The contents of this document will be discussed at the open Commission Meeting (briefing) scheduled for January 18, 2012.

UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
4330 EAST WEST HIGHWAY
BETHESDA, MD 20814

This document has been electronically approved and signed.

DATE: January 11, 2012

THIS MATTER IS NOT SCHEDULED FOR A BALLOT VOTE.

A DECISIONAL MEETING FOR THIS MATTER IS SCHEDULED ON: February 2, 2012

TO: The Commission
Todd A. Stevenson, Secretary

THROUGH: Cheryl A. Falvey, General Counsel
Kenneth R. Hinson, Executive Director

FROM: Philip L. Chao, Assistant General Counsel
Leah Wade, General Attorney

SUBJECT: Notice of Proposed Rulemaking: Safety Standard for Infant Swings

The Office of the General Counsel is providing for Commission consideration the attached draft proposed rule for publication in the *Federal Register*. The proposed rule would establish a safety standard for infant swings, pursuant to section 104 of the Consumer Product Safety Improvement Act of 2008.

Please indicate your vote on the following options:

I. Approve publication of the attached document in the *Federal Register,* as drafted.

_____ _____
(Signature) (Date)

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II. Approve publication of the attached document in the *Federal Register,* with changes. (Please specify.)

_____

_____

_____

_____ _____
(Signature) (Date)

III. Do not approve publication of the attached document in the *Federal Register*.

_____ _____
(Signature) (Date)

IV. Take other action. (Please specify.)

_____

_____

_____

_____ _____
(Signature) (Date)

Attachment: *Federal Register* Notice of Proposed Rulemaking to Establish a Safety Standard for Infant Swings

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Staff Briefing Package

Infant Swings NPR Briefing Package

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Briefing Memo

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UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
4330 EAST WEST HIGHWAY
BETHESDA, MARYLAND 20814

Memorandum

This document has been electronically approved and signed.

Date: January 11, 2012

TO: The Commission
Todd A. Stevenson, Secretary

THROUGH: Cheryl A. Falvey, General Counsel
Kenneth R. Hinson, Executive Director
Robert J. Howell, Deputy Executive Director for Safety Operations

FROM: DeWane Ray, Assistant Executive Director
Office of Hazard Identification and Reduction

Celestine T. Kiss, Project Manager
Division of Human Factors, Directorate for Engineering Sciences

SUBJECT: Staff's Draft Proposed Rule for Infant Swings

I. INTRODUCTION

Section 104, *Standards and Consumer Registration of Durable Nursery Products,* of the Consumer Product Safety Improvement Act (CPSIA) of 2008, requires the U.S. Consumer Product Safety Commission (CPSC, or Commission) to study and develop safety standards for certain infant and toddler products. Infant swings are one of the products specifically identified in section 104(f)(2) of the CPSIA as a durable infant or toddler product. The Commission is charged with promulgating consumer product safety standards that are substantially the same as the voluntary standard for infant swings or more stringent than the voluntary standard if the Commission determines that more stringent standards would further reduce the risk of injury associated with infant swings.

Section 104 of the CPSIA also requires the Commission to consult with representatives of consumer groups, juvenile product manufacturers, and independent child product engineers and experts to examine and assess the effectiveness of the relevant voluntary standards. This consultation process commenced in March 2010, during the ASTM International (formerly known as the American Society for Testing and Materials) subcommittee meeting regarding the ASTM infant swing voluntary standard, in which CPSC staff participated. Consultations with members of the ASTM subcommittee, who represent producers, users, consumers, government and academia,[1] are ongoing.

[1] ASTM International website: www.astm.org, About ASTM International.

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This briefing package assesses the effectiveness of the infant swings voluntary standard and presents staff's draft proposed rule to address potential hazards.

II. BACKGROUND

A. ASTM Voluntary Standard Overview

ASTM F 2088 *Standard Consumer Safety Specification for Infant Swings* is the voluntary standard that was developed to address the identified hazard patterns associated with the use of infant swings. The standard was first approved in 2001, and then revised in 2003, 2008, 2009, and twice in 2011. The current version, ASTM F 2088-11b, was approved on October 1, 2011, and published in November 2011.

An "infant swing" is defined in the ASTM voluntary standard as *a stationary unit with a frame and powered mechanism that enables an infant to swing in a seated position*. An infant swing is intended for use by infants from birth until able to sit up unassisted. The standard also addresses "cradle swings," which are defined as *an infant swing which is intended for use by a child lying flat* and "travel swings," which are defined as *a low profile, compact swing having a distance of 6 in. or less between the underside of the seat bottom and the support surface (floor) at any point in the seat's range of motion.* The standard was developed in response to incident data supplied by CPSC staff to address the following hazards: swings tipping over or collapsing, structural failures, entanglement in the restraints, and entrapment in leg holes.

The ASTM standard contains general and performance requirements that pertain to the following (the numbers in the parentheses refer to the section of the current ASTM F 2088-11b standard):

Hazardous Sharp Edges or Points (5.1),
Small Parts (5.2),
Lead in Paint (5.3),
Wood Parts (5.4),
Scissoring, Shearing, Pinching (5.5),
Openings (5.6),
Exposed Coil Springs (5.7),
Protective Components (5.8),
Labeling (5.9 and 8),
Toys (5.10),
Structural Integrity (6.1),
Stability Test (6.2),
Unintentional Folding (6.3),
Restraint System (6.4),
Passive Crotch Restraint System (6.5),
Cradle Swing Orientation (6.6), and
Swings Containing Battery Compartments (6.7).

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B. Juvenile Products Manufacturers Association (JPMA) Certification

The Juvenile Products Manufacturers Association (JPMA) has a certification program for a variety of juvenile products, including infant swings. To obtain JPMA certification, manufacturers submit their products to an independent test laboratory for conformance testing to the most current ASTM voluntary standard. Currently, there are five manufacturers that sell JPMA-certified infant swings.

III. DISCUSSION

A. Overview of Incident Data

CPSC staff is aware of 15 fatalities and 2,253 nonfatal incidents, with 600 nonfatal injuries, related to infant swings use, that were reported to have occurred from January 1, 2002 through May 18, 2011 (see Tab A). The data include children from birth through 2 years of age. The upper age limit of 2 years was chosen because the weight of the 50th percentile 19–24 month-old child is 26.0 lbs, and the upper weight limit for most of the swings is 25.0 lbs. Only incidents that occurred when the infant was using the swing are included for the purposes of this briefing package.

Of the 15 fatalities, the age of all but one of the decedents ranged from 1 month to 10 months; one decedent was a 2-year-old with a physical disability.

The 2,253 nonfatal incident reports included 600 reports of injuries. In 2 of the injury reports, infants required hospitalization. Both infants suffered serious injuries from falls from the swing. Seventy-six percent of the injured children were 6 months of age or younger, and 97 percent were 12 months old or younger.

National Injury Estimates[2]

There were an estimated total of 12,400 injuries (sample size=457, coefficient of variation=0.14) related to infant swings that were treated in U.S. hospital emergency departments over the 9-year period from 2002 through 2010. The injury estimates for individual years are not reportable because they fail to meet publication criteria.[3] Although there was a statistically significant increase observed in the estimated injuries from 2009 to 2010, there was no statistically significant trend observed over the 2002 through 2010 period.

[2] The source of the injury estimates is the National Electronic Injury Surveillance System (NEISS), a statistically valid injury surveillance system. NEISS injury data are gathered from emergency departments of hospitals that are selected as a probability sample of all the U.S. hospitals with emergency departments. The surveillance data gathered from the sample hospitals enable CPSC staff to make timely national estimates of the number of injuries associated with specific consumer products.

[3] According to the NEISS publication criteria, an estimate must be 1,200 or greater, the sample size must be 20 or greater, and the coefficient of variation must be 33 percent or smaller.

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No deaths were reported through the NEISS. About 72 percent of the injured were 6 months of age or younger, and about 88 percent were 12 months or younger. For the emergency department-treated injuries related to infant swings, the following characteristics occurred most frequently:

- Hazard – falls (over 70%); a majority of the reports did not specify the manner or cause of fall.
- Injured body part – head (61%) and face (16%).
- Injury type – internal organ (40%) and contusions/abrasions (32%).
- Disposition – treated and released (nearly 94%).

B. Hazard Pattern Characterization Based on Incident Data

The following discussion is organized by hazard pattern characterizations based on the incident data. For each hazard pattern there is a discussion of the data, how the ASTM standard addresses the hazard, or how it should be changed to address it, as well as information from technical staff regarding the hazard pattern.

While the voluntary standard includes cradle swings in its definition, it is difficult to determine from the incident data if combination cradle and infant swings actually were used in the cradle mode when the incidents occurred. Based on the data available, all the swing fatalities occurred when the child was in the seated mode (*i.e.*, infant seat mode, not cradle mode).

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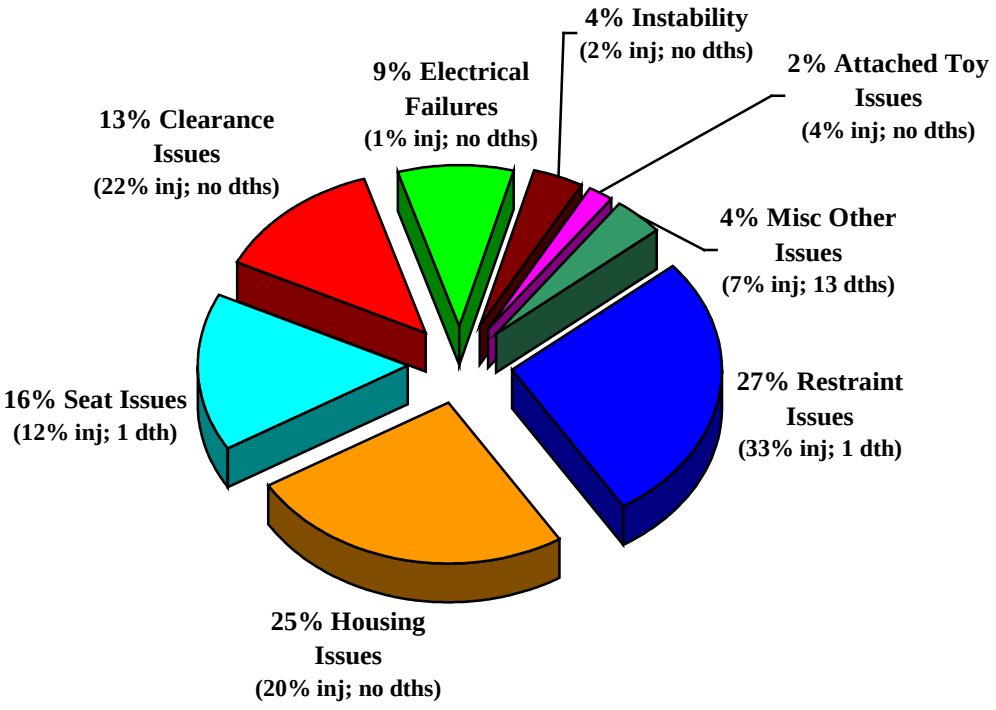
Fig 1: Distribution of Incident Reports Associated with Infant Swings by Hazard Pattern Characterizations 01/01/02-05/18/11



Miscellaneous and Other Issues

As shown in Figure 1 above, 13 of the 15 infant fatalities are included in the "Miscellaneous Other Issues" category because the cause of death cannot be directly attributed to one of the other hazard categories discussed below. Of the 13 deaths in the "Miscellaneous" category, 5 are slump-over deaths and 4 deaths are attributable to product misuse. For the remaining 4 deaths in the "Miscellaneous" category, there was insufficient information to determine how the infant died.

In Health Sciences (HS) staff's judgment (see Tab B), 5 of the 15 fatalities reported to the CPSC involved infants between the ages of 2 weeks and 3 months old, who were "slumped over." In 3 of these fatalities, the infant was specifically described by the medical examiner or investigating officials as being "slumped over"; in 2 additional fatalities, the description of the infant's position suggests to HS staff that they were also "slump over" incidents. Infants younger than 3 months old are particularly vulnerable to head slump over because they lack head control and are not able to keep their head upright. While physical growth in height and weight occurs rapidly in the first few months of life, maturation in gross and fine motor muscle tone, as well as cognitive development, occurs at a slower rate. Gross motor activity that controls and keeps the head steady in a sitting position is attained, on average, when the infant is 2 months old. Sitting

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upright with no head lag[4] is achieved by about 3 months of age.[5] The combination of a child's head mass and development of their neck muscle tone and strength makes it difficult for infants about 3 months old and younger to keep their heads up.

In cases where infants are found to be slumped over, the cause of death is usually positional asphyxia. In 4 of the 5 slump-over deaths reported to the CPSC in conjunction with infant swings, the cause of death was positional asphyxia. For the fifth fatality, the cause of death is listed as undetermined. Positional asphyxia was listed as the cause of death in 3 other fatalities: 1 death was due to inadequate restraint design; and 2 were attributable to product misuse. Positional asphyxiation occurs when the position of the child's body (such as compression of their neck from their head being slumped over) prevents the child from breathing. Prolonged lateral compression of the neck (when a child is left for a long time in a compromised position) can result in inadequate oxygen supply to the lungs and reduced oxygen delivery to the tissues of the body. Decreased oxygen supply to tissues of the body can result in tissue injury and permanent damage. Prolonged oxygen deprivation of the brain can cause unconsciousness and may result in death.

Slump-over deaths cannot be addressed with additional restraints in the swings. While shoulder harness restraints restrict the upper body movement of the infant, they do not control head slumping. At this time, the only known prevention method is to warn caregivers of the possibility of death caused by slumping over or limit the use of the product to infants who can hold their heads up unassisted. Currently, the voluntary standard contains a requirement that the following warning be printed on infant swings that have a seat back angle greater than 50°: "Use only in the most reclined seat position until infant can hold head up unassisted."[6] CPSC staff believes this warning is necessary because of the possibility that the swing seat's position may contribute to slump-over deaths. We are not recommending any additional changes to the standard to address slump-over deaths, however, we welcome comments about how seat angle may contribute to slump-over deaths.

The majority of the fatalities involved infants 3 months old and younger, who were left unattended[7] in the infant swing for a significant amount of time (from 5, 6, or 10 hours or as long as all morning and overnight). It is Health Sciences staff's opinion that the use of infant swings that are not in the fully reclined position as an alternative sleep product is unsafe, and potentially fatal. Other examples of incorrect use of infant swings that contributed to the fatalities included: placement of twins side-by-side in the swing; no use of restraints; and use of recalled infant swings.

