DOCUMENT RESUME

ED 394 648 PS 023 985

AUTHOR Frost, Joe L.; Sweeney, Theodora B.
TITLE Cause and Prevention of Playground Injuries and Litigation; Case Studies.
PUB DATE 95
NOTE 24p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Age Differences; Case Studies; *Children; *Court Litigation; Death; *Injuries; *Playgrounds; *Safety; Sex Differences; Standards
IDENTIFIERS American Society for Testing and Materials; Consumer Product Safety Commission

ABSTRACT

This study examined 187 playground injuries and 13 fatalities that resulted in lawsuits between 1981 and 1995, taken from the files of two expert witnesses on playground safety who testified in the cases. The data are presented by geographic location, nature of injuries, cause of injuries/fatalities, playground equipment implicated, location of injury/fatality, age of children, gender of children, and violations of safety specifications. Eighty-one percent of the cases in the study were settled out of court, 9 percent went to trial, and 10 percent are in progress. An analysis of the case indicates that playground lawsuits are growing rapidly in the United States, that most cases involve serious or fatal injuries, and that most injuries are due to falls from common playground equipment, such as slides, swings, climbers, merry-go-rounds, horizontal ladders, and fire poles. The study recommends that schools, day care facilities, and other entities with playground facilities follow closely the specifications and standards set forth by the Consumer Product Safety Commission (CPSC) and the American Society for Testing and Materials (ASTM) in order to avoid injuries and costly litigation. (Contains 8 references, a list of recommended resources, and 11 figures.) (MDM)

CAUSE AND PREVENTION OF PLAYGROUND INJURIES AND LITIGATION; CASE STUDIES

Joe L. Frost
Parker Centennial Professor
University of Texas at Austin
and
Theodora B. Sweeney
Private Consultant
Plainsboro, New Jersey

This is a study of 187 playground injuries and 13 fatalities resulting in lawsuits between 1981 and 1995. The data were taken from the files of Joe Frost (82 cases) and Theodora Sweeney (108 cases) who served as expert witnesses in the cases. Both are consultants on playground safety, not on legal issues, and the paper is written from playground safety perspectives.

Publication of playground injury/fatality data from litigation is valuable because over 90 per cent of the lawsuits settle out of court and the records are not accessible to the public. The information provided to experts by attorneys is extensive, including answers to interrogatories, responses to requests for production, depositions, police reports, hospital records, design, installation, supervision and maintenance records, and on-site inspection of accident/fatality sites, including implicated equipment. Consequently, the breadth of information for each case is far more extensive than from any other source, including the National Electronic Injury Surveillance System (NEISS) which collects playground equipment injury data and other consumer product related injury data from a nationwide sampling of hospital emergency rooms.

The data will be presented by geographical location (state) of litigation, nature of injuries, causes of injuries/fatalities, playground equipment implicated, location of injury/fatality, age of injured children, gender of children, and violations of Consumer Product Safety Commission's (CPSC) Handbook for Public Playground Safety (1981; 1991; 1994) and/or American Society for Testing and Materials' Standard Consumer Safety Performance Specification for Playground Equipment for Public Use (1993). Discussion and commentary will include both analysis of data and reflections from the

experience of the writers. No individuals, agencies, corporations or litigants will be identified.

States

The injuries/fatalities and resulting litigation represented in this study occurred in 38 states and the District of Columbia, with the most frequent being Texas (25 cases), Florida (17), Ohio (15), Minnesota (13), Louisiana (11), New York (10), California (9), Indiana (9), and Missouri (9), with others ranging from one to seven cases each. Playground injury litigation is widespread with every U.S. geographical area, including Hawaii, Alaska, and the District of Columbia, represented (Figure 1).

(INSERT FIGURE 1 ABOUT HERE)

Nature of Injuries

With few exceptions, the injuries resulting in litigation were serious, most bearing permanent effects. Consequently, it is not surprising to see that about 40 per cent (75) of the 190 cases were head injuries. Most of these were closed head injuries, many resulting in permanent impairment of physical/mental functions. Injuries to extremities (arms and legs) accounted for 42 per cent or 80 of 190 injuries. Many of these injuries resulted in permanent impairment of growth and/or mobility of the injured extremity, particularly those affecting wrists, elbows, and knees. Thirteen of the 190 injuries were fatal. The remaining injuries were internal, back, digit, burn and cut injuries, no one category exceeding 11 injuries. Head, arm and leg injuries are clearly the dominant type leading to litigation. Figure 2 shows overall agreement or consistency in types of injuries between the Frost and Sweeney data despite their distant geographical states of residence (Frost in Texas; Sweeney in New Jersey).

(INSERT FIGURE 2 ABOUT HERE)

Cause of Injuries and Fatalities

The leading cause of injuries, 113 of 190 cases, or almost 60 per cent, was falling onto hard ground surfaces - concrete, asphalt or hard-packed earth. Falling onto equipment accounted for an additional 21 cases (11 per cent) with a total of 71 per cent of all injuries resulting from falls onto hard surfaces or materials. Entrapments, shearing mechanisms, heavy, battering ram type swings, protrusions and open S-hooks caused an additional 41 injuries (22 per cent) and a variety of factors accounted for the remaining 15 injuries (seven per cent).

(INSERT FIGURE 3 ABOUT HERE)

The injuries to thirteen children were fatal (Figure 4). Six children were asphyxiated - two resulted from entrapment in equipment, one was hanged on a jump rope attached to a deck railing, two choked from clothing entangled on slides, and one from a coat cord entangled on a slide. Five of these children were two or three-year-olds and one was six. A two-year-old and a five-year-old died after being struck by swings. A two- year-old child's head struck a concrete culvert and a six-year-old fell off a jungle gym onto a hard surface. One child, age nine, died when hit by a motorcycle on an unfenced playground, and a four-year-old wandered from an unfenced playground into the path of a car. An eleven-year-old died after falling on a rocky playground while playing football. Four of the fatalities occurred at child care centers, three at public schools, three at apartment complexes, two at public parks and one in a back yard. The thirteen fatalities were spread geographically across eleven states from Montana to New York to Georgia to California.

