2: Examples of More Serious Recent Accidents (primarily from the UK)

Month/Year	Country	Location	Details
May 2000	UK	London	2 people died when a car broke free from a Super Trooper ride in a west London fairground
July 2000	UK	Blackpool Pleasure Beach	11 year old boy fell from Space Invader roller coaster and died.
July 2000	UK	Thorpe Park	Fire destroyed several rides. 7,000 people evacuated but no injuries reported.
July 2000	UK	Blackpool Pleasure Beach	Woman and three children injured after woman fell from horse on Derby Racer carousel.
August 2000	UK	Hartlepool	3 children hurt when car came off the Superbob ride at the Headland carnival.
Sept. 2000	UK	Blackpool Pleasure Beach	14 people injured (2 seriously) when two trains collided on the Big One roller coaster.
May 2001	Germany	Phantasialand	Fire destroyed Grand Canyon roller coaster. 36 people injured.
June 2001	UK	Lightwater	Woman died and 3 injured when two cars collided on the Treetop Twister
July 2002	UK	Gulliver's World	Girl falls 10m from a big wheel and died.
?? 2002	UK	Rotunda Amusement Park	8 year old girl thrown off seat on Mini Dragon ride and hit head causing fatal injuries.
Oct. 2002	UK	Hull fairground	5 people seriously injured when a Fabbri Booster ride released its restraints mid-ride.
Sept. 2003	Spain	Murcia	A girl was decapitated after standing up in the carriage of the 'Dragon train'.
Oct. 2003	Spain	Jaen	Four children were injured and one later died after a ghost train collapsed and the children fell 7 metres.
April 2004	UK	Oakwood, Wales	16 year old girl falls to death from the Hydro ride.
June 2004	UK	London	13 young people injured when car broke away from the Paratrooper ride at the Alexandra Palace fair.
August 2004	Germany	Cologne	14 year old girl was killed when the operators of a catapult-bungee ride released her carriage before her safety harness was secured.

Sources: www. joylandbooks.com, www.coasterforce.com, and press reports

3.3 Hazard Characterisation - Nature of Effects

3.3.1 Introduction

The second stage of the assessment, hazard characterisation, is defined as the quantitative or semi-quantitative evaluation of the nature of the adverse health effects to humans following exposure to a risk source(s).

The starting point for the analysis is the EU Injury Surveillance System (Euphin data-base) which collects sample data on patients visiting 'accident and emergency' (A&E) departments of hospitals from each Member State. The analysis was restricted to those

incidents in which the 'place of occurrence' was determined to be 'Amusement park, etc. - including circus, tivoli, zoo, animal park, fairground, holiday recreation centre' (Code 63). Whilst it is acknowledged that some entries will be outside the scope of this study (for example, those from zoos) the Euphin data provides a valuable starting point. The analysis was restricted to just over 10,000 injuries reported over the period 1996-2001 inclusive (as summarised in Table 3.3).

Table 3.3: Injuries at Amusement Parks, etc. Recorded on Euphin

Country	1996	1997	1998	1999	2000	2001
Austria	105	41	52	48	21	24
Belgium	219	226	118	188		
Denmark	439	431	295	357		
Finland	53	48	34			
France	139	109	94	115	96	61 (part year)
Germany	36					
Greece	30	25	21	118	120	118
Ireland	18	37	18			
Italy	96	79	72			
Luxembourg	5	4	3	3		
Netherlands	248	736	748	718	556	626
Portugal	523	584	396			
Spain	12	21	19		11	
Sweden	33	22	37	32	28	
UK	335	286				

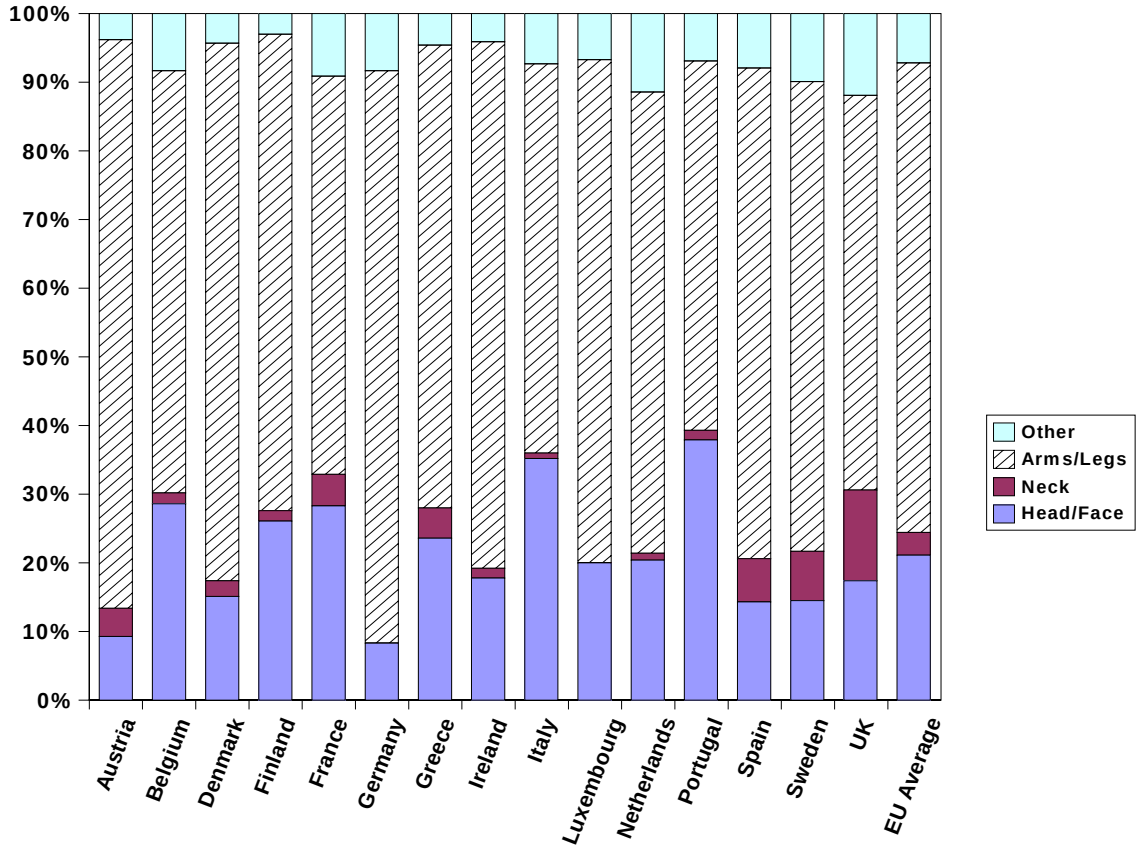
Although comprehensive data are available for 1996, the number of countries reporting has declined with the result that (full) data for 2001 are only available for three Member States (as of March 2004). Furthermore, it is important to note that the proportion of injuries recorded by individual Member States varies significantly. As such, Table 3.3 does not provide a direct indication of the relative numbers of injuries in particular countries.

3.3.2 Nature of Injuries

The Euphin data (1996-2001) were reviewed against severity and part of body injured. Overall, about 50% of patients were examined and sent home with or without treatment (Codes 1 and 2 for 'treatment and follow up'). As such, about 50% were treated and either referred for further treatment or admitted to hospital (Codes 3 to 6). A few patients (across the EU) died as a consequence of their injuries.

In relation to the body part injured, the majority (68%) involved arms and legs (including fingers/toes and shoulders/hips) whilst 21% involved the head/face. These relative distributions were reflected (more or less) across all EU Member States as shown in Figure 3.1.

Figure 3.1: Part of Body Injured



In the US, data on ride-related injuries has been collated by Saferparks (2002a) based on data from the US Consumer Product Safety Commission (CPSC) as well as from twelve state authorities. Both datasets suggest that the head, face and neck are most likely to be injured. Of particular note is that the CPSC data shows a significant rise in neck injuries during the 1990s.

This discrepancy arises because the EU data relates to all reported injuries which occur in amusement parks etc. and, as such, includes many slips, trips and falls whereas the US data relate to rider-related injuries.

3.3.3 Injuries by Age

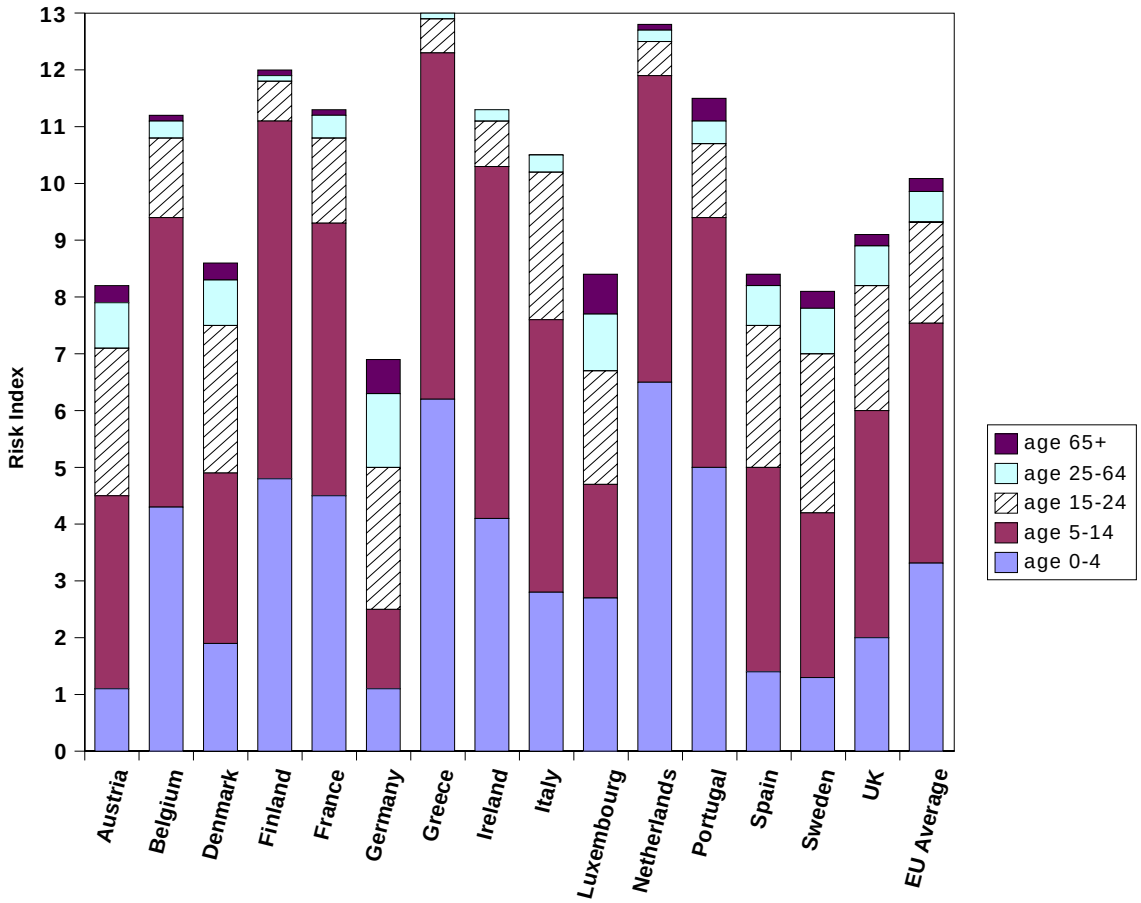
Most accidents (59%) involve children under 15, particularly those aged 5 to 14 who account for over 40% of all reported accidents[4]. The relative injury rate by age is illustrated using a 'risk index' (equivalent to percentage of accidents per year of age - see Table 3.4). If the distribution of accidents by age was uniform, then the risk index would be the same for all ages.

[4] This is consistent with US data which suggest that children (0-14) account for about half of all injuries.

Table 3.4: Variation of Accidents by Age Band					
Age Band	0-4	5-14	15-24	25-64	65+
Years in Band	5	10	10	40	10
Risk Index (EU average)	3.31	4.23	1.78	0.54	0.23
% Accidents in Age Band = Years in Band x Risk Index	17%	42%	18%	22%	2%
Cumulative %	17%	59%	77%	98%	100%

The variation from country to country is shown in Figure 3.2. This illustrates that Greece and Netherlands have the highest risk indices for the under-fives (in other words, in these countries the under-fives account for a significantly higher proportion of reported accidents than in other countries). For children aged 5-14 (the age group most likely to suffer a reported accident), the highest risk indices are reported for Finland, Greece and Ireland. Of course, great care must be taken in interpreting these findings as it may be the case that in some countries, parents are more likely to take their children to hospital as a precautionary measure than elsewhere.

Figure 3.2: Risk Index by Age



3.3.4 Injuries by Product

As indicated above, the Euphin data includes all reported injuries which occur within the amusement park, etc. where these include those which are not ride-related - for example, slips and trips in playgrounds located within the facility.

For each reported injury, there is a code for the 'product causing the injury'. The prevalent codes reported in each country are shown in Table 3.5 (overleaf). As can be seen, there is a wide variability as to the main products involved. Of note is that many are reported as Codes V9998/9 (Other).

Further analysis of the accident descriptions held on the Euphin database was undertaken by using a random 5% sample. The analysis was restricted to those countries for which accident descriptions were provided. The purpose of the analysis was to address two key questions:

- how many of the accidents related to amusement/theme parks and funfairs (as opposed to playgrounds, zoos, etc.)? and
- how many of those were ride-related?

The results are summarised in Table 3.6 with further discussion presented below.

Table 3.6: Analysis of Euphin Accident Descriptions

Country[1]	Sample Size[2]	N with descriptions	N relevant[3]	% relevant	N ride-related[4]	% ride-related
AT	13	9	3	33%	1	33%
BE	36	32	21	66%	4	19%
DK	80	67	52	78%	18	35%
FR	29	12	12	100%	10	83%
IE	5	5	2	40%	1	50%
IT	16	16	16	100%	6	38%
LU	1	1	0	0%		
NL	183	166	47	28%	24	51%
PT	70	70	45	64%	4	9%
ES	3	3	2	67%	2	100%
UK	42	42	40	95%	29	73%
All	**478**	**423**	**240**	**57%**	**99**	**41%**

Notes:
1) Accident descriptions are not available on Euphin for Finland, Germany, Greece and Sweden.
2) The sample size was an approximate 5% random sample from 9,332 data fields.
3) Relevant entries were taken as those that may have occurred within a fairground or amusement/ theme park.
4) Ride-related accidents include those associated with getting on/off the ride.

Table 3.5: Most Reported Products Causing Injuries by Country																
Code	**Description (of Product causing Injury)**	**Austria**	**Belgium**	**Denmark**	**Finland**	**France**	**Germany**	**Greece**	**Ireland**	**Italy**	**Luxembourg**	**Netherlands**	**Portugal**	**Spain**	**Sweden**	**UK**
B	Stationary equipment outside, processed surface outdoors and natural surface			13%												
B0155	Gate in fence, wall, garden gate							7%								
B0205	Swing								7%	4%			8%			
B0214	Climbing frame								10%							
B0300	Joy car, bumper car	6%				31%	14%			13%						14%
B0305	Merry-go-round					9%										3%
B0398	Other specified stationary equipment in amusement park	7%	5%	6%						10%				13%		26%
B0399	Stationary equipment in amusement park, unspecified													8%		4%
B1000	Asphalt surface, outdoors														5%	
B1004	Gravel surface, outdoors								7%							
B1009	Processed stone surface, outdoors, e.g. marble floor, flagstones, paving stones, etc.						11%									
B1098	Other specified processed surface, outdoors	9%											11%			
B1099	Processed surface, outdoors, unspecified			4%									10%			
B2002	Sand, gravel surface, unspecified												11%			
B2020	Lawn, grass surface	10%							34%							
B2998	Other specified natural surface		5%		4%		11%						14%			
B2999	Natural surface, unspecified		25%	16%	4%	10%				39%		10%		11%		
C0098	Other stairs				4%											
C0205	Vinyl, linoleum floor, indoors							6%								
K2099	Unspecified bicycle and accessories				4%											
L0978	*Not a defined code*		*11%*													
N0099	Ball, unspecified								7%							
N2016	Mat							9%								
T0000	Person							7%							6%	3%
T1599	*Not a defined code*										*13%*					
V9998	Other specified product				12%	7%									11%	
V9999	Product unspecified	13%	5%	10%	4%	8%	28%	23%		8%	40%	75%		25%	23%	7%

The analysis highlighted a number of issues. Although the Euphin 'location code 63' is defined as "Amusement park, etc. incl. circus, tivoli, zoo, animal park, fair ground, holiday recreation centre", not all such entries are related to accidents in fairgrounds and amusement/theme parks. There are three prime reasons for this:

- firstly, entries are correctly coded but relate to other activities (such as visits to the zoo). By way of example, several of the reported accidents in Austria were associated with open-air concerts;
- secondly, entries are incorrectly coded - for example some entries relate to accidents in school playgrounds; and
- thirdly, entries may be correctly coded but interpretation is country specific.

Although examples of the first two types were observed, the last reason accounted for major differences amongst countries. In particular, within the Netherlands, many accidents are associated with 'speeltuins'. It is understood that these are designed, primarily, for families to enjoy playground equipment (slides, climbing frames, trampolines, etc) so that the emphasis is very much on activities rather than on motorised rides. Similarly, albeit to a lesser extent, it would appear that many of the accidents in Portugal are associated with town parks rather than commercial amusement parks. By contrast, three-quarters of the UK reported accidents are ride-related.

Although it is difficult to be precise, it would appear that, overall, about half of the accidents recorded on Euphin under location code 63 relate to accidents to fairgrounds and amusement/theme parks. Furthermore, of these, about half are ride-related where these include accidents associated with getting on/off the rides. Finally, it is worth noting that many of the non ride-related accidents in fairgrounds and amusement/theme parks appear to be associated with slips, trips and falls - often in play areas.

These data are consistent with those provided by two companies operating amusement parks in the UK, which suggest that 57% and 60% of accidents with the parks are ride-related.

3.4 Exposure Assessment - Those at Risk

3.4.1 Introduction

The third stage of the assessment, exposure assessment, is defined as the quantitative or semi-quantitative evaluation of the likely exposure of man to risk sources.

3.4.2 Nature of Visitors

Essentially, visits to fairgrounds and amusement parks are designed to be enjoyed by most people with a range of rides and other activities to suit the wishes of the individual consumer.

There is however a distinction to be drawn between fairgrounds and amusement parks. In fairgrounds, rides are but one attraction and may well not be used by all visitors. On the other hand, amusement parks tend to have an entrance fee and the rides are the main attraction and, as such, are likely to be used by most visitors.

3.5 Risk Characterisation - Accident Rates

3.5.1 Introduction

The fourth stage of the assessment, risk characterisation, is defined as the quantitative or semi-quantitative estimate, including associated uncertainties, of the probability of occurrence and severity of adverse effect(s)/event(s) in a given population under defined exposure conditions based on hazard identification, hazard characterisation and exposure assessment.

3.5.2 Observed Accident Rates by Country

Overview

An accident rate is simply the number of accidents/number of events. In practice, the situation is more complex in that both the accidents and events have to be defined and the accidents must be associated with the event. In the case of fairgrounds and amusement parks, it would seem reasonable to define an accident as an event which results in an injury of sufficient seriousness to merit a visit to the 'accident and emergency' department at the local hospital. With such a definition, a number of accident rates could be derived including:

1) overall annual accident rate per visitor = number of accidents/annual number of visitors. This rate can be derived from data on accidents combined with the estimated numbers of visitors.

2) ride-related accident rate per visitor = number of ride-related accidents/annual numbers of visitors. This rate would require the number of ride-related accidents to be derived from the raw data. Clearly, this would introduce some difficulties - for example, should an accident involving a slip/trip/fall on entering/leaving a particular ride be categorised as ride-related?

3) ride-related accident rate per ride = number of ride-related accidents/annual numbers of rides. Clearly, the derivation of this requires more specific information on both accidents and usage of the rides.

Derivation of National Accident Rates

The Euphin data (see Section 3.3) provides information on accidents for samples from each country. Scaling these data up to national numbers of accidents is inherently uncertain (and in many cases, insufficient data are available for robust estimates) as shown in Table 3.7. As discussed above, it has been assumed that half of the incidents

reported on Euphin are associated with fairgrounds and amusement/theme parks and this has been factored into the calculations.

Table 3.7: National Numbers of Injuries in Fairgrounds and Amusement Parks

Country	Euphin Sample (% Population)	Estimated Scale-up Factor	Estimated Annual Number of Injuries
Austria	4 hospitals (*assume 5%*)	*20*	*240*
Belgium	4 hospitals (4.7%)	20	1,880
Denmark	5 hospitals (14.5%)	7	1,250
Finland	2 hospitals (<5%)	20	340
France	5-13 hospitals (*assume 5%*)	*20*	*960*
Germany	Survey of 100,000 households (0.35%)	300	5,400
Greece	4 hospitals (5%)	20	1,180
Ireland	2 hospitals (*assume 5%*)	*20*	*180*
Italy	5 hospitals (*assume 5%*)	*20*	*720*
Luxembourg	Survey (*assume5%*)	*20*	*30*
Netherlands	7 hospitals (40%)	2.5	625
Portugal	5-6 hospitals (8%)	12	2,400
Spain	Survey (*assume 5%*)	*20*	*110*
Sweden	3-4 hospitals (2.5%)	40	560
United Kingdom	Various hospitals (5%)	20	2,860
EU-15			**18,735**

Note: Estimated annual number of injuries derived from latest annual Euphin figure (see Table 3.3) multiplied by estimated scale-up factor and then divided by two to exclude those not associated with fairgrounds and amusement/theme parks. Figures in italics are highly uncertain.

Overall, it is estimated that, based on the Euphin data, there are about 19,000 injuries per year across the EU-15 Member States associated with fairgrounds and amusement/theme parks. Of these injuries, about half would be expected to be ride-related.

By combining data from Tables 3.7 (excluding very uncertain entries) with those from Table 2.2 enables a preliminary estimate of overall accident rates to be derived as shown in Table 3.8.

Table 3.8: Overall Annual Accident Rates (Preliminary Estimates)

Country	Estimated Annual Number of Injuries[1]	No. of Visitors[2] (millions)	Accidents per Million Visitors
Belgium	1880	10	188
Denmark	1250	16	78
Finland	340	2	170
Germany	5400	42	129
Greece	1180	2	590
Netherlands	625	12	52
Portugal	2400	2	1200
Sweden	560	10	56
United Kingdom	2860	85	34
EU-15 (estimate)	**18735**	**294**	**64**

Notes:
1) Number of injuries taken from Table 3.7
2) Number of visitors taken from Table 2.2 (where 1 million visitors have been assumed for 'few') and multiplied by two to account for visits to fairgrounds.

For some countries, further data have been obtained which may enable further refinements to the above estimates to be made as discussed below.

Belgium

A Belgian consumer association has provided some national EHLASS data which, on inspection, appears to be a sub-set of Euphin data[5].

Denmark

The Danish Accident Research Centre has kindly extended the data listed in Table 3.3 to include more recent entries (to 2002) from the National Registry as well as some analysis of the nature of the incident, age of victim, product involved in much the same way as the analysis presented in Section 3.3. Overall, it would appear that the numbers of injuries are similar to those suggested by Table 3.3 and about one quarter of the injuries can be directly attributed to ride-related accidents.

Portugal

Some data on accidents and visitors to the 13 Portuguese water parks have been provided by the Institute of Sports. In 2002, there were 569 reported accidents of which 519 were treated locally (first aid) and 49 involved a visit to the local hospital. Given visitor numbers of 725,000 in 2002, this suggests an injury (requiring attendance at hospital) rate of 67.5 per million visitors - which is significantly lower than that predicted in Table 3.7. However, these data relate to those injuries reported on-site and therefore exclude subsequent hospital visits.

UK

Safety in fairgrounds and amusement parks has been extensively studied in the UK following a tragedy in the early 1970s when several children were killed on a train ride in London's Battersea Park.

Furthermore, more recent data on accidents and injuries than those available on Euphin are available from the UK's accident surveillance system (DTI, 2003). These data suggest that the average number of reported injuries as a result of an accident in a 'fairground/circus/zoo/amusement park' (directly equivalent to the Code 63 Euphin classification) is about 9,500 per year for the years 2000 to 2002 (inclusive). In relation to the items involved, the main contributors were bouncy castles, other fairground ride and bumper/dodgem car with annual average numbers of 5,800, 2,500 and 1,600 per year[6].

The UK Health & Safety Executive (HSE) has undertaken recent research (including Worsell, 2000; Roberts, 2001; and Tilson & Butler, 2001) into accidents including those

[5] However, it is worth noting that some field entries (for example, date of birth) appear to differ from those on the Euphin data-base.

[6] These data are drawn from the 'leisure' (LASS) data but it is accepted that incidents involving bouncy castles (in particular) could occur in premises which are not fairgrounds or amusement parks (for example at a local community fete).

reported under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR). Under RIDDOR, any incident which involves someone leaving a fairground or amusement park in order to attend a hospital must be reported. There are about 450 'major injuries' reported to HSE each year. It is immediately apparent that these represent only 5% of the figures derived from the UK's accident surveillance system. There are two main reasons for this:

1) the accident surveillance system data include injuries which did not occur within fairgrounds and amusement parks; and

2) from a review of the Euphin data for the UK for 1997, it appears that most people (52%) attended hospital one or more days after the accident. Of those who attended hospital on the same day, most (51%) attended the hospital after 5pm. In other words, it would appear that many people suffer injuries which are attended to after they have left the fair/park and, as such, are not reported to HSE and, therefore, are not included within their statistics.

It is of note that five amusement parks in the UK (which responded to our consultation exercise) reported a total of 1,035 non-fatal accidents/injuries in 2003. Combining these data with the associated visitor numbers suggests an accident rate of about 330 accidents per million visitors. This is an order of magnitude larger than that presented in Table 3.8 for the UK - but many of the injuries are reported as minor and, as such, are unlikely to have resulted in a visit to hospital and thus would not appear in other data sources such as Euphin, or the UK RIDDOR system.

3.5.3 Comment

From the analysis presented above, it is clear that obtaining reliable data on accidents in fairgrounds and amusement parks is very difficult. The demise in national reporting to the Euphin database means that basic data are not available in a consistent format across all EU countries. Where countries do report information, injury data from (a few selected) hospitals cannot be readily linked to data collected by individual facilities (or, indeed, national bodies).

With regard to accidents from services such as amusement parks, where only a small number may exist within a country, data from a few selected hospitals are unlikely to provide a good indication of safety levels. Given that people may travel some distance to an amusement park, and may not visit a hospital until the next day, no link can be made with specific parks. This is important for considering the safety of non-regulatory measures, and thus the difference between parks which comply and those which do not.

Furthermore, the level of detail currently reported makes it difficult to ascertain the cause of the accident. Therefore, while non-regulatory safety measures can be reviewed in relation to design, operation, maintenance and emergency issues (as in Section 5), it can not be accurately assessed from the injury data which of these aspects contributed to an accident. Such investigations are only undertaken for the most serious accidents.

Where individual amusement parks collate their own injury database, there is generally no requirement to make this information public, unless injuries are significant enough to

be reported to the relevant authority, such as in the UK. In addition, this would still only capture those injuries reported during the visit to the amusement park. There is no mechanism to feedback injury information to an amusement park after a visitor has left the park, thus any collation of data by amusement parks is likely to underestimate the number of injuries.

These issues make comparative analysis of the effectiveness of safety measures over time a very uncertain process.

4. RISK MITIGATION MEASURES

4.1 Overview

The safety of consumers in fairgrounds and amusement parks is dependent on the operators providing a 'safe' environment. This necessitates the provision of well designed, maintained and operated facilities. To assist in this, there exists a range of regulatory and non-regulatory measures and these are outlined below.

4.2 The Regulatory Context

4.2.1 Relevant EU Directives

The safety of services is not regulated at the EU level in its own right, but it may be taken into consideration in various Community legislative provisions and initiatives (CEC, 2003). However, in most cases, the main objective of such provisions is to ensure the correct functioning of the internal market.

Directive 89/391/EEC provides a framework for measures to encourage improvements in the safety and health of employees at work. Although aimed primarily at workplace safety, the Directive may have implications for consumers, for example in relation to requirements for risk assessment and emergency procedures (ICRTL, 1995). The transposition of this Directive into national law may further emphasise consumer safety. However, given that any consideration of consumers is likely to be general in nature (rather than specific to fairgrounds and amusement parks), such legislation is not considered further.