Other miscellaneous issues included: the infant choking on netting; the tray failing to remain latched; sharp protrusions/surfaces; reports of product misuse; and incidental product involvement (i.e., infant choked on pacifier while in swing). There were a few reports with insufficient information to characterize any specific hazard. Where there was sufficient

[4] Head lag is when an infant is pulled from a supine to a sitting position, and their head lags behind their trunk.
[5] Nelson, Behrman, Kllegaman and Arvin, Nelson Textbook of Pediatrics, W.B. Saunders Company, 1996.
[6] ASTM F2088-11b, § 8.3.1(4).
[7] It is Health Sciences staff's opinion that the child had been left unattended and unsupervised in incidents where the caregiver did not witness the fatality.

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information available to determine the hazard, we believe that the current standard adequately addresses the issue, and we are not recommending any additions or modifications.

Restraint issues

Restraint issues, either the inadequate design of the restraint, or the failure of the restraint, were the most commonly reported hazard, resulting in the highest proportion of injuries. Approximately 27 percent of the incidents involved some sort of problem(s) with the restraint, most of them involving design issues. Common restraint-design scenarios included: infants falling (or nearly falling) out of the seat when leaning forward or sideways; and infants putting more weight toward the back of the seat, causing the seat to tilt back, and the restraint failing to prevent the infant from sliding out on their head. Common restraint-failure scenarios included: buckles or straps breaking, or buckles or straps detaching from the product altogether. Restraint issues accounted for 1 fatality and the highest proportion of injuries, most of which resulted from falls. The 1 fatality specifically attributable to a restraint design failure occurred when the victim slipped through the restraints and strangled in the crotch straps. One of the fall injuries due to restraint issues was serious enough to require hospitalization.

As infants start to learn to sit up on their own, they tend to lean forward in the swing. If the infant leans forward while the swing is moving backwards, the infant's upper body can fall out of the swing. A number of the incidents reported finding the infant hanging upside down with the waist/crotch restraint still attached. Other scenarios involved infants leaning to the side and having their head come into contact with the side frame, and infants pushing backward and falling out of the top of the swing. In ASTM F 2088-11a (published in March 2011), a new shoulder harness requirement for infant swings with seat back angles greater then 50° was added. The current market shows that some companies had already started moving toward five-point waist/crotch and shoulder restraint straps before the standard required it. Staff believes this requirement is likely to reduce the number of incidents in which infants fall from infant swings, or in which infants become entrapped in the side structures/frame of the swing. The ASTM standard indicates that the 50° seat back angle is adapted from infant car seat recline angles that measure between 45° and 60.° The note in the standard states: "*having shoulder restraints for seat back angles greater than 50° from horizontal will aid in keeping the occupant positioned in the seat area. The 50° angle is on the low side of the infant car seat recline angle range as a conservative measure.*"[8]

Staff is recommending several changes to the test that measures the seat back angle. In order to have more consistent measuring for seat angles, staff recommends that all positioning accessories that can affect the measurement be removed prior to the hinged boards being placed in the swing seat. In addition, staff recommends that the hinged boards be constructed of steel, rather than wood, because steel replicates better the force of a child in a seat. Staff believes that the shoulder harness requirement in swings with a seat back angle greater than 50°, along with the clarification recommended by staff, are likely to reduce the number of incidents, injuries, and fatalities, by restraining the infant in the swing more securely. The specific word changes to the standard can be found later in this memorandum in section B. Staff Changes to ASTM F 2088-11b, Table 1, 7.12 *Seat Back Angle Measurement*.

[8] ASTM F 2088-11b.

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Broken, detached, or loose components of the swing housing

Broken, detached, or loose components of the swing housing, such as the arm, leg, motor housing, or hardware, were the next most commonly reported problems. They accounted for 25 percent of the 2,268 incident reports, and were the third most attributed reason for injuries. Most of the resulting injuries were due to falls when the swing components collapsed. More serious injuries that required the child to be admitted to the hospital or held for observation involved closed-head injuries (for example, concussions) resulting from falls from the swing. According to HS staff, head trauma injuries in children could lead to permanent brain damage or death. CPSC Engineering Sciences and Laboratory Sciences staff recommend modifying the Dynamic Load Test by increasing the number of dynamic drop cycles from 50 to 500 to address fall incidents as a result of broken, detached, or loose components in the swing housing, including the swing seat.

Staff evaluated and tested multiple swings of various designs and quality produced from 2006 through 2011, but does not believe the existing requirement of 50 cycles is sufficient to identify potential issues with structural components of swing components. A full life cycle test requirement was considered initially. However, it was determined to be unrealistic based on the excessive time necessary to perform the test. Testing revealed that 500 cycles was the point at which the least robust swing started to show signs of fatigue in some plastic components. There was one failures recorded during this testing. Adding 450 cycles would increase testing time from approximately 4 to 5 minutes to about 42 minutes. Staff concluded that the initial assessment regarding the insufficiency of 50 cycles was correct and that a minimum of 500 cycles would be a more appropriate test to evaluate structural integrity and reveal potential structural issues of the swing components. Increasing the number of dynamic impact cycles to which the swing will be tested will reduce the possibility of structural failures and is expected to lead to a decrease in the number and severity of injuries. The new proposed wording is found in Table 1, 7.2.1.2 and 7.2.1.3.

Swing seat issues

Swing seat issues, either seat design or seat failure, were the third most commonly encountered hazard, accounting for 16 percent of the incident reports. These issues ranked fourth among the cause of injuries.

Seat design issues caused the seats to lean to one side, or tilt forward, or backward, usually resulting in the infant bumping into the swing frame. Seat failures resulted in seats folding up on the infant, or not holding in the upright position, but instead falling backward into the lowest recline, seat pads not staying in place, or seats falling off with no other apparent component failure. In these situations, the infant almost always fell out of the swing. One fatality was the result of a seat failure.

The changes recommended and discussed above for the dynamic load test will also help address some swing seat issues. We also recommend the addition of a new seat deflection test.

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Seat deflection refers to the distance the bottom of the seat moves toward the floor during testing. During the static structural testing of swing samples by laboratory staff, some designs deformed significantly under the current 75 lb static load test. In some cases, the deflection was so severe that the static mass fell to the floor. Additionally, the CPSC incident database showed similar incidents where the victim attempted to reach an object and, through a combination of seat deflection and seat instability, fell out of the seat. Currently, F 2088 requires a 75 lb static load with no deflection requirement. This allows unlimited seat deflection, potentially placing the occupant in an unsafe position that could result in injury. Staff is recommending that a maximum deflection requirement specifying no deflection greater than 4 inches be added, in addition to the static load test. Table 1, sections 6.1.2.1, 7.2.2.2, and 7.2.2.3 address the static load test and maximum deflection requirements.

Inadequate clearance

Inadequate clearance between the seat and swing frame was reported in 13 percent of the 2,268 incident reports. This resulted in the infant's head or neck getting caught between the frame and the seat when they leaned too far to the side or their limbs hit the frame while the swing was in motion. Inadequate clearance was the second most reported cause of injuries, most of which resulted from the infant hitting the frame. According to Health Sciences staff, inadequate clearance between the seat and the swing frame resulted in many entrapment-type injuries and hits to the head and limbs. Entrapment-type injuries can range from minor bruises, cuts, and scrapes, to more serious injuries, such as decreased blood flow to limbs, which could cause tissue damage.

F 2088-11b has a requirement that infant swings with seatback angles greater than 50° have shoulder harness restraints. Staff believes that this requirement will reduce the number of entrapment incidents resulting from inadequate clearance.

Electrical or battery-related issues

Electrical or battery-related issues were reported in 9 percent of the 2,268 reports. The electrical or battery-related incidents included the detection of smoke, leaking batteries, or overheating. Overheating of the motor housing was the most common scenario. While not many injuries were reportedly related to this issue, there are commonly used testing procedures that can be added to the standard to address the incidents and injuries that have been reported.

Swing designs typically rely on either a/c power, batteries, or a combination of both, to operate the product. There are no requirements in the current version of F 2088 regarding the design and operation of the electrical components in infant swings. To reduce these hazards, staff proposes the addition of a new stalled motor requirement and test procedure substantially similar to the requirements in ASTM F 963, *Consumer Safety Specification for Toy Safety*.

The test will check to ensure that a normal electrical load cannot overload the electrical circuit. Testing will include operating the swing with the seat in a fixed position and running continuously until a peak temperature can be recorded. This will ensure that all components, including motors, connections, batteries, circuit boards, wiring, and all other electrical

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components do not overheat. Overheating can cause the components to melt, smoke, explode, or cause a fire.

Additionally, staff recommends an accessible component temperature requirement. The new tests will include a maximum temperature requirement for all accessible electrical components on the swing. This requirement will be performed on any component that is accessible to the consumer during normal use. Testing will require the determination of accessibility using standard finger probes. Upon determination, all accessible electrical components will be subjected to a maximum temperature test. The maximum temperature for this requirement is less than the overload test but high enough to ensure that consumers do not sustain burns from contacting components with hot surface temperatures.

Some swing models operate with dual power sources, such as a/c and batteries. Staff included a requirement to test both power sources. Swings are to be tested using each power source independently. Additionally, staff is recommending a requirement for testing all applicable battery chemistries. Battery chemistries, such as Nickel Cadmium (NiCd), Nickel-Metal Hydride (NiMH), Lead Acid, and Lithium Ion (Li-ion) may be used interchangeably, depending upon the swing design. In certain situations, it could be possible for a consumer to interchange battery types, resulting in a battery failure. Testing each type independently will ensure that swings are designed properly to avoid these types of incidents.

The addition of electrical testing requirements will reduce the likelihood of overloading electrical components, battery leakage, or electrical failures that could lead to fire, ultimately preventing consumer injuries and property damage. Table 1, sections 6.7, 6.7.4, 6.7.5, 7.13, and 7.13.1 present the proposed language for the electrical testing.

Instability

Instability of the swing was reported in 4 percent of the incident reports. In most of these cases, the swing was described as lifting up on one leg when swinging or tipping over completely; in some cases, when set on an elevated surface, the swing would reportedly creep along the surface until it fell off. The latter scenario played out in one incident that resulted in an injury that required hospitalization. Injuries, however, were not reported frequently. There were a few reports of incidents where the swing started to fold up, resulting in stability-related incidents. Staff recommends a modification to the Stability in the Direction of Swing Motion Test and a clarification to the existing Unintentional Folding Test contained in F 2088.

F 2088 includes the Stability in the Direction of Motion Test which, in its current form, is primarily applicable to traditional swing designs. These traditional swings rotate about a horizontal axis, producing fore and aft motion; however, some newer swings have a vertical swing axis. F 2088 testing is designed for swings with a horizontal swing axis. This test requires testing in a forward and 180 degree opposite orientation, which is acceptable for traditional horizontal axis swings but does not sufficiently address alternative designs. In the case of swings with a vertical swing axis, fore and aft directions are not clearly defined. In these cases, there are multiple positions that could be considered for testing. Therefore, staff recommends testing alternative swing designs in the worst-case orientation. This requirement is

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only applicable to nontraditional, alternative designs that cannot be tested in the fore and aft orientations. Sections 7.3.2.3 and 7.3.2.4 in Table 1 reflect the new wording for this test.

The Unintentional Folding Test is designed to address stability for traditional A-frame-type infant swings. A force is to be applied at the bottom of the leg, which successfully addresses swings with traditional swing designs. However, new swings with nontraditional designs are now produced that require the stability test to be interpreted. Our testing on L-shaped infant swing designs revealed that forces placed at the end of the L-shaped legs created a twisting motion. This twisting motion may not exercise the latch to the same extent as a force applied to the end of a leg in an A-frame infant swing. Additionally, we wanted to clarify the location of the applied force, because the 'end of the leg' could be interpreted inconsistently over various infant swing leg designs. Based on this, we are proposing that this test be clarified to address all swing designs, by adding language that requires the tester to put the force "at the lowest point on the leg that results in the greatest force on the latch in the direction normally associated with folding." Table 1, section 7.4.1 has the new wording that will adequately test both A-frame swings and L-shaped swings.

Staff's recommendations to modify the Stability in the Direction of Motion Test and clarify the Unintentional Folding Test procedure are the result of CPSC testing that included nontraditional swing designs now available. Both recommendations are intended to address new swing designs currently available and any future designs that could be developed. These changes are expected to reduce the number of tip-over incidents and the number of injuries from this type of incident.

Attached Toy issues -- broken or detached toys, toy bars, mobiles, and globes

Broken or detached toys, toy bars, mobiles, and globes that were initially attached to the swing were reported in 2 percent of the 2,268 incident reports. Injuries included bumps and lacerations. These problems were cited as the fifth most common cause of injuries. Staff is recommending a modification to the existing mobile requirement in F 2088.

Currently, F 2088 requires mobiles to be designed to sustain a maximum force when applied in a vertical direction. CPSC staff testing results revealed that at least one mobile design detached at less than 1 lbf when the force was applied horizontally. This horizontally applied force is not normally associated with forces applied by an infant in the swing, but staff believes that inadvertent forces could be applied to mobiles in directions other than purely vertical. Therefore, mobiles that detach at less than 1 lbf in other than the vertical direction present a potential hazard. Based on concerns that some mobile designs can be pulled in directions other than vertical, and concerns that mobile arms could be used as handles to lift swings, staff recommends that mobiles should not release with less than a minimum force, in any direction, below horizontal. This change would effectively eliminate detachment from forces applied in inadvertent directions and still maintain the existing requirement.

Staff recommends modifying section 7.11.3 of the standard to allow the force to be applied in any direction at or below the horizontal plane, in the orientation most likely to fail. The proposed update is expected to reduce the number of inadvertent mobile detachments and the resulting injuries.

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C. Staff Proposed Changes to ASTM F 2088-11b *(Tab C)*

Based on its review of the current voluntary standard and the incidents involving infant swings, CPSC staff acknowledge that ASTM F 2088-11b is an improvement on the performance requirements from the original standard released in 2001. Staff continues to work with ASTM to improve the standard because we believe there are still areas of the standard that can be improved to address some of the known hazards. We believe that more stringent requirements would reduce further the risk of injury associated with infant swings. CPSC staff recommends accepting the ASTM F 2088-11b voluntary standard as the draft proposed rule for infant swings with two additions, two modifications, and several clarifications of specific requirements and associated test methodologies. The major changes as they apply to the different hazard classifications are discussed above. Below is a chart showing how the changes apply to F 2088-11b.

TABLE 1: CPSC Staff-Recommended Changes to ASTM F 2088-11b, Standard Consumer Safety Specification for Infant Swings

(~~Strikeout~~ indicates current language that is recommended to be removed. **Bold** indicates additional language recommended.)