(INSERT FIGURE 4 ABOUT HERE)

Equipment Involved in Injuries

The equipment most frequently involved in injuries was slides (38 cases) and swings (38 cases). Together these accounted for 76 cases or 42 per cent of total injuries. Following in order of involvement were climbers (24 cases), merry-go-rounds (16), horizontal ladders (14), fire poles (8), superstructures (7), chinning bars (6), and jungle gyms (6). Three national surveys sponsored by the American Alliance for Health, Physical Recreation, Recreation, and Dance (AAHPERD) (Bruya and Langendorfer, 1988; Thompson and Bowers, 1989; Wortham and Frost, 1990), concluded that the three types of equipment most frequently involved in injuries - slides, swings, and climbers - are also the three types most frequently found on playgrounds . Most injuries were caused by falling onto hard surfaces and resulted from faulty design of equipment. Failure to install and/or maintain resilient surfacing in fall zones was the most common direct cause of injury to children.

In twenty-nine of the 38 cases in which slides were involved in injuries, the child fell onto a hard surface (concrete, asphalt or hard packed earth). Protective railings were faulty or missing in at least four cases and two slides collapsed while in use. Contact with equipment (catching ring on bolts,

cut by sharp metal) accounted for two cases. In two cases, clothing was entangled in slides, leading to death. About half of the swing-related injuries resulted from being hit by the swing (heavy, animal type swings accounted for the most serious injuries), and about one-third from falling out of the swing onto hard surfaces. Two children hit their heads on swing supports, one was hanged on an open S-hook, and seats, chains or S-hooks collapsed in five instances.

Collectively, climbers, horizontal ladders, fire poles, superstructures, chinning bars, and jungle-gyms were involved in 65 (34 per cent) of the 190 injuries/fatalities. Most injuries resulted from falling onto hard surfaces with a few involving striking equipment in falls. Children standing or walking on top of climber rungs (e.g., horizontal ladder rungs) was particularly hazardous. A common factor involved in injuries was excessive height of equipment (particularly horizontal ladders, concealed (usually by dirt or sand) concrete footings at the base of fire poles and lack of protective hand loops or guardrails at or near entrys and exits to play events.

Most of the merry-go-rounds involved in injuries were old, open-base devices or those with exposed shearing mechanisms. Twelve of the children were injured by shearing/crushing mechanisms and four were struck by equipment. The remaining injuries involved a range of equipment with one to five injuries per item (Figure 5).

(INSERT FIGURE 5 ABOUT HERE)

Location of Injuries

Consistent with the findings from the AAHPERD national surveys of playgrounds that identified public school playgrounds as the most hazardous among three major groups - public schools, public parks, child care centers - public school playgrounds were also the most common sites of injuries leading to lawsuits. Seventy of the 190 cases (37 per cent) involved public schools, 48 involved public parks, 25 were at child care centers, 15 at fast food restaurants, 13 at back yards, seven at apartment complexes and the remaining scattered among camps, drive-in theatres, state parks, state schools, zoos, swim clubs, retail stores, private schools, and theme parks (Table 6).

(INSERT FIGURE 6 ABOUT HERE)

Ages and Gender of Children

The two- to eight-year old age range accounted for 137 of the 190 injuries/fatalities or 72 per cent of all injuries. Five- and six-year-olds were

the ages most frequently injured, with 26 cases for fives and 26 for sixes (Figure 7). The two- to eight-year-old range is designated the early childhood period by educators and is characterized by rapid mental, social and physical development. The frequency of playground injuries for this age range is probably due to several factors, including immaturity of logical reasoning, (including cause-effect thinking), immature physical skills, extensive time allocated to play on playgrounds at child care centers, preschools, kindergartens and primary schools, and, of course, hazardous playgrounds. As children grow into the primary grades, cognitive and motor skills become more refined and time previously spent on playgrounds is increasingly allocated to organized games that do not involve playground equipment.

(INSERT FIGURE 7 ABOUT HERE)

Consistent with other studies (INSERT) boys were more frequently injured than girls with 57 per cent of all injuries for boys versus 43 per cent for girls (Figure 8). Injuries to boys were also more likely to be fatal than were injuries to girls. There were 13 fatalities - nine boys and four girls.

(INSERT FIGURE 8 ABOUT HERE)

CPSC/ASTM Violations

Perhaps the most compelling finding in this study was the ratio of CPSC/ASTM (CPSC, 1991; ASTM, 1993) violations to "no violations." Ninety-four per cent or 179 of the 190 injuries/fatalities involved violations (Figures 9, 10). Failure to install and/or maintain resilient surfacing under and around equipment dominated the results with 53 per cent or 101 of the 190 cases. Asphalt, concrete and hard packed earth in fall zones accounted for virtually all of the surfaces causing injuries. Protrusions, shearing mechanisms and head entrapment violations followed in order of frequency - to least - with a wide range of violations accounting for fewer than five violations each.

Disposition of Litigation

Eighty-one per cent of the cases in this study were settled out of court, nine per cent went to trial and 10 per cent are in progress. Overall, about 90 per cent of cases settle out of court (most or all of the 10 per cent of cases still in progress are expected to settle). Litigation on playground injuries is rarely settled quickly. Lawsuits are usually active for two to three years before an out-of-court settlement is reached or the case goes to trial. Defendants' attorneys usually bill an hourly rate and may prefer lengthy litigation. A

great deal of energy, time, and money are expended as attorneys negotiate offers and counter-offers in attempting to reach a pre-trial settlement that eliminates the risk of "no award" (plaintiffs) or very large awards (defendants). In very serious injury cases, e.g., brain damage, litigation may be delayed several years until the injured child has developed sufficiently to determine the long-term effects of the injury.

Conclusions

Based on this analysis of 190 playground inuries and resulting 190 lawsuits, the following conclusions or patterns emerge. Playground lawsuits are growing rapidly in frequency throughout the United States. Practically all the litigation involves very serious injuries ranging from fractured limbs to brain damage and death. The causes of injuries in litigation are similar to those documented in other data bases (e. g., NEISS). Asphyxiation was the most common cause of fatal injuries, followed by impact by swings. The most common equipment on playgrounds - slides, swings, climbers, merry-go rounds, horizontal ladders and fire poles were the equipment most frequently involved in injuries, but in almost all cases (except for merry-go-rounds) falls from this equipment onto hard surfaces produced the actual injury. Injuries on merry-go-rounds were typically crushing injuries suffered when children entered the open base (old, outmoded equipment) or came in contact with crushing mechanisms (axle area) underneath the structure or through an opening created by a missing inspection plate.