The General Product Safety Directive was introduced in 1992 (92/59/EEC) and has since been revised by Directive 2001/95/EC. Although specifically relating to products, some countries, for example Finland, have applied the Directive to services in the national transpositions of the regulations.

A draft Directive on Non-Permanent Structures and Specific Equipment for Fairgrounds and Amusement Parks was recalled in 1992, when Member States argued that regulations in this area should be laid down at national level in accordance with the subsidiarity principle.

In the proposed amendment to Directive 95/16/EC on machinery in 2001, the European Parliament suggested that either specific equipment for use in fairgrounds and amusement parks should be included within the scope of the Directive, with defined safety requirements for this category of machinery, or an individual directive should be developed. This proposal was rejected by the Commission, based on the previous discussion in 1992 and, it has been suggested, due to lobbying from certain sectors of the industry.

Therefore, the current situation is that, at EU level, there is no legislation governing the safety of the fairground and amusement rides per se, nor is there any legislation to ensure the safe provision of the service to consumers.

4.2.2 National Legislation

In the absence of Community provisions, it is not surprising that Member States have different approaches and policies in place to address the safety of consumer services. Some countries have identified the issue as an overarching subject, whilst others argue that the subject is too broad and diverse and instead focus on specific sectors. Furthermore, in some countries central authorities have overall responsibility, while in other countries, for example Austria and Spain, extensive competencies may be placed on the regional and even local level authorities (CEC, 2003).

Therefore, CEC (2003) divides the Member States into three main groups by approach, and emphasises that the categorisation does not in any way correspond to levels of safety:

- countries with separate policies and legislation of a general nature with an aim to secure consumer safety. The general legislation supplements sector policies and legislation;

- countries with general policies and legislation aiming at safety at work, including consumer safety in the service area. The general legislation supplements sector policies and legislation directly aiming at the safety of services; and

- countries with sector policies and legislation on the safety of certain services. The sector legislation covers different types and aspects of these services.

Thus, while all Member States have a common concern to protect the safety of consumers using services, it is the extent of sector specific legislation that is of interest to this study. Table 4.1 lists the relevant legislation identified which relates to fairgrounds and amusement parks in each Member State.

Table 4.1: National Legislation Relating Specifically to Fairgrounds and/or Amusement Parks

Country	Legislation Relating Specifically to Fairgrounds and/or Amusement Parks
Austria	None at national level, but some Länder may have legislation[2]
Belgium	*Royal Decree of 10 June 2001 relating to the operation of amusement parks*[2] *Royal Decree of 18 June 2003 relating to the operation of fairgrounds*[2] Based on prEN13814 (see Section 4.2.3).
Denmark	National regulations were introduced in 1988 with minor amendments in 1992. Permission must be granted by the police, and each ride must have a logbook and be safety tested each year. Additional inspections may be required[3].
Finland	The regulation of services comes under the Product Safety Act (914/1986). The Public Entertainments Act is also relevant for fairgrounds. A licence, renewable annually, is issued by the police provided that mechanical and general safety requirements are met. Equipment may be inspected annually[3].
France	Special measures governing the safety of services and installations, notably for amusement parks[1]. Specific laws for non-permanent amusement parks or fairgrounds may also be applicable[3].
Germany	Amusement parks and fairgrounds are regulated under the building laws of the Länder. These refer to standards and guidelines and enforce *DIN4112 Temporary Structures*, which focuses on the design of rides. *Directive for the Operation and Use of Amusement Rides* (1997 – first issued 1970) regulates the construction, operation, use and maintenance of temporary structures and amusement rides in fairgrounds and in parks[2].
Greece	*Police Decree 22/18.11.71 Safety Measures Governing Amusement Parks*[1]

Table 4.1: National Legislation Relating Specifically to Fairgrounds and/or Amusement Parks	
Country	**Legislation Relating Specifically to Fairgrounds and/or Amusement Parks**
Ireland	The Department of the Environment introduced new regulations in September 2003 which require funfair operators to have a safety certificate. These were incorporated into the *Planning and Development Act 2000 – Section 239*: relating to the safety of fairground equipment to be used at funfairs[2].
Italy	*Ministerial Decree 19 August 1996 – Documentation and Verification Techniques*[2] Rides are checked annually at fixed sites and twice a year at travelling fairs by an official commission. Safety controls on travelling fairs depend on the requirements of City authorities.
Luxembourg	None[1]
Netherlands	*Decree on the Safety of Fairground and Playground Equipment (1996)*: prescribes design, operation and maintenance regimes having come to the view that there were too many accidents involving fairgrounds.
Portugal	*Decree 309/2002 regulating the installation and operation of public spectacles and amusement spaces* and D*ecree 16/2003 establishes technical specifications to be employed* – understood to be based on the draft CEN standards (see Section 4.3.2). These updated 1997 legislation which was enacted in the wake of two child deaths at a water park in July 1993.
Spain	Royal Decree 2816/82 Police Regulation of Public Spectacles and Leisure Activities covers general safety. However, it is of note that, following a number of accidents in 2003, the Spanish Confederation of Fairground Industrialists is striving for professional regulation[2]. Regarding amusement parks there is no legislation at national level, but some autonomous communities may have legislation.
Sweden	The Public Order Act states that a 'ride' shall be inspected before it can be used at a public event. The ordinance on inspection of fairground and amusement park devices states that the inspection shall be carried out by an accredited inspection body and when an inspection shall be carried out, when first erected and then annually or following modification. It is also stated that the owner of the ride has the responsibility for the "self control" of the ride; control after build up and daily control. The Swedish National Police Board regulations and guidelines on inspection of fairground and amusement park devices give details about the inspection[2].
UK	None[2]
Sources: *1) CEC (1998-2001)* *2) Consultation responses and literature review* *3) ICRTL (1995)*	

4.3 Non-regulatory Measures

4.3.1 Types of Measure

Non-regulatory measures have been implemented in a number of countries within the EU. These include codes of practice developed by regulators and/or industry bodies, standards and requirements for certification, rules/guidance for individual park users, etc.

Particular measures may focus on design, operation (including staff training), maintenance (including inspections), emergency procedures or any combination of these aspects. In the analysis that follows these are referred to as D (design), O (operation), M (maintenance) and E (emergency measures) respectively.

4.3.2 Cross-border Measures

As noted in the Specification (see Annex 1), two European standards are being developed but the implications of these are beyond the scope of this study. The two standards in question are prEN 13814 (*Fairground and amusement park machinery and structures - Safety*) and prEN 13782 (*Temporary structures - Tents - Safety*). However, during the course of this study, prEN13814 has been formally accepted and contains requirements for design, manufacture, installation, maintenance, operation, examination and testing, as detailed in Box 4.1. Thus, it is intended to protect people against the risks of accidents caused by deficiencies in the equipment and the services provided, and is based upon past experience and risk analyses. However, it is in the process of publication and the full text of the standard was not available at the time of writing.

Box 4.1: Contents of prEN13814 Fairground and Amusement Park Machinery and Structures

- Common requirement for design analysis and examination
  - → Design documents
  - → Selection of materials
  - → Design loads
  - → Structural analysis – principles
  - → Verification of stability
  - → Verification of strength
  - → Structural design and workmanship

- Requirements for design and manufacture of rides and structures
  - → Risk reduction by prevailing design and safety measures
  - → Supplementary safety requirements for various types of amusement device
  - → Manufacture and supply
  - → Initial approval, examination and acceptance – Recommended procedures
  - → Provisions before supply and use

- Operation and use of rides and structures
  - → Introduction
  - → Standard documentation
  - → Requirements of personnel
  - → Duties of the controller
  - → Duties of the amusement device operator
  - → Duties of the attendant
  - → Independent examinations
  - → Fire

Source: Final Draft of prEN13814, dated January 2004

The (draft) European standard forms the basis for the Belgian regulations adopted in 2001, as well as the national standards adopted in Spain and Italy. However, it is important to note that the new standard is not fully supported by all parts of the industry.

The German Technical Inspection Agency (TÜV) is one of the main bodies which certifies equipment used in fairgrounds and amusement parks and such certification is accepted (to varying degrees) by other Member States. 70% of TÜV's customers in this field are from outside Germany (Games & Parks, 2004). Other certification bodies include DNV, Lloyds and Bureau Veritas. Clearly, such certification to date has related primarily to the design and condition of the equipment rather than its operation and maintenance.

Furthermore, it is of note that other standards are applicable elsewhere in the world that may also be used in the EU. For example, the American Society for Testing and Materials (ASTM) is an independent standards-writing body that has developed amusement ride safety standards in the US for over 20 years. In 1998, the ASTM F-24 World Standards Task Group was created to develop an international standard for amusement ride design. In March 2003, a comprehensive standard for the Design of Amusement Rides and Devices (F2291) was produced, which is said to represent the best practices of both domestic (i.e. US) as well as international experts. Active committee members hail from Australia, Bahrain, Brazil, Canada, France, Germany, India, Italy, Japan, Russia, Switzerland, the Netherlands, the UK and the US (Design News, 2003a). The ASTM Committee F-24 works closely with industry associations and other standards development organisations (e.g. CEN) to avoid duplication of effort. The other standards in the F24 suite, relating to operations, testing and maintenance, are being updated to make them consistent with the guidance offered in F2291, with the ultimate goal of ensuring that ASTM standards are accepted worldwide and not seen as being just for US application (ASTM, pers.comm.).

4.3.3 National Measures

Countries which have specific legislation relating to fairgrounds and/or amusement parks are unlikely to have, or indeed to require, national non-regulatory measures. Table 4.1 identifies Austria, Luxembourg, Spain and the UK as countries without specific legislation. No information has been received regarding Austria or Luxembourg to suggest that non-regulatory measures exist in these countries. However, such measures do exist in Spain and the UK to address the absence of legislation, while a small number of other non-regulatory measures exist to supplement legislation in other countries.

Based on consultation with industry and competent authorities, information has been obtained for ten non-regulatory measures in six countries, three of which are within the context of legal requirements, and two of which are standards based on the draft European standard and thus due to be revised or replaced in the near future. These are summarised in Table 4.2 and are believed to be the main non-regulatory measures available at a national level. Additional measures may have been developed by individual parks, as discussed in Section 4.3.4 below.

Table 4.2: National Non-Regulatory Measures Identified

Country	Focus	Outline
Finland	O	*Finnish Consumer Agency's Guidelines for the Promotion of Safety in Program Services* 2003
Germany	DME	TÜV Süddeutschland safety certificate
	DOME	*Die gerichtsfeste Organisation des Freizeitparks* (Legally Unassailable Organisation of Leisure Parks) - sample safety manual commissioned by VDFU, national trade association for leisure parks
Ireland	DOM	Funfair Guidance Document
Italy	DOME	UNI 10894 (based on prEN 13814)
Spain	DOME	*UNE 76601:2001 on the Safety of Equipment and Structures for Amusement Parks and Fairgrounds* (based on prEN 13814)
	OME	*Guidance on Safe Practice* 1999

Table 4.2: National Non-Regulatory Measures Identified		
Country	**Focus**	**Outline**
United Kingdom	DOME	*HSG175* (HSE, 1997): comprehensive guidance developed by the Health & Safety Executive (HSE) in close collaboration with the UK trade associations. HSG175 complements a series of ride-specific HSE guidance notes. However, a spate of fatal accidents in 2000 prompted a review (Roberts, 2001) which revealed a breakdown in inspections (which, in turn, led to convictions). This, in turn, has led to increased enforcement action by HSE (HSC, 2003).
	D	*Safety of Amusement Devices: Design* (industry standard)
	DM	Amusement Device Inspection Scheme (ADIPS) adopted by all 120 members of the UK trade association (BALPPA)
Note: Focus Codes are D (design), O (operation), M (maintenance) and E (emergency measures).		

Finland

The Finnish Consumer Agency (2003) has produced *Guidelines for the Promotion of Safety in Program Services*, which includes fairgrounds and amusement parks. These guidelines are based on the Finnish Product Safety Act and define minimum standards for the safety of program services, serving as general instructions to be applied whenever appropriate within the field of consumer services. They do not specifically refer to fairgrounds and amusement parks.

The contents of the Guidance include the following:

- general safety requirements;
- safety document (including risk assessment, and reporting of accidents);
- personnel and safety training;
- machinery, structure and buildings;
- safety equipment; and
- emergency preparedness.

Application of the practices set out in the Guidance is required by Finnish law, however, its actual interpretation and the approach taken by amusement parks and fairgrounds is not defined. For this reason, the Finnish Guidelines are considered further in this Report to provide an indication of the effectiveness of guidelines if applied within a context of a legal general safety obligation.

Germany

The VDFU (German trade association for leisure parks) has recognised that the range of requirements and guidance relating to the safety of equipment and installations, environmental protection, safety at work, etc. may be confusing to some of its members, resulting either in non-implementation of some rules and/or gaps in the requirements. To address this, the VDFU has commissioned a sample manual (*Die gerichtsfeste Organisation des Freizeitparks/Legally Unassailable Organisation of Leisure Parks*) to ensure that its members meet all the safety requirements. The contents of this manual are provided (in German) in Box 4.2. Essentially, it covers organisational structure, visitor management and general safety issues. While it is largely based on legislative requirements (relating to design, maintenance and emergency procedures), it also

includes operational procedures which may not be codified, but which are day-to-day practice. It is believed that this sample manual was introduced at the beginning of the 2004 season, thus practical experience with it is limited, and no information on its use was available during the timeframe of this study.

Box 4.2: Contents of Die Gerichtsfeste Organisation des Freizeitparks (*Legally Unassailable Organisation of Leisure Parks*)

I. Aufbauorganisation
   1. Organigramm des Freizeitparkes (*Organigram*)
   2. Normalorganisation (*Normal Organisation*)
   3. Beauftragtenorganisation (*Assigning Organisation*)

II. Ablauforganisation (*Operational Organisation*)
   1. Allgemeine Regelungen (*General Regulation*)
   2. Kunden/Gästemanagement (*Customer/Guest Management*)
   3. Anlagenmanagement (*Plant Management*)
   4. Arbeitsschutz (*Industrial Safety*)
   5. Umweltschutz (*Environmental Protection*)
   6. Objektschultz/Verkehrssicherung (*Security/Safeguarding of Traffic*)
   7. Notfallmanagement (*Emergency Management*)

In March 2003, Europa Park in Germany was the first amusement park to receive a new safety certificate from TÜV Süddeutschland. This includes certification of meeting not only the technical requirements for individual rides, but also requirements for the safety of the park and rides concerning emergency, fire and evacuation procedures, schedules for inspections and maintenance and the relevant documentation. Other parks have also applied for this certificate. However, TÜV did not wish to provide further details on the certificate at this time, as it is a commercial venture.

Ireland

The *Planning and Development Act, 2000 (Certification of Fairground Equipment) Regulations 2003* were adopted in September 2003. These Regulations allow for the granting of certificates of safety for funfair equipment. The *Funfair Guidance Document*, published by the Minister for the Environment, Heritage and Local Government (2003) provides guidance on applying for safety certificates as well as the safety standards, codes of practice or related documents which may be considered necessary for the granting of a certificate of safety. It is noted that this Guidance is based largely on the UK HSG175 document described below and its contents include:

- applications for certificates of safety;
- operations manual – based on HSG175;
- technical guidance – based on HSG175; and
- thorough examination – based on HSG175.

Italy

The Italian standard UNI 10894 on the *Safety of Equipment for Fairs and Amusement Parks – Temporary Tents and Structures – Requirements for the Planning, the Construction, the Use and the Maintenance* is based on prEN 13814, and therefore is likely to reflect the content shown in Box 4.1. It was not possible to obtain information

on how many amusement parks or rides complied with this measure and no responses to the consultation were received from individual parks in Italy. This means that it has not been possible to assess the effectiveness of this measure in the following Section. However, it is noted that this standard will now be updated to reflect the newly adopted European standard.

Spain

In 1999, the Spanish Association of Amusement and Theme Parks (AEPA) developed *Guidance on Safe Practice* (AEPA, 1999). It is intended to provide best practice guidance that meets the existing regulations and is based on the European standard that was under development at the time the Spanish Guidance was produced. All AEPA's members (nine amusement/theme parks) must follow the guidance, and any new candidates must also follow the guidance in order to become a member of AEPA. Compliance is assessed by AEPA's Safety Committee and, although the Guidance is intended for amusement/theme parks, AEPA has also provided copies of the guide to authorities, inspection bodies and showmen operating fairgrounds.

The Guidance focuses on:

- risk management;
- dealing with manufacturers and suppliers;
- operation;
- maintenance;
- emergencies; and
- technical inspections.

In 2001, after the Guidance was developed, Spain translated the draft European standard, prEN 13814, into a national standard, UNE 76601:2001 on the *Safety of Equipment and Structures for Amusement Parks and Fairgrounds*. The Spanish standard will be replaced once the EU standard is available and translated into Spanish. This may take a few months but no significant changes are expected (AENOR, pers. comm.).

It is of note that the Spanish Confederation of Fairgrounds has its own system in place for ensuring the safety of fairgrounds, where this closely follows UNE 76601:2001 (although the safety system has in fact been in place for 10-12 years). The system includes an approval process before the ride is installed and it is also necessary for all travelling fairs visiting their sites to have certificates of safety showing that annual inspections have been undertaken (AFABE, pers. comm.). Awareness of AEPA's guidance does not appear to be high in the Spanish travelling fair industry and, in any case, it is suggested that the fairs do not operate in the same way as amusement parks, so therefore AEPA's guidance is not applicable (CEIF, pers. comm.). Furthermore, CEIF are expecting regulation for Spanish fairs and it would welcome this.

UK

Fairgrounds and Amusement Parks – Guidance on Safe Practice (HSG175) (HSE, 1997) is issued by the UK Health and Safety Executive and was first published in 1997. It notes that fairgrounds and amusement parks have been shown to be relatively safe, but that there have been a small number of serious accidents. Thus, the guidance recognises

the need to keep those risks that are present to acceptable levels, and reflects the increased emphasis on identifying measures to control risks by means of risk assessment and risk management, which have been introduced in health and safety law. It is understood that HSG175 is currently under revision.

The most relevant section of HSG175 for this study (i.e. in relation to services) is Section F – Guidance for Controllers[7]. This covers:

- responsibilities of controllers;
- buying or selling an attraction;
- modification and repair;
- effective maintenance;
- safe systems of operation;
- selecting and training staff; and
- emergency procedures.

The amusement devices inspection procedures scheme (ADIPS) assists with the implementation of HSG175 in the UK. It covers:

- the four types of inspection required for amusement devices;
- documentation required by amusement device operators;
- registration and administrative control of appropriately qualified inspection bodies; and
- inspections required for coin-operated children's amusement devices.

The UK industry tends to support a voluntary approach because it believes that the variety in the types of ride does not allow for specific and prescriptive requirements.

4.3.4 Local Measures

It would be expected that all operators of amusement parks and fairgrounds would have formalised procedures for ensuring the health and safety of consumers. A questionnaire designed to obtain information on local measures was circulated to individual parks. A total of 14 responses were received from the UK, two from Denmark and one each from Belgium, France, Germany and Spain. These responses provided general information on safety management issues which has contributed to the analysis in Section 5. Although requested, none of the responding parks provided their guidelines or documents on safety procedures. In the UK, several respondents indicated that their guidance followed national guidelines (e.g. HSG175).

As an alternative, examples of safety procedures have been gathered from the Internet or through general consultation for three parks which did not complete a questionnaire. Summaries of procedures from Alton Towers in the UK, Särkänniemi in Finland and a Swedish amusement park are provided in Annex 2. These are very general documents but identify a range of measures covering issues such as: engineering/maintenance of rides; ride/attraction operation; food safety/hygiene; first aid facilities; emergency planning and fire/security. It can be expected that many other amusement parks have

[7] However, all sections of HSG175 were considered in preparing this Report.

such measures in place, however these are not co-ordinated at a national or European level.

4.4 Outside the European Union

4.4.1 Ontario, Canada

The Technical Standards and Safety Authority (TSSA) is responsible for regulating the safety of more than 2,000 amusement rides in Ontario under the Technical Standards and Safety Act, 2000. It is a legal requirement that amusement rides be inspected before initial licensing to ensure compliance with safety standards and its registered design. Ride owners are also licensed and monitored under this Act. For each individual amusement ride, a permit is issued and must be renewed annually.

TSSA has initiated the 'RideSmart' programme in close collaboration with the three major amusement parks in the area. Incidents (80 per year in 1998) were dominated by those involving water slides, go-karts and roller coasters (as elsewhere) and most (over 70%) were rider-related. Recent reductions in the number of incidents (43 in 2002) have been attributed to the introduction of the RideSmart programme, although it is noted that the number of operators submitting reports has also fallen and could explain part of the reduction in (reported) accidents.

However, the TSSA, in partnership with the amusement industry, has also produced an *Amusement Ride Operators' and Attendants' Safety Handbook*. This identifies best practice safety procedures which are based upon the experience of field personnel or research conducted by safety specialists.

4.4.2 Australia

The Australian Amusement, Leisure and Recreation Association Inc (AALARA), formed in 1994, is the national body representing the amusement, leisure and recreation industry and has particular responsibilities in the areas of safety, operations and management within these industries. AALARA's safety support programme, AM-SAFE, is an industry self-regulation initiative which was introduced in 2002. It aims to achieve best practice through appropriate training, licensing and accreditation. Risk management is seen to be an integral part of good management practice, and AM-SAFE aims to be proactive, by reducing the level of incidents and increasing efficiencies.

4.4.3 United States

In the US, amusement rides are regulated through a range of federal, state, and local laws, with a number of exemptions. There is generally greater regulation of travelling fairs than amusement parks, as the former are regulated under the Consumer Product Safety Act. Some amusement rides are subject to some type of safety regulation at the state or local level. However, consumer protection laws vary widely from state to state, and amongst ride types and venues.

The amusement ride industry has developed a set of engineering standards through ASTM, as discussed above. Some parks, fairs, and manufacturers voluntarily comply

with those standards, whilst some state laws mandate compliance with parts of the ASTM standards for amusement rides (ASTM F-24) (Saferparks, 2004).

It is of note that, in the US, there is a dedicated consumer organisation, Saferparks, which campaigns for greater consumer safety in the amusement ride industry. There is no equivalent in the EU, and thus Saferparks provides a useful source of information when considering the issue of best practices for consumer safety. Although it is a US-focused organisation, much of the information is also applicable to the EU, given the global nature of the industry.

5. ASSESSMENT OF NON-REGULATORY MEASURES

5.1 Introduction

Previous research on safety in amusement parks and fairgrounds was undertaken by International Consumer Research and Testing Ltd (ICRTL) in 1995 on behalf of the European Commission. Seventy-two sites were examined across the EU, with nearly 600 rides assessed against a standard checklist (based on the then draft CEN standard and other guidance). The following observations were made:

- standards of safety were variable across countries but were generally better at fixed sites than travelling fairs;
- typically, safety was better where there were national controls operating or good systems of local inspection;
- in all countries there was a lack of appropriate information to the public;
- control of access to rides was also a problem;
- in all countries examples of a lack of attention by attendants or operators were also noted, alongside several examples of good practice; and
- dodgems were one of the most common rides to be assessed and on which safety failings were observed, with over half criticised for inadequate restraints.

Furthermore, ICRTL (1995) report that an analysis of UK accident data showed that, in addition to incidents related to inadequate supervision or poor standards of design or construction, a significant proportion of accidents at amusement parks or travelling fairs were a result of people's behaviour. This information is developed further in HSG175 which identifies the main causes of accidents on fairgrounds and amusement parks between 1985 and 1995 as follows (in descending order of significance):

- inadequate supervision;
- riding or standing in an unsafe position;
- poor design/construction;
- failure to comply with instructions;
- guarding faults;
- operator error;
- misbehaviour – by employee or other person;
- defective equipment;
- inadequate training/instruction; and
- unsafe system of work.

It should be noted that, since the ICRTL report in 1995, national regulations have been introduced in Belgium, Ireland, Netherlands and Portugal.

Given that there are only a few non-regulatory measures in the EU, more detailed case studies were undertaken on the UK and Spanish guidance documents, and the Australian

certification approach. It had been hoped that the German safety certificate would form an additional EU case study but the relevant data were considered to be commercially confidential. The assessment of non-regulatory measures is therefore based on the limited industry questionnaire responses, with further detailed information gathered from telephone and email discussions with key individuals in the case study countries, and a thorough review of published and Internet data.

This Section outlines the most important features, with greater detail provided in Annexes 4, 5 and 6 for the case study measures.

In addition, consideration has been given to some aspects of those regulatory measures where information was readily available, i.e. Belgium, Finland, Ireland and Canada, to provide a comparison for the scope and implementation of non-regulatory measures.

5.2 Scope of Safety Management

The Commission has identified the following elements as influencing the level of safety:

- technical issues related to design and installation of equipment;
- operation and use of equipment;
- maintenance and inspections of equipment;
- qualifications and training of personnel;
- guidance of visitors and safety information, including the use of signs; and
- emergency procedures and equipment.

For the measures identified, Table 5.1 shows that the German Safety Certificate and the Irish Regulation/Guidance are largely an indication of technical safety as they have limited, if any, requirements for the training of personnel or the guidance of visitors. In contrast, the Spanish Guidance does not address technical issues relating to design of equipment, as this is not seen to be a matter for park operators, but the issue of risk assessment in relation to the installation of the ride is covered. Of all the elements, guidance of visitors and safety information appears to be the least well covered by both regulatory and non-regulatory measures.

Table 5.2 summarises the stakeholders involved in the overall approach to safety management, which varies greatly between the different measures. Where guidance is provided in a regulatory context, the approach may be developed by a consumer organisation (Finland), a Government body (Ireland) or a standards body (Canada). In Germany, the measure is also driven by a standards organisation, but is non-regulatory. The Spanish and Australian approaches are purely industry initiatives, with the industry associations responsible for defining best practice, approving parks as meeting the required standards, and enforcing the requirements. Only the UK approach combines all

stakeholders to develop guidance under what is known as the Fairgrounds[8] Joint Advisory Committee[9] (FJAC).

Table 5.1: Aspects Covered by Safety Measures						
Country	**Technical issues relating to design and installation of equipment**	**Operation and use of equipment**	**Maintenance and inspections of equipment**	**Qualifications and training of personnel**	**Guidance of visitors and safety information (including use of signs)**	**Emergency procedures and equipment**
European						
DE - Certificate	Y	Y	Y	N	N	Y
ES - Guide	Y?	Y	Y	Y	Y	Y
FI - Reg/Guide	Y	Y	Y	Y	Y	Y
IE – Reg/Guide	Y	Y	Y	Y	N	N
UK - Guide	Y	Y	Y	Y	Y	Y
International						
AU - Certificate	Y	Y	Y	Y	?	Y
CA – Reg/Licence	Y	Y	Y	Y	Y	Y

Table 5.2: Stakeholders Involved in the Development (D) and Practical Application (A) of Safety Measures					
	Amusement Park Industry	**Fairground Industry**	**Government Agency**	**Consumer Organisation**	**Standards Organisation**
European					
DE - Certificate	D/A	-	-	-	D
ES - Guide	D/A	-	-	-	-
FI - Reg/Guide	A	A	D	D	-
IE – Reg/Guide	-	A	D	-	-
UK - Guide	D/A	D/A	D/A	D	-
International					
AU - Certificate	D/A	D/A	-	-	-
CA – Reg/Licence	D/A	D/A	D	-	D

8 It is of note that UK sources tend to refer to fairgrounds when they actually mean fairgrounds and amusement parks (as defined by this study). Although this has been corrected where possible, we have not changed names and titles.

9 Membership of the FJAC comprises the Health & Safety Executive (HSE); the Amusement Catering Equipment Society (AECS); the British Amusement Catering Trades Association (BACTA); the British Association of Leisure Parks and Piers (BALPPA); the National Association for Leisure Industry Certification (NAFLIC); the Showmen's Guild of Great Britain (SGGB); the Society of Independent Roundabout Proprietors (SIRP); and the Association of Independent Showmen (AIS).

5.3 Technical Issues Relating to Design and Installation of Equipment

5.3.1 Overview

There are essentially two approaches to managing the safety aspects of the design and installation of equipment in fairgrounds and amusement parks. Firstly, operators can request that the equipment they purchase meets a specific standard, or, secondly, an appropriate expert may be employed to inspect all equipment purchased.

