

FIXED-SITE AMUSEMENT RIDE INJURY SURVEY, 2005 UPDATE

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Preface

This report presents the results of work done by the National Safety Council, Research and Statistical Services Group, under contract to the International Association of Amusement Parks and Attractions. It includes estimates by the Council for calendar years 2003 through 2005. The Council's work is an extension of, but independent of, the estimates made for 2001-2002 by Heiden Associates, which are included here for reference and reported more fully in the June/July 2003 issue of *Injury Insights* (Heiden & McGonegal, 2003).

FIXED-SITE AMUSEMENT RIDE INJURY SURVEY, 2005 UPDATE

Since 2001 the International Association of Amusement Parks and Attractions (IAAPA) has sponsored an annual survey to collect and analyze ride, attendance, and patron injury data from facilities that operate fixed-site amusement rides. The IAAPA survey was undertaken to gain perspective on fixed-site amusement ride injuries in the United States. The surveys include amusement and theme parks, tourist attractions, and family entertainment centers. The results of these surveys are presented below.

Facilities were asked to report attendance and ridership as well as the number of patron injuries. Separate attendance-based and ridership-based analyses were performed and are shown in Table 2. To be consistent with the estimates previously reported for 2001-2002, the “Survey Highlights” are shown in Table 1.

Table 1. Survey Highlights

	2001-2002	2003*	2004	2005
Number of Facilities	459	403	403	398
Estimated Annual Attendance (millions)	302.9	300.4	300.0	300.4
Estimated Annual Ridership (billions)	---	1.95	1.81	1.82
Estimated Annual Number of Ride-Related Injuries	2,486	2,044	1,637	1,783
Injuries per Million Attendance	8.2	7.0	5.2	5.2

*Changes in the estimating method beginning with 2003 affect comparability with the 2001-2002 survey.

Table 2 indicates that the ridership-based estimates of ride related injuries compared to attendance-based estimates are 70 lower in 2005 (1,713 vs. 1,783), 11 higher in 2004 (1,648 vs. 1,637), and 90 lower in 2003 (1,954 vs. 2,044). This level of agreement is good considering not all facilities were able to report both attendance and ridership and therefore there were differences in the selection of facilities used in each analysis. The distributions of injuries by ride type and severity obtained from the ridership-based estimates are very similar to the distributions obtained from the attendance-based estimates.

Table 2. Attendance-Based vs. Ridership-Based Injury Estimates, 2003-2005

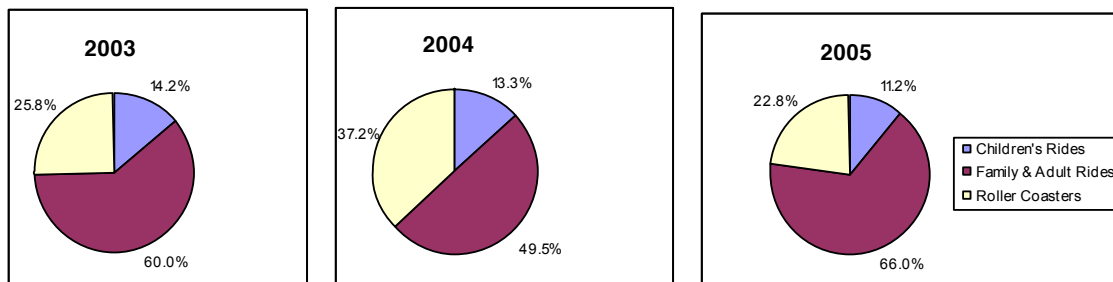
	2003	2004	2005
Attendance-Based			
Estimated Annual Number of Ride-Related Injuries	2,044	1,637	1,783
Injuries per Million Attendance	7.0	5.2	5.2
Ridership-Based			
Estimated Annual Number of Ride-Related Injuries	1,954	1,648	1,713
Injuries per Million Patron-Rides	1.0	0.9	0.9

Obviously ridership is a better measure of exposure to risk than attendance because injuries on rides is what is being analyzed. Parks with similar attendance may have much different ridership numbers because of differences in the number and kinds of amusement rides provided. The results reported below are based on the ridership analysis, which is shown in Table 3. This analysis provides additional results that were not available from the 2001-2002 survey.

- The estimated injury total is up 3.9% in 2005 compared to 2004 (1,713 vs. 1,648).
- The rate of injuries per million patron-rides remained unchanged at 0.9.
- Compared to 2003, both the estimated number of injuries and the rate in 2005 were down.
- The decrease in the injury rate per million patron-rides from 2003 to 2004 (1.0 to 0.9) is statistically significant.

As shown in Figure 1, about two thirds of the injuries in 2005 occurred on family and adult rides compared to about one half in 2004 and three fifths in 2003. Roller coasters accounted for 22.8% of the injuries in 2005 – about the same as in 2003 but down from more than one third in 2004. Injuries associated with children’s rides decreased from 14.2% in 2003 to 13.3% in 2004 and 11.2% in 2005.