The most common location of playground injuries was public schools, followed by public parks and child care centers. This pattern mirrors the findings from national playground surveys concluding that public school playgrounds are the most hazardous of the three locations, followed in order by public parks and child care centers. Serious injury or death followed by lawsuits appears to be a major motivational factor for sponsoring agencies to inspect and upgrade their playgrounds. A second motivational factor is growing awareness of national playground guidelines and standards. School administrators in states, e.g., Texas, where public schools enjoy tort immunity (freedom from legal liability for playground injuries) seem to be more reluctant to update their playgrounds until a major injury or fatality and resulting public pressure come into play. As states enact playground safety laws, e.g., California and Texas, additional pressure for playground improvement is exerted on reluctant playground sponsors.

The typical or most common case profile, not representing a wide range of individual injuries/lawsuits, is a seriously injured male child between the ages of two and eight years, who fell from a slide, swing or climber onto concrete, asphalt or hard-packed earch while playing at a public school, public park or child care center playground. The child suffered a broken limb or head injury resulting in litigation that endured for two to four years before being settled out of court in an agreement negotiated by attorneys and favoring the plaintiffs. The agreement was concluded to avoid longer, more expensive litigation and to eliminate the risk of extreme judgments in court favoring either the plaintiffs or the defendants.

Recommendations

Extensive data on playground injries resulting in litigation is available only from a few expert witnesses who have been involved in large numbers of cases. Very few attorneys have negotiated more than two or three playground injury cases and about nine out of ten cases settle out of court and no public records are available. The NEISS data base on playground injuries surveys the most cases of any data base but does not have access to the extensive depth and range of information about individual cases made available to expert witnesses. The professionals developing CPSC guidelines and the ASTM standards surveyed all available data bases while preparing safety guidelines/standards for publication and succeeded in preparing exceptional documents for improving safety on playgrounds. The following recommendations are intended to expand, illuminate, or supplement existing information, particularly the CPSC guidelines and the ASTM standards.

- The CPSC and ASTM playground safety guidelines/standards are the most extensively researched and skillfully developed playground safety guidelines/standards in the United States. Most of the state regulations and professional organization safety guidelines for playgrounds at child care centers are sterile and give a false sense of security to center owners and operators who assume that meeting these weak guidelines will protect them in litigation. This is not correct. The CPSC guidelines and ASTM standards are the most influential playground safety criteria in lawsuits. We recommend that all agencies and consumers responsible for children's playgrounds employ the the CPSC guidelines and ASTM standards as their minimum criteria for playground safety. Our finding that violations of

CPSC/ASTM guidelines/standards are implicated in about nine out of ten serious injuries lends urgency to this recommendation.

- All playground equipment installed before the publication of the initial (1981) CPSC safety guidelines should be immediately inspected, for virtually all of this equipment violates current guidelines/standards. A master plan should be developed to phase out old equipment and provide proper resilient surfacing under and around equipment, assigning first priority to those factors most likely to result in severe injury or fatality, e.g., hard surfaces, head entrapments, heavy swing seats, strangulation hazards.

- Every data base we have seen, including our own, concludes that falling onto hard surfaces is the major cause of serious injuries on playgrounds. The large majority of these injuries result from falls where impact with the ground is concentrated, e.g., directly under overhead apparatus, base of fire poles, base of climbers attached to decks, at the sides and exits of slides, directly under swings. We recommend that unitary, manufactured, rubberlike surfaces be installed in these critical areas even though less expensive loose surfacing materials, (e.g., sand, pea gravel, wood mulch) may cover the remainder of the fall zones. It is the rare playground indeed where loose surfacing is constantly maintained at commonly recommended depths in these critical, high impact areas.

- Some items of equipment pose such extreme hazards that a national effort is needed to recall or eliminate them from playgrounds nationwide. These include heavy, battering ram swing seats (especially animal figure types); old, vintage merry-go rounds with open bases and those with exposed crushing mechanisms; slides that are excessively tall for typical surfacing to protect children in falls; poorly designed equipment that allows children to fall from one section of equipment onto another section.

- The data and our experience confirm that falling from overhead apparatus, e.g., horizontal ladders, ring treks, track rides, is the cause of most fractured limbs on playgrounds. These fractures, especially joint fractures, frequently result in permanent impairment. The injuries occur essentially for two reasons; the equipment is too tall for the child user and the fall surface is too hard, usually hard packed earth. Care should be taken that children, especially beginners, have access only to overhead apparatus that is slightly above their standing, reaching height and that special care should be exercised to keep protective surfacing in place underneath the devices.

Some manufacturers, out of concern for children falling onto decks, have isolated their overhead apparatus from decks. However, without some means for shorter children to access overhead apparatus, they tie strings, ropes and wires to the hand grip of track rides and they stack rocks or other available material under equipment, creating even more extreme hazards. Manufacturers should explore reasonably safe means for ensuring accessibility to overhead apparatus including padded decks or simply inserting re.'lient rubber steps onto vertical support posts. Steel ladder rungs for access should be avoided for they create fall hazards and they invite children to climb on top of overhead apparatus.

- Bare metal decks and slides pose extreme risks for toddlers who "freeze" or "stick to" the hot surface until rescued by an adult, often leading to very severe burns. The scope and severity of such injuries has been concealed due to out-of-court settlements and reluctance of defendants to reveal them. Some manufacturers and consumer agencies do not even reveal patterns of injuries and lawsuits to their customers or to their playground equipment sales representatives. Playgrounds that are likely to attract toddlers, especially child care center playgrounds, back yard playgrounds, public park playgrounds designated for younger children should be equipped with plastic slides. The CPSC guidelines also recommend placing metal slides in the shade but this almost always means placing them in the shade of trees where shade varies by time of day and by season, resulting in an unreliable solution.