5.3.2 Requirements of Non-regulatory Measures

The **Spanish** Guidance requires that designs must meet the appropriate regulations (where these are of a general nature, e.g. electrical safety, structures, health & safety, etc.) and that the designer must undertake a risk assessment. With regard to installation, the Controller should undertake a risk assessment, follow instructions from the manufacturer and should be supervised by a competent body or technician that verifies that all the regulations are met.

In the **UK**, HSG175 states that design should be undertaken by suitably qualified and experienced designers. Three types of pre-use inspections (and associated reports) are required by the Amusement Devices Inspection Procedures Scheme (ADIPS – which supports HSG175) (Fawcett, 2003):

- ***design review*** – appraisal of a design by an inspection body to determine the adequacy of a design specification and the assumptions on which it is based (with an alternative Maturity of Design process for existing rides with a good safety record) supported by a Report of Design Review;

- ***assessment of conformity to design*** – a check carried out by an inspection body to check the ride is constructed to the design specification, supported by a Report of Assessment of Conformity to Design; and

- ***initial test*** – verification and test procedure by an inspection body to check the adequacy of the initial test in relation to the design specification, and operating instructions contained in the operations manual, supported by a Report of Initial Test. This is required before first use in the UK, before reuse after any safety-critical modification or before first use of a device installed at a fixed site.

Although other (machinery-related) legislation exists, the requirements for a design review and for an assessment of conformity to design, as required under the ADIPS guidance, are more stringent than the law.

In **Australia**, ride controllers are expected to ensure that their rides comply with the Australian Standard *AS3533 Part 1 Design and Construction*.

5.3.3 Requirements of Regulatory Measures and Associated Guidance

In **Finland**, it is recommended that responsibility for the design and technical implementation of special structures be entrusted to an expert. The Finnish Guidance

also suggests that it is a good idea to discuss safety matters with the local building inspector.

In **Germany**, it is a legislative requirement for rides to meet DIN 4112. Many rides are "TÜV certified", where this meets the requirements of DIN 4112 as well as any specific requirements of the Länder.

A Safety Certificate is required in **Ireland** before fairground equipment can be operated for public use. The Certificate will be issued following an application, which should contain specifications, test results or other information. The approach taken by the Irish Guidance is to follow HSG175 with respect to the ADIPS inspections and approval.

Before a new amusement device is registered in **Ontario**, its design is subject to an engineering review by TSSA to ensure compliance with the Act, Regulations and adopted safety codes and standards. A variance from regulations and adopted safety codes and standards may be granted where other methods are used to ensure equivalent amusement device safety. An onsite inspection is made before a new amusement device is authorised for operation, and a permit is issued.

5.3.4 Application of Requirements in Practice and Associated Costs

Approximately 85% of all new rides and attractions that were installed in 2003 across the world were designed and produced by European manufacturers (Freizeit Leisure Professional, 2004). It would appear that only Germany requires a specific standard (DIN 4112) to be met by law. Beyond Germany, it is generally the prerogative of individual parks to specify design standards. It has been suggested that the lack of harmonised legislation has created barriers to the import of equipment, whereby different countries have different procedures and different standards. This may have significant additional costs for manufacturers, without necessarily increasing safety.

The initial consultation responses from the UK suggest that these examinations and documents are generally obtained. However, in some cases, the parks may rely on the manufacturers to obtain these independent assessments. The ADIPS procedure is followed, and registered engineers are used. However, it is of note that one park that has just kiddie rides does not specify minimum design requirements, nor does it require any additional inspection/verification. The cost of these assessments will vary depending on the complexity of the ride as shown in Table 5.3.

In the UK, non-compliance with the requirements for design, manufacture and subsequent testing were the cause of 18% of improvement and immediate prohibition notices issued by HSE. Such issues are more likely to result in immediate prohibition notices because of the inherent danger of a faulty design. In the year 2002/03, a particular ride was found to have a faulty design, and this resulted in 15 prohibition notices to prevent all similar rides from operating until the problem was resolved.

Similar tests are undertaken by the responding amusement parks in France, Germany, Denmark and Spain, although no costs are provided. In Ontario, TSSA provides an hourly rate for undertaking such tests, and the costs are likely to be around the same range as given in Table 5.3.

Table 5.3: Approximate Cost of HSG175 Design and Installation Requirements			
Type of Ride	**Design Review**	**Assessment of Conformity to Design**	**Initial Testing**
Suspended Roller Coasters	€15,000 - €37,500	€3,000 - €3,750	€1,500 - €3,750
Traditional Roller Coasters	€15,000 - €37,500	€3,000 - €3,750	€1,500 - €3,750
Wooden Roller Coasters	€15,000 - €37,500	€3,000 - €3,750	€1,500 - €3,750
Other Thrill Rides (not Roller Coasters)	€7,500 - €18,000	€1,500 - €2,250	€1,200 - €2,250
Water Splash Rides	€7,500 - €37,500	€1,500 - €7,500	€1,200 - €7,500
Dark Rides	€7,500 - €15,000	€1,500 - €3,750	€1,200 - €3,750
Kiddie Rides	€3,000 - €7,500	€750	€450 - €750
Other, including Family Rides	€3,000 - €7,500	€750	€450 - €750
Source: Consultation Responses (2 parks and 1 inspection body)			

In Spain, travelling fairs are required to obtain a safety certificate each time the ride is set up. These normally cost in the region of €35-€70.

5.3.5 Safety Issues Related to Design and Installation

Fawcett (2003) suggests that a regime for safety inspections needs to be structured to address the problems which occur. An analysis of over 200 accidents (fatal or serious only) and dangerous occurrences provides a breakdown as presented in Table 5.4.

Table 5.4: Analysis of More Than 200 Accidents by Cause	
Cause	**% of Accidents**
Structural/mechanical – inadequate strength or fatigue life	34%
Passenger containment, restraints, locking	18%
Poor maintenance/repair	11%
Unsatisfactory clearances (shear traps), barrier/manning arrangements, guarding	10%
Unsatisfactory control system or electrical design	10%
Unauthorised or poorly executed modifications	5%
Unsatisfactory anti-rollback or emergency evacuation	4%
Excessive passenger G forces, etc.	2%
Source: Fawcett (2003)	

Further interpretation of this data by Fawcett (2003) indicates that poor dynamic analysis by the designer is implicated in a number of accidents or dangerous occurrences. Thus, Fawcett emphasises the importance of third party inspection at the design stage, as well as acceleration measurements on some types of ride during an initial test.

Saferparks (2004) lists a number of design-related hazard categories that it believes are not adequately addressed by ASTM standards, which are reproduced in Table 5.5. On the Saferparks website, these potential hazards are supported by examples of accident reports and, although these are not reproduced here, it should be noted that the consequences of machinery accidents involving children can be serious. In some circumstances such incidents may be recorded as a result of 'rider misconduct' and it is therefore difficult to ascertain the true cause of an incident.

Table 5.5: Examples of the Types of Incident Which May Occur Due To Poor Design	
Mechanical Hazards	**Example of Type of Incident**
Gaps and openings	Body part entrapment
	Impact with object
Hazardous heights	Fall from height
Moving and rotating objects	Impact
	Entanglement
	Ejection
	Physiological effects
Source: Saferparks (2004)	

The acceleration of rides is an important, and often discussed, design issue. Firstly, Saferparks (2004) suggests that because kiddie rides do not usually generate significant acceleration forces, ride manufacturers tend not to provide effective restraints, leaving small children vulnerable to falls and machinery hazards.

More often, the debate concerns 'g-forces'. Many amusement rides have the potential to cause neck and back injuries and, in the US, neck sprain/strain is the most common ride-related injury, and neck injuries are more common on fixed rides than mobile rides. Saferparks (2004) believes that each new amusement ride design has the potential for new and unexpected side effects and, as with any new product used by a wide range of people, a certain number of roller coaster riders will suffer some type of injury. However, without a comprehensive system for collecting and analysing data on ride-related injuries, it is likely to take many years before the risks of high-g rides are fully understood. Although the percentage of consumers injured due to high g-forces is very low, and Fawcett (2003) suggests that this may account for 2% of incidents, the extent of injury can be serious or fatal.

Both the CEN and the revised ASTM standard have been approved recently, although both have involved long periods of discussion. Saferparks (2004) reports that the g-forces component of the CEN standard was based on a German study, and that there are a number of known limitations to both the study and the standard, including:

- acceleration limits are set only for head-to-pelvis and lateral directions. It does not set limits on acceleration in the front-to-back direction;
- the rides in the sample set of the German study were all traditional gravity coasters, no data was collected on launched roller coasters;
- the CEN standard is limited to seated passengers, the limits are not necessarily valid for rides in which patrons stand or lie down; and
- the German study was designed to investigate neck injuries; the limits chosen may not be adequate in preventing neurological injuries.

The lack of accident data was highlighted as an issue (in the US) which meant that the theory was unable to be compared with what happened in practice. Of greater concern was the lack of data on how g-forces affect children and, although there was common agreement within the ASTM committee that lower g-force limits should be set for children, none of the countries/agencies had done so because there is a lack of knowledge as to how much lower those limits should be. Saferparks (2004) suggests that none of the

standardisation groups have studied the effects of g-force on children, or researched existing data that might correlate to the types of impact- and acceleration-related injuries that occur on amusement rides.

5.3.6 Conclusions on Design and Installation Issues

The requirements for design and installation vary between EU (and other) countries, because no European standard has existed until recently. Although two approaches may be taken (i.e. meeting a specified standard or undertaking inspections case-by-case) there does not appear to be any correlation between the approach taken and whether the measure is regulatory or not.

In both cases, costs are likely to be incurred as both approaches will necessarily involve inspection and testing (i.e. to confirm compliance or otherwise), particularly as many amusement rides are unique. These costs will be in the order of tens of thousands of Euro, and will be dependent on the complexity of the ride.

As with all products, cases of poor design will happen and may not be identified until such time that an accident occurs. Such an accident may or may not be serious, however, what is important then is that all other controllers of rides of identical or similar design are notified and the necessary precautions taken.

Although Fawcett (2003) considers the (then draft) European standard (prEN 13814) to identify similar pre-use inspections as HSG175, it is important to note that the European standard does not receive universal support. Aspects of its design requirements do not meet the current practice in, for example, the UK. Thus, any moves toward adopting EN 13814 EU-wide may reduce the costs for manufacturers who currently have to meet different standards, but may not necessarily result in improved safety, and would most likely not be accepted in all EU countries.

More specifically, concerns exist over the setting of g-force limits. The ASTM standard F2291 is said to be more comprehensive than the CEN standard in this respect (Design News, 2003b), yet Saferparks (2004) still highlight that data on the effect of g-forces on children are lacking. The authors of this Report have not considered this topic in detail, but note that the published research provides conflicting evidence on the subject. The tendency to attend hospital the day (or more) after visiting an amusement park or fairground may prevent the identification of g-force related injuries.

5.4 Operation and Use of Equipment

5.4.1 Overview

With regard to the operation and use of equipment, three issues tend to be reflected in the safety measures:

- the provision of an operations manual, providing instructions for the safe operation and use of a ride;
- the level of supervision provided by the ride controller/operator; and
- checking that passengers are safely contained.

How these issues are addressed will relate to the level of safety under normal operating conditions. An additional issue is the level of qualifications and training of the staff providing this supervision, and this is addressed separately under Section 5.6.

5.4.2 Requirements of Non-regulatory Measures

In **Spain** and the **UK**, manufacturers must provide the ride controller with a manual on operation and maintenance. Box 5.1 lists the information requirements in the UK. The **Australian** approach has similar requirements, and audits the availability of *Safe Work Instructions*.

Box 5.1: Information Requirements of an Operations Manual as required by HSG175

- Unique identification of the device
- Information on design and manufacture
- Relevant drawings or diagrams
- Replacement parts
- Details of examination inspection and testing prior to supply
- Information on transport, installation, erection, dismantling
- Information on safe use
- Instructions and guidance on any maintenance and inspection
- Examination and testing of the device once in use, including in-service inspection
- Modifications
- Log book
- Reports of in-service inspection

However, there are differences between the guidance documents in Spain and the UK regarding the age of staff operating the rides. In Spain, all rides, including slow kiddie rides, should be operated by a person who is at least 18 years old, whereas assistants may be 16 years old. HSG175 does not allow anybody under the age of 18 to operate rides, except for slow moving kiddie rides, for which operators may be 16 years old.

Furthermore, HSG175 states only that the minimum number of attendants needed for safe operation must be on duty, and does not specify the actual numbers required as this is deemed to be related to the complexity of the ride. With regard to passenger containment, operators must make sure that:

"*all passengers are safely contained and no spectators are in a dangerous place before starting*" (HSE, 1997).

5.4.3 Requirements of Regulatory Measures and Associated Guidance

The **Finnish** Guidelines state that the number of personnel should be adequate in view of the nature and scope of the activity and the number of participants. The operator is responsible for maintaining order and, if necessary, for ensuring participants' safety and protecting them by arranging for sufficient personnel to keep order. No minimum age requirements for operating or supervising staff are specified. Furthermore, services must not cause a hazard to the health or property of consumers using services, nor may they cause a hazard or nuisance to bystanders and passers-by. Interpreting this for fairgrounds and amusement parks would suggest that people are protected whether they have paid to ride on an attraction or whether they are only spectating.

Due to the general nature of the Finnish guidance, it does not specifically require an operations manual. Although reference is made to a safety document, it would be difficult to expect that the description provided would lead to a document comparable to that included in the Spanish or UK guidance. However, the Guidelines do state that a service must be safe at all times, considering the environmental and weather conditions, as well as the nature of the consumers. Thus, condition limits must be set and an operator should have clear instructions concerning what to do if conditions change during operation.

In **Ireland**, applications for certificates of safety should be accompanied by an operations manual similar to that referred to in HSG175.

In **Ontario**, operation manuals are also necessary and contain information regarding the safe operation of the ride, including daily checklists, daily logs, emergency instructions, lock out procedures, hand signals, operator safety and other specific operating instructions. The labour standards and health and safety legislation in each jurisdiction dictate the minimum age of workers. Generally, the minimum age for workers on a construction site or employed in construction is 16. When an amusement show is in operation or equipment is being maintained the minimum age is 15.

The issue of whether each safety belt/bar needs to be checked is explicitly addressed by the Canadian guidance for ride operators which says:

"*always check that seat belts or safety restraints are fastened and locked in place before the ride starts. The manner of checking is detailed in the ride operation manual and will be further explained during ride operation training by your supervisor*." (TSSA, 2004)

5.4.4 Application of Requirements in Practice and Associated Costs

The provision of operations manuals is a key area where the UK HSE is currently focusing its efforts when inspecting amusement rides. It has been found that ride documentation is generally insufficient, specifically regarding the operations manual. For example, of improvement notices issued in 2001-04 (prohibition notices are not relevant), 9% in amusement parks related to an absence of an operations manual, while the corresponding figure in fairgrounds was 43%. It is suggested that, as the number of imported rides increases, it is more likely that either the instructions are in a foreign language or are poorly translated. This has knock-on effects for the provision of adequate training and maintenance. It is unlikely that this issue is unique to the UK, but similar information is not available for other countries.

With regard to staffing levels, the ratio of the numbers of operating to supervising staff are shown in Table 5.6, which compares the average of the UK responses with the average of those responses from other EU countries. As might be expected, roller coasters tend to have a higher number of operating and supervising staff, while kiddie rides have the lowest number of staff. Although Table 5.6 may suggest there are higher levels of staffing in the UK than in other EU countries the sample is too small to provide a conclusive answer.

Table 5.6: Numbers of Operating Staff to Supervising Staff per Ride		
Type of Ride	**UK[1]**	**Other EU[2]**
Suspended Roller Coasters	5.0 : 1.5	2.5 : 1.0
Traditional Roller Coasters	2.7 : 1.0	2.3 : 1.0
Wooden Roller Coasters	6.0 : 2.0	2.3 : 1.0
Other Thrill Rides (not Roller Coasters)	3.0 : 0.9	2.2 : 0.8
Water Splash Rides	3.3 : 0.9	2.4 : 0.7
Dark Rides with Audio Visual Effects	2.4 : 0.7	1.8 : 0.7
Kiddie Rides	1.3 : 0.8	1.3 : 0.6
Other, including Family Rides	1.3 : 1.0	2.1 : 0.8
Notes: *1) Average numbers from seven UK consultation responses.* *2) Average numbers from six consultation responses from France, Belgium, Denmark, Germany and Spain.*		

The responding park in **Spain** requires both operating and supervising staff to be at least 18 years old, as per the Guidance. In the **UK**, four of the responding parks have indicated that they have 16 year olds operating kiddie rides; however, two other parks have also indicated that the minimum age for operating staff is 16, without specifying which rides they may operate. All the responding parks require other operating staff to be over 18 years old, and one park places a further requirement on roller coaster operators, who must be over 21.

The responding parks from **Denmark** take a similar approach to the UK, with 16 year olds allowed to operate smaller rides, and 18 year olds operating larger rides. In **France** and **Belgium**, 16 is the minimum age (with supervision in Belgium).

Supervising staff must be at least 18 in all countries, and in the UK, parks have different requirements for supervising staff, which is not specified by HSG175 beyond the above requirements, and the minimum age requirement may be 18, 20, 21 or 25.

The associated cost of these requirements is related to the staff wages, and thus the differences between wages for 16, 18, 21, etc. year old workers. This obviously varies amongst countries, depending on the national minimum wage, and amongst parks.

In September 2003, Test-Achats (a Belgian consumers' publication) undertook a survey of 5,200 consumers at thirteen amusement parks in France, Belgium, Germany, Italy and Spain. The survey provides information on the perception of visitors in terms of safety, as it asked consumers how many times the ride operators had checked their safety belts and bars. In four parks, 75% of the people questioned replied that checks were always made. In other parks, the percentages were less. A low percentage does not automatically mean that the rides are unsafe, but for visitors it is not sufficiently apparent that safety is continuously checked (Test-Achats, 2004).

These findings are supported by entries on the *Ciao* website, www.ciao.co.uk, which enables consumers to review a variety of products and services, including amusement parks across the world. Not surprisingly, many of the entries relate to the UK, although

other European countries are covered. Where safety is mentioned[10], comments tend to relate to passenger restraints and whether or not a person *felt* safe. Therefore, perception of safety is very important to consumers.

5.4.5 Safety Issues Related to Operation and Use

Interestingly, US and Canadian data show that injuries are more common on amusement rides where consumers control the action, such as bumper cars and waterslides, and this is supported by the European data in Table 3.5.

However, the quality of supervision, particularly on more complex rides is important. Roberts (2001) identifies a particular issue that has been exposed in accident investigation is the difficulty of maintaining effective supervision in dark rides. The availability of cheaper infrared surveillance systems is recommended as a practical solution.

Saferparks (2004) suggests that understaffing rides increases the risk of accidents and, despite the risk, companies sometimes short staff rides to save money or when labour is in short supply. It is not possible to tell whether this is true in the EU as minimum staffing levels are not stated in non-regulatory measures, and data on staffing levels are not widely available, but it is possible that, should understaffing occur for whatever reason, safety may be compromised.

In the US, the Department of Labour has ruled that amusement rides do not meet the definition of hazardous machinery, which means that 16 year olds may, for example, operate a roller coaster, but they may not operate any other kind of machinery with a conveyor belt. In fifteen US states, laws have been enacted to prohibit under-18 year olds from operating full-size mechanical amusement rides. Some state restrictions are based on consumer safety concerns, some on child labour concerns, and some on both. A Bill (the Amusement Park Ride Child Labor Act) has been proposed to extend this requirement across the US. A summary of the arguments for and against such a restriction (as argued by Saferparks) is presented in Table 5.7. Although this originates from the US it can be seen that all of the arguments would also apply to the countries in the EU where under-18 year olds are allowed to operate amusement rides.

Table 5.7: Key Points in the Debate Concerning Whether an Age Limit should be Set for Ride Operators

Arguments in Favour of an 18 Age Limit	Arguments Against an 18 Age Limit
• Risk-taking is a normal part of adolescent development. 16 year olds may place themselves at risk whilst operating a ride. • Teenagers are less likely to ask for help should a problem arise than older, more experienced workers. • Teenagers are less likely to confront a forceful consumer who asks them to ignore the safety rules (i.e. letting on a child who is to small or an adult who is drunk).	• Increasing the minimum age to 18 may result in a shortage of seasonal workers. • No correlation between the age of ride operators and accidents/injuries has been made. • All staff should undergo the same rigorous training and testing, regardless of age. • The computer systems installed in many rides will not allow the ride to operate unless everything is ready.

Source: based on Saferparks (2004)

[10] Safety appears to be a low priority for many consumers as it is rarely mentioned; although this is presumably an indication that safety is perceived to be high and therefore less necessary to comment on.

5.4.6 Conclusions on Operation and Use

Although the importance of a comprehensive Operations Manual is not disputed, the key issue, in relation to the operation and use of amusement rides, appears to be the number and age of the operating and supervising staff. No measures, whether regulatory or non-regulatory appear to set a minimum staffing level as this is deemed to relate to the complexity of the ride. Indeed, the risk of setting a minimum staffing level would be that more complex rides may become understaffed whilst still being considered 'best practice'. It is for this reason, amongst others, that guidelines for safe working, such as an Operations Manual, are important, so that ride controllers may follow the manufacturers' instructions.

With regard to age, any restriction on the minimum age of a ride operator or attendant would be likely to disproportionately impact on smaller parks and mobile rides (where the latter tends to operated by family members). An increase in the minimum age may cause an increase in the wages that the ride controller is required to pay. However, common sense suggests that having 18 year olds in charge of larger rides is better practice to ensure consumer safety than having 16 year olds in charge, and this is already the case in the UK and Spain where non-regulatory measures are in place.

5.5 Maintenance and Inspection of Equipment

5.5.1 Overview

Three types of maintenance and inspection activities may be expected:

- daily checks;
- routine maintenance; and
- third party inspections.

These are required by all measures for which such information is available, whether regulatory or non-regulatory.

5.5.2 Requirements of Non-regulatory Measures

HSG175 indicates that, in the **UK**, daily checks should be carried out by the park operator when an attraction is in daily use by the public. This should include at least one trial operating cycle, and requires that the person doing the daily check is sufficiently trained and experienced to do so. Regular maintenance is also to be carried out by or on behalf of the park/fairground operator, by people trained or experienced in the procedures appropriate for that equipment. An in-service inspection should be undertaken by an appointed inspection body to decide whether a ride may continue to be operated for a specified period of time. HSG175 requires that every ride is subject to an in-service inspection at least annually, or within any shorter period specified by the manufacturer or appointed inspection body.

In **Spain**, the ride operator is responsible for carrying out the necessary checks before starting the ride, for example, the automatic and manual systems, sensors of failures and

malfunctioning, etc., to ensure that the ride is safe for use and a daily checklist is completed. The Maintenance or Operations Supervisor will then sign the daily checklist and authorise the use of the ride. Ride controllers are required to keep a Maintenance Programme, an incident logbook and a record of everyday compliance with the safety requirements. External inspections are carried out by registered companies. These inspections are carried out annually; the costs of which obviously vary depending on the rides, uses and services of the park. Extraordinary checks should be carried out where mechanical parts are difficult to access for annual or periodical checks, and the time period between these extraordinary checks should not exceed 10 years.

5.5.3 Requirements of Regulatory Measures and Associated Guidance

In **Belgium**, the regulations require all fairground rides to be inspected each time they are set up. Furthermore, the regulations require that fairground rides must be subjected to a maintenance inspection every year and, every 3 to 5 years, depending on the type of attraction, an external inspection is necessary (CRIOC, 2004).

Services in **Finland** are required to have a Maintenance Plan for buildings and structures, safety equipment, machinery and other equipment, with a log of inspection and maintenance activities. No further requirements are specified.

Inspectors in **Ontario** carry out inspections of amusement devices found in carnivals, fairs, amusement parks and other commercial venues to ensure compliance with the national standard and applicable safety legislation. New devices are inspected prior to start-up, and at the start of every new season (to renew its operational licence) or following a ride modification.

5.5.4 Application of Requirements in Practice and Associated Costs

Following a number of accidents at fairgrounds in Spain in 2003, the president of the Asociación de Feriantes de Murcia noted the lack of information on the requirements or the checks to keep rides in good order; therefore, whatever maintenance is undertaken is done so at the initiative of the operator (Belt Iberica, 2003). It is of note that the travelling fairs' trade association, Confederación Española de Industriales Feriantes (CEIF), is actively requesting professional regulation

In Spain, external inspections, which are carried out annually, for travelling amusement rides cost in the region of €100-€200. Similar inspections in the UK may cost upwards from €180 (Hatchett, 2003).

The consultation responses from the UK on this safety element are variable, making comparisons more difficult. Certainly all parks undertake daily checks, generally by internal staff, where this may be a qualified engineer, or a member of staff who has received the in-house training. The costs of these checks are generally minimal.

Routine maintenance may often be undertaken weekly, occasionally monthly, or alternatively continuously (as suggested by two parks). Two parks which only operate kiddie rides undertake maintenance activities "as required". Maintenance activities are more likely to be undertaken by a qualified engineer, and thus the costs are more substantial as this will relate to wage costs. One park, with 34 rides, has indicated that

the wages for maintenance staff are €300,000 per year, giving an average of €8,800 maintenance costs per ride per year (excluding spare parts).

All responding UK parks undertake annual inspections, as required by HSG175, and these are conducted by ADIPS approved inspectors. These annual inspections would appear to cost in the region of a few thousand Euro and will obviously depend on the complexity of the rides to be inspected.

TSSA (2004) report that 792 amusement rides were inspected in 2003, and more than 1,900 directives were issued during these inspections, where a directive could be related to an identified safety hazard, or the breach of a code or standard. Fewer than 7% of the directives were issued because of serious safety hazards, and most were the result of infractions related to safety restraints and signage (i.e. height requirements).

5.5.5 Safety Issues Related to Maintenance and Inspection

Equipment failure accounts for a small proportion of all ride-related accidents. As in many industries, and as suggested in Section 3, most accidents are caused by slips, trips and falls, so Roberts (2001) suggests that maintenance of platforms and access areas is important.

Third party examination was introduced in the UK 25 years ago, following an accident in which six children died. There was concern about the maintenance of the ride, and it was envisaged that a better standard of maintenance would be guaranteed if every ride had to be submitted to an independent inspection each year. Fawcett (2003) suggests that, in the first ten years following the introduction of third party inspection, 25 years ago, fatal and serious accidents seem to have approximately halved. It is believed that in-service inspection played the biggest part in this reduction in the early years.

5.5.6 Conclusions on Maintenance and Inspections

The requirements for maintenance and inspections are similar whether a safety measure is regulatory or non-regulatory. It is also an area where there are significant costs (tens of thousands of Euro per large ride) incurred on a regular basis. Where measures vary is the frequency with which independent, thorough examinations are required. This is one area where it is believed that there are differences of opinion over the CEN standard.

Although the number of accidents related to maintenance issues is low, this is perhaps an indication that the necessary requirements have been implemented in most countries. The extent of agreement between the different safety measures considered would suggest this is the case.

5.6 Qualifications and Training of Personnel

5.6.1 Overview

Three categories of personnel can be identified for fairground and amusement parks:

- ride controllers, operators and attendants, who are responsible for the day-to-day operation of amusement rides;
- mechanics who are responsible for the general maintenance of amusement rides; and
- independent inspectors who undertake testing and examination of amusement rides.

Where safety measures have a more technical focus, such as the German safety certificate or the Irish legislation, requirements for qualifications and training of personnel receive less consideration. It is also an area which, in Ontario, although there are legislative requirements, is supported by best practice guidance. As it is more difficult to make a distinction between regulatory and non-regulatory measures for this element, this Sub-section is instead divided by the type of personnel and the associated requirements.

5.6.2 Ride Controllers, Operators and Attendants

HSG175 does not require staff at fairgrounds and amusement parks in the **UK** to have any specific qualifications, only that controllers of parks/fairs should ensure that employees are competent, and HSG175 provides guidance on employee selection, training, monitoring and keeping records. The following aspects are required to form part of an employee's training/induction:

- general health and safety knowledge;
- site safety;
- dealing with visitors who misbehave;
- dealing with defects and malfunctions;
- reporting procedures for accidents/incidents;
- emergency procedures;
- weather conditions;
- safe operation of attraction(s) to be used;
- safe loading/unloading of rides;
- details of passenger restrictions;
- safe waiting/viewing places for intending passengers and spectators; and
- use of passenger containment system.