ASTM F 2088-11b Section #	ASTM Language	Proposed Language
6.1.2.1	No existing requirement.	**6.1.2.1 The swing seat shall not have a change in vertical deflection greater than 4 in. The change in vertical deflection shall be calculated by subtracting the distance measured in 7.2.2.2 from the distance measured in 7.2.2.3.**
7.2.2.2	No existing requirement.	**7.2.2.2 Place a static load of 5 lb (2.3 kg) in the center of the seat distributed by a wood block. Measure and record the vertical distance from the floor to the lowest point on the infant swing's seating surface. Remove the load.**
7.2.2.3	7.2.2.2 By any necessary means, place a static load of 75 lb (34.1 kg) or 3 times the manufacturer's maximum recommended weight, whichever is greater, in the center of the seat distributed by a wood block. Gradually apply the weight within 5 s, and	7.2.2.3 By any necessary means, place a static load of 75 lb (34.1 kg) or 3 times the manufacturer's maximum recommended weight, whichever is greater, in the center of the seat distributed by a wood block. Gradually apply the weight within 5 s, and maintain

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ASTM F 2088-11b Section #	ASTM Language	Proposed Language
	maintain for 60 s.	for 60 s. **Measure and record the vertical distance from the floor to the lowest point on the loaded infant swing's seating surface.**
6.7	6.7 *Swings Containing Battery Compartment(s) (remote control devices are exempt from the requirements in 6.7):*	6.7 ***Electrically Powered Swings* (remote control devices are exempt from the requirements in 6.7):**
6.7.4	No existing requirement.	**6.7.4 The surfaces of the batteries, switch, motor, or any other accessible electrical components shall not achieve temperatures exceeding 160°F (71°C) when tested in accordance with 7.13. At the conclusion of the test, the stalled motor condition shall not cause battery leakage, explosion, smoking, or a fire to any electrical component. This test shall be performed prior to conducting any other testing within the Performance Requirements section.**
6.7.5	No existing requirement.	**6.7.5 Swings operating from an a/c power source, nominally a 120-V branch circuit, shall conform to 16 CFR part 1505.**
7.13	No existing requirement.	**7.13 *Electrical Overload Test*—The test shall be conducted using a new swing. The swing shall be tested using fresh alkaline batteries or an a/c power source. If the swing can be operated using both, then both batteries and a/c power must be tested separately. If another battery chemistry is specifically recommended by the manufacturer for use in the swing, repeat the test using the batteries specified by the manufacturer. If the swing will not operate using alkaline batteries, then test with the type of battery recommended by the**

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ASTM F 2088-11b Section #	ASTM Language	Proposed Language
		manufacturer at the specified voltage. The test is to be carried out in a draft-free location, at an ambient temperature of 68 ± 9°F (20 ± 5°C).
7.13.1	No existing requirement.	**7.13.1 Operate the swing at the maximum speed setting with the swing seat locked in a fixed position. Do not disable any mechanical or electrical protective device, such as clutches or fuses. Operate the swing continuously, and record peak temperature. The test may be discontinued 60 min after the peak temperature is recorded. If the swing shuts off automatically, or must be kept "on" by hand or foot, monitor temperatures for 30 s, resetting the swing as many times as necessary to complete the 30 s of operation. If the swing shuts off automatically after an operating time of greater than 30 s, continue the test until the swing shuts off.**
7.2.1.2	7.2.1.2 Set-up the swing in accordance with the manufacturer's instructions. If the swing seat has more than one height position, recline position, or facing direction, test the product in the configuration most likely to fail.	7.2.1.2 Set-up the swing in accordance with the manufacturer's instructions. If the swing seat has more than one height position, recline position, ~~or~~ facing direction, **tray position, or other adjustable feature,** test the product in the configuration most likely to fail.
7.2.1.3	7.2.1.3 Place the shot bag on the seating surface of the swing and allow swinging motion to come to rest. Secure the swing so that the seat cannot move during the test. The means of securing the seat shall not affect the outcome of the test. Raise the shot bag a distance of 1 in. above the seat of the swing. Drop the weight onto the seat 50 times with a cycle time of 4 +/- 1s/cycle. The drop height is to be adjusted to maintain the 1 in. drop	7.2.1.3 Place the shot bag on the seating surface of the swing and allow swinging motion to come to rest. Secure the swing so that the seat cannot move during the test. The means of securing the seat shall not affect the outcome of the test. Raise the shot bag a distance of 1 in. above the seat of the swing. Drop the weight onto the seat ~~50~~ **500** times with a cycle time of 4 +/- 1s/cycle. The drop height is to be adjusted to maintain the 1 in. drop height as is practical.

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ASTM F 2088-11b Section #	ASTM Language	Proposed Language
	height as is practical.	
7.3.2.3	7.3.2.3 Position the product on the inclined surface with the axis of swinging motion parallel to the stop and the lower most frame member(s) in contact with the stop as shown in Fig. 5. If the product contains an axis of swinging motion that does not remain parallel to the stop during the full cycle of the swinging motion, the product shall be tested in the positions most likely to fail. 7.3.2.4 If the swing seat has more than one height position, recline position, or facing direction, test the product in the configuration most likely to fail. 7.3.2.5 Rotate the swing frame 180° and repeat the steps in 7.3.2.2-7.3.2.4.	**7.3.2.3 For a product with a horizontal axis of swing motion,** position the product on the inclined surface with the axis of swinging motion parallel to the stop and the lower most frame member(s) in contact with the stop as shown in Fig. 5. ~~If the product contains an axis of swinging motion that does not remain parallel to the stop during the full cycle of the swinging motion, the product shall be tested in the positions most likely to fail.~~ If the swing seat has more than one height position, recline position, ~~or~~ facing direction, **direction of motion, tray position, or other adjustable feature,** test the product in the configuration most likely to fail. Rotate the swing frame 180° **and repeat the procedure.**
7.3.2.4	No existing requirement.	**7.3.2.4 For a product with other than a horizontal axis of swing motion, position the product on the inclined surface in the most onerous swing orientation, such that the product is in contact with the stop. If the swing seat has more than one height position, recline position, facing direction, direction of motion, tray position, or other adjustable feature, test the product in the configuration most likely to fail.**
7.4.1	7.4.1 With the unit in the manufacturer's recommended use position, apply a force of 10 lbf (45 N) at the end of a leg in the direction normally associated with folding, while holding opposite leg(s) stationary.	7.4.1 With the unit in the manufacturer's recommended use position, apply a force of 10 lbf (45 N) at the ~~end of a leg~~ **lowest point on the leg that results in the greatest force on the latch** in the direction normally associated

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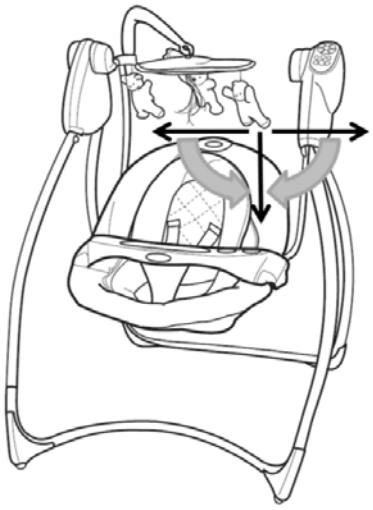
ASTM F 2088-11b Section #	ASTM Language	Proposed Language
	Gradually apply the force over 5 s, and maintain for an additional 10 s. Repeat this test on each leg.	with folding, while holding opposite leg(s) stationary**.** Gradually apply the force over 5 s, and maintain for an additional 10 s. Repeat this test on each leg.
7.11.3	7.11.3 Gradually apply a vertical downward force of 10 lbf in the direction of the occupant to the end of the mobile furthest from the swing attachment point. Apply the force within 5 s and maintain for an additional 10 s.	7.11.3 Gradually apply a ~~vertical downward~~ force of 10 lbf ~~in the direction of the occupant~~ to the end of the mobile **or component** furthest from the swing attachment point. **The direction of the force shall be in the most onerous direction that is at or below the horizontal plane passing through the point at which the force is applied (see Fig. 8a).** Apply the force within 5 s, ~~and~~ maintain for an additional 10 s, **and release within 1 s**. **The test is complete after the release.**  **Fig. 8a Mobile Attachment Strength**
7.12	7.12 *Seat Back Angle Measurement*– Place the back of the swing in the most upright position. Place the hinged boards with the hinged edge into the junction of the swing back and seat (see Fig. 8). Place the inclinometer on the floor and zero the reading. Manually pivot the swing to its furthermost back	7.12 *Seat Back Angle Measurement*– Place the back of the swing in the most upright **use** position. **Remove positioning accessories, including pillows. Orient the belt restraint segments to limit interaction with the hinged boards.** Place the hinged boards with the hinged edge into the junction of

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ASTM F 2088-11b Section #	ASTM Language	Proposed Language
	position. While maintaining this position, place the inclinometer up against the back recline board to obtain the seat back angle as shown in Fig. 9.	the swing back and seat (see Fig. 8). Place the inclinometer on the floor and zero the reading. Manually pivot the swing to its furthermost back position. While maintaining this position, place the inclinometer up against the back recline board to obtain the seat back angle as shown in Fig. 9. **Hinged boards shall be made of C1020 steel using a 4 by 4 in. (101 by 101 mm) plate hinged to a 4 by 9 in. (101 by 225 mm) plate. The thicknesses shall be adjusted so that the mass is equal to 17.5 lb.**

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D. Potential Small Business Impact

Infant swings are typically produced and/or marketed by juvenile product manufacturers and distributors. CPSC staff believes that there are currently at least 10 manufacturers or importers supplying infant swings to the U.S. market. Eight firms are domestic manufacturers, and 2 are domestic importers with foreign parent companies. Based on U.S. Small Business Administration guidelines, there are 8 small firms—6 domestic manufacturers and 2 domestic importers—likely to be affected by the staff-recommended proposed standard, as described in the Directorate for Economic Analysis memo (Tab D).

The impact on the 2 small manufacturers whose infant swings are compliant with the existing voluntary standard (either because they are JPMA certified or claim compliance) is unlikely to be significant. More significant product modifications may be needed for one or more manufacturers whose infant swings do not comply with the voluntary standard.

In general, importers of infant swings may need to find an alternative source if their existing supplier does not come into compliance, possibly replacing the noncompliant infant swing with a compliant infant swing or another juvenile product. Because both of the known importers are subsidiaries importing their infant swings from a foreign parent company, finding an alternative supply source would not be an option for these firms. However, they could respond to the rule by discontinuing the import of their noncomplying infant swings, possibly replacing them with another juvenile product. This is more likely to be necessary for the infant swing supplied by one of the two known small importers who is not believed to be compliant with the voluntary standard.

Additionally, once the rule is final, all manufacturers and importers will be subject to additional costs associated with the third-party testing and certification requirements.

E. Compliance/Recall Information

The Office of Compliance staff reviewed the recalls and opened cases on infant swing incidents that occurred between January 2002 and March 22, 2011. There have been a total of 4 consumer-level recalls completed since 2002 involving infant swings. Three consumer-level recalls were under the Fast-Track Recall Program, whereby Compliance staff and the firm agreed to work together on a corrective action plan that included the consumer-level recall. There were 11 different infant swing models recalled between January 1, 2002 and March 2011, totaling 309,000 products. Three of the four firms that conducted a consumer-level recall provided consumers the option of obtaining a free repair kit to address the infant swing defect. Only one firm requested that consumers contact the firm to return the product and receive a voucher for a replacement product.

Two of the 4 consumer-level recalls involved a fall hazard due to instability of the frame, where the swing flipped forward while the swing was in motion, causing infants to hit their head on the floor or strike their head on the frame of the swing. One recall was the result of screws

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loosening. The 4th recall involved an entrapment hazard because of inadequate clearance between the swing seat and frame.

F. Effective Date of Final Rule

The Administrative Procedure Act (''APA'') generally requires that the effective date of a rule be at least 30 days after publication of the final rule (5 U.S.C. 553(d)). To allow time for infant swing manufacturers to bring their products into compliance after the final rule is issued, the staff proposes that the standard should become effective six months after publication of a final rule for products manufactured or imported on or after that date. A six-month effective date is consistent with other section 104 rules (with the exception of cribs).

IV. STAFF RECOMMENDATIONS

CPSC staff recommends adopting the ASTM F 2088-11b voluntary standard as the federal regulation for infant swings, with CPSC staff-recommended additions, modifications, and clarifications. The requirements outlined in staff's draft proposed rule are substantially the same as those in ASTM F 2088-11b, *Standard Consumer Safety Specification for Infant Swings,* with the following changes:

- Add seat deflection requirements;
- Add electrical overload requirements;
- Modify dynamic drop test cycles;
- Clarify stability testing;
- Modify mobile and toy retention requirements; and
- Clarify other minor requirements as indicated in Table 1 above.

CPSC staff believes the additions, modifications, and clarifications to ASTM F 2088-11b will reduce the number of deaths and injuries to infants from infant swings and recommends that the Commission adopt staff's draft proposed rule for infant swings with an effective date of six months after publications for products manufactured or imported on or after that date.

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TAB A: [Hazard Analysis Staff Memo]

TAB A

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UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
4330 EAST WEST HIGHWAY
BETHESDA, MARYLAND 20814

Memorandum

Date: November 21, 2011

TO : Celestine T. Kiss
Infant Swings Project Manager
Division of Human Factors
Directorate for Engineering Sciences

THROUGH: Kathleen Stralka
Associate Executive Director
Directorate for Epidemiology

FROM : Risana T. Chowdhury
Division of Hazard Analysis
Directorate for Epidemiology

SUBJECT : Infant Swing-Related Deaths, Injuries, and Potential Injuries, and NEISS Injury Estimates; 2002–Present

Introduction

This memorandum characterizes the number of deaths and injuries and the types of hazards related to products coded as infant swings (product code 1553) over a period of more than 9 years, beginning in 2002, through May 18, 2011.[9] These characterizations are based on reports received by CPSC staff. An "infant swing" is defined in the ASTM voluntary standard [F 2088-11b] as a stationary unit with a frame and powered mechanism that enables an infant to swing in a seated position. Infant swings are intended for use with infants from birth until a child is able to sit up unassisted. A cradle swing, which is an infant swing intended for use by a child lying flat, is also included within the scope of the standard. The ASTM standard on infant swings was originally published in 2001, and it was followed by some minor revisions, the latest of which were added in 2011. The data analyzed in this memo begins with the year 2002. Due to the large number of injury reports received through the emergency departments during this wide timeframe, the estimates of emergency department-treated injuries associated with infant swings are presented separately from the rest of the incident data.