- The severity of injuries (e.g., permanent brain damage, paraplegia) suffered by children falling onto concrete footings, especially partially concealed footings at the base of fire poles where children frequently fall, leads us to recommend that manufacturers design fire poles that do not require concrete footings. We have seen fire poles solidly secured to the exit region of the equipment at the top of the pole and buried in the ground (without concrete) two to three feet that were very substantial. Children's feet compact the soil around the pole.

- Hazards to fingers are not well documented in the literature or noted specifically in the CPSC guidelines or ASTM standards. Holes in the vinyl coated metal decks of some manufacturers, drain holes in plastic slides, holes where bolts are missing, etc,. are frequently of such size to entrap fingers. Fire department personnel may require one to two hours to free the entrapped child. This situation does not usually cause serious injury but results in

emotional distress of the child. Other manufacturers have retooled to create drain holes in decks either too small or too large for fingers to become entrapped.

- We recommend that S-hooks not be used on playground equipment. Although both CPSC and ASTM recommend that S-hooks be closed, we have seen very few playgrounds where this is the case. Even when hooks are closed, some exposed edges can entangle clothing or catch on jewelry. A number of alternate types of completely closed hooks, which withstand more stress than S-hooks, are readily available. They cost a few cents more per hook. Strangulation fatalities result from entanglement of clothing on S-hooks and fingers are amputated when items of jewelry (rings) hang on them.

- As this material is being written, three lawsuits are in progress in Texas alone resulting from two children and one adult catching their rings on an S-hook, a protruding bolt end, or the sharp end of a protruding element. These resulted when two individuals jumped off the ground, caught their rings and the full weight of the body amputated their ring fingers. The third occurred when the individual jumped off a structure and caught his ring during the fall. In all three cases, the fingers could not be reattached. Children should not be allowed to wear jewelry, e.g., rings, necklaces, cords, ropes on playgrounds.

- Equipment in the immediate vicinity of playground equipment -fences, sporting equipment, swimming pools - should be thoroughly inspected using standards relevant to each while bearing in mind that every item within the playground area will be used for play by children. S-hooks on basketball nets, unpadded steel basketball goals, protruding elements, sharp points and head entrapments in fences, are examples of hazards not identified in common, national playground safety guidelines and standards. Swimming pools or water accessible to very young children, especially toddlers and nonswimmers, pose extraordinary risks. The appropriate national, regional, state and local safety standards and codes should be followed.

- Design of equipment, installation, maintenance and supervision are common factors leading to injuries and resulting lawsuits. Unless the consumer has modified the equipment, manufacturers are usually held responsible for design and installation defects implicated in injuries so with

proper planning the consumer may shift responsibility for design and installation to the manufacturer/installer. The manufacturer's representative can usually arrange for installation by an experienced subcontractor. The purchaser/consumer should require that the manufacturer certify in writing that the equipment meets current CPSC guidelines, ASTM standards, and, as they become available, Americans with Disabilities Act (ADA) guidelines. The installer or manufacturer should certify in writing that the installation of the equipment meets the above guidelines and standards and the manufacturer's installation instructions.

-Maintenance and supervision are the responsibility of the consumer/operator, e.g., public school, public park, child care center. We recommend that all sponsoring agencies develop systematic maintenance programs for their playgrounds. Failure to maintain and poor maintenance were factors in almost all of the injuries/lawsuits reported in this study, influencing large settlements or judgments in several cases. Our data are consistent with the AAHPERD national playground safety surveys concluding that playground maintenance ranges, generally, from poor to non-existent. This condition is improving as the public becomes more aware of the nature and scope of playground injuries, of the existence of national safety guidelines/standards and as a growing number of manufacturers provide well-developed maintenance procedures or programs for the purchaser/consumer. Those agencies experiencing very serious injuries or fatalities on their playgrounds, particularly those resulting in lawsuits, have been leaders in renovating their playgrounds and implementing maintenance programs. A growing number of agencies are enrolling their maintenance workers or supervisors in the National Recreation and Park Association's National Playground Institutes which lead to Safety Inspector Certification. We recommend this practice. The institutes are offered several times each year in selected cities throughout the United States.

- All adults who supervise children on playgrounds should receive regular training on playground supervision. This should include instruction on the CPSC safety guidelines, the nature and value of play, observation techniques, behavior management, play enhancement and emergency procedures. The recommended ratio of trained supervisors to children on playgrounds varies widely from state to state. All state and national child care center regulations specify the child/adult ratio for child care centers in general

but most do not make recommendations specifically for playgrounds (Wallach and Afthinos, 1990). Only one State Department of Education recommends or prescribes teacher/child ratios for public school playgrounds (Wallach and Edelstein, 1991). Tennessee prescribes a ratio of one adult for 25 children. Only nine State Departments have any regulations for playgrounds and most of these are limited and inadequate. Only two states (South Carolina and Tennessee prescribe the CPSC guidelines. Most public park systems do not provide adult playground supervision on a regular basis, perhaps expecting parents to supervise their children. A national survey of state and municipal park districts by Wallach (1990) did not reveal a single district with supervision regulations. Michigan and Minnesota State Departments of Natural Resources responded; "Casual supervision is necessary...", and the Missouri Division of Parks noted that users should provide adult supervision for children under age seven.

- The lack of nationally recognized guidelines/standards on playground supervision or widely accepted supervision criteria supports a laissez faire system of supervision, particularly in public schools, where recess or outdoor play is commonly viewed as a time for teachers to take a break. The lawsuits in this study revealed a teacher/pupil ratio on public school playgrounds, where serious injuries occurred, of up to 325 children to one teacher, untrained in playground supervision. Faulty supervision is claimed by the plaintiffs in practically every playground injury lawsuit but the outcome now depends upon common sense judgment and the opinions of expert witnesses rather than any particular set of standards. We recommend that national professional organizations develop comprehensive playground supervision guidelines for their respective members, e.g., public school, public park, and child care professionals.

REFERENCES

American Society for Testing and Materials. (1993). Standard consumer safety performance specification for playground equipment for public use. Philadelphia: The Society.

Bruya, L., & Langendorfer, S. J. (1988). Where our children play: Elementry school playground equipment. Reston, VA: American Alliance for Health, Physical Education, Recreation, and Dance.