The **Finnish** Guidance suggests that personnel should have appropriate training and should be given proper orientation when they are hired. Personnel should have adequate language, first-aid, safety and fire-extinguishing skills relevant to the activity, and safety training and drills should be arranged for all personnel at least once a year, for example before the season starts.

In **Ontario**, TSSA and the amusement ride industry have worked together to produce the *Amusement Ride Operators' & Attendants' Safety Handbook*. It incorporates contributions from both amusement parks and travelling fairs, as well as risk advisors. The handbook establishes a minimum training standard for amusement ride employees.

5.6.3 Maintenance Mechanics

In **Ontario**, each owner of an amusement ride is required by law to be a competent mechanic or to employ one. The specifications include the need for such personnel to document a minimum of 8,000 hours experience, 720 hours of specific training and to pass an examination administered by the safety authority. TSSA, in conjunction with the Amusement Industry Training & Certification Advisory Board, has developed training and certification standards for amusement ride mechanics. Certification is divided into the following categories: Amusement Rides; Go Karts; Waterslides; Bungee; and Inflatables.

Annex 1 of the Arrête Royale in **Belgium** describes the required competence of a technician (CRIOC, 2004).

5.6.4 Independent Inspectors

In the **UK**, **Spain**, **Australia** and **Ontario**, independent inspectors are registered with national bodies. In Spain, the external inspectors must have at least five years experience, additional qualifications relating to inspections techniques and knowledge of the relevant regulations. In the UK, the registration of ride inspectors has been required for a number of years, and HSG175 considers that the standard EN 45004[11] provides an appropriate framework for inspection bodies. This requires ride inspectors to:

- have appropriate qualifications, experience and training (there are some "grandfather clauses" that do allow some existing practitioners to continue without formal qualifications if alternative evidence of competence is produced);
- belong to registered inspection bodies;
- be independent of the device concerned, i.e. independent of the designer, manufacturer or controller of the equipment; and
- make specified checks.

Since 2000, *Rules for the accreditation of bodies performing inspection of fairground and amusement park machinery and structures* have been in place. Registration is now much more stringent (previously reliant on self-declaration), with each Inspection Body required to compile a quality file containing details of staff qualifications, experience and other competencies. Inspection bodies need to register each year and a new registration number is issued accordingly (Fawcett, 2003). However, Roberts (2001) believes that the industry-based registration scheme does not automatically correspond to independent accreditation although it shares many of the same features.

Annex 1 of the Arrête Royale in **Belgium** also describes the required competence of an independent organisation and an accredited organisation (CRIOC, 2004).

5.6.5 Application of Requirements in Practice and Associated Costs

In the UK, most respondents indicated that they provide training for operating staff on all the areas required by HSG175. Those aspects that were not always covered were

[11] EN 45004 – *General criteria for the operation of various types of bodies performing inspection.*

weather conditions, training on safe waiting/viewing places for intending passengers and spectators, or, more importantly, the use of passenger containment systems.

All training is provided in-house, ranging from 4-30 hours training for operating staff, at an approximate cost of €26-€200 per staff member (based on hourly wage rates). In addition to this, operating staff may receive on the job training which cannot be quantified. Supervising staff are likely to receive more in-house training than operating staff, perhaps more than twice as much (particularly where operating training is at the lower end of the scale), but they are also more likely to have had more experience before being promoted to a supervising role.

Roberts (2001) recommended that further training and quality standards should be considered, and indeed BALPPA initiated a National Vocational Qualification (NVQ) in Mechanical Ride Operations. Staff at amusement parks can qualify as assessors to train other employees. However, none of the responding parks mentioned this qualification in their response.

Respondents from parks in other European countries indicated that employees receive similar training to that specified by the UK's HSG175.

5.6.6 Safety Issues Related to Qualifications and Training

There have been a number of accidents which may be attributed to a lack of staff training or experience, although the exact proportion in Europe is not clear. TSSA (2003) report that the percentage of operator-related incidents in Ontario dropped from 13% of all incidents in 2001 to 5% in 2002, and it is suggested that this positive result was influenced by a variety of TSSA/industry initiatives including enhanced operator training.

Roberts (2001) reports that there has been a potential shortage of registered ride inspectors for all disciplines and particularly for electrical inspections. Although, industry has worked to attract new bodies into the field, the lack of training courses or formal qualifications for amusement engineering may still result in constraints on recruiting sufficiently qualified inspectors.

5.6.7 Conclusions on Qualifications and Training of Personnel

Fawcett (2003) suggests that there remains questions concerning whether there should be further specifications for the competence of particular ride operators (primary dutyholders) or their staff/subcontractors, and believes that some development of training and quality standards for ride operators would seem likely in the future. This is an element which is missing from most of the measures considered.

The issue, and associated problems, of training seasonal staff is well recognised in the tourism industry, and the amusement ride industry may well find examples of best practice outside of its own sector from which it can learn.

However, both regulatory and non-regulatory measures appear to agree on the need to have registered independent bodies to undertake inspections of amusement rides. It should be acknowledged though that this work is becoming more specialised, due to the

uniqueness of the rides, and that improved formal training and/or knowledge exchange systems may become necessary, particularly if a shortage of such inspectors is observed.

5.7 Guidance of Visitors and Safety Information

5.7.1 Overview

In order for consumers to enjoy fairs and amusement parks safely, it is necessary for:

a) the manufacturer to provide the relevant safety information to the ride controller;
b) the ride controller to communicate safety information to the consumer;
c) the consumer to fully understand the information given; and
d) the ride operator to enforce the safety requirements.

Communication of safety information is a feature of best practice guidance in the UK, Spain and Ontario. In legislation or measures which relate to the mechanical safety of a ride, such as in Germany or Ireland, safety information for consumers plays a much smaller part, if included at all.

5.7.2 Requirements of Non-regulatory Measures

The **Spanish** Guidance requires that signs are displayed showing use restrictions and safety information. An example of a sign displaying safe rider behaviour is shown in Figure 5.1 below. Restrictions may include weight, height, age, health conditions and carrying objects such as cameras, umbrellas, bags, etc. Visitors with disabilities must be accompanied by a relative or assistant.

Figure 5.1: Example of a Safety Information Sign from Spain

HSG175 in the **UK** requires that reasonably practicable measures are taken to identify and exclude any individuals who cannot ride safely. Prominent notices or pictograms should clearly set out restrictions, and these should be reinforced using the public address system where possible. Furthermore, HSG175 requires that attendants should give clear and appropriate instructions to passengers on their conduct and check adjustable restraints before each ride.

5.7.3 Requirements of Regulatory Measures and Associated Guidance

In **Belgium**, according to the regulations, fairground attractions must be equipped with warnings and information on how to use the attraction safely. This information must be written, as a minimum, in the language (or languages) of the area where the fairground is

located. The information must also be presented in an easy to read manner and conspicuous, in a striking location. It is forbidden to include the warning "*Use is at your own risk*" (CRIOC, 2004).

The Best Practice Guidance from **Ontario** also states that restrictions may apply because of age, height and or weight restrictions or if a rider is suspected to be under the influence of alcohol or drugs. It advises ride operators not to operate a ride if there is any uncertainty because of ride restrictions or behaviour. If a ride has a public address system it can be used to assist the communication of safety messages to a large number of riders and a prepared script may be valuable to ensure consistency and accuracy of the message. TSSA is also promoting safe riding practices through the RideSmart program.

It is important to note that the regulations in Ontario state that no person shall behave in or on an amusement device in such manner as to:

(a) impair the safe operation of the device; or
(b) endanger any person.

The law requires that riders obey all warnings and directions regarding any ride and behave in a manner that will not cause injury to themselves or others. If a rider fails to follow the rules for riding safely they can be charged under Ontario's Amusement Devices Act.

According to the **Finnish** Consumer Protection Act, marketing that does not contain information which is necessary to ensure consumers' health is considered unfair and marketing materials should state for whom activities are intended. This would suggest that provision of safety information to consumers is a legal requirement in Finland. Furthermore, languages should not cause safety risks, so it is important to ensure that customers understand instructions. The Finnish Guidance also provides instructions for customers participating in program services, however, it is noted that the operator is responsible for safety.

5.7.4 Application of Requirements in Practice and Associated Costs

The amusement parks responding to the consultation indicate that safety information is communicated to visitors via leaflets, websites, signs on site and by supervising staff. However, the use of leaflets and website is less common than the other two methods. These responses are supported by a sample search of Internet sites, which also indicates that some sites provide such information whilst others do not. The most commonly provided information on websites is height restrictions for each type of ride.

Responses from the UK provide the following estimates of associated costs:

- leaflets – €15,000 - €60,000 per year;
- websites – little additional cost once website has been established;
- signs on site – €300 - €9,000 per year; and
- staff – incorporated in wage costs.

An example of safety information from a UK amusement park is provided in Box 5.2

Box 5.2: Safety Information Provided to Consumers by a UK Amusement Park

Safety for Individuals

Important Notice: The law requires that riders obey all warnings and directions regarding this ride and behave in a manner that will not cause or contribute to injuring themselves or others. Failure to comply will result in eviction from the Park and or prosecution.

We are committed to the highest standard of health, safety and entertainment. All guests will show courtesy to others and by entering the premises accept that there are elements of risk in an active lifestyle, which can be reduced by common sense and personal responsibility.

All guests have responsibility for their own safety and the safety of others. Children under 14 years of age are under the control of the responsible guest in whose care they are permitted to enter the premises and who assumes full responsibility.

We pay the highest attention to health and safety.

By entering the Park you agree to observe the code and accept that the Park will not be held liable for any loss or damage howsoever caused.

All guests shall:

- Take reasonable care for the health and safety of himself/herself and of other persons who may be affected by his acts or omissions.
- Be responsible for obeying all written and verbal instructions within the Park.
- Not engage in any reckless act or activity which may cause or result in injury to himself/herself or to others.
- Not board or dismount from an amusement ride except at a designated areas and as instructed by a member of staff.
- Not throw any object from an amusement ride.
- Not disconnect any safety device, seat belt or harness.
- Not use any facilities when his or her ability is impaired by alcohol or drugs.
- Be responsible for knowing and acting within the limits of his or her own ability.

If unfortunately you have cause for complaint, please speak to the nearest Ranger who will strive to solve your problem immediately.

In the rare event that you are involved in any accident or have any unresolved complaints, please give your name, address and full details to the Park Duty Manager before leaving the premises.

Follow the Code - it's your Personal Responsibility
And enjoy Maximum Fun Guaranteed.

Source: Consultation

CIROC (a Belgian consumers' association) visited attractions in Belgium (where there are legal requirements) and noticed various deficiencies in the warnings and their inscriptions, particularly on the higher velocity rides. Many of the attractions included too few or even no warnings or no information at all on safe usage, for example:

- the messages were only in French (or even German);
- the version in Dutch differed from the version in French;
- they were not sufficiently visible;
- they did not contain warnings for whom use of the attraction is not advised: for example, on the state of health of the users, pregnant women, minimum age, drunken state, etc.

In Ontario, public education is considered to be a key factor in preventing accidents on amusement rides over which passengers have a degree of control. TSSA provides RideSmart Rest Stops at amusement parks and exhibitions from which it delivers safety information to parents and children. In 2002, TSSA launched the RideSmart Operator Reward program, which recognises operators who most effectively deliver rider safety messages. In addition, TSSA also undertook a pilot educational project designed to provide operators with support information, including the best methods of communicating safety messages.

5.7.5 Safety Issues Related to the Guidance of Visitors and Safety Information

There is a prevailing view that many accidents are due to rider-related causes. Estimates from Ontario suggest these may be responsible for around 70% of all accidents (TSSA, 2003), and statistics from Florida show that consumer error accounts for an average of 76% of all accidents reported (DOACS, 2003). It can reasonably be assumed that the situation in Europe is similar.

Consultation undertaken by Roberts (2001) suggests that consumers are less disciplined and less willing to follow instructions than in the past. In addition, drink and drugs may also be factors, with young adults at particular risk. It is suggested that any increase in accidents caused by rider-related behaviour may increase in the short term, especially on older rides where the passenger restraint systems were designed when more compliant passenger behaviour was the norm. Examples of the types of 'incorrect' rider behaviour are given in Table 5.8.

Table 5.8: Examples of Incorrect Rider Behaviour Leading to Accidents and Injuries

Riders of All Ages	• **Ignoring posted safety restrictions**, such as height/weight limitations, pre-existing medical conditions, etc. • **Reaching hands or feet outside** the ride vehicle. • **Standing up** while the ride is moving. • **Not using seat belts** or other safety equipment as instructed. • **Overloading rides**. • **Horseplay**. • **Tripping or falling** due to inattention. • **Turning/twisting head or body while on high-g ride**. • **Riding while tired, dehydrated, or intoxicated**.
Young Children	• **Falling off rides**. Safety equipment on kiddie rides is not always designed to restrain children. • **Getting off rides prematurely** due to confusion, excitement, fear, or because they miss their parents. • **Reaching hands or feet into the machinery**. • **Running/jumping** while getting into or out of rides.

Source: Saferparks, 2004

Saferparks (2004) acknowledges that ride controllers have conflicting priorities when it comes to safety messages. On the one hand, they have a need to increase sales, which requires suppressing any negative information. On the other hand, in order to be effective, safety warnings have to create a "stop and think" response. It is noted that warning signs relating to rider size are common and, in addition, most amusement parks caution consumers with heart conditions, pregnancy, and back/neck injuries against riding. Although these warnings are important, Saferparks is concerned that this list of prohibitions may not cover all potential problems. Warning signs often end with a clause instructing consumers not to ride if they have any physical condition that might increase the risk of injury on the ride. However, Saferparks believes that that there is a lack of information about the physiological effects of different types of amusement rides, which makes it difficult for consumers to adequately assess the likely effects and to comply with the safety warnings.

There are, of course, examples of accidents occurring where safety warnings are missing. CIROC (2004) found deficiencies in safety warnings at a fairground in Brussels and, although this is unlikely to be a one-off, conversely there is no evidence to suggest this is a common occurrence across Europe. Furthermore, it should be recognised that the relationship between parents/caregivers and children may vary with geographic, cultural/ethnic and socio-economic differences, and that there may be cultural variations in discipline, supervision, and safety awareness. This could have an impact on any measure implemented across the EU.

5.7.6 Conclusions on Guidance for Visitors and Safety Information

Saferparks (2004) suggests that consumers need to know precise information about:

- the nature of the hazard;
- how it can be avoided, and
- the consequences of failure.

There is some concern that consumers are encouraged to believe that amusement rides are safe no matter what, as opposed to the fact that they are safe, provided that the safety information is followed. Saferparks (2004) refers to 'The Circle of Misplaced Trust' suggesting that industry counts on riders (or their parents) to protect themselves from ride-related hazards, and riders count on industry to design safe rides. However, amusement ride safety is the joint responsibility of manufacturers, owner/operators, safety authorities and consumers, and Saferparks advocates a team approach to safety. This can be compared to the approach taken in the UK, with the formation of a national joint advisory committee.

In the future, TSSA intends to analyse rider behaviour on active or rider-controlled rides, and similar research is also being undertaken in the UK. A greater understanding of rider behaviour could help to improve safety, and reduce the number of accidents, provided that the findings are communicated to the manufacturers and the controllers responsible for ensuring safe design and delivering safety messages.

5.8 Emergency Procedures

5.8.1 Overview

The requirement to have an emergency plan in place is best practice for all public services, and is generally required by law under health and safety at work legislation. It is therefore not surprising that all the measures considered here address emergency procedures, with the exception of the Irish regulation/guidance. This is because the Irish guidance is concerned with the mechanical safety of each individual ride, as opposed to the safety of a group of rides. However, it is likely that local regulations exist to assess the adequacy of emergency procedures at fairgrounds, as is the case in countries such as Sweden, Italy and Denmark.

However, also of concern is the reporting of accidents, which can be considered under this heading. Different requirements exist in EU countries (although it can be assumed that fatalities are reported to authorities in all EU countries), but there may be differences in the severity of accidents which have to be reported.

5.8.2 Requirements of Non-regulatory Measures

The **Spanish** Guidance includes provision for safety procedures when a ride breaks down. In all cases, the operator is responsible for removing people from the ride, according to the ride's Manual. Although the Guidance notes that evacuation should be avoided wherever possible, if it is decided that the breakdown will require some time to resolve and passenger carriages cannot be moved to the point of access, evacuation will be necessary. The evacuation should be supervised and should be communicated to the maintenance department and the centre for incidents in the park. Other provisions included in the Guidance relate to fire, weather conditions and other safety issues, such as a passenger falling, emergency stop, first aid, etc. There is no requirement in Spain to report any accidents or incidents to the manufacturers, competent authorities, or the national trade association (AEPA).

HSG175 in the **UK** requires that the layout and emergency procedures should be prepared by all parks or fair organisers, and that operators/organisers should also ensure that everyone has received training in emergency procedures. In the UK, accidents and incidents are reported to the Heath and Safety Executive and recorded in the RIDDOR system. Under RIDDOR, any incident which involves someone leaving a fairground or amusement park in order to attend a hospital must be reported. HSG175 notes that trade associations, insurers, designers, manufacturers or suppliers may need to be notified of any accident or defect, but this is not required in all cases.

It is of note that, when a serious accident occurs in the UK, the procedures that are initiated, i.e. an investigation by HSE, are required by regulation rather than as a voluntary measure. This is also the case in **Australia**, where the non-regulatory measure also requires an emergency plan.

5.8.3 Requirements of Regulatory Measures and Associated Guidance

Rescue legislation in **Finland** specifies particular places or activities which must be covered by a written safety plan, but it is not clear whether this includes fairgrounds and amusement parks. However, the Guidance suggests that all services should prepare a written safety or rescue plan as this helps all service providers to prevent accidents and deal with emergencies.

Furthermore, the service operator must document accidents and serious near-misses as this helps to assess the risks and improver operations. In accordance with the Product Safety Act, operators must also report accidents or serious near-misses to the local health inspector, the state provincial office and/or the Consumer Agency as soon as possible.

In **Ontario**, the Best Practice Handbook sets out what to do in an emergency, however, only accidents involving an employee are required to be reported to a Government authority. Accidents involving consumers may be reported to TSSA and TSSA is responsible for investigations should an incident involving an amusement ride occur. A Risk Reduction Group (RRG), comprising TSSA and industry stakeholders, has been formed to investigate and address causal factors contributing to amusement ride incidents.

5.8.4 Application of Requirements in Practice

The majority of consultation respondents have an emergency plan in place. This is established at a cost of €750 to €25,000 (or up to two weeks work), depending on the size of the park, and then reviewed annually, at an approximate cost of €150. One park monitors their emergency plan monthly.

Surprisingly one park responding from the UK, which only operates kiddie rides, does not have an emergency plan in place, nor are its staff trained on emergency procedures.

Whilst it is assumed that accidents are reported which are legally required to be so, it is obviously not possible to assess the degree of under reporting. However, in 2001, TSSA found that the number of incidents involving amusement rides dropped significantly from the number reported in 2000, and this was found to correspond to a decrease in report filing by operators, suggesting a high degree of under reporting.

It is of note that, since 2003, there have been no independent reports on accidents at amusement parks in the US. Estimates of injuries on fixed-site amusement rides are now provided by the industry trade association, IAAPA, rather than a public safety agency. Saferparks (2004) reports that IAAPA generates its figures by asking member parks to file a voluntary anonymous report of the number of people who required medical treatment each year after being hurt on a moving ride. This system does not collect any information on the types of injuries, types of rides on which they occurred, or causes of the injuries. However, estimates of injuries on mobile rides and inflatable devices are made available by the U.S. CPSC.

5.8.5 Safety Issues Related to Emergency Procedures

TSSA believe that complete and accurate information is important to the risk-based approach to regulating public safety, as it allows for a more effective analysis of the causes of incidents. TSSA has taken action to improve the reporting of accidents related to amusement rides, including education programs and efforts to facilitate and expedite the reporting process. In 2003, TSSA focused on educating industry operators on the importance of reporting incidents and near misses on amusement rides. As a result of this targeted effort, TSSA obtained significantly more information from industry. In total, 234 incidents were reported by 44 operators during 2003, compared with only 43 by 22 operators in 2002. Some 14 of the 234 incidents resulted in serious injuries (TSSA, 2003).

5.8.6 Conclusions on Emergency Procedures

Roberts (2001) suggests that the size of some modern rides mean that a single incident of catastrophic failure could result in many deaths or injuries. Other possible sources of multiple fatalities in amusement parks or fairgrounds are fires in enclosed spaces or crowd behaviour. Obviously, it is necessary that emergency procedures are in place to deal with such events, and it would appear that this is the case in the majority of parks responding, and is generally required by local authorities for travelling fairs.

However, it is not just incidents resulting in multiple injuries which ride controllers should be concerned with, but also single injury incidents. In the aftermath of an event, there should be clear procedures for the reporting and investigation of an incident. This is important to provide information on the cause of accidents and therefore to target safety measures more effectively. Whilst the RIDDOR approach in the UK captures a proportion of incidents, and the majority of the more serious accidents, TSSA's approach to educating industry operators will, over time, result in a greater understanding of less serious events, but which are more common, potentially providing greater benefits for consumer safety.

5.9 Compliance Mechanisms

5.9.1 Introduction

Detailed information on compliance mechanisms and sanctions in case of non-compliance is only available for the UK. It is likely that this is due to the involvement of a Government-funded body, and therefore there are requirements in place for formal monitoring and reporting of compliance. Compliance with other measures, such as the Spanish Guidance and the Australian certification scheme are assessed by industry bodies, which may result in 'informal' discussions with individual amusement parks to ensure that compliance is maintained.

5.9.2 Compliance Mechanisms in the UK

The National Fairgrounds Inspection Team (NFIT) in the UK is a section within the Health & Safety Executive (HSE) and is thus a Government-funded body. The NFIT plays a key role in dealing with non-compliance and is currently a 65-person team (HSE,

pers. comm.) which works part-time on examining such matters as passenger restraints, ride supervision, electrical safety and maintenance. Thus, whilst industry and the authorities have developed the guidance together, it is the authorities which effectively enforce the requirements, although industry associations provide support in this respect by requiring all members to comply.

The NFIT has operational resources of around 1,200 days per year. Activities have been targeted to poor performers with a greater degree of integration and co-ordination and it is suggested that the positive outcome of this targeting has resulted in a greater level of enforcement action (HSC, 2003). Essentially, if a ride controller is found not to be compliant with the requirements of HSG175 they may either be issued an improvement notice for minor issues (e.g. documentation is not available) or an immediate prohibition notice for dangerous deficiencies (e.g. maintenance or design issues).

Table 5.9 provides further information on the reasons for the notices issued between 2001 and 2004. As can be seen, there are significant differences (highlighted in grey) between reasons for notices at amusement parks and those at fairgrounds. It is of note that a large number of prohibition notices issued in 2002/03 relate to a particular ride for which a design defect was identified and thus all similar rides were prohibited from operating until agreed modifications were made. Table 5.10 identifies the fines imposed for more serious cases of non-compliance, generally where this has resulted in an injury or a fatality.

Table 5.9: Reasons for Improvement Notices (IN) and Immediate Prohibition Notices (IPN) Issued to Fairgrounds and Amusement Parks between May 2001 and July 2004

Element	Reason for Notice	Amusement Parks (%)			Fairgrounds (%)			Total
		IN	IPN	Total	IN	IPN*	Total	
Technical issues related to design and installation	Faulty design / manufacture	9	10	9	7	9 (40)	8	8
	Inadequate testing	4	5	5	7	13 (9)	10	9
Operation and use of equipment	No / inadequate risk assessment	13	10	12	11	0	6	9
	No Operations Manual	9	0	5	43	0	24	15
	Faulty / unsafe operation	17	0	9	18	30 (20)	24	16
	Inadequate passenger restraint	4	25	14	0	9 (6)	4	9
Maintenance and inspections	Inadequate maintenance	17	30	23	4	26 (17)	14	18
	Inadequate testing / examination	0	0	0	11	4 (3)	8	4
	No evidence / documentation of maintenance or testing	4	5	5	0	4 (3)	2	3
	No Declaration of Compliance	22	10	16	4	13 (9)	8	12
Qualifications and training	Inadequate training	9	0	5	7	4 (3)	6	5
Other	No Health & Safety policy	4	0	2	0	0	0	1
Total Number		**23**	**20**	**43**	**28**	**23 (35)**	**51**	**94 (106)**

* Figures in this column have been adjusted to remove the impact of the large number of prohibition notices issued for what is essentially one problem, i.e. a design defect on a particular ride. However, for comparison, the numbers in brackets include all prohibition notices.

Table 5.10: Fines Imposed for Non-compliance with HSG175					
Year	**Status of Defendant**	**Deficiency**	**Injuries**	**Description**	**Penalty**
2002	Fairground ride controller	Inadequate supervision/ lack of training	2 children (aged 18 mths and 23 mths) seriously injured	Two children thrown from ride and seriously injured. Controller of attraction had left ride with attendant who was not properly trained in its safe operation.	£500 fine £500 costs
2001	Fairground ride controller	Alleged lack of maintenance	1 adult & 2 children received minor injuries	Ghost Train car ran out of control down a slope following the failure of its drive chain. 2 of the 6 cars showed clear signs of drive chain wear.	£1,250 fine £1,250 costs
2001	Examiner	Inadequate examination	Minor injuries to a child	Case arises from an accident on a juvenile waltzer which was examined by the defendant a few months prior to one of the cars coming off.	£2,000 fine £2,000 costs
2000	Fairground ride controller	Unsafe operation		Defendant failed to ensure safety in operation of ride which was involved in an incident in which a car with three occupants in became detached from the ride.	£1,000 fine £0 costs
2000	Manufacturer	Did not provide adequate information relating to the safe use of ride	9 year old ejected from fairground ride. Major injuries.	Prosecution proposed of manufacturer of passenger cars for failed to provide adequate information relating to the use of his passenger cars so that they would be safe when used.	£15,000 fine £12,533 costs
2000	Manufacturer	No pre-use examination or testing	2 passengers seriously injured	A brand new fairground ride was supplied by the defendant without the pre-use examinations and testing required to show that the design and manufacture were safe. The passenger restraint bar was shown to be insufficiently strong and there was no restriction of operating speed.	£15,000 fine £14,197 costs
1999	Fairground ride controller	Inadequate daily inspection and vigilance during ride operation	No significant injuries	Incident during operation of Bungee Rocket fairground ride. One of the two bungee ropes failed during the ride.	£1,200 fine £3,520 costs
1999	Amusement park operator	Inadequate maintenance	Injury to head	Passenger struck on head when hinged lid that allows access to cars on ride slammed shut as she disembarked. Investigation found that collapse of the lids was a regular occurrence caused by deterioration of the supporting gas rams. There was no programme of planned preventative maintenance.	£4,500 fine £1,250 costs
1999	Amusement park operator	Inadequate maintenance		A car became detached from ride whilst carrying a family of four. Car centre pin was replaced previous year with a non-standard part of inappropriate specification, which subsequently failed.	£12,000 fine £1,354 costs
1999	Amusement park operator	Unsafe operation	8 year old sustained fatal injuries	Child fell from the rear car of the roller coaster whilst in motion. Prosecution brought for failure on part of Company to take all reasonable practicable steps to ensure safety of passengers on this ride.	£25,000 fine £140,000 costs

6. OPTIONS FOR IMPROVEMENTS OF NON-REGULATORY MEASURES

6.1 Improvements in the Scope of Non-regulatory Measures

6.1.1 Overview

Two important gaps were identified in the scope of those regulatory and non-regulatory measures considered in Section 5, and these relate to the training of staff and the communication of safety information to visitors. Whilst these are both addressed by the UK and Spanish guidance documents, they are areas which could be improved, and such improvements could also support more technical or product-based legislation elsewhere in Europe. Examples are provided of best practice, or proposed initiatives, in Canada, the US and the UK.

6.1.2 Improved Training of Operating Staff

Option 1: Development of a Best Practice Training Manual

One of the key areas where the scope of safety measures could be improved is the training of staff operating the amusement rides. This would apply to both amusement parks and travelling fairs. Existing measures may provide an indication of the topics which should be covered but there is no minimum standard of training.