[9] Not all of these incidents are addressable by an action the CPSC could take; however, it was not the purpose of this memorandum to evaluate the addressability of the incidents, but rather to quantify the number of fatalities and injuries reported to CPSC staff and to provide estimates of emergency department-treated injuries.

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Incident Data[10]

CPSC staff is aware of a total of 2,268 incidents (15 fatal and 2,253 nonfatal) related to infant swings that reportedly occurred from January 1, 2002 through May 18, 2011. The data extracted included children from birth through 2 years of age. The upper age limit of 2 years was chosen because the weight of the 50th percentile 19- to 24-month-old child is 26.0 lbs, and the upper weight limit for most of the portable swings is 25.0 lbs. However, only incidents that occurred when the infant was using the swing are included for purposes of this memo.[11]

Fatalities

There were 15 fatalities that were reportedly associated with an infant swing during the period from January 1, 2002 to May 18, 2011. The age of all but one of the decedents ranged from 1 month to 10 months; one decedent was a 2-year-old with a physical disability.

In 9 of the 15 fatalities, it was undetermined whether the product was involved in the death or there was very little information available in the reports about the circumstances involved. The decedents in 3 of these fatalities were described as "slumped over."

Among the remaining 6 fatalities, 4 cases resulted from the decedent being placed in a hazardous environment through incorrect use of the product and 2 cases resulted from product failure. The hazardous environment scenarios included:

- Use of a swing without the tray restraint, which resulted in the victim slipping through and getting strangled in the crotch straps;
- Placement of twins in a swing that tipped over, leaving the decedent trapped under a sibling; and
- Placement of the decedent in a swing without any restraints, which allowed the infant to slip out. In one case, the decedent landed face down on a soft surface. In the other case, the decedent, who was severely handicapped, was found prone underneath the swing.

The 2 cases resulting from a product failure (both of which were recalled infant swings, although 1 of the recalls was unrelated to the failure that resulted in the fatality) involved:

- Use of a swing that folded up on the victim; and
- Use of a swing whose straps strangled the victim.

Nonfatal Incidents

[10] The CPSC databases searched were the In-Depth Investigation (INDP) file, the Injury or Potential Injury Incident (IPII) file, and the Death Certificate (DTHS) file. These reported deaths and incidents are neither a complete count of all that occurred during this time period, nor a sample of known probability of selection. However, they do provide a minimum number of deaths and incidents occurring during this time period and illustrate the circumstances involved in the incidents related to infant swings.

[11] The date of extraction for reported incident data was 05/18/11. All data coded under product code 1553 (Portable Baby Swing (for home use)) was extracted. Upon joint review with Engineering Sciences staff, some cases were considered out of scope for the purposes of this memo. For example, cases where SIDS or preexisting medical conditions were listed as the official cause of death, cases where the child was outside the infant swing, cases where the child was playing on the swing rather than using it, or cases where the product, although coded as an infant swing, was an outdoor toddler swing or a hammock, were excluded. With the exception of incidents occurring on U.S. military bases, all incidents that occurred outside of the United States have been excluded. To prevent any double counting, when multiple reports of the same incident were identified, they were consolidated and counted as one incident.

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A total of 2,253 nonfatal incidents associated with portable infant swings were reported to CPSC staff from January 1, 2002 through May 18, 2011. The vast majority (1,809 out of 2,253 or 80 percent) of the reports were submitted to the CPSC by retailers and manufacturers through the CPSC's "Retailer Reporting System." In addition to these, there were 444 incident reports submitted to the CPSC from various sources, such as hotlines, Internet reports, newspaper clippings, medical examiners, and other state/local authorities.

The 2,253 reports included 600 reports of injuries. Two of the injury reports were of children requiring hospitalization. Both infants suffered serious injuries from falls from the swing. Seventy-six percent of the injured children were 6 months of age or younger, and 97 percent were 12 months or younger. Some reports specifically mentioned the type of injury, while others only mentioned an injury with no specifics. Among the injuries specified, bumps, bruises, abrasions, lacerations, concussions, and fractures were common, with the more serious injuries resulting from falls from swings.

Hazard Pattern Identification

CPSC staff considered all 2,268 (15 fatal and 2,253 nonfatal) incidents together to identify the hazard patterns associated with portable infant swing-related incidents. In order of frequency of incident reports, the hazard patterns were grouped into the following categories:

- Restraint issues;
- Broken, detached, or loose components of the swing housing;
- Swing seat issues;
- Inadequate clearance between seat and swing frame;
- Electrical or battery-related issues;
- Swing instability;
- Broken or detached toys, toy bars, mobiles, and globes; and
- Miscellaneous issues.

  - Restraint issues, either the inadequate design of the restraint or the failure of the restraint, were the most commonly reported hazard, resulting in the highest proportion of injuries. Approximately 27 percent of the incidents involved some sort of problems with restraint, most of them involving design issues. Common restraint-design scenarios included: infants falling (or nearly falling) out of the seat when leaning forward or sideways; and infants putting more weight toward the back of the seat, causing the seat to tilt back, and the restraint failing to prevent the infant from sliding out on their head. A common restraint-failure scenario involved buckles or straps breaking or detaching from the product altogether. Restraint issues accounted for 1 fatality and the highest proportion of injuries, most of which resulted from falls. One of the fall injuries due to restraint issues was serious enough to require hospitalization.

  - Broken, detached, or loose components of the swing housing, such as the arm, leg, motor housing, or hardware, were the next most commonly reported problems. They accounted for 25 percent of the 2,268 incident reports, and they were the third most attributed reason for injuries. Most of the resulting injuries were due to falls when the swing components collapsed.

  - Swing seat issues, either seat design or seat failure, were the next most commonly encountered hazard, accounting for 16 percent of the incident reports. Seat design issues caused the seats to lean to one side, or tilt forward or backward. Seat failures resulted in seats folding up on the infant, seat pads not staying in place, or seats falling off with no other apparent component

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failure. With seats that leaned to one side, the infant bumped into the swing frame; with the seat failures, the infant almost always fell out of the swing. One fatality was the result of a seat failure. These issues ranked fourth among the causes of injuries.

- Inadequate clearance between seat and swing frame was reported in 13 percent of the 2,268 incident reports. This problem resulted in the infant's head or neck getting caught between the frame and the seat when they leaned a little, or the infant's limbs hitting the frame while the swing was in motion. Inadequate clearance was the second most reported cause of injuries, most of which resulted from the infant hitting the frame.

- Electrical or battery-related issues were reported in 9 percent of the 2,268 reports. Overheating of the motor housing was the most common scenario. However, there were not many injuries related to this issue reported.

- Instability of the swing was reported in 4 percent of the incident reports. In most of these cases, the swing was described as lifting up one leg when swinging or the swing tipping over completely; in some cases, when the swing was set on an elevated surface, it was reported to inch along the surface until it fell off. The latter scenario played out in one incident that resulted in an injury requiring hospitalization. Injuries due to swing instability, however, were not reported frequently.

- Broken or detached toys, toy bars, mobiles, and globes that were initially attached to the swing were reported in 2 percent of the 2,268 incident reports. Injuries included bumps and lacerations. These problems were cited as the fifth most common cause of injuries.

- Miscellaneous issues accounted for the remaining 4 percent of the reports. The issues ranged from the infant choking on netting, the tray failing to remain latched, and sharp protrusions/surfaces, to reports of product misuse and incidental product involvement. There were a few reports with insufficient information to characterize any specific hazard. Thirteen of the fatal incidents are included in this category because they are attributable to something other than a product hazard; 4 of these deaths were attributable to infants left in a hazardous environment and for the remaining 9 deaths, there was insufficient information to determine what caused the death.

The distribution of the 2,268 reported incidents by the hazard patterns described above are shown in Fig. 1.

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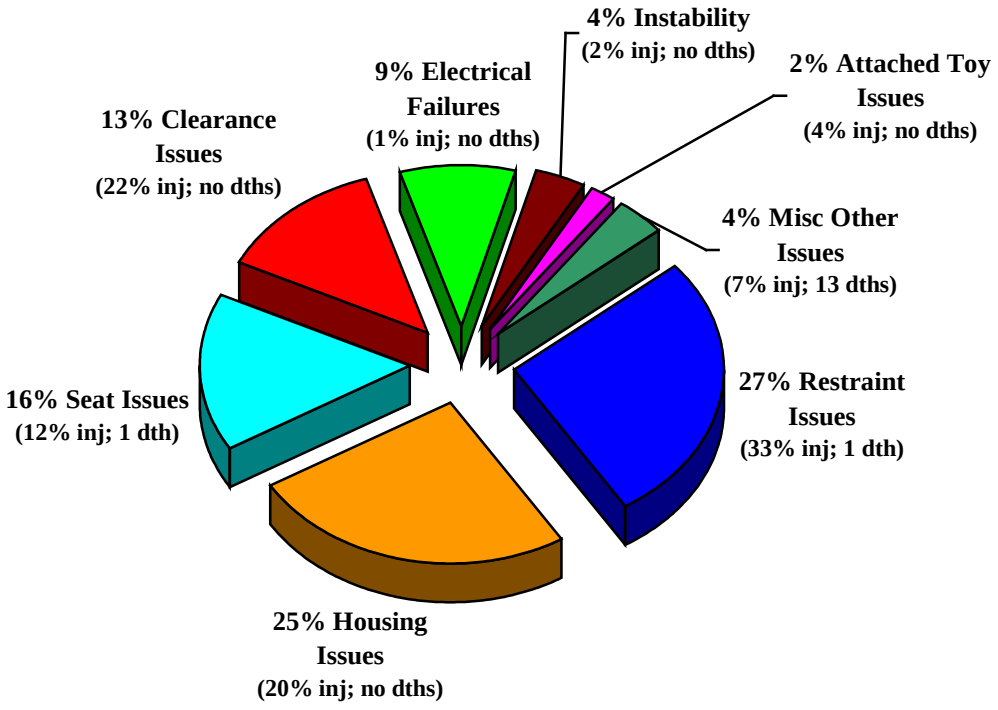
Fig 1: Distribution of Incident Reports Associated with Infant Swings by Hazard Pattern Characterizations 01/01/02-05/18/11



Source: CPSC epidemiological databases IPII, INDP, and DTHS.

National Injury Estimates[12]

There were an estimated total of 12,400 injuries (sample size=457, coefficient of variation=0.14) related to portable infant swings that were treated in U.S. hospital emergency departments over the 9-year period from 2002 through 2010. The injury estimates for individual years are not reportable, because they fail to meet publication criteria.[13] Although there was a statistically significant increase observed in the

[12] The source of the injury estimates is the National Electronic Injury Surveillance System (NEISS), a statistically valid injury surveillance system. NEISS injury data are gathered from emergency departments of hospitals that are selected as a probability sample of all the U.S. hospitals with emergency departments. The surveillance data gathered from the sample hospitals enable CPSC staff to make timely national estimates of the number of injuries associated with specific consumer products.

All data coded under product code 1553 for patients age 2 years and under was extracted. Certain records were considered out of scope for the purposes of this memo. For example, a child sustained a skull fracture when she fell off of a bed and hit her head on an infant swing. Another example involved an older sibling who crawled into a swing in which the infant was seated, causing the swing to fall. These records were excluded prior to deriving the statistical injury estimates.

[13] According to the NEISS publication criteria, an estimate must be 1,200 or greater, the sample size must be 20 or greater, and the coefficient of variation must be 33 percent or smaller.

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estimated injuries from 2009 to 2010, there was no statistically significant trend observed over the 2002 through 2010 period.

No deaths were reported through the NEISS. About 72 percent of the injured were 6 months of age or younger, and about 88 percent were 12 months or younger. For the emergency department-treated injuries related to infant swings, the following characteristics occurred most frequently:

- Hazard – falls (over 70%); a majority of the reports did not specify the manner or cause of fall.
- Injured body part – head (61%) and face (16%).
- Injury type – internal organ injury (40%) and contusions/abrasions (32%).
- Disposition – treated and released (nearly 94%).

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TAB B: [Health Sciences Staff Memo]

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UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
4330 EAST WEST HIGHWAY
BETHESDA, MARYLAND 20814

Memorandum

Date: November 29, 2011

TO : Celestine T. Kiss
Infant Swings Project Manager
Division of Human Factors
Directorate for Engineering Sciences

THROUGH: Mary Ann Danello, Ph.D., Associate Executive Director
Directorate for Health Sciences

Lori E. Saltzman, M.S. Division Director
Division of Health Sciences

FROM : Stefanie Marques, Ph.D. Physiologist
Division of Health Sciences

Suad Wanna-Nakamura, Ph.D. Physiologist
Division of Health Sciences

SUBJECT : Infant Swing-Related Deaths and Injuries

Introduction:

Section 104 of the Consumer Product Safety Improvement Act (CPSIA), *Standards and Consumer Registration of Durable Nursery Products*, requires the U.S. Consumer Product Safety Commission (CPSC) to assess the effectiveness of voluntary consumer product safety standards for durable infant and toddler products and to promulgate mandatory safety standards. The Commission is charged with promulgating consumer product safety standards that are substantially the same as the voluntary standard for infant swings or more stringent than the voluntary standard if the Commission determines that more stringent standards would further reduce the risk of injury associated with infant swings. Section 104 of the CPSIA also requires the Commission to consult with representatives of consumer groups, juvenile product manufacturers, and independent child product engineers and experts to examine and assess the effectiveness of the relevant voluntary standards. Infant swings are one of the products specifically identified in section 104(f) (2) of the CPSIA as a durable infant or toddler product.

An "infant swing" is defined in the ASTM voluntary standard F 2088-11b as a stationary unit with a frame and powered mechanism that enables an infant to swing in a seated position. It is intended for use with infants from birth until a child is able to sit up unassisted. "Cradle swings" are infant swings intended for use by a child lying flat, and are also included within the scope of the standard. The current version of the voluntary standard, ASTM F 2088-11b (which was

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published in November 2011), contains new performance requirements that were not in the original standard published in 2001.

This memorandum provides information on deaths and injuries associated with the use of swings. Four CPSC databases[14] covering the period from January 1, 2002 through May 18, 2011 were searched (Chowdhury, 2011) [15] and only incidents involving children from birth to 2 years of age that were seated in the infant swing during the incident were considered in the memo. There were a total of 2,268 incidents related to infant swings. Of the 2,268 reported incidents, 15 were fatalities, and 600 were nonfatal injuries. According to Chowdhury (2011), there were an estimated 12,400 injuries treated in U.S. hospital emergency departments from 2002 through 2010, as determined from data in the National Electronic Incident Surveillance System (NEISS).