Thompson, D., & Bowers, L. (1989). Where our children play: Community park playground equipment. Reston, VA: American Alliance for Health, Physical Education, Recreation, and Dance.

United States Consumer Product Safety Commission. (1991; 1994). Handbook for public playground safety. Washington, D. C: The Commission.

Wallach, F. (1990). Survey of state parks and municipalities: Focused on playgrounds and supervision. New York: Total Recreation Management Srvices, Inc.

Wallach, F., & Afthinos, I. D. (1990). An analysis of the state codes for licensed day care centers: Focused on playgrounds and supervision. New York: Total Recreation Management Services, Inc.

Wallach, F., & Edelstein. (1991). Analysis of the state regulations for elementary schools: Focused on playgrounds and supervision. New York: Total Recreation Management Services, Inc.

Wortham, S. C., & Frost, J. L. (1990). Playground for young children: National survey and perspectives. Reston, VA: American Alliance for Health, Physical Education, Recreation, and Dance.

RECOMMENDED RESOURCES

Frost, J. L. (1992). Children's play and playscapes. Albany, New York: Delmar.

Information Exchange. Inspecting playgrounds for hazards (videotape). P. O. 1529, Fair Oaks, CA 95628.

Moore, R. C., Goltsman, S. M., and Iacofano, D. S. (eds.). (1992, 2nd. edition). Play for all guidelines. MIG Communications, 1802 Fifth Strteet, Berkeley, CA 94710.

National Recreation and Park Association. Playground safety test kit (including entrapment probes and protrusion gauges). 2775 South Quincy Street, Arlington, VA., 22206-2204.

Ratte, D. J., Morrison, M. L., Lerner, N. D., Denham, S. A., & Johnson, D. M. (1990). Development of human factors criteria for playground equipment safety. Comsis Corporation, 8737 Colesville Road, Suite 1100, Silver Spring, MD. 20910. (Research document prepared for the CPSC).

FIGURE 1
STATES
(N=190)

	FROST (N=82)	SWEENEY (N=108)	TOTAL (N=190)
ALASKA	1	1	2
ARIZONA	2	1	3
ARKANSAS	-	1	1
CALIFORNIA	5	4	9
COLORADO	1	2	3
DIST. OF COLUMBIA	1	-	1
FLORIDA	8	9	17
GEORGIA	2	1	3
HAWAII	1	-	1
ILLINOIS	1	5	6
INDIANA	5	4	9
IOWA	1	2	3
KANSAS	1	1	2
KENTUCKY	1	1	2
LOUISIANA	6	5	11
MARYLAND	1	-	1
MASSACHUSETTS	2	1	3
MICHIGAN	4	-	4
MINNESOTA	-	13	13
MISSOURI	2	7	9
MONTANA	1	3	4
NEBRASKA	1	-	1
NEVADA	-	1	1
NEW JERSEY	-	1	1
NEW YORK	3	7	10
NORTH CAROLINA	-	1	1
NORTH DAKOTA	1	-	1
OHIO	-	15	15
OKLAHOMA	3	-	3
PENNSYLVANIA	1	6	7
RHODE ISLAND	-	1	1
SOUTH CAROLINA	-	1	1
TENNESSEE	1	2	3
TEXAS	21	4	25
UTAH	-	2	2
VIRGINIA	3	-	3
WASHINGTON STATE	2	2	4
WISCONSIN	-	2	2
WYOMING	-	2	2

FIGURE 3
CAUSE OF INJURIES
(N=190)