An example of good practice is provided by a combined effort between industry and a competent authority in Canada. The Technical Standards and Safety Authority (TSSA) in Ontario, Canada and the amusement ride industry worked together in 2003 to produce the *Amusement Ride Operators' & Attendants' Safety Handbook* (TSSA, 2003). A Risk Reduction Group representing the industry developed the content, and it incorporates contributions from 21 amusement ride companies, including travelling shows, fixed parks, labour consultants, the Ministry of Labour, TSSA inspectors and risk advisors. The Handbook establishes a minimum training standard for amusement ride employees. The content of the Handbook covers similar points to those addressed in HSG175, but presents it in a more user-friendly manner, and is more of a training resource. However, due to the individuality of each ride, the Handbook should not been seen a replacement for operator training, but as a supporting document.

A similar document could be developed at a European level, by industry and consumer safety stakeholders. This could also be provided as a training video, but both formats would need to be translated into all EU languages to be an effective training tool. Such a document does not currently exist in Europe and it is often left to individual parks to provide their own training (albeit with some guidance from trade associations). This is an area where larger organisations can pass on examples of best practice to smaller facilities.

Provision of a training document/tool is the first step in improving staff training. This could be further developed by introducing either nationally recognised qualifications, such as the NVQ in the UK, or industry accredited training. Given that most parks

already undertake training, the improvement would relate to making training on best practice more consistent. Thus, actions under this Option could include:

- development of training manual, drawing on best practice from amusement parks, fairs and consumer associations;
- development of a training video, based on best practice manual; and
- development of training standards/qualifications by trade associations.

6.1.3 Communication of Safety Information to Visitors

Research suggests that the behaviour of riders is a significant cause of accidents. Thus, any measure which may address rider behaviour has the potential to reduce the number of accidents. Three options are presented below which could be implemented.

Option 2a: Public Education Programme

A public education programme could be initiated by consumer organisations, competent authorities or industry, or any combination of these stakeholders. It is most likely to be successful if it is supported by industry, which will benefit from improved public perception of safety issues.

An example of this type of programme can be found in Canada, where the competent authority (TSSA) has been operating its RideSmart® public education programme for a number of years. It based on a number of simple instructions to consumers, as shown in Box 6.1, to enable them to enjoy amusement rides safely, and these are available on TSSA's own website, as well as *Safetyinfo.ca*, a consumer website.

Box 6.1: RideSmart Instructions

BEFORE the Ride

- Observe age, height and weight restrictions to determine whether or not the ride is appropriate for your child.
- Read all of the rules for each ride so you can then instruct your child on how to behave appropriately.

DURING the Ride

- Be sure to tie up long hair and remove any loose articles (sunglasses, hats, jewelry) that have the potential to fall off during the ride.
- Remain seated, buckled in and be sure to keep your hands and feet inside the ride at all times.
- Use all safety equipment which the ride offers and remember to always listen to the operator's instructions.

AFTER the Ride

- When the ride is over, remain seated until you come to a complete stop.
- If you feel tired, stop riding or take a break - the rides aren't as much fun if you are exhausted.
- If you find any problems with any rides, be sure to report them to the operator immediately.

Source: TSSA (www.tssa.org)

In 2002, the programme was developed further, with the creation of RideSmart Rest Stops – stations at exhibitions and amusement parks where safety information is delivered to parents and riders in a comfortable, child-friendly setting. In 2003, TSSA chose to target its RideSmart activities to reach riders of waterslides and go-karts, the devices for which its data showed that the majority of incidents occur. TSSA believes that public education is a key factor in preventing accidents on amusement rides, particularly those for which passengers have a degree of control. In 2003, the program was delivered to over 212,000 riders during visits to the fairs and water parks (TSSA, 2002, 2003 and 2004).

Individual consumer organisations have undertaken targeted public information campaigns regarding fairgrounds and amusement parks, particularly following the ICTRL study in 1995. However, there is no authoritative source in Europe that consistently delivers a similar simple, but clear, message to consumers. The idea of physically taking the message to amusement parks, and targeting it at those rides mostly likely to cause accidents, is particularly unique and is only possible due to the accident data collected by TSSA. Saferparks notes that most accidents are caused by consumer behaviour, yet current industry and regulatory programs focus primarily on preventing accidents related to equipment failure and operator actions. It suggests that consumers will continue to make the same mistakes until they are educated about the causes of ride-related accidents and how to avoid them.

Actions required under this Option would be:

- development of a clear and consistent safety message for consumers regarding safe behaviour at amusement parks and fairs. This could be promoted by both industry and consumer associations.

Option 2b: Consumer Information Website

An alternative method of providing better information to consumers is through the Internet. Given that a number of consumers are likely to use the Internet to research opening times, prices, directions, etc. for visits to fairgrounds and amusement parks, an Internet site concerned with providing such information along with safety information may provide a useful resource.

An example of such an Internet site has recently been set up in the United States. In August 2004, Saferparks (a US consumer group) developed the concept of a centralised database system designed to facilitate the collection, analysis, and dissemination of safety-related information on amusement rides, devices and attractions operated in the US. The Ride Information Depository & Exchange System (RIDES) proposed by Saferparks would create a central database where accurate technical information about US amusement rides and ride-related accidents can be collected and used to plan and monitor accident prevention strategies.

This approach is, therefore, in its early stages and is not yet fully operational. However, it provides an example of how consumer information could be developed and delivered.

RIDES has the following goals:

- to give consumers the information they need to safely use amusement rides, devices, and attractions; and

- to give regulatory officials the tools they need to efficiently and effectively monitor, identify and correct issues affecting consumer safety and to communicate safety-related information to the general public.

It is envisaged that RIDES will receive the following inputs:

- detailed information from the owners/operators describing the rides and operational parameters that may affect consumer safety. That information will then be merged into a "Safety Fact Sheet", a standardised labelling system for US amusement rides;

- information from manufacturers that consumers should know in order to safely use the equipment (e.g. design assumptions or limitations, consumer warnings or recommendations, etc.);

- from regulatory agencies, information on functions performed by regulatory officials and extent of jurisdiction (i.e. which rides/devices at which venues are covered); findings and recommendations pertinent to consumers; accident reports and other safety records; and

- from the public, reports of accidents/incidents, concerns and suggestions that may help the RIDES Consumer Safety Board to identify potential hazards.

Outputs produced by RIDES will include:

- publicly available standardised Safety Fact Sheets for each ride registered in the system listing important parameters that may affect consumer safety, giving consumers easy, reliable, and consistent access to safety information about amusement rides. An example fact sheet is provided in Annex 7, as taken from the Saferparks website (*www.saferparks.org*);

- recommendations, instructions, and warnings to consumers formed by the RIDES Consumer Safety Board based on the information in the RIDES database;

- information for consumers on state and local safety agencies with jurisdiction over amusement rides and devices; and

- access to more detailed information for regulatory officials, manufacturers and owner/operators as an aid to their own accident prevention efforts.

Saferparks believes that this will provide the general public with accurate and useful information regarding the safety of amusement parks, allowing consumers to make informed choices about which rides are appropriate for them and their children and how to avoid potential hazards whilst on board. It may also assist with monitoring the health effects of amusement rides and could allow authorities and inspectors to share technical information.

Roberts (2001) identifies other US websites that collate data from various sources and encourage the public to report accidents. These provide accident data in a less organised way which may scare, rather than inform consumers. Roberts suggests that there could be advantages to establishing and maintaining a UK site for information exchange, including perhaps anonymous reporting of dangerous incidents. Furthermore, such a site could be used to collate and display ride inspection certificates, providing transparency for the industry, regulators and the public.

Given the international aspect of tourism and visits to amusement rides, such a website could be more usefully developed at a European level. Whilst this should be independent of industry, and thus managed by a consumer organisation or public authority, the volume of information that could potentially be generated would require significant resources. For this reason, it may be better developed by a multi-stakeholder group, potentially with funding from industry. This would assist with obtaining the preferred data from industry, and providing a balanced website, rather than one which only focuses on the negative aspects. For example, industry may wish to provide additional data on the number of rides given each year, levels of staffing, etc.

Therefore, actions required for this Option would include:

- development of a multi-stakeholder group to over see website development;
- production of a balanced and informative website, providing key information and safety messages;
- maintenance of website to ensure completeness and accuracy over time.

Option 2c: Legislation on Consumer Responsibility

There are a number of ways to influence consumer behaviour, and an alternative or additional method to the Options above may be in the form of legislation, which requires the public to act responsibly whilst on amusement rides. Such legislation is already in place in some US states.

The amusement industry in the UK has proposed such legislation. In November 2003, BALPPA (the UK trade association) presented details of the proposed Rider Uniform Safety Act to the All Party Parliamentary Tourism Group (APPTG) in the UK. BALPPA is concerned that the growth of the 'compensation culture' is causing problems for operators, where this is due to the growth in claims where the incident was either avoidable had greater care been exercised or would not previously have been considered as a basis for a claim (Interpark, 2004). BALPPA defines the riders' responsibilities as shown in Box 6.2, and, at the time of writing the report, was still lobbying Government to consider such an Act.

Box 6.2: The Rider Uniform Safety Act as Proposed by BALPPA

This Act shall be known as the Amusement Rider Safety and Liability Act

"Rider" A person 14 years of age or older utilising an amusement ride. The term includes any person who is an invitee. Whether or not the person pays consideration.

Rider's responsibility:

- A rider is responsible for obeying the posted rules or oral instructions of amusement rides and shall abide by the following:
- A rider may not board or dismount from an amusement ride except at a designated area if one is provided.
- A rider may not throw or expel any object or matter from an amusement ride.
- A rider may not act in any manner contrary to posted and oral rules while boarding, riding on or dismounting from any amusement ride.
- A rider may not engage in any reckless act or activity, which may tend to injure himself or others.
- Every rider shall maintain reasonable control of his speed.
- A rider may not disconnect, disable or attempt to disconnect or disable any safety device, seat belt, and harness.
- A rider may not disembark from any amusement ride before, during or after movement of a ride has started.
- A rider may not board or attempt to board any amusement ride if they are under the influence of alcohol or any controlled substance.
- A rider may not alter or enhance the intended speed, course or direction of a ride.
- A rider 14 years of age or older embarking on a ride after failing to pay appropriate consideration for its use shall be considered a trespasser.
- A rider shall not attempt to gain access to controls of an amusement ride.

This industry-led option is a legislative approach, and thus takes other approaches to improving rider behaviour, such as the Ride Smart programme a step further. However, in Ontario, if a rider fails to follow the rules for riding safely they can be charged under the Amusement Devices Act. Such legislation would enforce the message that riders are responsible for their own actions, but would need to be complemented and supported by public education programmes and safety information to help them to comply. In this respect, the approach taken in Ontario provides a good model.

For implementation in Europe, this Option would require:

- agreement on the responsibilities of consumers to behave correctly; and
- EU legislation that could be enforced nationally, respecting national public liability laws.

6.1.4 Summary of Options to Improve the Scope of Non-regulatory Measures

Table 6.1 summarises the advantages and disadvantages of the Options presented above. The availability of resources and the support of industry appear to be most important to the success of any Option, and for this reason Options 1 and 2a would appear to be most practical, certainly in the short-term, to address issues of consumer safety.

Table 6.1: Comparison of Options to Improve the Scope of Non-regulatory Measures		
Option	**Advantages**	**Disadvantages**
Option 1 – Development of Best Practice Training Manual	• Would address a key component in improving consumer safety. • Can be easily introduced as a non-regulatory measure, implemented by industry. • Consumer associations could also be involved to provide a multi-stakeholder approach • Involvement of industry would communicate experience from large parks to small parks. • Would be applicable to both amusement parks and fairgrounds.	• Requires development in many languages – may be resource intensive • Guidance will still be general to account for wide range of amusement rides – will rely on good local implementation. • Will require promotion by trade associations to be effective.
Option 2a – Public Education Programme	• Would address a key cause of accidents. • Can be easily introduced as a non-regulatory measure, either by industry or consumer organisations (although more effective if joint effort). • Simple messages would be applicable to majority of amusement rides, in both parks and fairgrounds. • Simplicity of messages would be less resource intensive than other options.	• If it is not viewed as a priority by consumer organisations, restricted resources may prevent is implementation. • Will depend on support by industry to be most effective.
Option 2b – Consumer Information Website	• Would educate people on the risks associated with specific rides. • Would allow people to fully consider options before visiting amusement parks.	• Would be most relevant to amusement parks. • Very resource intensive, requires maintaining database. • Requires translation into many languages • Safety message may get lost amongst other information.
Option 2c – Legislation on Consumer Responsibility	• Would enforce message that consumer behaviour is a key cause of accidents. • Would apply to both amusement parks and fairgrounds.	• Legislation may be difficult to implement and enforce in all countries. • Option may not be supported by consumer organizations. • May be difficult to prove causes of accidents.

6.2 Improvements in the Application of Non-regulatory Measures

6.2.1 Overview

The effectiveness of non-regulatory measures depends on the support that they receive from industry, authority and consumer stakeholders, as well as their enforcement. The UK appears to be unique in involving all stakeholders in a joint committee and may provide a model for developing best practice in other countries. In Australia, the industry association have taken best practice guidance a step further, by introducing a voluntary

certification scheme, which enables consumers to identify leading facilities, and is comparable with other accreditation schemes in the tourism industry. Similar schemes have been discussed at a European level, although they have not yet been taken forward. Finally, Ontario provides a legally enforceable approach, by requiring all operators to have a licence.

6.2.2 Development and Support of Non-regulatory Measures

Option 3: Development of a Multi-stakeholder Group Overseeing Safety Issues

As indicated in Section 2 of this Report, three key European associations exist to represent the interests of the amusement park and fairground industries. One of these associations indicates a willingness to work with the others, and all are concerned with safety issues. Given recent collaborations on the development of a European standard, working relationships are likely to already exist between the key stakeholders.

Consideration should be given to developing a multi-stakeholder working group to consider safety issues within the industry. An example of this is observed in the UK, where the Fairgrounds Joint Advisory Committee (FJAC) aims to:

- promote health, safety and welfare of employees and members of the public in the fairgrounds and amusement parks industry;
- help prevent all accidents and especially fatal or serious ones;
- discuss investigated incidents in order to identify key issues;
- initiate research into accident causation; and
- prepare guidance documents.

Membership consists of:

- the Health & Safety Executive (HSE);
- the Amusement Catering Equipment Society (AECS);
- the British Amusement Catering Trades Association (BACTA);
- the British Association of Leisure Parks and Piers (BALPPA);
- the National Association for Leisure Industry Certification (NAFLIC);
- the Showmen's Guild of Great Britain (SGGB);
- the Society of Independent Roundabout Proprietors (SIRP);
- the Association of Independent Showmen (AIS); and
- local authority representatives.

Previously, one consumer representative with links to the British Standards Institution was also represented on the FJAC, but this person has changed jobs and currently no consumer representative is present on the FJAC.

The committee provides a dialogue between HSE (the enforcing authority) and industry, although Roberts (2001) recommended a broader scope for representation, and this is happening to some extent with the addition of local authority representatives. It is noted that industry had some reservations about extending the membership, arguing that introducing people without knowledge of fairgrounds and the responsibility of implementing standards would be likely to result in delays and could be counterproductive, Roberts (2001) believes that such risks could be effectively managed

and would be outweighed by the benefits of greater transparency and wider representation.

Membership of a multi-stakeholder group at the European level could consist of:

- Europarks;
- ESU;
- EAASI;
- ANEC (or other consumer organisation);
- DG SANCO; and
- other national associations not otherwise represented.

The terms of reference for the group could be limited to consumer safety issues. It could ensure the effective communication of safety alerts concerning specific equipment, develop guidance, such as the training document suggested in Option 1 above, and ensure best practice for consumer safety was widely communicated to individual parks and fairs.

6.2.3 Formalised Certification

Certification of amusement parks and fairgrounds may take one, or a combination, of the following forms:

- certification of the whole park or fair;
- certification of individual pieces of equipment;
- certification or licensing of operators.

These Options would require considerable co-ordination across the EU to ensure consistency.

Option 4a: Certification of Parks / Travelling Fairs

Certification of parks and/or fairs has the potential to cover all aspects of safety and consumer service that may influence accident rates and ensure a high level of service. It could ensure that parks and fairs meet a consistent standard of safety across Europe and, if a recognisable logo was developed, could communicate an acceptable level of safety to consumers.

An example of park/fair certification is the scheme in Australia. The Australian Amusement, Leisure and Recreation Association Inc (AALARA) is the national body representing the amusement, leisure and recreation industry and has particular responsibilities in the areas of safety, operations and management within these industries. Its scope is much wider than that of the European associations, bringing together travelling showmen, amusement and theme parks, water parks, ride manufacturers/designers and many others.

In Australia, State and Territory Governments are responsible for the regulation of occupational health and safety, which includes fairground and amusement equipment. Although regulations vary considerably between jurisdictions, the law generally holds ride owners responsible for the safety of people on amusement rides and devices (NERB, nd). There is also an Australian Standard, AS 3533, relating to Amusement Rides and

Devices, which covers design and construction and operation and maintenance. It can be seen that a similar framework exists as that in the EU.

AALARA's safety support programme, AM-SAFE, is an industry self-regulation initiative which was introduced in 2002. It aims to achieve best practice through appropriate training, licensing and accreditation. Risk management is seen to be an integral part of good management practice, and AM-SAFE aims to be proactive by reducing the level of incidents and increasing efficiency.

To achieve AM-SAFE Compliant Operator Accreditation, the starting point is normally the AALARA Risk Management Policies and Procedures Manual. This manual, which is subject to constant update and review, contains some forty policies and procedures, including:

- Health and Safety Policy;
- Obligations and Responsibilities;
- Induction Training;
- Safe Work Instructions;
- Risk Assessment;
- Lighting and Electrical Safety; and
- First Aid.

This Manual, which also contains numerous forms for personalisation and use in association with policies and procedures, costs approximately €400. This cost also includes general implementation advice tailored to fit the type of operation involved, but does not include a site visit. Although it is not generally necessary, further assistance is available on a fee basis.

AM-SAFE accreditation is achieved after an audit is conducted by AALARA Risk Management approved auditors. The audit consists of an on-site inspection and a review of policies and procedures in place, including staff training and records, etc. Subject to complying with the requirements, operators will then be entitled to apply to AALARA for the Accreditation certificate and the associated insignias for public display. Such accreditation provides recognition of a best practice operation.

The AM-SAFE accreditation is required to be renewed annually. Every second year, a full on-site audit is conducted, with a desk audit (where the operator needs to present documentation to prove that he has the appropriate risk assessment processes and procedures in place) being conducted in the intervening year. If the operator is found to be non-compliant his accreditation lapses; or if a random audit or incident through the year identifies non-compliance with AM-SAFE requirements, the accreditation can be cancelled mid-term.

The cost of the AM-SAFE accreditation is directly related to the cost involved in conducting the audit, where this is obviously related to the amount of work involved in the audit process (i.e. number of attractions, size of attractions, etc.). As an example, an audit for a mobile ride operator with three or four rides would usually cost around €1,500 (Aus $2,500), whereas an audit for a mobile ride operator with six to eight rides may cost around €2,600 (Aus $4,500). There is obviously an increase in cost as the risk exposure to be assessed increases.

Option 4b: Certification of Equipment

Certification of equipment could be used to ensure the safe design, installation and maintenance of amusement rides. Such a scheme is seen by the industry as an alternative to a Directive, and Bakker (2004) states that it should be proposed and agreed upon by the industry.

Although such a scheme may be possible, Fawcett (2004) suggests that there are disadvantages as well as advantages. In the absence of a compulsory scheme, i.e. a Directive, the following problems are identified:

- the scheme would need to be consistent with national health and safety law in each of the countries involved, and there are differences between those countries in the legal detail and in how it is interpreted and enforced; and

- there are also differences in enforcing authorities' expectations and, while some of these differences may be overcome, the scheme must be consistent with the rest of them.

Fawcett (2004) suggests that it is likely that agreement would only be possible when a voluntary ride certification scheme combined the toughest, most extensive, combination of the various national requirements. Two possibilities are discussed further:

- a Limited Scheme:
  - → Eurocertification for all new equipment prior to first use;
  - → Eurocertification for periodic in-service inspection of equipment which crosses borders; and
  - → retention of administratively simpler schemes for periodic inspection of equipment which stays national.

- a Comprehensive Scheme:
  - → Eurocertification for all new equipment prior to first use;
  - → Eurocertification for periodic in-service inspection of all equipment; and
  - → no separate national scheme retained in any country taking part.

The advantages and disadvantages of these possibilities are given in Table 6.2 below.

Table 6.2: Advantages and Disadvantages of Proposed Eurocertification Schemes

Scheme	Advantages	Disadvantages
Limited	• Systems for equipment not crossing borders remain simpler and cheaper. • Reduced pre-use certification costs for designers / manufacturers who export to multiple European countries. • Simpler processes and reduced costs, compared with the present, for equipment that crosses borders.	• Added complexity of having parallel certification systems in operation.
Comprehensive	• Retains one system to cover all. • Reduced pre-use certification costs for designers / manufacturers who export to multiple European	• Higher in-service certification costs would apply to equipment which does not cross borders. • Unlikely to find favour, as a

Table 6.2: Advantages and Disadvantages of Proposed Eurocertification Schemes		
Scheme	**Advantages**	**Disadvantages**
	countries. • Simpler processes and reduced costs, compared with the present, for equipment that crosses borders.	voluntary system, with ride controller associations.
Source: Fawcett (2004)		

Bakker (2004) suggests that accredited Notified Bodies could certify rides/parks against agreed norms and standards, and EN 13814 provides a basis for this. The use of Notified Bodies also raises issues for Fawcett (2004) who suggests that inspections and certification carried out by non-national bodies may cause problems as, in the case of misdemeanour, legal systems need to be able to prosecute and punish somebody (e.g. an inspection body or other body). This may mean that some countries (possibly the UK) would require the ultimate certification responsibility to be borne by domestically-based bodies. A Eurocertification scheme would then need to be about the processes to be followed by a domestic body in processing the reports and certificates issued in other participating countries.

Fawcett (2004) identifies the following elements which are likely to be required in a Eurocertification scheme:

- a scheme for the accreditation/registration/certification of inspection bodies (e.g. ADIPS in the UK). A European scheme could possibly be based on ISO/IEC TR 17010 – *General requirements for bodies providing accreditation of inspection bodies*, maybe in conjunction with ISO/IEC 17024 – *Conformity assessment – General requirements for bodies operating certification of persons.* Until the first of these is adopted as a full ISO Standard, or until an equivalent European Standard comes into being, it may be preferred to base the scheme on EN 45012 – *General requirements for bodies operating assessment and certification/registration of quality systems* and ISO/IEC 17024 – *Conformity assessment – General requirements for bodies operating certification of persons*;

- when the scheme details have been developed and agreed there would need to be one (Europe-wide), or more, accredited bodies to carry out the registration/certification of inspection bodies complying with the scheme (ADIPS Ltd is an example of such a registration/certification body in the UK at the moment, although the system on which to base its formal accreditation is still being developed);

- rules for competence of inspection bodies and their staff in relation to inspection of fairground and amusement park equipment (based on EN 45004 – General criteria for the operation of various types of bodies performing inspection) (in the UK there is the ADIPS Rules for the registration of bodies performing inspection of fairground and amusement park machinery and structures);

- agreed technical guidance for inspection bodies, to form a basis for the different types of inspection. (A new UK publication is currently in preparation – *Safety of amusement device: Inspection*, to be published in the same series as the recent *Safety of amusement device: Design*);

- rules for inspection bodies regarding the issuing of ride certification;
- a central ride certification database (ADIPS Ltd operate this in the UK);
- a Europe-wide structure to develop the appropriate systems;
- a Europe-wide structure (cf. the Standing Committee for Machinery) to deal with problems that arise once the system is up and running; and
- the agreement and participation of ride controller associations.

DNV's Certification Scheme for New Building of Attractions is also suggested as a basis for development of a Eurocertification Scheme. Furthermore, in future, such a scheme could be combined with other schemes in the US, Russia, etc., leading to a world certification scheme.

Option 4c: Licensing of Ride Operators

Licensing of operators is a more formal approach than Option 1, which requires a minimum standard of training for operators, provided through a 'standard' training guide. Licensing of operators could be introduced as a regulatory or non-regulatory measure.

An example of the approach is that used in Ontario, under the *Technical Standards and Safety Act, 2000*. Prior to operation in Ontario, all amusement rides (and their controllers) require:

- a valid TSSA Operators license (€190, payable annually);
- a valid TSSA Permit (€70-€105, payable annually); and
- an inspection by TSSA (€770 - €11,500[12], payable annually)

Roberts (2001) rejected mandatory licensing as too 'inflexible' for the UK, but suggested that it remained an option for the future. However, he concluded that to introduce the necessary changes, and to improve safety through this route, could be slower and less flexible in adapting to changing circumstances, and no more effective than continuing to improve the exiting regime and its enforcement. Table 6.3 presents a summary of Roberts (2001) conclusions of the potential advantages and disadvantages of specific legislation and licensing requirements for fairgrounds and amusement parks in the UK.

Table 6.3: Advantages and Disadvantages of Legislation and Licensing in the UK

Advantages	Disadvantages
Specific Regulations: such regulations could include specific requirements relating to all the main areas of the guidance.	
• Regulations would make it clearer to the industry what the legal requirements were. • Specific regulations might be more straightforward to enforce.	• A further increase in the volume of health and safety law, without increasing actual levels of safety or obviating the need for additional guidance. • Difficulties in writing regulations that were

[12] Based on UK inspection body's estimates of time required for annual inspections, ranging from 10 hours for a kiddie ride up to 150 hours for a roller coaster.

Table 6.3: Advantages and Disadvantages of Legislation and Licensing in the UK	
Advantages	**Disadvantages**
	specific enough to be easily enforceable, yet flexible enough to cope with the variety of equipment in use • Constraints in achieving timely updates • Diversion of HSE resource from inspection and enforcement to writing and updating legislation.
Licensing Requirements: these could involve requirements for fairs to be licensed, or for rides or ride controllers to be licensed.	
• It could be easier for the authorities to keep check of the safety of rides, by providing information about where and by whom they were operated. • If display of licences were required, it would be easier for the public and the authorities to identify those outside the scheme. • Withdrawal of licences could be an exceptionally powerful sanction.	• Increased costs for the industry and the regulator (although licences could be made self-funding through fees). • Obtaining a piece of paper would be no guarantee of ride safety or safe operation, so would still need to be backed by inspection and enforcement. • Licensing schemes tend to transfer responsibility for safety away from those in control of the risks and towards the authority issuing the licence.
Source: Roberts (2001)	

6.2.4 Summary of Options to Improve the Implementation of Non-regulatory Measures

Table 6.4 summarises the advantages and disadvantages of the Options presented above. Option 3, development of a multi-stakeholder group, can most easily be implemented as a non-regulatory measure, and could go some way to improving the standard of consumer safety across the EU, by providing a forum for the exchange of information and development of best practice. Options for certification of equipment or operators may be more effective as regulatory measures, but would be resource intensive. Certification of parks and/or traveling fairs is most likely to appeal to consumers and could lead to consistent standards across the EU, if enforcement was adequate. This may also provide benefits for industry, where good practice would be recognised. However, such certification is likely to require payment of a fee which will impact on small parks, which, while they may be safe, would not be able to justify such expenditure.

Table 6.4: Comparison of Options to Improve the Scope of Non-regulatory Measures		
Option	**Advantages**	**Disadvantages**
Option 3 – Development of a multi-stakeholder group	• Can be easily introduced as a non-regulatory measure, developed by industry. • Could provide an integrated approach to safety management, where issues will be very similar between countries. • Involvement of industry would communicate experience from large parks to small parks. • Consumer associations could also be involved to provide a multi-stakeholder approach.	• Will require good network of communication between European level to national associations and individual parks/fairs to be effective.