Health Sciences (HS) review of fatalities and discussion of hazard patterns:
There were 15 reported fatalities associated with infant swings during the time period January 1, 2002 to May 18, 2011. In one incident, it is unclear whether the child died in the infant swing; the infant was found dead by his mother in her bed, but the mother claimed that her son died in the swing before she moved him to her bed. In 14 out of the 15 fatalities, the age of the children ranged from 2 weeks to 10 months. The remaining fatality involved a 2-year-old with severe developmental disabilities causing the child to have a tracheostomy and a feeding tube. Ten of the 15 fatalities involved an infant between the ages of 2 weeks to 3 months.

In HS staff's judgement, 5 fatalities involved infants between the ages of 2 weeks to 3 months who were "slumped over." In 3 of these fatalities, the infant was specifically described by the medical examiner or investigating officials[16] as "slumped over"; in 2 additional fatalities, the description of the infant's position suggests to HS staff that they were also "slumped over" incidents.[17]

Infants younger than 3 months are particularly vulnerable to head slumping because they lack head control and are not able to keep their heads upright. While physical growth in height and weight occur rapidly in the first few months of life, maturation in gross and fine motor muscle tone, as well as cognitive development, occur at a slower rate. Gross motor activity that controls and keeps the head steady in a sitting position is attained, on average, when the infant is 2 months old. Sitting upright with no head lag[18] is achieved by around 3 months of age.[19] The combination of a child's head mass and development of their neck muscle tone and strength makes it difficult for infants around 3 months old and younger to keep their head up.

[14] The CPSC databases searched were the In-Depth Investigation (INDP) file, the Injury or Potential Injury Incident (IPII) file, the Death Certificate (DTHS) file, and the National Electronic Injury Surveillance System (NEISS). These reported deaths and incidents are not a complete count of all that occurred during this time period. However, they do provide a minimum number of deaths and incidents occurring during this time period and illustrate the circumstances involved in the incidents related to swings.
[15] Memorandum from Risana T. Chowdhury, Division of Hazard Analysis, Directorate for Epidemiology to Celestine T. Kiss, dated November 21, 2011, subject: Infant Swings-Related Deaths, Injuries and Potential Injuries, and NEISS Injury Estimates; 2002–Present.
[16] The cause of death, as determined by the medical examiner for these fatalities, was asphyxia or positional asphyxia.
[17] For one of these fatalities, the cause of death, as determined by the medical examiner, was positional asphyxia; for the other fatality, the cause of death was listed as undetermined by the medical examiner.
[18] Head lag is when an infant is pulled from a supine to a sitting position, and their head lags behind their trunk.
[19] Nelson, Behrman, Kllegaman and Arvin, Nelson Textbook of Pediatrics, W.B. Saunders Company, 1996.

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In seven incidents,[20] the cause of death, as determined by the medical examiner, was asphyxia[21] or positional asphyxia. Positional asphyxiation occurs when the position of the child's body (such as compression of the neck from the head being slumped over) prevents the child from breathing. Prolonged lateral compression of the neck (when a child is left for a long time in a compromised position) can result in inadequate oxygen supply to the lungs and reduced oxygen delivery to the tissues of the body. Decreased oxygen supply to tissues of the body can result in tissue injury and permanent damage. Prolonged oxygen deprivation of the brain can cause unconsciousness and may result in death.

It is Health Science staff's opinion that a slump-over risk may be present when infants cannot hold their heads upright. Thus, infants who cannot hold their heads up should be placed in a swing only when it is in the fully reclined position. Currently, the voluntary standard contains a requirement that the following warning be printed on infant swings that have a seat back angle greater than 50°: "Use only in the most reclined seat position until infant can hold head up unassisted."[22] It is Health Sciences staff's opinion that this warning addresses the potential risk of harm of slump-over death.

The majority of the fatalities involved the child being left unattended[23] in the infant swing for a significant amount of time (5, 6, or 10 hours, or as long as all morning and overnight). It is Health Sciences staff's opinion that the use of the infant swing as an alternative sleep product is unsafe, and potentially fatal. In addition to leaving infants to sleep unattended for long periods of time, there were other examples of incorrect use of the infant swing that contributed to the fatalities, such as placement of twins side-by-side in the swing, failure to use the restraints, and use of recalled infant swings.

Health Sciences review of nonfatal incidents and discussion of hazard patterns:
A total of 2,253 nonfatal incidents associated with portable infant swings were reported to CPSC staff from January 1, 2002 through May 18, 2011 (Chowdhury, 2011). The 2,253 reports included 600 reports of injuries. The majority of the injuries involved children 12 months old or younger. The majority of the nonfatal injuries appear to be due to restraint issues or overall swing design issues.

Restraint issues were the largest hazard pattern contributing to the majority of the nonfatal injuries. Inadequate design or failure of the restraint system resulted in the child falling completely out of the swing onto the surface below or partially falling within the swing, such as falling forward over the seat tray, or falling to the back or to the side of the swing. The injuries resulting from falls due to restraint issues ranged from minor bumps, bruises, abrasions, and lacerations that did not require any medical attention, to more serious limb fractures and head trauma, such as concussions and skull fractures that did require immediate medical attention. Head trauma injuries in children could lead to permanent brain damage or death.

[20] These incidents include four out of the five slumped over incidents described above; the other slumped over incident was listed as undetermined. It also includes 1 death attributable to poor restraint design and 2 deaths attributable to product misuse.
[21] Asphyxiation occurs when there is an inadequate oxygen supply to the lungs or impairment of oxygen transport to tissues due to obstruction of blood circulation.
[22] ASTM F2088-11b, § 8.3.1(4).
[23] It is HS staff's opinion that the child had been left unattended and unsupervised in incidents where the caregiver did not witness the fatality.

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Overall swing design issues (structural integrity issues), such as broken, detached, or loose components, and seat design/seat failure issues, such as slipping of seat padding, leaning seats, or collapsing seats contributed to a number of nonfatal injuries. Broken, detached, or loose components and seat design/failure issues contributed significantly to fall-related injuries. Another significant hazard pattern that contributed to the number of nonfatal injuries was inadequate clearance between the seat and the swing frame. Overall seat design and inadequate clearance between the seat and the swing frame resulted in many entrapment-type injuries and hits to the head and limbs. Entrapment-type injuries range from minor bruises, cuts, and scrapes, to more serious injuries, such as decreased blood flow to limbs, which could cause tissue damage.

The majority of the incident reports through NEISS involved falls, and the most commonly injured body parts were the head and face. Most of the injuries involved minor bumps, bruises, abrasions, and lacerations that were treated and released from hospital emergency departments. More serious injuries that required the child to be admitted to the hospital or held for observation involved closed-head injuries (for example, concussions), resulting from falls from the swing.

Health Sciences conclusions:
A review by Health Sciences staff of the fatalities and injuries indicates that improper use of the product, such as failure to use restraints, use of old recalled products, and use of the product with infants 3 months old and younger as a sleep environment for prolonged periods of time, were the major contributing factors in the deaths. The failure of parents to appreciate the hazards associated with leaving a vulnerable infant in the first few months of life to sleep for a prolonged period of time in a swing is a major contributing factor to deaths associated with this product.

The severity of injuries (where injury type was specifically entered in the NEISS database) ranged from bumps and bruises to concussions and fractures. The most serious injuries were due to falls from the swing, but the majority of the reported injuries were not serious, and the children who were brought to the hospital were treated and released.

Health Sciences staff is aware that ASTM F 2088-11b now requires use of a shoulder restraint system if the seat of the swing has an incline angle greater than 50 degrees. It is the opinion of Health Sciences staff that use of shoulder harnesses would greatly reduce the number of injuries that result from the child falling from the swing. A shoulder harness system would prevent the child from pushing out, slipping out, or falling forward out of the restraint system. However, it is the opinion of Health Sciences staff that use of a shoulder restraint system would have very little impact on the fatalities where the child's head was slumped over or where the swing was used improperly for long periods of time as a sleep environment. The seat should always be positioned in a fully reclined position whenever infants cannot hold their heads upright.

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TAB C: [Engineering and Laboratory Staff Memo]

TAB C

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UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
4330 EAST WEST HIGHWAY
BETHESDA, MARYLAND 20814

Memorandum

DATE: November 29, 2011

TO: Celestine T. Kiss
Infant Swings Project Manager
Division of Human Factors
Directorate for Engineering Sciences

THROUGH: Andrew G. Stadnik, Associate Executive Director for Laboratory Sciences,
James C. Hyatt, Director, Division of Mechanical Engineering, Directorate for Laboratory Sciences

FROM: Richard McCallion
Mechanical Program Area Team Leader
Office of Hazard Identification and Reduction

Ian Hall, Mechanical Engineer
Division of Mechanical Engineering
Directorate for Laboratory Sciences

SUBJECT : Proposed Changes to ASTM F 2088-11b, Standard Consumer Safety Specification for Infant Swings, for Incorporation in Staff's Proposed Rule.

I BACKGROUND / OVERVIEW

Section 104, *Standards and Consumer Registration of Durable Nursery Products,* of the Consumer Product Safety Improvement Act (CPSIA) of 2008, requires the U.S. Consumer Product Safety Commission (CPSC) to assess the effectiveness of voluntary consumer product safety standards for durable infant and toddler products and to promulgate mandatory safety standards. Section 104 (b)(1)(B) states that "The Commission shall . . . promulgate consumer product safety standards that—(i) are substantially the same as voluntary standards; or (ii) are more stringent than such voluntary standards if the Commission determines that more stringent standards would further reduce the risk of injury associated with such products."

The ASTM voluntary standard for Infant Swings, ASTM F 2088, was originally approved in 2001. The 2001 version of the standard included test requirements to prevent powered swings from tipping over or collapsing. It was also meant to prevent structural failures and children

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becoming entangled in the restraints, and entraped in the leg holes. The current published version includes additional test requirements for dynamic structural testing, a leg opening test, a positive protection from unintentional battery charging requirement, strengthened restraint requirements, and it requires toys included with swings to meet ASTM F 963, *Consumer Safety Specification for Toy Safety*. Additionally, there have been other standard modifications to provide clarifications (Table 1), which in the opinion of CPSC staff, have improved the standard. This memorandum reports the results of a CPSC staff assessment of the effectiveness of ASTM F 2088-11b, and outlines changes recommended by staff for inclusion in the draft proposed rule on infant swings.

Table 1: ASTM F 2088 Infant Swing Standard Revisions

Standard Version	Revision, Deletion, or Modification
F 2088-01 (Original Published Version)	Sharp Edges/Points Small Parts Lead Paint and Surface Coating Wood Parts Latching/Locking Scissoring/Shearing Openings Exposed Coil Springs Protective Components Labeling Static Load Stability Unintentional Folding Restraint Cradle Swing Orientation Battery Operated Swings
F 2088-03 (Published 04/2003)	Deleted 5.5 Latching/Locking mechanism redundant to 6.3 Unintentional Folding - renumbered sections Revised 5.6 Holes and Openings section Added 6.6.3 Charging of primary batteries Added 8.3.3 Cradle Swing Warnings on product and in instructions
F 2088-07 (Published 01/2008)	Added 5.10 Toys Revised 6.4 requiring 3 point restraint for all seated swings Added 6.5 and 7.10 Passive Crotch Restraint and renumbered accordingly Revised 6.7 and 8.4 Battery Operation
F 2088-08 (Published 02/2008)	Revised 6.1 and 7.2 to include a dynamic test
F 2088-08e1 (Published 11/2008)	Reworded 8.3 for clarity and renumbered accordingly Revised old 8.3.3 (now 8.3.2) cradle swing warnings
F 2088-09 (Published 11/2009)	Added 5.10.1 addressing toy mobiles that attach solely to a swing

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Standard Version	Revision, Deletion, or Modification
F 2088-011a (Published 3/2011)	Added 3.1.11 defining a travel swing Added 5.10.2 and 7.11 addressing toy mobile requirements and testing Modified 6.1 to eliminate repositioning after the dynamic drop test Added 6.4.2 to require shoulder straps for certain seatback angles Modified 7.2.1.2 to test the orientation most likely to fail Modified 8.3.1 to clarify warning statements Added Figure 8 and Figure 9 to clarify seatback angle test Added Appendix X1.1 to clarify background information on the seatback angle requirement Added Appendix X1.4 to clarify background information on the toy mobile requirements
F 2088-011b (Published 11/2011)	Modified 7.2.1.3 to restrict swing motion during dynamic test Modified 7.3.2.3 to test alternative swing designs Modified 8.3.1(4) to clarify warning statement

A) Incident Data Review

According to the CPSC's Epidemiology memorandum,[24] CPSC received reports of 15 deaths from the use of infant swings by children under 3 years old since January 1, 2002.[25] Staff is aware of 2,253 nonfatal incidents, including 600 injury reports between January 1, 2002 and May 18, 2011. CPSC staff identified hazard patterns in multiple areas and categorized them as restraints; swing housing components; swing seat issues; seat to frame clearance; electrical or battery issues; swing instability; broken or detached toys, toy bars, mobiles, and globes; and miscellaneous issues.

The most commonly reported incident involved restraint issues. Restraint issues refer to the inadequate design or a restraint system failure in the incident swing and accounted for approximately 27 percent of the total incidents reported. The most common issues with restraints involved infants falling while leaning forward or sideways, infants pushing themselves out of the rear or side of the swing, buckles breaking, and straps detaching from the swing. Incidents related to restraints had the highest number of reported injuries and one death.

The second most commonly reported incident involved broken, detached, or loose swing housing components, which accounted for 25 percent of the incidents. In addition to causing incidents, broken or detached components caused a significant number of injuries, according to CPSC data, making this the third most reported cause of injuries. The injuries were predominantly falls when the swing components collapsed.

[24] Memorandum from Risana Chowdhury to Celestine T. Kiss, Infant Swings-Related Deaths, Injuries and Potential Injuries, and NEISS Injury Estimates; 2002–Present, November 21, 2011.

[25] The CPSC databases searched were the In-Depth Investigation (INDP) file, the Injury or Potential Injury Incident (IPII) file, and the Death Certificate (DTHS).

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Incidents involving the swing seat accounted for 16 percent of the incidents. These included seats tilting sideways, forward, or backward. Additionally, consumers reported incidents in which the swing folded on the child, the seat detached, and the seat pads detached. Seat issues were reported as the fourth largest cause of injuries, and they were associated with one death.

Inadequate clearance between the swing seat and frame accounted for another 13 percent of the reported incidents. This was the second most reported cause of injuries and resulted in a head, neck, or limb entrapment when the infant's head, neck, or limb exited the side of the seat while the swing was in motion.