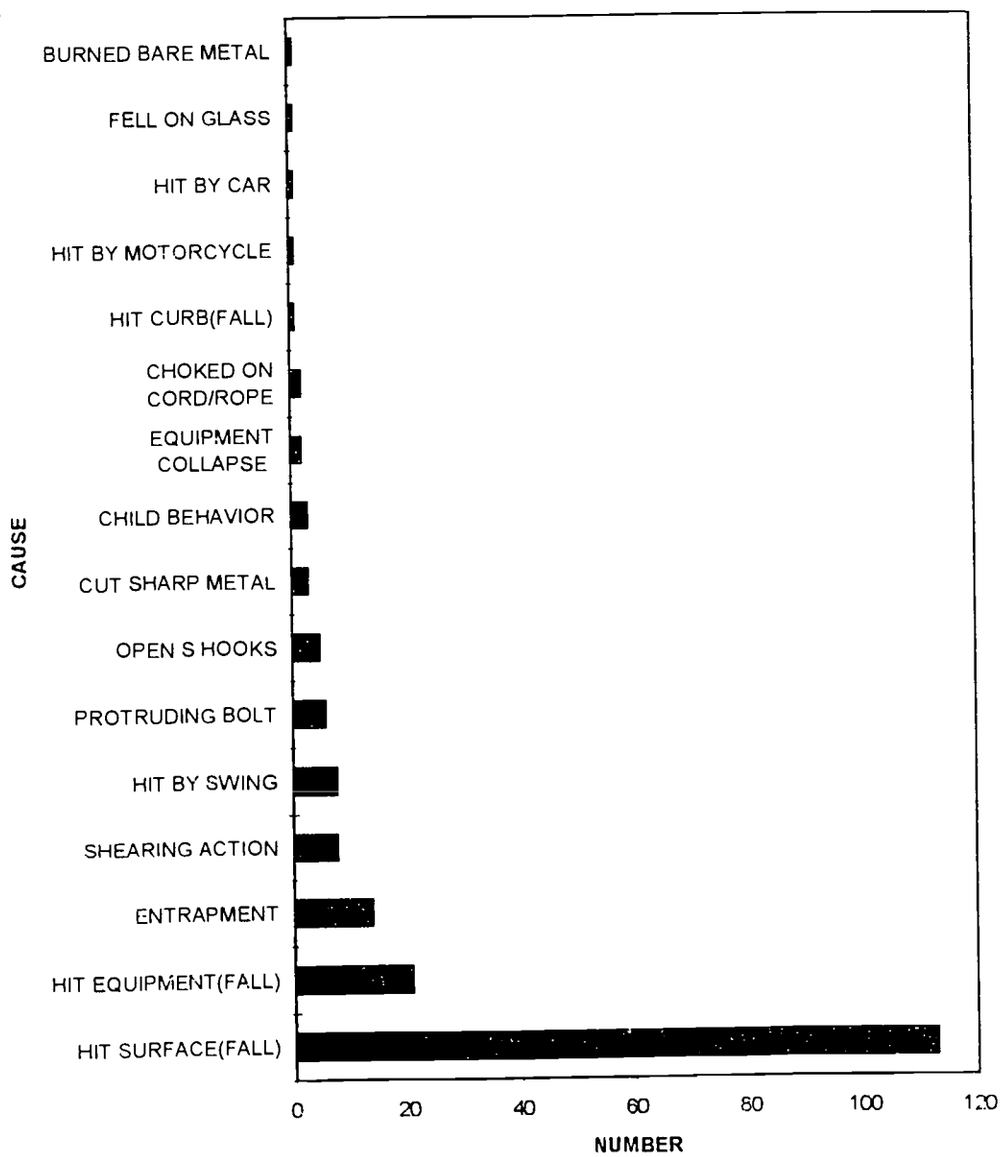

FIGURE 4
CAUSE OF FATALITIES
(N=13)

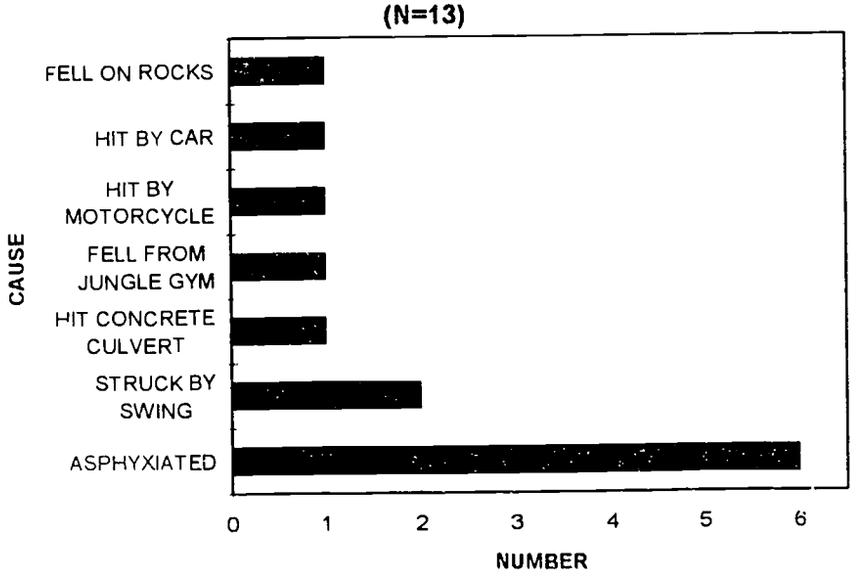

FIGURE 5
EQUIPMENT
(N=190)

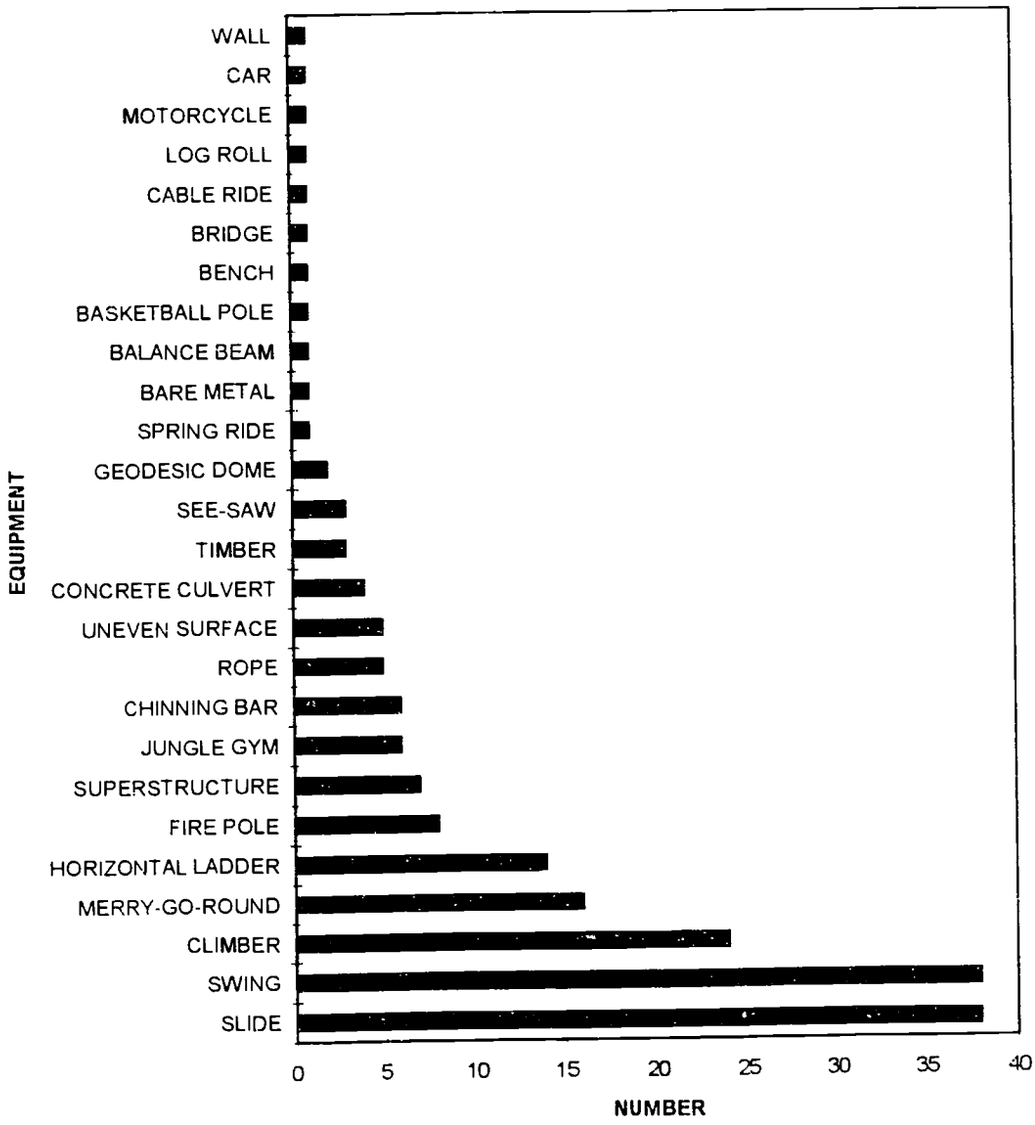

FIGURE 6
LOCATION OF INJURIES
(N=190)