Figure 1. Proportion of Injuries By Ride Type, U.S., 2003-2005



In 2005, the injury rate for family and adult rides was 1.0 per million patron-rides, compared to 0.9 for roller coasters and 0.8 for children's rides. Although similar in magnitude, the difference between the injury rate for children's rides and family and adult rides is statistically significant as is the difference between the injury rates for family and adult rides and roller coasters. However, the difference between the children's and roller coaster injury rates is not statistically significant.

About 7.7% of the injuries were reported to be "serious," which means an injury that results in immediate admission and hospitalization in excess of 24 hours for purposes other than medical observation. The remaining 92.3% were other than serious. The proportion of injuries that were serious in 2005 was less than in 2004 but more than in 2003. The rate of serious injuries per million patron-rides remained at 0.1 for all three years.

Table 3. Summary of Estimated Fixed-Site Amusement Ride-Related Injuries, U.S., 2003-2005 (based on ridership)

Characteristic	2003			2004			2005		
	Estimated Number of Injuries	Percent	Injuries per Million Patron-Rides	Estimated Number of Injuries	Percent	Injuries per Million Patron-Rides	Estimated Number of Injuries	Percent	Injuries per Million Patron-Rides
Total	1,954	100.0%	1.0	1,648	100.0%	0.9	1,713	100.0%	0.9
Children's Rides	277	14.2	1.2	219	13.3	1.0	192	11.2	0.8
Family and Adult Rides	1,173	60.1	1.0	806	49.5	0.8	1,131	66.0	1.0
Roller Coasters	504	25.8	1.0	613	37.2	1.2	390	22.8	0.9
Total	1,954	100.0%	1.0	1,648	100.0%	0.9	1,713	100.0%	0.9
Serious Injuries	106	5.4	0.1	132	8.0	0.1	132	7.7	0.1
Other Reportable Injuries	1,848	94.6	1.0	1,516	92.0	0.8	1,582	92.3	0.9

Source: National Safety Council estimates based on 2003-2005 fixed-site amusement ride injury surveys.

Note: Totals may not equal sum of parts due to rounding.

Survey Response

Of the 398 eligible facilities in 2005, 130 provided some or all of the data requested. Response was similar in 2003 and 2004. Forty-eight of Amusement Business's "Top 50 North American Parks" are in the United States. Forty-six of the 48 reported in 2005. This is a slight increase from 2003 and 2004 when 44 of the 48 reported. The respondents used in the analyses represented about 63% of the estimated total annual attendance and about 64% of estimated total rides taken at all facilities.

Data from 117 facilities were used for the 2005 attendance-based estimates compared to 124 for 2004 and 111 for 2003. Data from 90 facilities were used for the 2005 ridership-based estimates compared to 99 for 2004 and 90 for 2003. It was impractical to find a single set of facilities that reported all data (attendance, ridership, and injuries) for all years as that would have reduced the reliability of the estimates.

Differences with NEISS

National statistics on fixed-site amusement ride injuries are also available from annual reports issued by the U.S. Consumer Product Safety Commission (CPSC; e.g., Levenson, 2005). However, the IAAPA survey and the CPSC estimates are based on different definitions, data sources, and methodological approaches so direct comparisons are not appropriate.

The CPSC's annual injury estimates are derived from emergency department injury reports from about 100 of the nation's more than 5,000 hospitals that have emergency department facilities and participate in the National Electronic Injury Surveillance System (NEISS). The system is designed to track injuries that are generally distributed across the U.S. population, such as those associated with bicycling, lawn mowers, and garage doors. However, "[b]ecause fixed-site injuries occur in a relatively small number of locations, the sites of amusement and theme parks, the number of recorded injuries in NEISS depends to a large degree on the geographical closeness of the NEISS hospitals to the parks. Thus, the utility of NEISS for estimating fixed-site ride injuries may be limited" (Levenson, 2003). Nevertheless, the CPSC estimated that there were 3,400 (95% confidence interval 2,000 to 4,800) fixed-site ride injuries in 2004 that were treated in hospital emergency departments (Levenson, 2005).

2003-2005 Methodology

The National Safety Council conducted the survey using a master list of amusement/theme parks, family entertainment centers, and tourist attractions thought to have fixed-site rides. The master list was prepared in consultation with IAAPA and Amusement Industry Consulting, Inc. The survey consisted of a notification letter, a package of reporting information mailed one week later, and a follow-up postcard mailed one week after the reporting package. After the mailings, IAAPA volunteers made follow-up telephone calls and sent e-mails to IAAPA member facilities and some nonmember facilities. Injury rates based on the reporting facilities were used to estimate national totals. (See also "Survey Response" above.)

2001-2002 Methodology

In 2001 and 2002 IAAPA mailed survey questionnaires to members previously identified as having fixed-site amusement rides. IAAPA retained Heiden Associates, Washington, DC, to analyze the survey results. Using the IAAPA survey results and other data, Heiden Associates estimated the number of U.S. facilities with one or more fixed-site amusement rides and the injury totals and rates.

References

- Heiden, E.J., & McGonegal, S. (2003). 2001-2002 fixed-site amusement ride injury survey analysis. *Injury Insights*, June/July 2003.
- Levenson, M.S. (2003). *Amusement ride-related injuries and deaths in the United States: 2003 update*. Bethesda, MD: U.S. Consumer Product Safety Commission.
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