Electrical or battery-related issues accounted for 9 percent of the incidents, and the majority of these incidents involved overheating motor housings. There were few reported injuries.

Four percent of the incidents were the result of swing instability, including leg lift-offs and assembly tip over. In some cases, the caregiver incorrectly placed the swing on an elevated or inclined surface. Over time, the infant swing inched toward and subsequently fell off the edge of the surface. There were a limited number of injuries reported, and one injury required hospitalization.

Incidents involving toys and mobiles accounted for 2 percent of the injuries that included lacerations and contusions. These problems were cited as the fifth most common cause of injuries.

Miscellaneous issues include issues with tray table latches, netting, sharp points, edges, protrusions, and any other type of incident not contained in the previous categories. Thirteen of the reported deaths were associated with this area because they are not associated with one of the hazards listed above. Five of these deaths are attributable to slump over, and four deaths are attributable to product misuse. For the remaining four deaths, CPSC staff lacked enough information to determine what caused the death and whether the swing contributed to the fatality.

From 2002 through 2010, there were an estimated 12,400 injuries treated in U.S hospital emergency departments related to swings, as determined from data in the National Electronic Injury Surveillance System (NEISS). The most frequent injury type reported was falls from the swing. Head injuries accounted for 70 percent of the treated injuries, and approximately 94 percent of the patients treated were released without requiring a hospital stay.

B) Adequacy of ASTM F 2088-11b

The current version of the voluntary standard, ASTM F 2088-11b, was evaluated by CPSC staff. Staff obtained and tested swing samples from different manufacturers, as well as different models and designs. Sample manufacturing dates ranged from 2006 to 2011. CPSC staff tested all swing samples in new condition and in accordance with the requirements of F 2088-11a, since ASTM released F 2088-11b after the testing. Staff conducted additional testing on specific samples based on the results obtained from the initial tests, observations during those tests, and

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laboratory staff experience. The additional testing was used to support the proposed staff recommendations.

ASTM F 2088-11b was released after the completion of laboratory staff testing and standard evaluation. Technical staff has reviewed the updates in the latest version and revised the staff recommendations to include updates made by the ASTM Subcommittee on Infant Swings.

Overall, ASTM F 2088-11b improved the performance requirements from the original standard released in 2001. The latest 2011 version addresses many of the issues reported to the CPSC; however, staff does not believe that these requirements are sufficient to reduce or address all of the hazards to infants resulting from foreseeable use of infant swings. Therefore, CPSC staff recommends changes to the proposed rule beyond ASTM F 2088-11b.

II PROPOSED REQUIREMENTS FOR INFANT SWINGS

CPSC staff recommends adopting the ASTM F2088-11b voluntary standard as the federal regulation for infant swings with the addition, modification, and clarification to several requirements and associated test methodologies, including:

- Electrical Overload
- Mobile and Toy Retention
- Stability
- Structural Integrity
- Seatback Angle

Electrical Overload

Approximately 9 percent of the total incidents involved electrical or battery-related incidents, including the detection of smoke, leaking batteries, or overheating. Swing designs typically rely on either a/c power, batteries, or a combination of both to operate the product. There are no requirements in the current version of F 2088 regarding the design and operation of the electrical components in infant swings. To reduce these hazards, staff proposes the addition of a new stalled motor requirement and test procedure substantially similar to requirements in ASTM F 963.

The test will check to ensure that a normal electrical load cannot overload the electrical circuit. Testing will include operating the swing with the seat in a fixed position and operated continuously until a peak temperature can be recorded. This will ensure that all components, including motors, connections, batteries, circuit boards, wiring, and all other electrical components do not overheat. Overheating can cause the components to melt, smoke, explode, or cause a fire.

Additionally, staff recommends an accessible component temperature requirement. The new tests will include a maximum temperature requirement for all accessible electrical components on the swing. This requirement will be performed on any component that is accessible to the

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consumer during normal use. Testing will require the determination of accessibility using standard finger probes. Upon determination, all accessible electrical components will be subjected to a maximum temperature test. The maximum temperature for this requirement is less than the overload test but high enough to ensure that consumers do not sustain burns from contacting components with hot surface temperatures.

Some swing models operate with dual power sources, such as a/c and batteries. Staff included a requirement to test both power sources. Swings are to be tested using each power source independently. Additionally, staff is recommending a requirement for testing all applicable battery chemistries. Battery chemistries such as Nickel Cadmium (NiCd), Nickel-Metal Hydride (NiMH), Lead Acid, and Lithium Ion (Li-ion) may be used interchangeably depending on the swing design. In certain situations it could be possible for a consumer to interchange battery types, resulting in a battery failure. Testing each type independently will ensure that swings are designed properly to avoid these types of incidents.

The addition of electrical testing requirements will reduce the likelihood of incidents, such as overloading electrical components, battery leakage, or electrical failures that could lead to fire, yielding a reduction in consumer injuries and property damage.

Mobile and Toy Retention

Incident reports indicate that mobiles and toys were responsible for 2 percent of the overall injuries and no fatalities. Most of the injuries sustained were contusions and lacerations. Staff is recommending a modification to the existing mobile requirement in F 2088.

Currently, F 2088 requires mobiles to be designed to sustain a maximum force when applied in a vertical direction. CPSC staff testing results revealed that at least one mobile design detached at less than 1 lbf when the force was applied horizontally. This horizontally applied force is not normally associated with forces applied by an infant in the swing; but staff believes that inadvertent forces could be applied to mobiles in directions other than purely vertical. Therefore, mobiles that detach at less than 1 lbf in other than the vertical direction present a potential hazard. Based on concerns that some mobile designs can be pulled in directions other than vertical, and concerns that mobile arms could be used as handles to lift swings, staff recommends mobiles should not release with less than a minimum force in any direction below horizontal. This change would effectively eliminate detachment from forces applied in inadvertent directions and still maintain the existing requirement.

Staff recommends modifying this section of the standard to allow the force to be applied in any direction at or below the horizontal plane, in the orientation most likely to fail. The proposed update is expected to reduce the number of inadvertent mobile detachments and the resulting injuries.

Stability

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Instability accounted for 4 percent of the incidents reported. These incidents were mostly described as lift-off issues, where one leg loses contact with the ground or completely tips over. There were a few reports of incidents where the swing started to fold, resulting in stability-related incidents. Staff is recommending a clarification of the existing Unintentional Folding Test contained in F 2088. Staff also recommends a modification to the Stability in the Direction of Swing Motion Test.

The Unintentional Folding Test is designed to address stability for traditional A-frame type infant swings. A force is to be applied at the bottom of the leg that successfully addresses swings with traditional swing designs. However, new swings with nontraditional designs are now produced that require the stability test to be interpreted. Swings with cantilevered legs (L-shaped) were tested by CPSC staff. In swings of this design, the force can be applied anywhere along the leg and could result in a pass or fail, depending upon the location of the force application. Based on this, staff recommends clarifying F 2088 to state that the force shall be applied in the location that will most likely result in the swing folding.

F 2088 also includes the Stability in the Direction of Motion Test which, in its current form, is primarily applicable to traditional swing designs. These traditional swings produce a fore and aft motion by rotating around a horizontal axis; however, some newer swings have a vertical swing axis. F 2088 testing is designed for swings with a horizontal swing axis. This test requires testing in a forward and 180-degree opposite orientation, which is acceptable for traditional horizontal axis swings but does not sufficiently address alternative designs. In the case of swings with a vertical swing axis, fore and aft directions are not clearly defined. In these cases, there are multiple positions that could be considered for testing. Therefore, staff recommends testing alternative swing designs in the worst-case orientation. This requirement is only applicable to nontraditional, alternative designs that cannot be tested in the fore and aft orientations.

Staff's recommendations to clarify the F 2088 Unintentional Folding Test procedure and the Stability in the Direction of Motion Test are the result of CPSC staff testing, which included nontraditional swing designs now available. Both recommendations are intended to address new swing designs currently available and any future designs that could be developed. These changes are expected to reduce the number of tip-over incidents and the number of injuries from this type of incident.

Structural Integrity

Twenty-five percent of the incidents reported broken, detached, or loose swing housing components. Detached components were the third most reported cause of injuries. These injuries were predominantly falls, resulting from the swing components collapsing after failure. Seat issues, such as seats leaning to one side, tilting forward or backwards, and seat failures resulting in seats folding up on the infant, comprised 14 percent of the incidents, including one fatality. These issues ranked fourth among the causes of injuries. CPSC staff recommends modifying the Dynamic Load Test by increasing the number of dynamic drop cycles from 50 to 500, as well as the addition of a new seat deflection test.

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Staff evaluated and tested multiple swings of various designs produced from 2006 through 2011, and they does not believe the existing requirement of 50 cycles is sufficient to identify potential issues with structural components. A full life cycle test requirement was initially considered; however, staff determined it to be unfeasible, based on the time necessary to perform the full test. A full life cycle test would require the swing to be used until it completely failed. Testing revealed that 500 cycles was the point at which the least robust swing started to show signs of fatigue in some plastic components. CPSC staff reported one design failed the proposed 500-cycle requirement, although it passed the original 50-cycle test. By adding 450 cycles, staff calculated that it would extend the test by approximately 30 minutes. Staff concluded that the initial assessment regarding the insufficiency of 50 cycles was correct, and a minimum of 500 cycles would be a more appropriate test to evaluate the structural integrity and reveal potential structural issues in the swing components.

In addition to modifications to the cyclic test procedure, staff identified a potential issue that could be solved by updating the static structural test. During the static structural testing of swing samples by laboratory staff, some designs significantly deformed under the current 75 lb static load test. In some cases, the deflection was so severe that the static mass fell to the floor. Additionally, the CPSC incident database showed similar incidents where the victim attempeted to reach an object and, through a combination of seat deflection and seat instability, fell out of the seat. Currently, F 2088 requires a 75 lb static load with no deflection requirement. This allows unlimited seat deflection, potentially placing the occupant in an unsafe position, which could result in injury.

Staff recommends adding an additional measurement and requirement to the static load test. Prior to placing the 75 pound mass in the swing's seat, test personnel would place a 5 pound mass in the seat and measure the vertical distance between the floor and the bottom of the seat. Then, during the static load test, test personnel could measure the vertical distance between the floor and the swing's seat again, yielding a relative displacement under nominally loaded and severely loaded conditions. Some swings have cloth seats, which significantly relax when they are unloaded. That relaxation could confound the real goal of this test, which is measuring the swing's structural deformation under severe loads. Therefore, staff believes that comparing the structural deformation of the 75 lb test against the 5 lb test is more appropriate than comparing the structural deformation of the 75 lb against an unloaded seat. If the difference between the two distances is greater than 4 inches, the unit would fail the test.

Staff recommends updating both the dynamic and the static tests. Increasing the number of dynamic impact cycles will reduce the possibility of structural failures and will lead to a decrease in the number and severity of injuries. Staff has concluded, based on testing and evaluation, that the existing requirement of 50 cycles is insufficient to address the incidents that currently occur. Additionally, staff recommends the addition of a new maximum seat deflection requirement to the static seat test in the standard. This will reduce the possibility of excessive swing seat deflection and seat failures.

<u>Seatback Angle</u>

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Twenty-seven percent of all incident reports involve restraint issues. Restraint issues resulted in 33 percent of reported injuries. In many of the incidents, the victim pushed themselves backward with their feet and fell out of the swing. We received reports of one fatality and one hospitalization attributable to restraint issues.

In any swing, adding a shoulder harness may reduce the quantity and severity of incidents. The current voluntary standard contains a test procedure used to determine which swing seats have a seat back angle greater than 50°. According to the current voluntary standard, those units with seat back angles greater than 50° would then be required to have a shoulder harness. CPSC staff proposes two changes to the seat back angle test procedure in section 7.12.

The first proposed change requires the tester to move positioning accessories and belts to limit the interaction with the seat back angle test fixture. This modification will reduce test-to-test variation, and thus improve consumer safety.

The second change requires that the seat back angle fixture be constructed of C1020 steel and have a mass of 17.5 lb, the mass of the CAMI Mark II dummy (i.e., standardized infant dummy used for testing). Some infant swings are constructed by stretching cloth over a tube structure. In those designs, the cloth deflects downward when a child is placed in the seat, and as the cloth deflects, the seat back angle increases. The proposed fixture better replicates the weight of the child in the swing and may make the test more severe.

Both changes will reduce the number and severity of injuries, by reducing test variability and by more accurately representing a child's weight.

TABLE 2: CPSC Staff-Recommended Changes to ASTM F 2088-11b, Standard Consumer Safety Specification for Infant Swings

(~~Strikeout~~ indicates current language that is recommended to be removed. **Bold** indicates additional language recommended.)