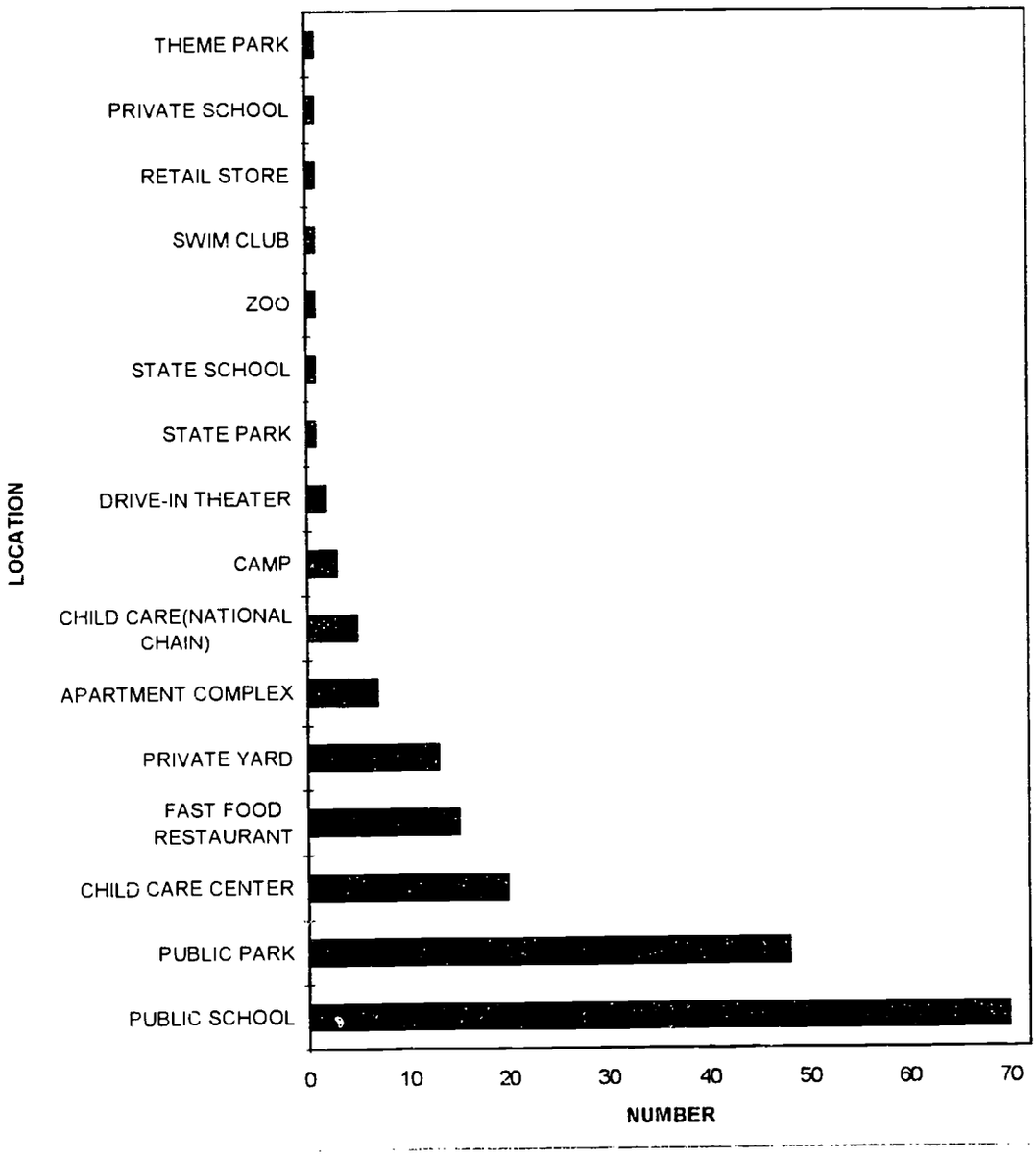

FIGURE 7
AGE OF CHILD
(N=190)

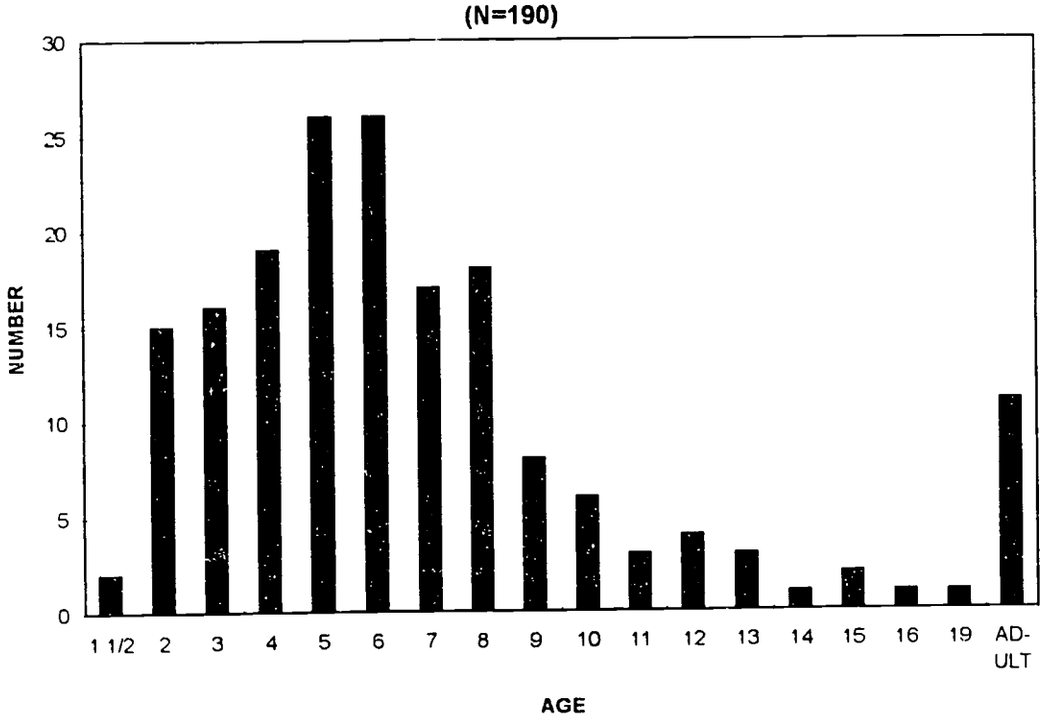

FIGURE 8
GENDER
(N=190)