Table 6.4: Comparison of Options to Improve the Scope of Non-regulatory Measures		
Option	**Advantages**	**Disadvantages**
	• Would be applicable to both amusement parks and fairgrounds.	
Option 4a – Certification of Parks/Travelling Fairs	• Promotion of logo as indicator of safety could provide benefits both to industry and consumers. • Would provide consistent standard across the EU. • Could address key aspects of consumer safety in services.	• Would require overseeing body to ensure consistency between EU countries. • Introduction of scheme would require significant promotion to ensure implementation. • Requires the support of industry to be effective, likely to be resource intensive. • Will be significant cost to participate. May impact on smaller parks/fairs.
Option 4b – Certification of Equipment	• Promotion of logo as indicator of safety could provide benefits both to industry and consumers. • Would provide consistent standard across the EU.	• More relevant to safety of products than services. • Would require overseeing body to ensure consistency between EU countries. • Introduction of scheme would require significant promotion to ensure implementation. • Requires the support of industry to be effective, likely to be resource intensive. • Will be significant cost to participate. May impact on smaller parks/fairs. • More likely to be effective as a regulatory measure.
Option 4c – Licensing of Ride Operators	• Promotion of logo as indicator of safety could provide benefits both to industry and consumers. • Would provide consistent standard across the EU. • Could address key aspects of consumer safety in services. • Removal of licences would be a powerful sanction to ensure consumer safety.	• Would require overseeing body to ensure consistency between EU countries. • Introduction of scheme would require significant promotion to ensure implementation. • Requires the support of industry to be effective, likely to be resource intensive. • Will be significant cost to participate. May impact on smaller parks/fairs. • More likely to be effective as a regulatory measure.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

Currently, there is no community legislation to regulate the risks associated with consumer services such as fairgrounds and amusement parks and the Commission has been asked by the European Parliament and the Council to provide further information to inform further debates on this matter. This report, commissioned by DG SANCO, provides a comprehensive assessment of the best practices for consumer safety in fairgrounds and amusement parks. Within this report, fairgrounds have been taken to refer to travelling fairs whilst amusement parks are fixed sites where rides are paid for individually (amusement parks) or are covered by a single admission ticket (theme parks).

Each year, perhaps half of the EU population enjoys a visit to a fairground or amusement park. These range from large themes parks which attract several million visitors a year to a small travelling fair visiting a remote village for a few days. Unfortunately, there are also numerous accidents leading, perhaps, to about 19,000 injuries per year with the occasional fatality. Most (60%) of these injuries involve children (i.e. under 15). Typical accidents would include:

- an excited child is running from one ride to the next, trips and cuts leg;
- a person getting on (or off) a ride inadvertently hits head on a piece of the equipment; and
- a person on a thrill ride is hurt when ride car makes a violent movement.

Although there is no directly relevant community legislation, there are numerous measures which are applied to fairgrounds and amusement parks to ensure the safety of consumers. These include national legislation, international and national non-regulatory measures as well as local measures. Although the focus of this study is on non-regulatory measures, their nature and scope for particular fairgrounds and amusement parks will depend, to some extent, on the presence or otherwise of other regulatory measures. By way of example, although the UK has no specific legislation, it has comprehensive non-regulatory 'best practice' guidance which has been developed in close collaboration between industry and the regulator. Conversely, several countries (such as Belgium and the Netherlands) have specific legislation but not national non-regulatory measures. Within the context of non-regulatory measures, it is important to note that there are also various industry associations at both national and international level which set minimum standards as well as disseminating advice on best practice to individual ride operators.

Within the context of this study, it has not been possible to determine whether the level of safety in fairgrounds and amusement parks is better or worse in those countries where the emphasis is on regulation or in those with an emphasis on non-regulatory measures. This is largely because there is little coherence in the collection of accident statistics across the EU-15 countries. As a consequence, the uncertainties in the data reviewed make it very difficult to draw firm conclusions about the relative levels of safety in different countries. Furthermore, it is difficult to draw conclusions as to whether the overall numbers of injuries are increasing or decreasing in particular countries.

Nevertheless, there appears to be a growing awareness amongst regulators, industry and consumers that there is a need to ensure that reasonable measures are taken to ensure the safety of consumers. It could be argued that, to some extent, this is being driven by the realisation that the trend towards faster, higher and more extreme rides could lead to an extremely serious multi-fatality accident. It is of note that, in the US, concerns appear to focus much more on the potential for the more extreme rides to lead to a greater incidence of head, neck and internal injuries.

In broad terms, safety measures for fairgrounds and amusement parks are, in many ways, similar to those that would be developed for any facility. As such, it would be expected that these would cover:

- safety management systems;
- design and construction of equipment;
- operation of equipment;
- maintenance and inspection of equipment;
- qualifications and training of personnel;
- safety of visitors/customers; and
- emergency procedures/equipment.

These aspects have been considered (together with the associated costs) for examples drawn from countries with non-regulatory measures (with an emphasis on the UK, Spain and Australia) and from countries with regulatory measures (with an emphasis on Belgium, Finland, Ireland and Canada). This comparative analysis suggests that, in general terms, there is little to differentiate regulatory measures from non-regulatory measures in terms of their effectiveness. This picture is further complicated (in relation to technical matters at least) by the introduction of the European standard (EN 13814). Although intended as an international non-regulatory measure, elements have already been incorporated into legislation in some countries. However, the standard does not enjoy universal support and reservations have been expressed by both national authorities and industry (notably the UK).

Of the aspects listed above, weaknesses have been identified in relation to staff training and the communication of safety information to visitors. This observation applies to both non-regulatory and regulatory regimes.

Examples of 'best practice' for these aspects have been identified and it is believed that these could be more widely adopted to improve the safety of consumers. Of course, influencing the behaviour of consumers plays an important role and it is worth noting that, in the UK, legislative measures are being suggested which clearly go further than the provision of safety information (and guidance) to consumers.

More generally, there are various means by which such improvements could be adopted including the use of multi-stakeholder groups (as in the UK), increased use of certification for facilities (as in Australia) or for equipment (as in the proposed Eurocertification Scheme), and the licensing of ride operators (as in Canada).

In summary, there is a wide range of non-regulatory and regulatory measures being applied to fairgrounds and amusement parks in the EU and further afield. There is insufficient evidence to suggest that non-regulatory measures are more or less effective than regulatory measures. Indeed, in considering a particular aspect of consumer safety, the requirements will be similar whether based on non-regulatory or regulatory measures. However, with numerous injuries every year, there is room for improvement particularly in relation to staff training and the provision of safety information to consumers.

7.2 Recommendations

7.2.1 Better Reporting of Accidents

Within the EU, there is a lack of coherent data on injuries to consumers. This makes it very difficult to draw meaningful conclusions about the relative levels of safety in one country compared to another. This problem is now of greater concern with the apparent lack of support amongst Member States for the *EUPHIN* data-base as well the expansion of the EU to 25 countries.

The first recommendation is that further efforts are made to ensure the continued operation of the EUPHIN database in order to provide robust information to assist the development of policies for consumer safety.

TSSA's approach to encouraging ride controllers/operators to improve reporting of accidents and their cause (e.g. rider-error, operator-error, poor maintenance, etc.), which is not available from EUPHIN in any case, may lead to a greater understanding of the hazards at amusement parks and fairgrounds. This would provide additional information on the less serious accidents, which are not covered by any national or EU reporting requirements, but which are more numerous, and would allow prevention methods to be identified.

The second recommendation is that national authorities or consumer organisations should consider obtaining more detailed accident data to allow better targeting of consumer safety programmes.

7.2.2 Better Collaboration Amongst Trade Associations

In Australia, ride manufacturers, amusement park operators and travelling showmen are brought together under one trade association. It is acknowledged that a similar association is unlikely to be possible in Europe because of the range of issues and the nature of the industries that the existing European associations represent. However, EAASI has expressed an interest in greater collaboration with Europarks and ESU/UFE. Combining the experience and knowledge in each association on safety issues could only be beneficial to the industry and consumers. It is noted that the existing industry trade fairs already hold seminars on safety issues, and this approach should be encouraged and continued. Furthermore, the trade associations could seek to improve their coverage of the EU-25.

The third recommendation is that the European trade associations build on their existing work on safety issues and develop better channels of dissemination of safety

information and greater collaboration amongst them (taking into account the EU-25 Member States).

7.2.3 Encouragement of Multi-stakeholder Groups

Consumer safety at fairgrounds and amusement parks is not currently subject to specific European Directives. Although the objective of this study was to examine the effectiveness of non-regulatory measures, this study has shown that in many countries, this can only be done within the context of regulatory measures. As a consequence, it has not been possible to reach a view on whether further action would be more or less effective if it were taken on a non-regulatory than on a regulatory basis. However, the analysis has shown that some aspects of safety, notably staff training and provision of safety information to visitors, could be improved.

Safety at amusement parks and fairgrounds is the responsibility of the ride manufacturers, the ride controllers/operators, the public authorities and consumers. The UK is unique in establishing a multi-stakeholder group that represents the interest of all parties in the development of best practice guidance. Improved communication between stakeholders at national, and potentially EU, levels, could lead to safer facilities and a better consumer perception of the industry. Option 3, considered in Section 6, suggests the development of a multi-stakeholder group.

The fourth recommendation is that steps be taken to involve key stakeholders (regulators, industry and consumers) in discussing how measures (particularly relating to staff training and provision of safety information) could be developed and applied across the EU-25 Member States.

7.2.4 Development of Best Practice Manual for Staff Training

Option 1 considered in Section 6 is to develop a training manual for operating staff that would provide a consistent standard across the EU. The formation of a multi-stakeholder group as recommended above could provide the basis for developing such a manual. Consideration would need to be given to the most user-friendly format to ensure that is was widely adopted in the amusement industry. This could support existing non-regulatory and regulatory measures in the EU.

The fifth recommendation is to consider developing a best practice staff training manual that could be used by individual parks and travelling fairs across the EU. This could build on improved accident data to understand the most likely causes of injury to consumers.

7.2.5 Development of a Consistent Safety Message to Consumers

The RideSmart programme developed by TSSA in Ontario provides a useful model for developing a consistent safety message to consumers. Co-operation between consumer associations and industry could ensure that this message is promoted throughout the EU and may improve awareness amongst consumers that they are responsible for their own actions on amusement rides and they should act responsibly. This Option is likely to be accepted by both industry and the consumer associations as a means of improving consumer safety as it is less resource intensive than other options.

The sixth recommendation is to develop a consistent safety message for consumers that can be promoted by industry and consumer associations alike, throughout the EU, to address aspects of consumer behaviour which may impact on safety.

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ANNEX 1: SPECIFICATION ATTACHED TO THE INVITATION TO TENDER

General invitation to tender SANCO/2003/B3/004 regarding technical assistance for assessment of best practices in fair grounds and amusement parks in relation to safety of consumers.

1. Introduction – context of the contract

A large body of Community legislation has been established over several decades in the area of consumer *product* safety and liability for defective *products*. The objective of such legislation was to harmonise national rules on safety and liability in order to prevent or eliminate barriers to internal trade in products, while ensuring a high level of consumer health and safety protection and the protection of consumer interests. The legislation includes vertical directives, applicable to particular categories of products and/or risks, and horizontal instruments, in particular the recently revised Directive on General Product Safety (European Parliament and Council Directive 2001/95/EC – OJ No; L 11, 15.01.2002 p. 4) (hereinafter referred to as the GPSD). In the area of s*ervices* provided to consumers, Community legislation and data collection directly connected with safety is currently limited to a few specific areas (notably in the sector of passenger transportation), but there is an increased interest in the issue. Efforts to establish an internal market for services, the potential influence of e-commerce and increased transboundary demand and supply of services, and the greater political priority for consumer safety in general are key elements in this respect. In particular, the European Parliament and the Council have recently requested the Commission to present by 2003 a report on the safety of services, accompanied by appropriate proposals (article 20 of the GPSD). Commission services adopted the report 6 June 2003, examining the needs, possibilities and options for Community action in the area of service *safety*. In the preparation of the report fairgrounds and amusement parks have been identified as consumer services of particular interest.

At EU level, it is recalled that the Commission withdrew a draft directive on Non-Permanent Structures and Specific Equipment for Fairgrounds and Amusement Parks in 1991/92 after considerations linked to subsidiarity. Directive 89/391/EEC on the introduction of measures to encourage improvements in the safety and health of workers at work is indirectly relevant for safety levels of consumers, and apart from this no legislation on EU level exists, neither with regard to the equipment used, training of personnel or other aspects. After the shelving of the draft directive, work on standardisation in the responsible CEN Technical Committee TC 152 has continued and two standards are now in the process of being adopted. Both standards (prEN 13814 and prEN13782) will focus on safety of fairground and amusement park machinery and structures.

At national level the approaches vary significantly. Some countries apply their legislation on product safety, others have introduced licensing, while some have no control mechanism. International Consumer Research and Testing Ltd. assessed the situation with regard to risks in 1995 under a contract financed by the European Commission (B5-1050/94/000048). The assessment, among other things, focused on existing codes of practice, guidelines and voluntary measures in the area. These did not only cover design, production and installation of equipment, but also other elements of safety management like operation and use of equipment, training of personnel, guidance of visitors, information, signs, emergency procedures and equipment, maintenance and inspections etc.

There has been no systematic collection or assessment of existing non-regulatory measures in the area since 1995. The importance of services in general, the cross border relevance of fairgrounds and amusement parks in particular and the expectations by EU citizens for a high level of safety throughout the EU indicate that such an assessment would be useful and provide a better basis for distribution of best practices and for improvement of safety levels. The contractor should assist the Commission in this respect.

2. Purpose of the contract etc

2.1 Scope and objectives

The scope of the contract is limited as follows:

a) The description and analysis shall cover the situation in all EU Member States
b) The factual scope is limited to fairgrounds and amusement parks. These are premises or part of premises where services offered to consumers against a fee mainly include the use of fairground equipment or amusement rides designed to be in motion for entertainment purposes with members of the public on or inside it. It also refers to any plant which is designed to be used by consumers for entertainment purposes, for example as a slide or for bouncing upon, and includes swings, dodgems and other plant which is designed to be in motion wholly or partly under the control of, or to be put in motion by, a member of the public. The definition includes coin-operated children's rides, but not non-powered children's playground equipment (playgrounds).
c) Only *non-regulatory* measures are to be included. These are formalised codes of practice, codes of conduct, standards, guidelines, internal safety procedures, recommendations, etc that are not directly linked to a legal obligation.
d) The standards prEN 13814 and prEN13782 currently under adoption in CEN are excluded from the scope.
e) Only risks relating to health and physical safety of consumers (physical person acting in his/her personal capacity) are covered, not economic interests or the safety of workers

Within this scope the objectives of the contract are to provide:

- An identification and description of existing non-regulatory measures aiming at consumer safety in fairgrounds and amusement parks,
- A comparative analysis of these existing non-regulatory measures, including their effectiveness
- A presentation of different options for improvement of existing non-regulatory measures

The overall objective is to facilitate the implementation of best practices for consumer safety in fairgrounds and amusement parks.

2.2 Description of the tasks

In order to reach the objectives set out above, the contractor shall carry out the following tasks:

a) The contractor will first identify non-regulatory measures of a general nature, i.e. measures that are developed for use by more than one or just a few fairgrounds and amusement parks. In addition to general measures, internal safety procedures used by specific operators and recognised as best practice can be included where appropriate. The measures will be described systematically with a clear distinction between elements that influence the level of safety, hereunder:
   - technical issues related to design and installation of equipment
   - operation and use of equipment
   - maintenance and inspections of equipment
   - qualifications and training of personnel
   - guidance of visitors and safety information, hereunder the use of signs
   - emergency procedures and equipment.

   The contractor will include a description of compliance mechanisms in place and the use of sanctions in case of non-compliance.

b) The contractor will, as a second step, assess the identified and described measures. The assessment will be based on objective criteria and in particular reflect
   - the actual use of the measures by service providers
   - the impact on safety levels
   - costs involved

   When assessing the impact on safety levels the contractor will as far as appropriate use existing and available accident data.

c) The contractor will identify gaps in existing non-regulatory measures and present options for improvement both in terms of actual implementation and in terms of contents.

2.3 Working method

In order to collect information on existing methods, the contractor will contact national administrations, economic operators, insurance companies, consumer organisations and academic research centres as appropriate. Existing and ongoing studies and research will be taken into account, in particular the publication "Safety in Amusement Parks and Fairgrounds", EC Subsidy: B5 – 1050/94/000048, published by International Consumer Research and Testing Ltd., September 1995.

The contractor will define the practical, operational and organisational approach and methodology to carry out the tasks in a structured and systematic way.

The contractor will participate in the relevant meetings organised in Brussels by the Commission (approximately two meetings).

ANNEX 2: EXAMPLES OF LOCAL NON-REGULATORY MEASURES

A2.1 Alton Towers, UK

Health and Safety Information Sheet for Educational Establishments

The quality and safety of all our rides and attractions are of the utmost importance and therefore a considerable amount of time and effort is spent on making all visits a safe and fun experience. The Tussauds Group who own Alton Towers are Europe's leading operator and developer of visitor attractions. Due to the complexity of Theme Park operations in the UK, a summary of the main health and safety requirements is set out below:-

1. Legal Requirements:-

Health and Safety at Work Act etc 1974 –This is the principle Act that applies to the company and is to ensure that all workers in all occupations are protected by law. Its purpose is to provide one comprehensive integrated system of law, dealing with health, safety and welfare of employees and members of the public who are affected by work activities. The Act is written in very general terms and does not require many specific requirements for managing health and safety at work. Instead, the Act places a general duty on employers to provide safe systems of work that are so far as is reasonably practicable, safe and without risks to health.

Under the HASAW Act 1974 are many specific Regulations which relate to work activities on site. The principle requirement being to undertake risk assessments to identify 'hazards' and assess the risk under the Management of Health and Safety at Work Regulations 1999.

- The company's health and safety policy was last reviewed on the 22 February 2002. The health and safety policy is signed by the Chief Executive Officer for the Tussauds Group and the Divisional Director for both Parks.
- Risk Assessments are undertaken by all departmental Managers with reference to the work activities that they manage. Risk Assessments are reviewed at least annually or if any significant change takes place with regard to a work activity or area of work. Due to the volume of risk assessment documents it is not possible to send these out on an individual basis.
- The Park and Hotel are covered by Public Liability Insurance. The amount of cover provided by this policy is £10 million. The Policy is with ACE Insurance (Policy No: 47UKA07551/2)
- The Park is dual enforced by the local Health and Safety Executive and Environmental Health Department.

Fairgrounds and Amusement Parks – Guidance on Safe Practice HSG175 – this is the principle guidance for theme parks in the UK. It is industry good practice and is developed by the trade associations in conjunction with the Health and Safety Executive. The guidance develops good practice concerned with the overall safety management of attractions with emphasis on risk assessment, management of safety and the inspection stages known as design review, assessment of conformity to design, initial test and 'in-service annual' inspection for all fairground rides.

2. Engineering / Maintenance of Rides:-

All new rides must be designed and manufactured in accordance with strict safety standards and comply with UK requirements. Before any ride is commissioned it is subject to a comprehensive pre-use inspection procedure by an independent inspection body registered under the Amusement Devices Inspection Procedures Scheme (ADIPS). This is an extremely comprehensive assessment process which encompasses all safety critical and safety related matters including the type/magnitude of forces involved, the passenger containment system, and operating systems/restrictions e.g. heights etc.

The "pre-use inspection" process is further consolidated by an 'In–Service Annual Inspection' by an independent ADIPS registered inspection body to ensure the safety and integrity of the ride for each season. A comprehensive regime of daily, weekly and monthly safety checks /planned preventative maintenance are also carried out by our own in-house qualified engineers to ensure that the requisite standard of safety is maintained at all times.

3. Ride / Attraction Operation:-

The operation of all rides /attractions on park conform to strict documented procedures and manufacturers guidance. The rides/attractions team have a considerable amount of experience in operating rides and attractions which ensures safe operating standards.

All ride operators are over 18 and undergo an annual company medical. They are also rigorously trained to a high level of competence specifically related to each ride they operate. Ride assistants whose primary role is to assist guest's embarking/disembarking from the rides are over 16 years of age and undergo similar structured training to that of operators.

4. Food Safety / Hygiene:-

Food outlets operated by Alton Towers are operated in accordance with strict hygiene standards by trained employees to ensure compliance with the Food Safety Act 1990 and are regularly inspected by the local Environmental Health Department. We also employ independent food safety auditors who undertake biannual food safety/hygiene inspections to ensure that high standards of food hygiene are observed at times.

5. First Aid Facilities:-

Alton Towers has a First Aid Centre located near to the entrance plaza which is operated by a dedicated first-aid team, many of whom are trained as first responders in conjunction with the Staffordshire Ambulance Service. We also have a fully equipped terrestrial ambulance for use on and off-site by our first-responder team. First aiders are trained to deal with all minor injuries on site and also in the initial stages of any major injuries that may occur until the emergency services arrive at the scene. The nearest Hospital with Accident and Emergency facilities is approx. 20 miles from the Park.

6. Schools Registration & Lost Children Point :-

Our Guest Services/Information Office located at the top of Towers Street (ie at entrance plaza) is available for schools/teachers to register their details (ie contact names and telephone numbers) and acts as a lost person collection point to enable them to be reunited with members of their party. A number of Guest Information booths are also located around the Park which can be used for general assistance/contact purposes.

7. Emergency Planning:-

Alton Towers has a contingency plan that would be invoked in the event of any emergency situation. The emergency plan covers all foreseeable major incident /emergency scenarios and has been developed and tested by means of practical exercises over time in conjunction with the local emergency services ie fire, ambulance and police.

8. Fire/Security :-

The site have a dedicated security team which are able to deal with any security issues on site 24 hours per day 7 days per week. The security team pro-actively patrols the park and deal with any security related matters and are also trained to deal with any emergency incidents that occur on the site.

Within our security Team we have a full time fire officer who oversees all fire safety issues. Fire procedures for all venues/attractions are in place and operating staff are trained in these procedures accordingly.

9. Parking Drop off/Pick Up Points :-

From the main entrance to the Park directional signage is displayed to indicate car/coach parking facilities as well as drop off/pick up points.

10. Access and Facilities for Disabled Visitors :-

Alton Towers aims to ensure that the Park is accessible to all our visitors. Further guidance on access and facilities for visitors with disabilities is available from our Guest Services Team.

A2.2 Särkänniemi, Finland

In Särkänniemi, special attention is paid to the safety of our guests.

The rides may look extremely wild, but their safety has been maximised. The ordinance of the City of Tampere requires the equipment to be checked monthly by an authorised outside inspector.

The staff at Särkänniemi will check and test every ride daily before the park opens. The equipment has been manufactured by top European manufacturers and is serviced and monitored according to a detailed programme. In addition, "seat belts" are installed at Särkänniemi as an optional extra on much of the equipment, which does not originally have them.

The new Rapid's Ride adventure course, built at the foot of the Näsinneula Tower, is a good example of how safety considerations are taken into account at Särkänniemi. Trained staff of more than 20 years of age operate the ride. Guests are given thorough instructions, and there are 11 monitoring cameras in operation along the rapid's course. Safety measures for exceptional situations have also been carefully planned and practised.

During the summer months, the service staff at Särkänniemi is on continuous stand-by. During the winter, the equipment is kept in a warehouse and thoroughly checked, for example, by ultrasound tests, as well as being carefully serviced for the next summer season.

Safety is one of the key areas in staff training. In addition to taking care of the safety of the rides and equipment, the staff knows how to act in a case of sudden fire or other unexpected accident. Many have asked us why the height limits for the different rides are so definite. We can only give one answer - safety.

In Särkänniemi, the safety of our customers has also been maximised with a variety of other precautions. We do this to give our guests the opportunity to concentrate on the main issue – having fun.

Source: http://www.sarkanniemi.fi/english/services/turvallisuus.php

A2.3 Swedish Example

Technical issues related to design and installation of equipment

When purchasing new attractions, i.e. buildings or rides, two guidelines are generally followed, which have been established by the Swedish Construction Contracts Committee (BKK). These guidelines cover ethics during purchasing (Regulations of Purchasing 2000) and general conditions of contract (AB92).

Documents regarding current directives, standards and requirements are attached to the contracts. The documents contain requirements such as ergonomic and environmental issues, emergency power etc. according to our policies. During the project design work

the surrounding areas, escape ways, emergency light, signs etc. are taken into consideration.

Maintenance and inspections of equipment

The systematic maintenance and safety control of rides is subjected to checklists, based upon manufacturer's manuals. Parts of the annual overhaul maintenance are related to results from the authority inspections with respect to non-destructive testing etc.

Interferences and measures are reported into a PC system, for example, ride interruptions are dispatched to the technical departments.

Emergency power units and emergency light systems are regularly tested.

Operation and use of equipment

The operation department is responsible for park security, park service, park information, ride operations, games and shops. Ride operation is covered by manuals, one general and a number of ride-specific ones, partly based upon the manufacturer's manuals.

Qualifications and training of personnel

All operative staff are regularly trained in service and behaviour towards our guests. The ride operators are educated in general and ride-specific operation of the rides. This education requires attainments tested by examination.

Managers, supervisors and personnel are selected according to requirements and are educated in first aid and CPR. The security staff are trained in taking care of guests with disabilities or special needs.

Guidance of visitors and safety information

All operative staff are trained in information service, supported by a guideline called “I know the answer”, which covers safety issues such as emergency care, lost children information etc. In a central point of the park we have an customer service desk where our guests have the possibility to receive information on most aspects.

All rides are equipped with information signs in a designed pictograph system, regarding heights, restrictions etc. Some rides, according to requirements, are equipped with visual and audible information.

Generally, our guests can obtain information in brochures, at the entrances, at the cash stands and from information signs in the park

We carry out about 10,000 guest interviews each year, with the aim of improving the general quality level of the park experience, including product safety,

Emergency procedures and equipment

Besides the above mentioned education in first aid and CPR, a plan of action and procedure is established to take care of potentially serious accidents. In our case, as we are situated in a city centre, the rescue services and hospitals are located in our neighbourhood, which give us no reason to establish our own team to provide serious medical treatment.

The customer service desk takes care of simple medical incidents etc, and provides an area for rest and treatment.

All incidents have to be reported through the customer service desk. The operation- and technical organisations consider the reports with respect to insurance or technical measures.

ANNEX 3: QUESTIONNAIRE FOR OPERATORS OF AMUSEMENT PARKS

The European Commission has asked Risk & Policy Analysts (RPA) to write a report on best practice for consumer safety in fairgrounds and amusement parks. This study aims to identify and describe existing voluntary (non-regulatory) measures, including their effectiveness, and present different options for improvement, where necessary.

It is important that we provide an accurate review of existing safety measures in amusement parks and we would be grateful if you could answer the following questions which will provide us with the information that we need. In some questions we have asked the cost of providing certain safety measures. This will help us to ensure that any recommendations that we make would not result in excessive costs to businesses. We also ask questions about accidents and injuries. This information is very important to enable us to report on the effectiveness of safety measures. Please answer as many questions as possible, we are happy to receive estimated or approximate information where accurate information is not available.

Please note that all responses to this questionnaire will be confidential and your name will not be associated with your response at any stage in our reporting to the European Commission, or to anyone outside RPA. Please return this questionnaire directly to RPA at the address at the end of this questionnaire. We would be grateful to receive your completed response by **28 June 2004**, but please contact us if you are unable to provide a response by this date.

Thank you for your help.

Name of Company:	
Contact Name:	
Contact Address:	
Telephone/Fax:	
Email Address:	

A. General Information

1. Please indicate the name of each park that your company owns, its location and its year of opening:

Name of Park	Location	Year of Opening

2. Please indicate the number of rides of different types in each park that you operate:

	Park 1	**Park 2**	**Park 3**
Suspended Roller Coasters			
Traditional Roller Coasters			
Wooden Roller Coasters			
Other Thrill Rides (not Roller Coasters)			
Water Splash Rides			
Dark Rides with Audio Visual Effects			
Kiddie Rides			
Other, including Family Rides			

3. Please estimate how many visitors each park has received in the last three years and/or how many visitor rides have been given:

Name of Park	**Number of Visitors**			**Number of Visitor Rides**		
	2001	**2002**	**2003**	**2001**	**2002**	**2003**

B. Safety Procedures - General

4. If you own more than one park, do all parks follow the same safety procedures?

Yes ☐ No ☐ If no, please complete separate questionnaires for each park

5. What role do the following authorities/organisations have in your safety procedures (please tick all that are applicable):

	National Authority	**Regional/local Authority**	**Trade Association**	**Other**
Please specify which authority/organisation				
No role in safety procedures				
Specifies exact safety requirements				
Provides guidance on safety				
Requires notification of safety procedures				
Checks/audits safety procedures				
Only intervenes following an accident				

6. Which of the following aspects are covered by your safety procedures? (please tick all that apply)

Technical issues related to design and installation of equipment	
Operation and use of equipment	
Maintenance and inspections of equipment	
Qualifications and training of personnel	
Guidance of visitors and safety information (including use of signs)	
Emergency procedures and equipment	

7. When were your current safety procedures introduced?

8. How often are your safety procedures reviewed?

C. Design and Installation

9. Please indicate the number of rides that you have bought new and the number bought second-hand:

	Number of rides bought new	**Number of rides bought second hand**
Suspended Roller Coasters		
Traditional Roller Coasters		
Wooden Roller Coasters		
Other Thrill Rides (not Roller Coasters)		
Water Splash Rides		
Dark Rides with Audio Visual Effects		
Kiddie Rides		
Other, including Family Rides		

10. For new rides, do you specify minimum design requirements? If yes, please provide details.

11. Do you require the same minimum design requirements for second-hand rides? If no, please provide details of the different requirements.