ASTM F 2088-11b Section #	ASTM Language	Proposed Language
6.1.2.1	No existing requirement.	**6.1.2.1 The swing seat shall not have a change in vertical deflection greater than 4 in. The change in vertical deflection shall be calculated by subtracting the distance measured in 7.2.2.2 from the distance measured in 7.2.2.3.**

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ASTM F 2088-11b Section #	ASTM Language	Proposed Language
7.2.2.2	No existing requirement.	**7.2.2.2 Place a static load of 5 lb (2.3 kg) in the center of the seat distributed by a wood block. Measure and record the vertical distance from the floor to the lowest point on the infant swing's seating surface. Remove the load.**
7.2.2.3	7.2.2.2 By any necessary means, place a static load of 75 lb (34.1 kg) or 3 times the manufacturer's maximum recommended weight, whichever is greater, in the center of the seat distributed by a wood block. Gradually apply the weight within 5 s and maintain for 60 s.	7.2.2.3 By any necessary means, place a static load of 75 lb (34.1 kg) or 3 times the manufacturer's maximum recommended weight, whichever is greater, in the center of the seat distributed by a wood block. Gradually apply the weight within 5 s and maintain for 60 s. **Measure and record the vertical distance from the floor to the lowest point on the loaded infant swing's seating surface.**
6.7	6.7 *Swings Containing Battery Compartment(s) (remote control devices are exempt from the requirements in 6.7):*	6.7 ***Electrically Powered Swings* (remote control devices are exempt from the requirements in 6.7):**
6.7.4	No existing requirement.	**6.7.4 The surfaces of the batteries, switch, motor, or any other accessible electrical components shall not achieve temperatures exceeding 160°F (71°C) when tested in accordance with 7.13. At the conclusion of the test, the stalled motor condition shall not cause battery leakage, explosion, smoking, or a fire to any electrical component. This test shall be performed prior to conducting any other testing within the Performance Requirements section.**
6.7.5	No existing requirement.	**6.7.5 Swings operating from an a/c power source, nominally a 120-V branch circuit, shall conform to 16 CFR 1505.**

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ASTM F 2088-11b Section #	ASTM Language	Proposed Language
7.13	No existing requirement.	**7.13** ***Electrical Overload Test*—The test shall be conducted using a new swing. The swing shall be tested using fresh alkaline batteries or an a/c power source. If the swing can be operated using both, then both batteries and a/c power must be tested separately. If another battery chemistry is specifically recommended for use in the swing by the manufacturer, repeat the test using the batteries specified by the manufacturer. If the swing will not operate using alkaline batteries, then test with the type of battery recommended by the manufacturer at the specified voltage. The test is to be carried out in a draft-free location, at an ambient temperature of 68 ± 9°F (20 ± 5°C).**
7.13.1	No existing requirement.	**7.13.1 Operate the swing at the maximum speed setting with the swing seat locked in a fixed position. Do not disable any mechanical or electrical protective device, such as clutches or fuses. Operate the swing continuously, and record peak temperature. The test may be discontinued 60 min after the peak temperature is recorded. If the swing shuts off automatically or must be kept "on" by hand or foot, monitor temperatures for 30 s, resetting the swing as many times as necessary to complete the 30 s of operation. If the swing shuts off automatically after an operating time of greater than 30 s, continue the test until the swing shuts off.**

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ASTM F 2088-11b Section #	ASTM Language	Proposed Language
7.2.1.2	7.2.1.2 Set-up the swing in accordance with the manufacturer's instructions. If the swing seat has more than one height position, recline position, or facing direction, test the product in the configuration most likely to fail.	7.2.1.2 Set-up the swing in accordance with the manufacturer's instructions. If the swing seat has more than one height position, recline position, ~~or~~ facing direction, **tray position, or other adjustable feature,** test the product in the configuration most likely to fail.
7.2.1.3	7.2.1.3 Place the shot bag on the seating surface of the swing and allow swinging motion to come to rest. Secure the swing so that the seat cannot move during the test. The means of securing the seat shall not affect the outcome of the test. Raise the shot bag a distance of 1 in. above the seat of the swing. Drop the weight onto the seat 50 times with a cycle time of 4 +/- 1s/cycle. The drop height is to be adjusted to maintain the 1 in. drop height as is practical.	7.2.1.3 Place the shot bag on the seating surface of the swing and allow swinging motion to come to rest. Secure the swing so that the seat cannot move during the test. The means of securing the seat shall not affect the outcome of the test. Raise the shot bag a distance of 1 in. above the seat of the swing. Drop the weight onto the seat ~~50~~ **500** times with a cycle time of 4 +/- 1s/cycle. The drop height is to be adjusted to maintain the 1 in. drop height as is practical.
7.3.2.3	7.3.2.3 Position the product on the inclined surface with the axis of swinging motion parallel to the stop and the lower most frame member(s) in contact with the stop as shown in Fig. 5. If the product contains an axis of swinging motion that does not remain parallel to the stop during the full cycle of the swinging motion, the product shall be tested in the positions most likely to fail. 7.3.2.4 If the swing seat has more than one height position, recline position, or facing direction, test the product in the configuration most likely to fail. 7.3.2.5 Rotate the swing frame 180° and repeat the steps in 7.3.2.2-7.3.2.4.	**7.3.2.3 For a product with a horizontal axis of swing motion,** position the product on the inclined surface with the axis of swinging motion parallel to the stop and the lowermost frame member(s) in contact with the stop as shown in Fig. 5. ~~If the product contains an axis of swinging motion that does not remain parallel to the stop during the full cycle of the swinging motion, the product shall be tested in the positions most likely to fail.~~ If the swing seat has more than one height position, recline position, ~~or~~ facing direction, **direction of motion, tray position, or other adjustable feature,** test the product in the configuration most likely to fail. Rotate the swing frame 180° **and repeat the procedure.**

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ASTM F 2088-11b Section #	ASTM Language	Proposed Language
7.3.2.4	No existing requirement.	**7.3.2.4 For a product with other than a horizontal axis of swing motion, position the product on the inclined surface in the most onerous swing orientations, such that the product is in contact with the stop. If the swing seat has more than one height position, recline position, facing direction, direction of motion, tray position, or other adjustable feature, test the product in the configuration most likely to fail.**
7.4.1	7.4.1 With the unit in the manufacturer's recommended use position, apply a force of 10 lbf (45 N) at the end of a leg in the direction normally associated with folding, while holding the opposite leg(s) stationary. Gradually apply the force over 5 s, and maintain for an additional 10 s. Repeat this test on each leg.	7.4.1 With the unit in the manufacturer's recommended use position, apply a force of 10 lbf (45 N) at the ~~end of a leg~~ **lowest point on the leg that results in the greatest force on the latch** in the direction normally associated with folding, while holding opposite leg(s) stationary**.** Gradually apply the force over 5 s, and maintain for an additional 10 s. Repeat this test on each leg.
7.11.3	7.11.3 Gradually apply a vertical downward force of 10 lbf in the direction of the occupant to the end of the mobile furthest from the swing attachment point. Apply the force within 5 s and maintain for an additional 10 s.	7.11.3 Gradually apply a ~~vertical downward~~ force of 10 lbf ~~in the direction of the occupant~~ to the end of the mobile **or component** furthest from the swing attachment point. **The direction of the force shall be in the most onerous direction that is at or below the horizontal plane passing through the point at which the force is applied (see Fig. 8a).** Apply the force within 5 s, ~~and~~ maintain for an additional 10 s, **and release within 1 s**. **The test is complete after the mobile comes to rest.**

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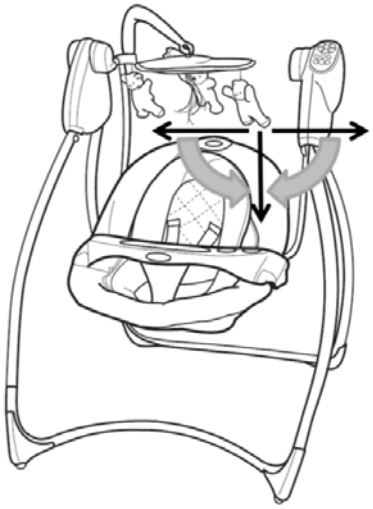
ASTM F 2088-11b Section #	ASTM Language	Proposed Language
		 **Fig. 8a Mobile Attachment Strength**
7.12	7.12 *Seat Back Angle Measurement* – Place the back of the swing in the most upright position. Place the hinged boards with the hinged edge into the junction of the swing back and seat (see Fig. 8). Place the inclinometer on the floor and zero the reading. Manually pivot the swing to its furthermost back position. While maintaining this position, place the inclinometer up against the back recline board to obtain the seat back angle as shown in Fig. 9.	7.12 *Seat Back Angle Measurement* – Place the back of the swing in the most upright **use** position. **Remove positioning accessories, including pillows. Orient the belt restraint segments to limit interaction with the hinged boards.** Place the hinged boards with the hinged edge into the junction of the swing back and seat (see Fig. 8). Place the inclinometer on the floor and zero the reading. Manually pivot the swing to its furthermost back position. While maintaining this position, place the inclinometer up against the back recline board to obtain the seat back angle as shown in Fig. 9. **Hinged boards shall be made of C1020 steel, using a 4 by 4 in. (101 by 101 mm) plate hinged to a 4 by 9″ (101 by 225 mm) plate. The thicknesses shall be adjusted so that the mass is equal to 17.5 lb.**

III CONCLUSIONS

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CPSC staff recommends adopting the ASTM F 2088-11b version of the standard with the proposed revisions. These revisions include two new requirements in addition to two major modifications and several clarifications of the existing requirements.

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TAB D: [Economic Staff Memo]

TAB D

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UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
4330 EAST WEST HIGHWAY
BETHESDA, MARYLAND 20814

Memorandum

Date: November 29, 2011

TO : Celestine T. Kiss
Project Manager, Infant Swings
Division of Human Factors
Directorate for Engineering Sciences

THROUGH: Gregory B. Rodgers, Ph.D.
Associate Executive Director
Directorate for Economic Analysis

Deborah V. Aiken, Ph.D.
Senior Staff Coordinator
Directorate for Economic Analysis

FROM : Jill L. Jenkins, Ph.D.
Economist
Directorate for Economic Analysis

SUBJECT : Initial Regulatory Flexibility Analysis of Staff-Recommended Proposed Standard for Infant Swings

Introduction

On August 14, 2008, the Consumer Product Safety Improvement Act (CPSIA) of 2008 was enacted. Among its provisions, section 104 of the CPSIA requires that the U.S. Consumer Product Safety Commission (CPSC) examine and assess the effectiveness of the existing voluntary standards for durable infant or toddler products and promulgate a mandatory standard substantially the same as, or more stringent than, the applicable voluntary standard. Swings (often referred to as infant swings to differentiate them from swings for older children) are among the durable products specifically named in section 104 of the CPSIA. Upon review, CPSC staff recommends that the Commission adopt the voluntary ASTM International (formerly known as the American Society for Testing and Materials) standard for infant swings (F 2088-11b), with several modifications, additions, and clarifications.

The Regulatory Flexibility Act (RFA) requires that proposed rules be reviewed for their potential economic impact on small entities, including small businesses. Section 603 of the RFA requires that CPSC prepare an initial regulatory flexibility analysis and make it available to the

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public for comment when the general notice of proposed rulemaking is published. The initial regulatory flexibility analysis must describe the impact of the proposed rule on small entities and identify any alternatives that may reduce the impact. Specifically, the initial regulatory flexibility analysis must contain:

1. a description of and, where feasible, an estimate of the number of small entities to which the proposed rule will apply;
2. a description of the reasons why action by the agency is being considered;
3. a succinct statement of the objectives of, and legal basis for, the proposed rule;
4. a description of the projected reporting, recordkeeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities subject to the requirements and the type of professional skills necessary for the preparation of reports or records; and
5. an identification, to the extent possible, of all relevant Federal rules which may duplicate, overlap, or conflict with the proposed rule.

The Product

Infant swings are products with a stationary frame that use a powered mechanism to swing the child. The powered mechanism may be electronic, battery powered, or wind up. Most infant swings hold children in a seated position, but cradle swings—where the child is lying flat or nearly flat—are also considered infant swings. Other products that would be included in the staff-recommended standard are:

1) travel swings, which are similar to traditional swings but are lower to the ground; and
2) gliders, which differ from traditional swings only in their type of motion.

Swings without a power mechanism, whether intended for infants or older children, would not be included under the staff-recommended proposed standard.

The Market for Swings

Infant swings are typically produced and/or marketed by juvenile product manufacturers and distributors. CPSC staff believes that currently, there are at least 10 manufacturers or importers supplying infant swings to the U.S. market.[26] Eight firms are domestic manufacturers, and two are domestic importers with foreign parent companies.[27] Five of the 10 firms have been certified as compliant with the ASTM voluntary standard by the Juvenile Products Manufacturers Association (JPMA), the major U.S. trade association that represents juvenile product manufacturers and importers.

[26] There is an additional company that was supplying infant swings to the U.S. market as recently as last year. It could easily re-enter the market.
[27] Determinations were made using information from Dun & Bradstreet and ReferenceUSAGov, as well as firm websites.

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According to a 2005 survey conducted by the American Baby Group (*2006 Baby Products Tracking Study*),[28] 79 percent of new mothers own at least one infant swing—61 percent own full-size infant swings, and 33 percent own smaller travel infant swings. Approximately 33 percent of full-size infant swings and 27 percent of travel infant swings were handed down or purchased secondhand.[29] Thus, about 67 percent of full-size infant swings and 73 percent of travel infant swings were acquired new. This suggests annual sales of about 2.7 million infant swings to households (.67 x .61 x 4.1 million births per year + .73 x .33 x 4.1 million births per year).[30]

Reason for Agency Action and Legal Basis for the Draft Proposed Rule

Section 104 of the CPSIA requires the CPSC to promulgate a mandatory standard for infant swings that is substantially the same as, or more stringent than, the voluntary standard if the Commission determines that a more stringent standard would further reduce the risk of injury. CPSC staff is recommending several modifications, additions, and clarifications to the current voluntary standard (F 2088-11b). CPSC staff believes that the more stringent requirements will address known hazard patterns, and, thereby, help to further reduce injuries and deaths in infant swings.[31] Additionally, staff believes that the clarifications will enable test labs to conduct the mandatory standard more easily and uniformly.

Compliance Requirements of the Draft Proposed Rule

CPSC staff recommends adopting the voluntary ASTM standard for infant swings with several modifications, additions, and clarifications. Key components of the current ASTM standard for infant swings (F 2088-11b) include:

- Stability test—intended to prevent tip over. Swing models that rotate about the lateral axis are positioned on an inclined surface with the swing facing forward and then facing backward. ASTM F 2088-11b has been updated to add a new test for swing models that do *not* rotate about the lateral axis—these swings are tested in the

[28] The data collected for the *Baby Products Tracking Study* does not represent an unbiased statistical sample. The sample of 3,600 new and expectant mothers is drawn from American Baby magazine's mailing lists. Also, because the most recent survey information is from 2005, it may not reflect the current market.
[29] The data on secondhand products for new moms was not available. Instead, data for new moms and expectant moms were combined and broken down into first-time mothers and experienced mothers. Data for first-time mothers and experienced mothers have been averaged to calculate the approximate percentage that were handed down or purchased secondhand.
[30] U.S. Department of Health and Human Services, Centers for Disease Control and Prevention (CDC), National Center for Health Statistics, National Vital Statistics System, "Births: Final Data for 2009," *National Vital Statistics Reports* Volume 60, Number 1 (November 2011): Table I. The number of births in 2009 is rounded from 4,130,665.
[31] Memorandum from Richard McCallion, Mechanical Program Area Team Leader, Office of Hazard Identification and Reduction, and Ian Hall, Division of Mechanical Engineering, Directorate for Laboratory Sciences, dated November 29, 2011, Subject: Proposed Changes to ASTM F 2088-11b, Standard Consumer Safety Specification for Infant Swings, for Incorporation in Staff's Proposed Rule; Memorandum from Risana T. Chowdhury, Division of Hazard Analysis, Directorate for Epidemiology, dated November 21, 2011, Subject: Infant Swings-Related Deaths, Injuries and Potential Injuries, and NEISS Injury Estimates; 2002–Present.

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position most likely to fail. CPSC staff recommends additional clarification as part of the staff-recommended proposed rule, as discussed below.