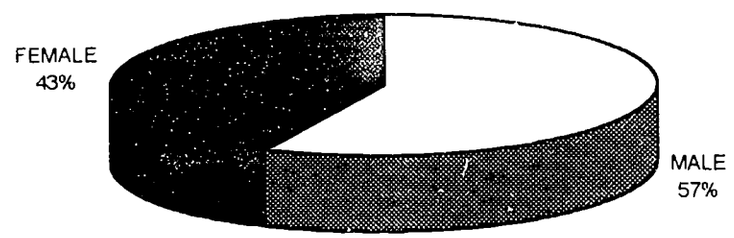

FIGURE 9
CPSC/ASTM VIOLATIONS
(N=190)

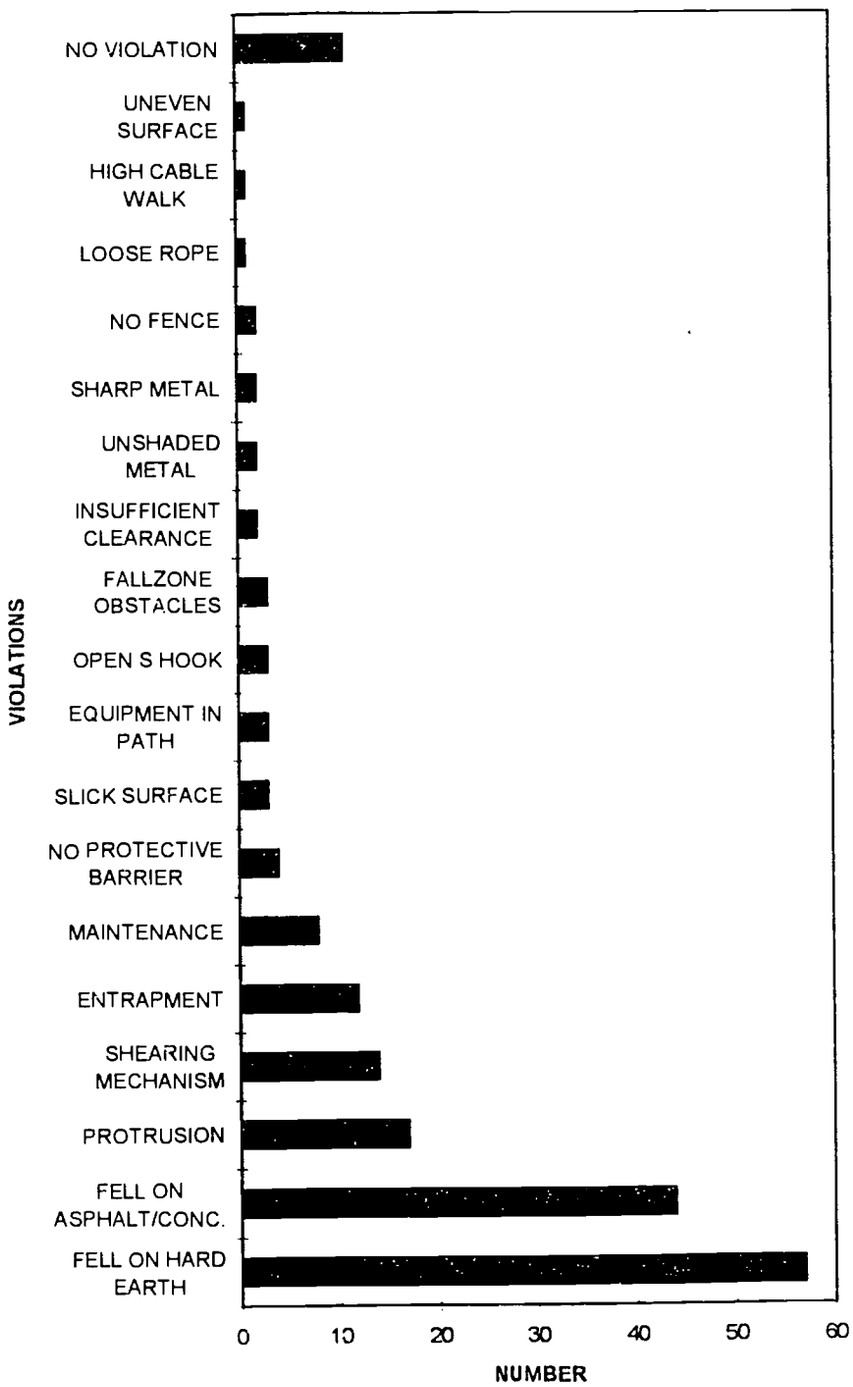

FIGURE 10
CPSC/ASTM VIOLATIONS
(N=190)

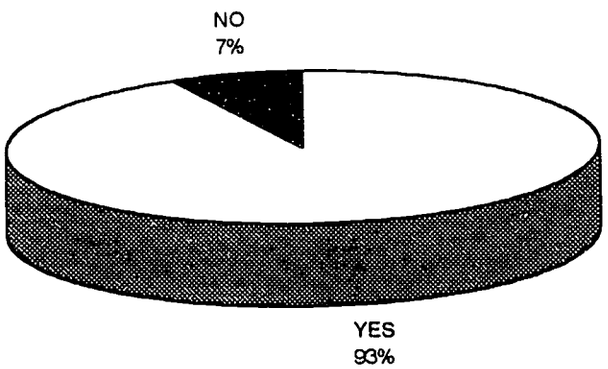

FIGURE 11
DISPOSITION OF CASE
(N=190)