12 Do you require the people installing the rides to meet certain standards or requirements? If yes, please provide details.

13. Do you require an independent inspection/verification of the ride, new or second-hand, at any stage in the design and installation process that has additional costs for your company (in addition to that which you pay to the manufacturer)?

Yes ☐ No ☐

If yes, please indicate at which stage you require additional inspection/verification, and the approximate costs to your company of this:

Type of Ride	**Design**	**Assessment of conformity to design**	**Initial testing**	**Installation**	**Other**
Suspended Roller Coasters					
Traditional Roller Coasters					
Wooden Roller Coasters					
Other Thrill Rides (not Roller Coasters)					
Water Splash Rides					
Dark Rides with Audio Visual Effects					
Kiddie Rides					
Other, including Family Rides					

D. Operation and Use of Equipment

14 How many people are required to operate and/or supervise each type of ride?

Type of Ride	**Number of operating staff per ride**	**Number of supervising staff per ride**
Suspended Roller Coasters		
Traditional Roller Coasters		
Wooden Roller Coasters		

Other Thrill Rides (not Roller Coasters)		
Water Splash Rides		
Dark Rides with Audio Visual Effects		
Kiddie Rides		
Other, including Family Rides		

15. What are the minimum age requirements of operating and supervising staff?

Operating Staff	Supervising Staff

16. What is the average hourly rate of operating and supervising staff?

Operating Staff	Supervising Staff

17. What are the minimum qualification/training requirements for operating and supervising staff?

Operating Staff	Supervising Staff

18. Does your company provide any of this training? If yes, please indicate the time required and/or cost of providing this training, per person?

Operating Staff	Supervising Staff

E. Maintenance and Inspection of Equipment

19. Are your rides checked daily (or more frequently) by your own staff, what qualifications or training do these staff have, and what is the cost (in time or money) of carrying out these checks?

Type of Ride	Frequency of checks	Qualification or training of checking staff	Cost to your company
Suspended Roller Coasters			
Traditional Roller Coasters			
Wooden Roller Coasters			

Other Thrill Rides (not Roller Coasters)			
Water Splash Rides			
Dark Rides with Audio Visual Effects			
Kiddie Rides			
Other, including Family Rides			

20. How often is routine maintenance carried out by your maintenance staff, what qualifications or training do these staff have, and what is the cost (in time or money) of carrying out routine maintenance?

Type of Ride	**Frequency of maintenance**	**Qualification or training of maintenance staff**	**Cost to your company**
Suspended Roller Coasters			
Traditional Roller Coasters			
Wooden Roller Coasters			
Other Thrill Rides (not Roller Coasters)			
Water Splash Rides			
Dark Rides with Audio Visual Effects			
Kiddie Rides			
Other, including Family Rides			

21. How often are your rides inspected by external organisations, which organisation carries out these inspections, and what is the cost (in time or money) of carrying out these inspections?

Type of Ride	**Frequency of inspection**	**Inspecting Organisation**	**Cost to your company**
Suspended Roller Coasters			
Traditional Roller Coasters			
Wooden Roller Coasters			
Other Thrill Rides (not Roller Coasters)			
Water Splash Rides			
Dark Rides with Audio Visual Effects			
Kiddie Rides			
Other, including Family Rides			

F. Training of Personnel

22. Please indicate which of the following aspects your employees receive initial training (when first employed) and refresher training on, and the frequency of refresher training?

	Initial training	**Refresher training**	**Frequency of refresher training**
General health and safety knowledge			
Site safety			
Dealing with visitors who misbehave			
Dealing with defects and malfunctions			
Reporting procedures for accidents/incidents			
Emergency procedures			
Weather conditions			
Safe operation of attraction(s) to be used			
Safe loading/unloading of rides			
Details of passenger restrictions			
Safe waiting/viewing places for intending passengers and spectators			
Use of passenger containment system			

G. Guidance of Visitors and Safety Information

23. How are restrictions (for example, age, height, weight, health and behaviour restrictions) and other safety information communicated to your visitors, and what cost is associated with providing this information?

Method	**Used?**	**Cost per park**
Leaflets		
Website		
Signs on site		
By supervising staff		

H. Emergency Procedures

24. Do you have an emergency plan in place?

Yes ☐ No ☐

If yes, please provide details of the time and costs involved in developing this plan.

I. Accidents and Incidents

25. Are you required to report any accidents or incidents to the following organisations?

Organisation	Yes/No	If yes, please provide details
Manufacturers		
Local authorities		
National authorities		
Trade association		

26. Please provide data on any non-fatal accidents/injuries that have occurred in your parks in the last five years (if available).

Name of Park	1999	2000	2001	2002	2003

27. Please indicate the (approximate) distribution of these injuries by the types of ride:

Type of Ride	1999	2000	2001	2002	2003
Suspended Roller Coasters					
Traditional Roller Coasters					
Wooden Roller Coasters					
Other Thrill Rides (not Roller Coasters)					
Water Splash Rides					
Dark Rides with Audio Visual Effects					
Kiddie Rides					
Other, including Family Rides					
Within park, but not related to any specific ride					

28. Please provide details of any fatal accidents which have occurred in your parks in the last ten years.

29. We are very interested to receive details of situations where the adoption of safety measures, as discussed above, have lead to a reduction in accidents and injuries. If you have any examples please provide brief details below, and we will follow these up at a later date.

30. **We would be grateful if you could send us any documents that detail your safety procedures, in English where available, and any other documents or reports that you consider may be useful to this study.**

31. Finally, if you feel we have missed anything important, please add any comments you wish to make below.

Thank you for your assistance.

Please return your completed questionnaire to:

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ANNEX 4: UK – HSG175 FAIRGROUNDS AND AMUSEMENT PARKS: GUIDANCE ON SAFE PRACTICE

A4.1 Background to Non-regulatory Measure

It is recognised that the hazards associated with fairgrounds and amusement parks have increased as amusement rides have evolved, and the occurrence of accidents has provided the incentive to improve the safety record of the industry. British requirements covering the safety of amusement rides and structures are detailed in Health & Safety Executive[13] (HSE) Codes and Guidance documents. These documents are prepared by a Fairgrounds[14] Joint Advisory Committee (FJAC), which comprises representatives of the industry associations connected with the operation and certification of amusement rides and attractions. Once adopted, the documents are applicable to the whole of the industry and, although they cannot be directly enforced in law, they are enforced by industry representatives and HSE as best practice (Fawcett, 2003). Over the past 30 years a variety of laws and codes have been introduced, and the main ones are listed in Box A4.1 below.

Box A4.1: Key Events Addressing the Safety of Amusement Rides and Attractions in the UK

- The ***Health and Safety at Work etc Act 1974*** clarified the obligations on designers, manufacturers, importers and suppliers of articles (e.g. machines and equipment) for use at work (Law).
- A particularly bad accident (killing six children in 1973) led to the introduction of *Guide to Safety at Fairs* in 1976 (pre-dating the HSE, it was produced by the Home Office, a Government department, and used as guidance by individual companies and industry associations and included independent inspection and certification).
- A **Fairgrounds Joint Advisory Committee** (FJAC) was set up by industry and HSE.
- *A Code of Safe Practice at Fairs* was introduced in 1984 (HSE Code of Practice).
- **Various Guidance Notes relating to particular types of Amusement Device** have been published since then (HSE Guidance).
- The ***Consumer Protection Act 1987***, amending the Health and Safety at Work Act, made specific mention of additional duties imposed on designers, manufacturers, importers and suppliers of articles of fairground equipment (Law).
- In 1988, ***A Code of Safe Practice at Fairs: Technical Annex*** was introduced to provide a more detailed technical interpretation of the Code (HSE Code of Practice).
- *Fairgrounds and Amusement Parks: A Code of Safe Practice*, a revised version of *A Code of Safe Practice at Fairs*, was published in 1992 (HSE Code of Practice).
- ***Fairgrounds and Amusement Parks – Guidance on Safe Practice*** is the current publication, published in October 1997 (HSE Guidance).
- Entertainment Sheet No. 8 ***The Amusement Devices Inspection Procedures Scheme (ADIPS)*** was launched in September 1999.
- The first edition of ***Safety of Amusement Devices – Advice on Design*** published in January 2003, will provide a partial replacement for *A Code of Safe Practice at Fairs: Technical Annex*.

Source: Fawcett (2003)
*Note: Those in **bold** represent current documents.*

[13] The Health & Safety Executive is a Government agency.

[14] UK sources tend to refer to fairgrounds when they actually mean fairgrounds and amusement parks (as defined by this study). Although this has been corrected where possible, we have not changed names and titles.

The Fairgrounds Joint Advisory Committee (FJAC) has been in existence for over 20 years. Its aims are to:

- promote health, safety and welfare of employees and members of the public in the fairgrounds and amusement parks industry;
- help prevent all accidents and especially fatal or serious ones;
- discuss investigated incidents in order to identify key issues;
- initiate research into accident causation; and
- prepare guidance documents.

Membership consists of:

- the Health & Safety Executive (HSE);
- the Amusement Catering Equipment Society (AECS);
- the British Amusement Catering Trades Association (BACTA);
- the British Association of Leisure Parks and Piers (BALPPA);
- the National Association for Leisure Industry Certification (NAFLIC);
- the Showmen's Guild of Great Britain (SGGB);
- the Society of Independent Roundabout Proprietors (SIRP); and
- the Association of Independent Showmen (AIS).

Previously, one consumer representative with links to the British Standards Institution was also represented on the FJAC, but this person has changed jobs and currently no consumer representative is present on the FJAC.

The industry association for amusement and theme parks is the British Association of Leisure Parks, Piers and Attractions (BALPPA). Most parks in the UK are members of this association, totalling 120. A key role for BALPPA is lobbying MPs and Government departments over new legislation, and BALPPA is a founder member of Europarks, which exists to lobby the European Parliament and Commission (Roberts, 2001).

The industry associations representing fairground ride controllers are the SGGB; SIRP; AIS; and ACES. The SGGB is the largest of these, with 98% of operators in the travelling fair industry as members (Fitzgerald, 2003). These total about 5,000 members controlling around 6,000 rides, although not all members are active ride controllers (Roberts, 2001).

HSG175 Fairgrounds and Amusement Parks: Guidance on Safe Practice was published in 1997 and is the current guidance document and the focus of this case study. It sets out "*…what the FJAC considers are the appropriate measures for those involved and others in the industry to work safely and comply with the law*."

A review of fairground safety (the Roberts Review) was commissioned in 2000 following a cluster of fatalities to members of the public on amusement rides (Roberts, 2001). After a period of 3 years without any such deaths, there were 6 within 11 months. The review concluded that there was a fit for purpose legal framework but that there were small pockets of non-compliance that should be targeted to strengthen the existing regime (HSC, 2003). A number of recommendations were made which are discussed, where relevant, below.

It is of note that HSG175 is due to be revised in the near future. It is unlikely that this will change the fundamental aspects of safety management; it is more likely to be a case of updating references to regulations and amending the current document where inconsistencies have been identified.

This case study is supported by information from consultation responses from fourteen amusement parks as well as discussion with key stakeholders.

A4.2 Overview of Safety Management

Although ride controllers are in principle free to ensure the safety of rides by means other than compliance with HSG175, in practice they need to follow it closely (Roberts, 2001). It is supported in this respect by:

- agreement, adoption and support by all the industry associations, who make compliance a condition of membership;
- the requirements of health and safety law; and
- examples of enforcement action by HSE based on the law and guidance.

In 1999, the Amusement Devices Inspection Procedures Scheme (ADIPS) was established. This framework was developed to support HSG175 because of the importance of inspection in ensuring the safety of amusement rides (HSE, 1999). The scheme covers:

- the four types of inspection required for amusement rides;
- documentation required by amusement ride operators;
- registration and administrative control of appropriately qualified inspection bodies; and
- inspections required for coin-operated children's amusement rides.

The following forms and documents are in use:

- Report of design review;
- Report of assessment of conformity to design;
- Report of initial test;
- In-service Inspection Report;
- Declaration of Operational Compliance (DOC);
- Operations Manual; and
- Report of Urgent Defect.

There are 29 registered independent inspection bodies, all of which are NAFLIC members, which cover about 6,000 amusement rides. These inspection bodies provide a commercial service, undertaking the four types of inspection required by ADIPS. However, it is of note that as the system is voluntary and there is no legal requirement for ride controllers to hire a registered inspection body (Hatchett, 2002).

In April 2002, the National Fairgrounds Inspection Team (NFIT) was established as a section within HSE (Brown, 2003), and is thus a Government-funded body. The NFIT

plays a key role in dealing with non-compliance and is currently a 65-person team (HSE, pers. comm.) which examines matters like passenger restraints, ride supervision, electrical safety and maintenance. It aims to ensure compliance with health and safety law and improves safety, by carrying out planned and reactive visits, including examination of registered bodies (Hatchett, 2003). Inspectors are located at HSE offices throughout the country but are not dedicated full time to the team, carrying out their NFIT work as part of their normal range of work (Brown, 2003).

A4.3 Technical Issues Related to Design and Installation of Equipment

The product safety requirements of the Health and Safety at Work (HSW) Act apply to the safety of rides manufactured, imported or supplied for use at work whether new or second-hand. However, there are no agreed standards applicable specifically to the design of fairground rides for use in the UK. Instead, there general standards relating to issues such as stability and electrical safety guidance; some guidance in HSG175, supplemented by a Technical Annex on *Advice for Design*; and the new CEN standard (Fawcett, 2003).

As there is a variety of supply routes for obtaining amusement rides, it is seldom possible for HSE to regulate rides at the point of manufacture or sale. Instead, control is exercised under the independent pre-use inspections of rides required by ADIPS. HSG175 states that design should be undertaken by suitably qualified and experienced designers. Designers are responsible for drawing up the safety requirement specification within the design specification and three types of pre-use inspections (and associated reports) are required (Fawcett, 2003):

- ***design review*** – appraisal of a design by an inspection body to determine the adequacy of a design specification and the assumptions on which it is based (with an alternative Maturity of Design process for existing rides with a good safety record) supported by a Report of Design Review;

- ***assessment of conformity to design*** – a check carried out by an inspection body to check the ride is constructed to the design specification, supported by a Report of Assessment of Conformity to Design; and

- ***initial test*** – verification and test procedure by an inspection body to check the adequacy of the initial test in relation to the design specification, and operating instructions contained in the operations manual, supported by a Report of Initial Test. This is required before first use in the UK, before reuse after any safety-critical modification or before first use of a device installed at a fixed site.

Although other legislation exists (e.g. The Provision and Use of Work Equipment Regulations 1998, The Lifting Operations and Lifting Equipment Regulations 1998, and The Pressure Systems Regulations 2000), the requirements for a design review and for an assessment of conformity to design, as required under the ADIPS guidance, are more stringent than the law. This is considered to be particularly relevant and necessary for rides; because they are not mass produced and the industry relies heavily on novelty and innovation (Roberts, 2001).

In the case of coin-operated children's ride, an initial test report and instruction manual are sufficient. In addition, HSG175 requires that a thorough examination of second-hand equipment is undertaken, even if it appears to have a current certificate. However, HSG175 notes that reports of design review may not be available or needed for older attractions where the design has been proven through many years of safe operation.

Amusement ride inspection and testing tends to be of a bespoke nature as many rides are one-offs. As the sophistication of ride designs increases, design reviewers and ride inspectors need to be more versatile and more acutely aware of longer term effects such as stress that may be revealed after several years of operation. Roberts (2001) reports that the number of design and in-service defects identified by registered inspection bodies each year is in the tens of thousands. It is of note that all parks responding to the consultation undertake the tests required.

The Roberts Review (2001) recommended putting in place specific guidance on design, which was subsequently published in 2003. Furthermore, Roberts suggested that work should be undertaken to establish a model and guidance for design to take account of the behaviour of younger children; and that the industry and HSE should actively support efforts to establish international standards. Although the CEN standard, which includes design requirements, has now been adopted, it is not fully supported by all industry stakeholders.

A4.4 Operation and Use of Equipment

With regard to operation and use of equipment, HSG175 requires the following:

- each ride must have an Operations Manual;
- the minimum number of attendants needed for safe operation must be on duty, but it does not specify the actual numbers required as this is deemed to be related to the complexity of the ride; and
- only people aged 18 or older are allowed to operate rides, except for simple slow moving rides designed for use by children, for which operators should be at least 16 years old.

Four of the parks responding to the consultation indicated that they have 16 year olds operating kiddie rides; however two other parks have also indicated that the minimum age for operating staff is 16, without specifying which rides they may operate. All the responding parks require other operating staff to be over 18 years old, and one park places a further requirement on roller coaster operators, who must be over 21. However, parks have different requirements for supervising staff, which is not specified by HSG175 beyond the above requirements, and the minimum age requirement may be 18, 20, 21, or 25.

HSE suggest that the quality of documentation is often quite poor, particularly for travelling fairs (this is supported by Table A5.1), due to a reliance on foreign rides where the operating manual may be in a foreign language. This has knock-on effects on the quality of training and maintenance. Thus, HSE are focusing on improving the quality of documentation as a priority.

A4.5 Maintenance and Inspections of Equipment

HSG175 indicates that daily checks should be carried out by the park operator when an attraction is in daily use by the public. This should include at least one trial operating cycle, and requires that the person doing the daily check is sufficiently trained and experienced to do so.

Regular maintenance is also to be carried out by or on behalf of the park/fairground operator, by people trained or experienced in the procedures appropriate for that equipment. ADIPS (and thus HSG175) also requires a fourth type of inspection:

- ***in-service inspection*** – a periodic check (this is at 14 month maximum intervals unless otherwise specified) on fitness for further use, which may include procedures, tests and examinations. Successful completion of each periodic inspection leads to the issue of a Declaration of Operational Compliance (DOC).

An in-service inspection should be undertaken by an appointed inspection body to decide whether a ride may continue to be operated for a specified period of time. It includes visual inspection, non-destructive testing (NDT) of safety critical components and functional tests of safety-related systems (Roberts, 2001). HSG175 requires that every ride is subject to a thorough examination at least annually (although up to 14 months is allowed to provide flexibility), or within any shorter period specified by the manufacturer or appointed inspection body.

ADIPS further specifies that records of all inspections should be contained in the Operations Manual for each ride, and a new DOC should not be issued unless this manual is in place and contains records of inspections. A levy of £20 is applied to the issue of each DOC and the levy and a copy of the DOC has to be returned to the ADIPS DOC Bureau which maintains a database of all DOCs issued. Following receipt of the DOC and levy, the Bureau issues a sticker which must be displayed on the amusement device (Fawcett, 2003 and HSC, 2003). It is of note that this requirement has been initiated as a direct response to the Roberts Review.

The consultation responses on this safety aspect are variable, making comparisons more difficult. Certainly all parks undertake daily checks, generally by internal staff, where this may be a qualified engineer, or a member of staff who has received the in-house training. The costs of these checks are generally minimal.

Routine maintenance may often be undertaken weekly, monthly, or continuously. Two parks which only operate kiddie rides undertake maintenance activities "as required". Maintenance activities are more likely to be undertaken by a qualified engineer, and thus the costs are more substantial as this will relate to wage costs. One park, with 34 rides, has indicated that the wages for maintenance staff are €300,000 per year, giving an average of €8,800 maintenance costs per ride per year (excluding spare parts).

All parks undertake annual inspections, as required by HSG175, and these are conducted by ADIPS approved inspectors. These annual inspections would appear to cost in the region of a few thousand Euro and will obviously depend on the complexity of the rides to be inspected.

Consultation undertaken by Roberts (2001) suggests that some ride controllers tend to rely too heavily on annual inspection under ADIPS and not enough effective maintenance throughout the year. Roberts therefore concludes that the importance of regular maintenance needs to be stressed, and recommends that this should be covered explicitly in new measures to build awareness and diligent compliance. Specific guidance on inspection, also recommended by Roberts (2001), is under development by ADIPS.

A4.6 Qualifications and Training of Personnel

A4.6.1 Ride Controllers and Operators

Neither HSG175 nor ADIPS specify particular requirements for competence or quality systems with respect to ride controllers, operators or assistants, other than for the welding of safety critical component details. The only requirement of HSG175 is that controllers of parks/fairs should ensure that employees are competent and that this involves employee selection, training, monitoring and keeping records. The following aspects are required to form part of an employee's training/induction:

- general health and safety knowledge;
- site safety;
- dealing with visitors who misbehave;
- dealing with defects and malfunctions;
- reporting procedures for accidents/incidents;
- emergency procedures;
- weather conditions;
- safe operation of attraction(s) to be used;
- safe loading/unloading of rides;
- details of passenger restrictions;
- safe waiting/viewing places for intending passengers and spectators; and
- use of passenger containment system.

Most respondents indicate that they provide training on all the areas required by HSG175. Those aspects that were not always covered were weather conditions, training on safe waiting/viewing places for intending passengers and spectators, or use of passenger containment systems.

All training is provided in-house, ranging from 4-30 hours training for operating staff, at an approximate cost of €26-€200 per staff member (based on hourly wage rates). In addition to this, operating staff may receive on the job training which cannot be quantified.

Supervising staff are likely to receive more in-house training than operating staff, perhaps more than twice as much (particularly where operating training is at the lower end of the scale), but they are also more likely to have had more experience before being promoted to a supervising role.

Where staff do not encounter issues on a day-to-day basis, for example, emergency procedures, refresher training is provided annually or as needed/requested.

Roberts (2001) reports that BALPPA has prepared a training programme leading to the BALPPA Certificate for Visitor Attraction Operation, and recommends that the industry associations should further consider the development of training and quality standards for members as a means of assisting in the maintenance of high standards. Fawcett (2003) suggests that questions remain as to whether there should be further specifications for competence of ride controllers and their staff, particularly in light of Roberts' (2001) recommendations, and believes that some development of training and quality standards for controllers and operators would seem likely in the future.

It should be noted that the UK trade association, BALPPA, established a National Vocational Qualification (NVQ) Level on operating mechanical rides in the mid 1990s. However, none of the responding parks mentioned this qualification in their response.

A4.6.2 Ride Inspectors

The registration of ride inspectors has been required for a number of years, and HSG175 considers that the standard EN 45004 provides an appropriate framework for inspection bodies, this requires ride inspectors to:

- have appropriate qualifications, experience and training (there are some "grandfather clauses" that do allow some existing practitioners to continue without formal qualifications if alternative evidence of competence is produced);
- belong to registered inspection bodies;
- be independent of the device concerned, i.e. independent of the designer, manufacturer or controller of the equipment; and
- make specified checks.

Most ride inspectors belong to the trade association NAFLIC, which has six main objectives in its constitution:

- to represent the interest of those organisations providing a service to the leisure industry;
- to maintain a register of member organisations agreeing to the appropriate conditions of membership and attaining adequate standards of competence;
- to agree detailed Codes of Practice to improve standards of safety and engineering excellence;
- to encourage the leisure industry to recognise the importance and benefits of agreed standards and to use the services of association members;
- to establish direct links with all external bodies associated with the design, manufacture and safe operation of amusement devices and associated equipment, on all matters relating to examination, testing and certification;
- to represent the interests of the association on all appropriate committees.

The registration of inspection bodies is a central part of ADIPS as it enables the industry to set an appropriate framework of quality standards (Fawcett, 2003). Since 2000, *Rules for the accreditation of bodies performing inspection of fairground and amusement park machinery and structures* have been in place. Registration is now much more stringent (previously reliant on self-declaration), with each Inspection Body required to compile a quality file containing details of staff qualifications, experience and other competencies,

and Roberts (2001) reports that this caused at least one IB to drop out. Inspection bodies need to register each year and a new registration number is issued accordingly (Fawcett, 2003).

However, Roberts (2001) believes that the industry-based registration scheme does not automatically correspond to independent accreditation although it shares many of the same features. Although there is some support from industry for independent accreditation there are also reservations, based on the considerable cost implications of setting up and maintaining an accreditation system without demonstrable safety benefit. Roberts notes that it may be possible to develop the existing system further, but believes that there is a strong case for such formal accreditation. Roberts concludes that, although greatly strengthened since 1999, the registration and monitoring processes are not as strong as they need to be given the critical role of ride inspectors in the safety regime. Thus, a recommendation of the Review was to introduce a scheme for the registration of ride inspectors that is independent of HSE, is administered in a way that transparently avoids any conflict of interests, and includes effective arrangements for periodic sampling of the work by individual inspectors, based on UKAS accreditation.

Roberts (2001) reports that there has been a potential shortage of registered ride inspectors for all disciplines and particularly for electrical inspections. However, industry has worked to attract new bodies into the field and it is possible that the problem of supply has decreased. The lack of training courses or formal qualifications for amusement engineering may still, though, result in constraints on recruiting sufficiently qualified inspectors.

A4.7 Guidance of Visitors and Safety Information

HSG175 requires that reasonably practicable measures are taken to identify and exclude any individuals who cannot ride safely. Prominent notices or pictograms should clearly set out restrictions, and these should be reinforced using the public address system where possible. Furthermore, HSG175 requires that attendants should give clear and appropriate instructions to passengers on their conduct and check all adjustable restraints before each ride.

Amusement parks use a variety of methods to communicate restrictions and safety information to visitors, including:

- leaflets – costing €15,000 - €60,000 per year;
- websites – little additional cost once website has been established;
- signs on site – costing €300 - €9,000 per year; and
- staff – incorporated in wage costs.

Previously, there have been no requirements to display DOC certificates, so consumers have not been able to tell which rides have been inspected in the appropriate time period. The use of stickers has been implemented to resolve this.

A4.8 Emergency Procedures and Equipment

HSG175 requires that layout and emergency procedures should be prepared by all parks or fair organisers, and that operators/organisers should also ensure that everyone has received training in emergency procedures.

The majority of consultation respondents have an emergency plan in place. This is generally established at a cost of €1,000 to €3,000 (or up to two weeks work) and then reviewed annually, at an approximate cost of €150. One park monitors their emergency plan monthly.

Surprisingly two parks, which only operate kiddie rides, do not have an emergency plan in place, and one of these parks has not trained its staff on emergency procedures.

A4.9 Actual Use of the Non-regulatory Measure by Service Providers

HSG175 and ADIPS are supported by the industry associations. Adoption of ADIPS is a condition of membership of BALPPA and Roberts (2001) states that BALPPA has promoted safety generally, and compliance with the current safety regime in particular. Action includes:

- putting time and effort into supporting the FJAC and subgroups;
- organising safety seminars;
- providing safety guidance;
- sharing information with members on accidents and incidents; and
- circulating safety information and advice, and developing training material such as the BALPPA Certificate for Safety Attraction.

Furthermore, Roberts (2001) indicates that, according to the industry, all travelling fairs operate under ADIPS, because the industry associations overseeing the organisation of fairs insist upon it. The SGGB has taken an active role in promoting safety through its regional structure, and its rules are said to contain provisions for self-policing, including powers to suspend or fine members for safety contraventions. Examples of action taken by the Guild include:

- requiring members to follow HSG175 and ADIPS;
- collating ride inspection reports by the Guild sections;
- disciplinary action against members who do not meet the standards;
- organising and paying for by special levy a one-off programme of re-inspection of 1,450 rides at a cost of €150,000, following doubts about the adequacy of some ride inspections that had been carried out.

HSE is responsible for enforcement of health and safety legislation at travelling fairs but, like other mobile industries, they are intrinsically less easy to regulate by inspection (not necessarily less safe) than fixed sites for reasons including (Roberts, 2001):

- the transient and seasonal nature of the industry;

- the practical difficulties of trying to carry out inspections as times when fairs are setting up or in operation;
- difficulties in accident investigation, with witnesses often hard to track down;
- some illiteracy in the fair community (although it is stressed that this is a question of the travelling lifestyle sometimes having made formal education difficult and not of intelligence); and
- a cultural aversion, according to some HSE inspectors, to maintaining paper records.

HSG175 applies only to amusement parks and 'fairgrounds' and this wording might be potentially misleading to controllers of small rides who might not consider themselves included. For example, there is the possibility that rides found at venues such as small private amusement sites, amusement arcades, shopping arcades, holiday camps, pub car parks, car boot sales and private parties may not follow the safety guidance. It is said that usually such rides are typically of the older, slower types. In addition, not all controllers are members of the industry associations, and as such may not be required by membership rules to implement ADIPS. Roberts (2001) suggests that one industry association found that potential applicants were deterred from joining by membership conditions requiring ADIPS certification and public liability insurance.

Roberts (2001) reports on differing estimates for the number of rides that are not operating under ADIPS at all. NAFLIC suggested that there were in excess of 1,000 machinery-type rides, situated mainly at small private sites in coastal areas, while the industry believes the number is much smaller – perhaps 100 mainly smaller and part time operators, consisting of about 1-2% of the industry who are not with in the industry associations. It is expected that non-compliance is now much lower, and nearer a couple of hundred than 1,000.

The NFIT has operational resources of around 1,200 days per year. Activities have been targeted to poor performers with a greater degree of integration and co-ordination and it is suggested that the positive outcome of this targeting has resulted in a greater level of enforcement action (HSC, 2003). Figure A5.1 indicates the number of improvement and prohibition notices issued over the past few years. It is of note that the large number of prohibition notices issued in 2002/03 relate to a particular ride for which a design defect was identified and thus all similar rides were prohibited from operating until agreed modifications were made. Table A5.1 provides further information on the reasons for the notices issued. As can be seen, there are significant differences (highlighted in grey) between reasons for notices at amusement parks and those at fairgrounds. Table A5.2 identifies the fines imposed for more serious cases of non-compliance, generally where this has resulted in an injury or a fatality.

Figure A5.1: Number of Notices Issued by HSE Inspectors

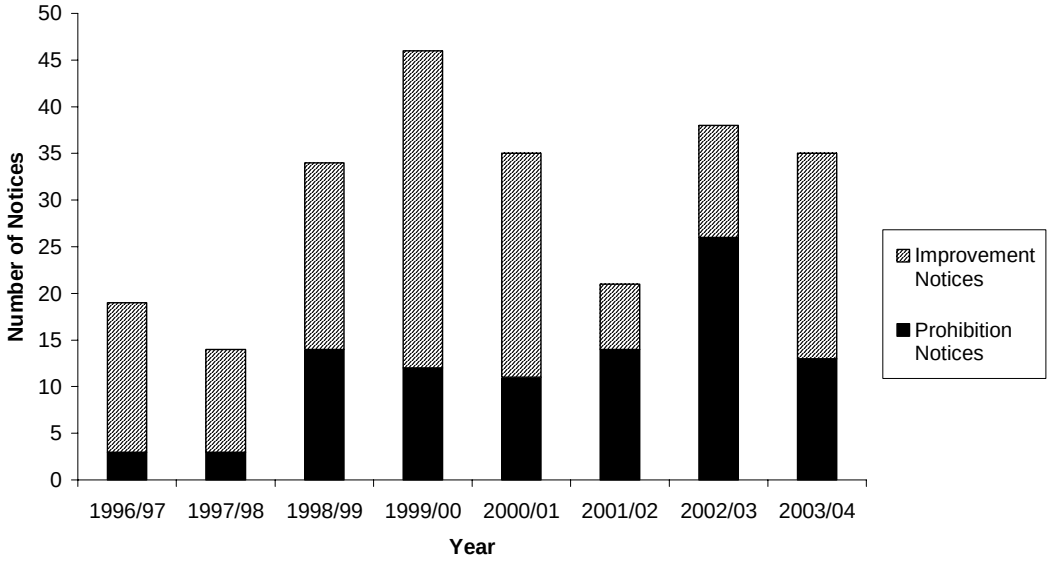

Table A4.1: Reasons for Improvement Notices (IN) and Immediate Prohibition Notices (IPN) Issued to Fairgrounds and Amusement Parks between May 2001 and July 2004

Element	Reason for Notice	Amusement Parks (%)			Fairgrounds (%)			Total
		IN	IPN	Total	IN	IPN*	Total	
Technical issues related to design and installation	Faulty design / manufacture	9	10	9	7	9 (40)	8	8
	Inadequate testing	4	5	5	7	13 (9)	10	9
Operation and use of equipment	No / inadequate risk assessment	13	10	12	11	0	6	9
	No Operations Manual	9	0	5	43	0	24	15
	Faulty / unsafe operation	17	0	9	18	30 (20)	24	16
	Inadequate passenger restraint	4	25	14	0	9 (6)	4	9
Maintenance and inspections	Inadequate maintenance	17	30	23	4	26 (17)	14	18
	Inadequate testing / examination	0	0	0	11	4 (3)	8	4
	No evidence / documentation of maintenance or testing	4	5	5	0	4 (3)	2	3
	No Declaration of Compliance	22	10	16	4	13 (9)	8	12
Qualifications and training	Inadequate training	9	0	5	7	4 (3)	6	5
Other	No Health & Safety policy	4	0	2	0	0	0	1
Total Number		**23**	**20**	**43**	**28**	**23 (35)**	**51**	**94 (106)**

* Figures in this column have been adjusted to remove the impact of the large number of prohibition notices issued for what is essentially one problem, i.e. a design defect on a particular ride. However, for comparison, the numbers in brackets include all prohibition notices.

Table A4.2: Fines Imposed for Non-compliance with HSG175					
Year	**Status of Defendant**	**Deficiency**	**Injuries**	**Description**	**Penalty**
2002	Fairground ride controller	Inadequate supervision/ lack of training	2 children (aged 18 mths and 23 mths) seriously injured	Two children thrown from ride and seriously injured. Controller of attraction had left ride with attendant who was not properly trained in its safe operation.	£500 fine £500 costs
2001	Fairground ride controller	Alleged lack of maintenance	1 adult & 2 children received minor injuries	Ghost Train car ran out of control down a slope following the failure of its drive chain. 2 of the 6 cars showed clear signs of drive chain wear.	£1,250 fine £1,250 costs
2001	Examiner	Inadequate examination	Minor injuries to a child	Case arises from an accident on a juvenile waltzer which was examined by the defendant a few months prior to one of the cars coming off.	£2,000 fine £2,000 costs
2000	Fairground ride controller	Unsafe operation		Defendant failed to ensure safety in operation of ride which was involved in an incident in which a car with three occupants in became detached from the ride.	£1,000 fine £0 costs
2000	Manufacturer	Did not provide adequate information relating to the safe use of ride	9 year old ejected from fairground ride. Major injuries.	Prosecution proposed of manufacturer of passenger cars for failed to provide adequate information relating to the use of his passenger cars so that they would be safe when used.	£15,000 fine £12,533 costs
2000	Manufacturer	No pre-use examination or testing	2 passengers seriously injured	A brand new fairground ride was supplied by the defendant without the pre-use examinations and testing required to show that the design and manufacture were safe. The passenger restraint bar was shown to be insufficiently strong and there was no restriction of operating speed.	£15,000 fine £14,197 costs
1999	Fairground ride controller	Inadequate daily inspection and vigilance during ride operation	No significant injuries	Incident during operation of Bungee Rocket fairground ride. One of the two bungee ropes failed during the ride.	£1,200 fine £3,520 costs
1999	Amusement park operator	Inadequate maintenance	Injury to head	Passenger struck on head when hinged lid that allows access to cars on ride slammed shut as she disembarked. Investigation found that collapse of the lids was a regular occurrence caused by deterioration of the supporting gas rams. There was no programme of planned preventative maintenance.	£4,500 fine £1,250 costs
1999	Amusement park operator	Inadequate maintenance		A car became detached from ride whilst carrying a family of four. Car centre pin was replaced previous year with a non-standard part of inappropriate specification, which subsequently failed.	£12,000 fine £1,354 costs
1999	Amusement park operator	Unsafe operation	8 year old sustained fatal injuries	Child fell from the rear car of the roller coaster whilst in motion. Prosecution brought for failure on part of Company to take all reasonable practicable steps to ensure safety of passengers on this ride.	£25,000 fine £140,000 costs

Roberts (2001) recommended that the implementation and enforcement of the regime should be strengthened by:

- the industry associations:
    - increasing the awareness of their members;
    - ensuing there are effective procedures to monitor full and diligent compliance by their members;

- HSE:
    - continuing to take a firm and well publicised regulatory stance, especially where this is non-compliance with the ADIPS scheme;
    - improving on the existing resource by increasing the specialisation of operational inspectors dealing with fairgrounds and maintaining continuity of expertise in the sector;
    - auditing the registered ride inspection bodies as planned; and
    - implementing improvements to the handling of ride investigations and complaints.

A4.10 Impact of Non-regulatory Measure on Safety Levels

In 2000/01, a review of fairground safety was undertaken in response to an increased numbers of fatalities at fairgrounds and amusement parks. The main concerns were (HSC, 2003):

- malpractice by one independent registered inspection body, implicated in three deaths;
- whether the 'self-regulatory' nature of the industry might permit low standards, and
- whether the sudden cluster of deaths demonstrated deterioration in control (given that the previous fatal accident to a member of the public occurred in 1995).

In 2002, Mr Nicholas Brown, the Secretary of State for Work and Pensions, stated that:

"*The Review concluded that the current regulatory regime is fit for purpose as a flexible framework for continuing to improve accident reduction. It is based on a sound framework of law and industry-specific guidance, receives high level support from the leaders of industry, and has been shown to be enforceable by the Health and Safety Executive. If it is complied with fully, competently and diligently the risks of death and injury will be minimised … Additional legislative controls remain an option should there be deterioration in compliance with the existing regime or in accidents.*"

Tilson & Butler (2001) provides a quantitative assessment of risks to the public in the UK associated with amusement rides. These attempt to update previous work, but changes in the recording of incidents makes comparison of injury statistics (and associated risk levels) difficult. Comparison of death statistics are more reliable and suggest a reduction in the risk per ride from 1 in 25 million (4.0×10^{-9}) to 1 in 83 million

(1.2×10^{-9})[15]. Tilson & Butler advise that the fatalities in 1999/00 were not statistically significant of an upward trend, a the number of fatalities are low and there were a total of 7 years in the preceding 12 year period in which no fatalities involving members of the public were recorded.

Fawcett (2003) also notes that accident data in the UK has suffered over the years from changes in definitions, particularly of 'serious accident', which makes comparisons difficult. However, he suggests that, in the first ten years following the introduction of third party inspection, 25 years ago, fatal and serious accidents seem to have approximately halved. It is believed that in-service inspection played the biggest part in this reduction in the early years.

Roberts (2001) suggests that most of the deaths in the UK associated with amusement rides (up to the year 2000) were a consequence of passengers not being contained within the ride, this being related to:

- design and maintenance of passenger containment systems;
- fatigue and failure of stressed parts; and
- ergonomic and human factors.

The main preventative measures suggested by Roberts (2001) are:

- high standards of safety by design, taking into account human factors;
- effective maintenance, especially of passenger containment devices;
- competent and diligent ride inspection under ADIPS, with particular attention to containment devices, parts subject to failure by metal fatigue and replacement of guarding; and
- effective supervision of passengers.

The NAFLIC website provides Technical Bulletins and Incident Bulletins, which enable the lessons of the UK industry to be shared nationally and internationally, and are an invaluable source of information. Roberts (2001) suggests that the willingness of industry to share information in this way is an exceptionally strong feature, particularly as the process is managed on an unpaid basis.

A4.11 Associated Costs of Non-regulatory Measure

Costs occur throughout the stages of safety management and are summarised in Table A4.3.

It is noted that these costs do not include the administration of the non-regulatory measure (although this is in part covered the DOC levy) or its promotion by HSE and trade associations, and are thus only the costs incurred by ride controllers. The costs are also based on a small number of questionnaire responses and should therefore be taken as indicative costs only.

[15] Roberts (2001) suggests that these estimates are pessimistic because they include some deaths that are not directly attributable to accidents to fee paying members of the public. However, they may have involved onlookers which, in the context of this study and the safety of services, may be relevant.

Table A4.3: Indicative Costs of HSG175 for Ride Controllers			
Safety Element		**One-off costs**	**Annual costs**
Design Review	Adult Ride	€15,000 - €37,500 per ride	N/A
	Kiddie Ride	€3,000 - €7,500 per ride	
Assessment of Conformity to Design	Adult Ride	€2,250 - €7,500 per ride	
	Kiddie Ride	€750 - €2,250 per ride	
Initial Test	Adult Ride	€1,200 - €7,500 per ride	
	Kiddie Ride	€450 - €750 per ride	
Ongoing Maintenance		N/A	€8,800 per ride
In-service Inspection	Adult Ride	N/A	€2,500 - €9,000 per ride
	Kiddie Ride		€750 per ride
DOC Levy		N/A	€30 per ride
Training		€26-€200 per staff member	
Leaflets		N/A	€15,000 - €60,000 per park
Signs on Site		N/A	€300 - €9000 per park
Emergency Procedures		€1,000 - €3,000 per park	€150 per park
Totals			
Cost for one Adult Ride, assuming 4 members of staff		€18,600 - €53,300	€11,300 - €17,800
Cost for one Kiddie Ride assuming 1 member of staff		€4,200 -€10,700	€9,600
Cost for average amusement park with 12 Adult Rides and 7 Kiddie Rides (including park-wide costs)		€253,600 - €717,500	€218,300 - €350,000
Source: Consultation Responses (2 parks and one inspection body)			

Roberts (2001) suggests that the benefits of HSG175 (and the improvements suggested by his recommendations) are increased consumer confidence, and possibly reductions in the direct costs of accidents and in the potentially huge hidden costs to the whole of the industry of bad publicity arising from preventable accidents. Furthermore, Roberts (2001) suggests that, in 2000, almost all insurance companies agreed to require compliance with ADIPS as a condition of cover.

ANNEX 5: SPAIN – GUÍA PARA UNA PRÁCTICA SEGURA (GUIDANCE ON SAFE PRACTICE)

A5.1 Background to Non-regulatory Measure

In 1999, the Asociación Española de Parques de Atracciones (AEPA) (Spanish Association of Amusement and Theme Parks) developed *Guía Para Una Práctica Segura* (*Guidance on Safe Practice)*. It is intended to provide best practice guidance that meets the existing regulations in Spain and is based on the European standard that was under development at the time the Spanish Guidance was produced.

The Guidance was adopted to coincide with the work being undertaken by the CEN TC152 group on the European standards. In addition, it was considered to be a proactive move in taking action to deal with the safety of rides in theme parks. Although there is a plethora of regulation concerning buildings, fire, and health and safety in restaurants and other services in the theme parks, the issue of the safety of rides was felt to be inadequately addressed. Furthermore, it was believed that public perception associated theme parks with travelling fairs and that any incidents in the latter could also be attributed to theme parks. Although the Guidance is intended for amusement/theme parks, AEPA have also provided copies of the guide to authorities, inspection bodies and showmen operating fairgrounds.

In 2001, after the Guidance was developed, Spain translated the draft European standard, prEN 13814, into a national standard, UNE 76601:2001 on the Safety of Equipment and Structures for Amusement Parks and Fairgrounds. The Spanish standard will be replaced once the EU standard is available and translated into Spanish. This may take a few months but no significant changes are expected (AENOR, pers. comm.).

A5.2 Overview of Safety Management

AEPA has adopted the Guidance as in-house standards so that all its member parks meet the requirements. The Guidance focuses on:

- risk management;
- dealing with manufacturers and suppliers;
- operation;
- maintenance; and
- technical inspections.

The key documents that Operators are required to keep for each ride are:

- a risk assessment;
- a maintenance and operation manual;
- an operation plan;
- a maintenance programme;
- an incident log book; and
- a daily checklist.

A5.3 Technical Issues Related to Design and Installation of Equipment

The Guidance establishes basic conditions for the design, manufacturing, supply and installation of amusement rides. As stated above, there are many building, fire and health and safety regulations that the structures and machinery must comply with. However, the Guidance also requires risk assessments to be conducted for individual attractions and the conclusions of this should be recorded. For the purposes of the risk assessment, the Designer must:

- identify the manner in which the public or staff can be injured; and
- identify the potential effects of misuse by the public, controllers or operators.

In addition, the Operator should:

- assess the risks of location, for instance, access, the surrounding area and the electricity supply;
- find a location that minimises the risks;
- identify any plan, equipment, information and necessary training to deal with emergencies;
- assess the risks of transport, assemblage, maintenance and use of rides; and
- identify the warnings and training necessary to make sure that all work undertaken is safe.

With regard to installation, instructions from the manufacturer must be followed and should be supervised by a competent body or technician that verifies that all the regulations are met (regarding electrical equipment, pressurised air, gas, fire, smoke, landscape etc.) as well as the norm adopted by the manufacturer and UNE 76601:2001.

A5.4 Operation and Use of Equipment

The Manufacturer should supply the Operator with a Manual on Maintenance and Operation. The steps to start the ride must be provided in the Operation Plan, according to the manufacturer's instructions, and this should focus on the necessary checks before starting the ride, the automatic and manual systems, sensors of failures and malfunctioning, etc. The ride operator is responsible for carrying out these checks to ensure that the ride is safe for use and will complete a checklist. The Maintenance or Operations Supervisor will then sign the daily checklist and authorise the use of the ride.

Operators of all rides, including slow kiddie rides, should be at least 18 years old whereas assistants may be 16 years old. As well training on the operation of the ride (see below), the operators should also be ready to temporarily close a ride in the event of adverse weather conditions.

A5.5 Maintenance and Inspections of Equipment

Operators are required to keep a Maintenance Programme, an incident logbook and a record of everyday compliance with the safety requirements. External inspections are

carried out by registered companies (of which there are two or three). The external inspectors must have at least five years experience, additional qualifications relating to inspections techniques and knowledge of the relevant regulations. These inspections are carried out annually; the costs of which obviously vary depending on the rides, uses and services of the park. Extraordinary checks should be carried out where mechanical parts are difficult to access for annual or periodical checks, and the time period between these extraordinary checks should not exceed 10 years.

A5.6 Qualifications and Training of Personnel

The operators of rides and their assistants must be trained in terms of the safe loading and unloading conditions and the operation and use of the rides.

There are also requirements with regard to the minimum age of operators and assistants. These are 18 and 16 depending on the type of ride use (although for the vast majority of rides the minimum age required is 18, with these including kiddie rides).

A5.7 Guidance of Visitors and Safety Information

Signs should be installed for each ride, showing any restrictions in its use by visitors. Restrictions could include for example, weight, height, age, health conditions, and carrying objects such as cameras, umbrellas, bags, etc. Visitors with disabilities should be accompanied by an assistant where necessary.

Users should use all safety equipment provided (belts, harnesses, etc). They should not use the rides under the influence of alcohol or drugs.

A5.8 Emergency Procedures and Equipment

Section C2 of the Guidance includes provision for safety procedures when the system breaks down. The operator is responsible for removing people from the ride according to the ride's Manual and its instructions for evacuation.

Although the Guide notes that evacuation should be avoided wherever possible, if it is decided that the breakdown will require some time and the passenger cars cannot be moved to the point of access, evacuation will have to be undertaken. The evacuation will be supervised and should be communicated to the Maintenance Department and the Centre for Incidents in the Park. If external help is needed, evacuation will be coordinated together with the Security Department. The assistants to the operator will also make sure that riders remain calm. If any of the riders is a person with disabilities, medical assistance should also be sought.

Other provisions included in the Guide relate to fire, weather conditions and other safety issues, such as a passenger falling, emergency stop, first aid, etc. The Operations Manual should also cover other situations such as objects being stolen or lost, children being lost, etc.

A5.9 Actual Use of the Non-regulatory Measure by Service Providers

As it is a requirement of AEPA membership to follow the guidance, there are currently nine theme parks which use the Guidance and another two which aim to join AEPA in the next year or so, if the Safety Committee of AEPA decides that they are compliant.

A5.10 Impact of Non-regulatory Measure on Safety Levels

According to AEPA, the benefits of this non-regulatory measure are believed to be the flexibility that is provided in being able to adapt to changing circumstances. However, it is not believed that the number of incidents has been significantly reduced as a result of the Guidance, as checks have been on-going since before the Guidance was published and it is suggested by AEPA that the risk of injury was already quite low. There is no requirement to report any accidents or incidents to the manufacturers, competent authorities, or AEPA, thus monitoring the effectiveness of the Guidance is difficult.

ANNEX 6: AUSTRALIA – AM-SAFE© ACCREDITATION[16]

A6.1 Background to Non-regulatory Measure

The Australian Amusement, Leisure and Recreation Association Inc (AALARA), formed in 1994, is the national body representing the amusement, leisure and recreation industry and has particular responsibilities in the areas of safety, operations and management within these industries. Its scope is much wider than that of the European associations, bringing together travelling showmen, amusement and theme parks, water parks, ride manufacturers/designers, and many others.

In Australia, State and Territory Governments are responsible for the regulation of occupational health and safety, which includes fairground and amusement equipment. Although regulations vary considerably between jurisdictions, the law generally holds ride owners responsible for the safety of people on amusement rides and devices (NERB, nd). There is also an Australian Standard, AS 3533, relating to Amusement Rides and Devices, which covers design and construction, and operation and maintenance.

AALARA's safety support programme, AM-SAFE, is an industry self-regulation initiative which was introduced in 2002. It aims to achieve best practice through appropriate training, licensing and accreditation. Risk management is seen to be an integral part of good management practice, and AM-SAFE aims to be proactive, by reducing the level of incidents and increasing efficiencies.

The scope and requirements of AM-SAFE is determined solely by the Board of AALARA, which comprises industry representatives. As a means of delivering the AM-SAFE program and to assist members with implementation, AALARA has formed AALARA Risk Management Pty Ltd, which has the sole objective of delivering appropriate AALARA endorsed risk management services to the industry.

A6.2 Overview of Safety Management

To achieve AM-SAFE Compliant Operator Accreditation, the starting point is normally the AALARA Risk Management Policies and Procedures Manual. This manual which is subject to constant update and review, contains some forty policies and procedures, including:

- Health and Safety Policy;
- Obligations and Responsibilities;
- Induction Training;
- Safe Work Instructions;
- Risk Assessment;
- Lighting and Electrical Safety; and
- First Aid.

[16] The information for this case study has been kindly provided by Mr Rod Hughes, Chief Executive Officer of AALARA Risk Management Pty Ltd, unless otherwise stated.

This Manual, which also contains numerous forms for personalisation and use in association with policies and procedures, costs approximately €400. This cost also includes general implementation advice tailored to fit the type of operation involved, but does not include a site visit. Although it is not generally necessary, further assistance is available on a fee basis.

AM-SAFE accreditation is achieved after an audit is conducted by AALARA Risk Management approved auditors. The audit consists of an on-site inspection and a review of policies and procedures in place, including staff training and records, etc. Subject to complying with the requirements, operators will then be entitled to apply to AALARA for the Accreditation certificate and the associated insignias for public display. Such accreditation provides recognition of a best practice operation.

The AM-SAFE accreditation is required to be renewed annually. Every second year, a full on-site audit is conducted, with a desk audit (where the operator needs to present documentation to prove that he has the appropriate risk assessment processes and procedures in place) being conducted in the intervening year. If the operator is found to be non-compliant his accreditation lapses; or if a random audit or incident through the year identifies non-compliance with AM-SAFE requirements, the accreditation can be cancelled mid-term.

A6.3 Technical Issues Related to Design and Installation of Equipment

Ride owners and operators relocate, assemble, check and operate their equipment in accordance with manufacturers' instructions and procedures recommended by the standard AS3533 (NERB, nd). Ensuring that operators comply with the requirements of that standard is included as part of the AM-SAFE audit.

A6.4 Maintenance and Inspections of Equipment

It is important to note that the AM-SAFE audit is an audit of best practice systems, policies and procedures rather than being an engineering audit of mechanical equipment. However, part of the AM-SAFE auditors' role is to ensure that the operators are having appropriate engineering safety checks done, that they are responding accordingly and have appropriate procedures and documentation in place with regard to checking and servicing of their equipment.

Appropriately qualified engineers can be registered on the National Professional Engineer Register (NPER) or the National Engineering Technologists Register (NETR) in the area of Amusement Rides and Devices In-service Inspection. This helps owners and operators to select qualified personnel to undertake in-service inspections (NERB, nd).

In November 2003, and following a series of accidents at amusement parks, Standards Australia released new national guidelines to improve competency levels for the inspectors and inspections of amusement rides. These were adopted by the NERB, and set out guidelines for inspectors to monitor machinery closely following the

manufacturers' specification, as well as suggestions for training, qualifications and experience for a 'competent person' (Standards Australia, 2003).

A6.5 Impact of Non-regulatory Measure on Safety Levels

As the program has only been running for two years, it is too early for AALARA to assess whether it has resulted in a reduction in the number of accidents and incidents. However, it is suggested that the safety and operating under best quality practices has become an even higher priority since the introduction of the AM-SAFE accreditation.

A6.6 Associated Costs of Non-regulatory Measure

As previously stated, the starting point is the AALARA Risk Management Policies and Procedures Manual, which costs approximately €400. The cost of the AM-SAFE accreditation is directly related to the cost involved in conducting the audit, where this is obviously related to the amount of work involved in the audit process (i.e. number of attractions, size of attractions, etc.). As an example, an audit for a mobile ride operator with three or four rides would usually cost around €1,500 (Aus $2,500), whereas an audit for a mobile ride operator with six to eight rides may cost around €2,600 (Aus $4,500). There is obviously an increase in cost as the risk exposure to be assessed increases.

The above costs are for the initial full audit. The initial desk audit cost is currently around €230 (Aus $385), and future audits after the initial version are usually approximately 20% less due to the familiarity with the operation.

As in other countries, the public liability market is very difficult in Australia, with very few companies prepared to insure amusement ride type risks. Whilst AM-SAFE accreditation does not guarantee that liability insurance will be provided in every instance, the improved risk status that AM-SAFE provides does improve the likelihood that insurance will be provided. At least one insurer has AM-SAFE accreditation as a prerequisite for insurance acceptance.

ANNEX 7: SAFERPARKS – AMUSEMENT RIDE SAFETY FACT SHEET

Official Safety Fact Sheet for

Big Theme's Jungleland Florida Big Lightening Bolt

This Amusement Ride Has Been Registered With the U.S. RIDES System

Sample Prototype - Developed by Saferparks, July 2004

Venue

Name:	Big Theme's Jungleland Florida
Location:	Orlando, FL
Type:	Amusement Park

Amusement Ride or Attraction

Name:	Big Lightening Bolt
Type:	coaster
Size:	full-sized
Owner/Operator:	Big Theme, Inc.
Manufacturer:	Arrow
Trade name:	
Make/Model/Year:	1972
Serial Nnumber:	
Date registered:	September 21, 2004

Patron Directed

Design Parameters

Ride action:	
Max speed:	40 mph
Max RPM:	
Max acceleration:	
Max time to stop:	
Ride height:	40 ft

This ride complies with the following industry standards:

Patron Restrictions and Loading Requirements

Patron limits:	Height	Weight	Age
Min (unaccompanied):	42 in		7 yr
Min (accompanied):	42 in		
Max:			

Minimum Qualifications for Rider Who Accompanies Smaller Rider:
Must be a responsible adult.

Patrons Must Have the Following Abilities to Ride Safely:

Patron Responsibilities on this Ride:

Additional Patron Restrictions, Warnings, or Information:

Loading conditions:

Restraints

Primary restraint: lap bar
Other restraints:
Do restraints fit closely against each patron?
No

Operations

Ride operated in the dark?
Minimum crew size: 5
Minimum operator age: 18 yr
Minimum operator training:
40 hours of training and testing
Do operators speak English fluently?
Yes
Is there on-site first aid?
Emergency procedure: Private emergency response crews on-site
How to report problems: To security

Public Accountability

Regulating agency: Florida Dept. of Agriculture

- Public Safety Inspections
- Public Accident Investigations

- There are inherent risks in the participation in or on any amusement ride, device, or attraction. Amusement rides, by their very nature, are physically demanding and emotionally intense.
- Patrons have a duty to exercise good judgment and act in a responsible manner while using the amusement ride, device, or attraction, and to obey all oral or written warnings, or both, during or after participation, or both.
- Amusement rides, devices, and attractions are not necessarily designed to be child-safe. Parents and guardians are warned to take extra care when choosing rides for children under ten.

Source: www.saferparks.org