- Test to prevent unintentional folding—intended to ensure that any locking/latching mechanisms remain functional after testing.
- Tests on restraint system—intended to prevent slippage and breakage during regular use.
- Requirements for cradle swing orientation—intended to ensure that the surface remains relatively flat both while in motion and while at rest.
- Specific requirements for battery operated swings—intended to prevent leakage and otherwise protect consumers.
- Requirement for toy mobiles—intended to ensure that toys within a child's reach do not detach when pulled. This requirement was new to the 2011a standard.
- Shoulder strap requirement—swing seats with angles greater than 50 degrees must include shoulder straps. Directorate for Health Sciences (HS) staff believes that this requirement, new to the 2011a standard, will reduce greatly the number of injuries resulting from falls.[32]
- Dynamic and static load requirements—intended to ensure that the infant swing can handle these loads without breaking. In the most recent ASTM standard, the swing is secured to prevent movement during the dynamic load test.

The voluntary standard also includes: (1) torque and tension tests to ensure that components cannot be removed; (2) requirements for several infant swing features to prevent entrapment and cuts (minimum and maximum opening size, small parts, exposed coil springs, protective components, hazardous sharp edges or points, and edges that can scissor, shear, or pinch); (3) requirements for the permanency and adhesion of labels; (4) a leg opening test to ensure that occupants cannot slide out; (5) requirements for instructional literature; and (6) restraint system requirements. Additionally, all testing must be performed without adjusting or repositioning the swing, and swings with multiple seat configurations must be tested in the position most likely to fail.

CPSC staff worked with ASTM to incorporate several warning label modifications into the 2011a standard. First, warning labels for seat belts were expanded to include all restraint systems. Second, a warning for adjustable seats was added that would indicate which positions should be used before the child can hold its head up unassisted. This warning was further modified for ASTM F 2088-11b to specify that only the most reclined position should be used for these children. Third, a warning that travel swings should be used only on the floor was added.

CPSC staff recommends modifying and clarifying ASTM F 2088-11b and adding two new requirements. All clarifications are meant to ensure ease of testing and consistency across test labs, while modifications and additions are intended to address known hazard patterns and incidents.[33]

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[32] Memorandum from Stephanie Marque and Suad Wanna-Nakamura, Division of Health Sciences, Directorate for Health Sciences, dated November 29, 2011, Subject: Infant Swings-Related Deaths and Injuries.
[33] McCallion and Hall, 2011.

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1. Modifications:
    a. Infant swing mobiles can be jostled by individuals other than the occupant, such as the caregiver or a sibling. This has the potential to separate the mobile from the swing structure, potentially even falling on a child. In order to account for "ball and socket" mobile designs, staff recommends testing in a downward direction at or below the horizontal plane, rather than the vertical pull in ASTM F 2088-11b. This change may address some proportion of the 2 percent of the 2,268 incidents reported to CPSC staff from January 1, 2002 to May 18, 2011, that involved swing toys, toy bars, mobiles, and globes that broke or detached.[34]
    b. For the dynamic load test, CPSC staff recommends increasing the number of times the 25 lb shot bag is dropped onto the swing seat from 50 to 500 times. This modification may address some portion of the incidents that involve broken, detached, or loose components of the swing housing that may be fatigue related. Twenty-five percent of the 2,268 incidents reported to CPSC staff fell into this category.[35]
2. New requirements:
    a. Add requirements for electrical overload to address overheating, electrical overload, and electrical failures. The staff-recommended additions include a stalled motor requirement and an accessible component temperature requirement. Electrical or battery-related issues accounted for approximately 9 percent of the 2,268 incidents reported to CPSC staff. Of those, overheating was the most common issue, but there were few injuries reported.[36]
    b. Add a seat deflection requirement to address seats that fold up on infants and seats that tilt to one side, forward, or backward. Such incidents account for 16 percent of those reported to the CPSC, including 1 fatality.[37]
3. Clarifications:
    a. Expand the list of swing elements that should be adjusted for the stability and dynamic load tests in order to accommodate new swing designs. The lists in ASTM 2088-11b include height position, recline position, and facing direction. Staff recommends adding tray position and any other adjustable features.
    b. Staff recommends several modifications to the seat back angle measurement test, which uses hinged boards to measure the angle of the swing seat in its most upright position. First, the boards should be made of C1020 steel. Second, it should be measured in the "most upright *use* position," where "use" has been added to the staff-recommended requirement. Third, remove any pillows or other positioning accessories. Fourth, ensure that the restraint system interferes as little as possible with the hinged boards.
    c. Staff recommends some changes to the stability test to be consistent with the language anticipated for the next iteration of the ASTM standard. None of these changes are expected to affect infant swing designs or production.

[34] Chowdhury, 2011.
[35] Ibid.
[36] Chowdhury, 2011.
[37] Chowdhury, 2011.

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d. The unintentional folding test in ASTM F 2088-11b is unclear; it requires the force to be placed at the end of a leg but does not define "the end of a leg." To ensure that the force places most of the pressure on the latch that is intended to prevent swings from folding during use, CPSC staff recommends placing the force at the lowest point on the leg that results in the greatest force on the latch in the direction normally associated with folding.

As mentioned above, the clarifications that staff recommends to modify ASTM F 2088-11b are intended to simplify requirements for test labs and ensure consistency in test results. Engineering staff does not believe that any of these changes will require product modifications. Therefore, the impact on manufacturers is not evaluated.

The new electrical overload requirements (2a) are likely to result in relatively low costs for manufacturers whose infant swings require changes to comply. It is anticipated that few, if any, manufacturers will be affected by either the stalled motor test or the accessible component temperature test. Failures of these tests are rare and most likely due to defects. They would require either a replacement battery/power source or a new supplier. According to one industry source, it is already fairly common for manufacturers to use thermal overload protection on circuits or battery compartments. Therefore, this is not anticipated to be an expensive fix.

At least some infant swings are not expected to comply with the increased number of repetitions for the dynamic load test (1b) without modifications. The costs associated with these requirements are likely to vary, depending on the particular swing, but they could be large for a few products. Products that require modification to meet the revised dynamic load test may only need stronger screws or other means of attaching swing components. Other infant swings might require stronger or more rigid materials, while still others might require a complete redesign. At least one manufacturer's infant swings are not expected to require any modifications. Therefore, it is unclear how many products would be affected by the modified requirement and the precise impact on the affected products and their manufacturers.

Only infant swings that use an arm for elevation (for example, cradle swings) might require modifications to meet the seat deflection requirement (2b). These types of swings are more likely to tilt when weight is placed on the swing seat. In most cases, manufacturers would be able to use stronger and/or different materials to meet the staff-recommended requirement. However, it is possible that one or more of the few firms affected may opt to redesign their noncompliant products. In either case, only a small number of infant swing models would be affected.

The revised infant mobile requirement (1a) is expected to have a significant impact on manufacturers whose infant swings require modifications to come into compliance. It is anticipated to entail larger costs than other staff-recommended changes, not only because it would involve redesign, but also because it will require modifications to the hard tools used to manufacture the relevant swing components.[38] These hard tools are usually modified by an outside firm, which means that production would cease, and, unless the firm maintains an

[38] During the production process, a hard tool, which is a mold of the desired infant swing component shape, is injected with plastic or another material using a molding machine.

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alternating production schedule, it could result in significant downtime for the firm's production process. However, it is expected that only a few products will require modifications to meet the mobile requirements (both ASTM-compliant and noncompliant models).

Other Federal or State Rules

The Commission is in the process of implementing sections 14(a)(2) and 14(i)(2) of the Consumer Product Safety Act (CPSA), as amended by the CPSIA. Section 14(a)(2) of the CPSA requires every manufacturer of a children's product that is subject to a children's product safety rule to certify, based on third party testing, that the product complies with all applicable safety rules. Section 14(i)(2) of the CPSA requires the Commission to establish protocols and standards (i) for ensuring that a children's product is tested periodically and when there has been a material change in the product, (ii) for the testing of representative samples to ensure continued compliance, (iii) for verifying that a product tested by a conformity assessment body complies with applicable safety rules, and (iv) for safeguarding against the exercise of undue influence on a conformity assessment body by a manufacturer or private labeler.

Because infant swings will be subject to a mandatory standard, they will also be subject to the certification requirements of section 14(a)(2) of the CPSA.

Impact on Small Businesses

There are approximately 10 firms currently known to be producing or selling infant swings in the United States. Under U.S. Small Business Administration (SBA) guidelines, a manufacturer of infant swings is small if it has 500 or fewer employees, and an importer is considered small if it has 100 or fewer employees. Based on these guidelines, eight are small firms—six domestic manufacturers and two domestic importers. The remaining firms are large domestic manufacturers. There may be additional unknown small manufacturers and importers operating in the U.S. market.

Small Manufacturers

The impact of the staff-recommended proposed standard on small manufacturers will differ based on whether their infant swings are compliant with the current voluntary ASTM standard (F 2088-11b). Staff has not been able to evaluate each of the 35 infant swings manufactured by small firms to determine precisely what modifications would be required for each to meet the staff-recommended proposed standard (F 2088-11b plus staff-recommended changes). Therefore, the conclusions drawn below are based on limited staff testing and input from industry to the extent possible.

The impact on the two small domestic manufacturers whose infant swings are compliant with ASTM F 2088-11b is not expected to be significant. Most of the staff-recommended changes to F 2088-11b are anticipated to have either no costs or low costs. While it is possible that they may need to redesign one or more of their infant swings to meet requirements 1a and/or 1b, it is

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also possible that one of these requirements (1b) can be met using lower cost methods. In any case, the impact is unlikely to be significant for either of these firms. Both have annual gross revenues in excess of $100 million dollars. As noted below, a complete redesign could cost $500,000 or more. Even if redesign costs were $1 million, this still represents less than 1 percent of annual gross revenue for these firms. Any impact may be partially mitigated if the costs are treated as new product expenses that can be amortized.

The staff-recommended proposed standard could have a significant impact on one or more of the four small domestic manufacturers whose infant swings are not believed to be compliant with ASTM F 2088-11b. Meeting the voluntary standard's existing requirements could require these manufacturers to redesign their non-ASTM-compliant infant swings. It is also possible that some will have to undergo redesign to meet some of the staff-recommended requirements (1a, 1b and/or 2b, in particular). There also may be increased production costs, particularly if additional materials are required or if packaging must be changed to resemble more closely the enclosed product. One manufacturer estimated that a complete infant swing redesign would cost approximately $400,000, not including significant overhead costs, such as engineering time, which at $100 per hour, could easily increase overall redesign costs by $100,000 or more.

As noted, meeting the existing requirements of the voluntary standard may result in significant costs to small domestic manufacturers supplying noncompliant infant swings. However, because section 104 of the CPSIA directs us to issue mandatory safety standards for swings, these expenses would be incurred regardless of whether the Commission approves the more stringent staff-recommended additions and modifications. The incremental costs associated with the staff-recommended changes should not be significant. Also, a complete product redesign is unlikely to be necessary in most cases, and therefore, costs are likely to be substantially lower than the estimates provided in the previous paragraph. The impact of these costs may be mitigated if they are treated as new product expenses that can be amortized.

The scenario described above assumes that only firms that produce infant swings certified by JPMA or that claim compliance with the voluntary standard will pass F 2088-11b standard's requirements. This is not necessarily the case. CPSC staff has identified many cases where products not certified by JPMA are actually compliant with the relevant ASTM standard. To the extent that this is true, the impact of the staff-recommended proposed rule will be less significant than described. Additionally, once the rule is final, all manufacturers will be subject to the additional costs associated with the third-party testing and certification requirements.

Small Importers

In general, importers of infant swings would need to find an alternate source if their existing supplier does not come into compliance with the new requirements of the staff-recommended proposed standard. The wholesale cost of compliant, higher quality infant swings could increase and they could, in turn, pass some of those increased costs on to consumers. Some could respond to the rule by discontinuing the import of their noncomplying infant swings. The impact of such a decision could be mitigated by replacing the non-compliant infant swing with a complying product or another juvenile product. Deciding to import an alternative product would be a reasonable and realistic way to offset any lost revenue.

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Because both of the known importers are subsidiaries importing their infant swings from a foreign parent company, finding an alternative supply source would not be an option for these firms. However, they could respond to the rule by discontinuing the import of their noncomplying infant swings, possibly replacing them with another juvenile product. This is more likely to be necessary for the infant swing supplied by one of the two known small importers who are not believed to be compliant with the voluntary standard.

As is the case with manufacturers, all importers will be subject to third-party testing and certification requirements, and consequently, will experience additional costs.

Alternatives

Under section 104 of the CPSIA, one alternative that would reduce the impact on small entities is to make the voluntary standard mandatory, with no modifications. Adopting the current voluntary standard without any changes could potentially reduce costs for four of the six small manufacturers and the two small importers whose infant swings are not already compliant with the voluntary standard. However, these firms could still require substantial product changes in order to meet the voluntary standard.

A second alternative would be to set an effective date later than the staff-recommended 6 months. This would allow suppliers additional time to modify and/or develop compliant infant swings and spread the associated costs over a longer period of time.

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TAB E: [*Federal Register* Notice of Proposed Rulemkaing to establish a Safety Standard for Infant Swings]

TAB E

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Billing Code 6355-01-P

CONSUMER PRODUCT SAFETY COMMISSION

16 CFR Part 1223

CPSC Docket No. CPSC-2012- ____

RIN 3041-AC90

Safety Standard for Infant Swings

AGENCY: Consumer Product Safety Commission.

ACTION: Notice of Proposed Rulemaking.

SUMMARY: Section 104(b) of the Consumer Product Safety Improvement Act of 2008 ("CPSIA") requires the United States Consumer Product Safety Commission ("Commission," "CPSC," "we," or "us") to promulgate consumer product safety standards for durable infant or toddler products. These standards are to be "substantially the same as" applicable voluntary standards or more stringent than the voluntary standard if the Commission concludes that more stringent requirements would further reduce the risk of injury associated with the product. The Commission is proposing a safety standard for infant swings in response to the direction under section 104(b) of the CPSIA.

DATES: Submit comments by [INSERT DATE 75 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER**]**.

ADDRESSES: Comments related to the Paperwork Reduction Act aspects of the marking, labeling, and instructional literature of the proposed rule should be directed to the Office of Information and Regulatory Affairs, OMB, Attn: CPSC Desk Officer, FAX: 202-395-6974, or e-mailed to: oira_submission@omb.eop.gov.

Other comments, identified by Docket No. CPSC-2012-____, may be submitted electronically or in writing:

Electronic Submissions: Submit electronic comments to the Federal eRulemaking Portal at: http://www.regulations.gov. Follow the instructions for submitting comments. To ensure timely processing of comments, we are no longer directly accepting comments submitted by electronic mail (e-mail), except through www.regulations.gov. We encourage you to submit electronic comments by using the Federal eRulemaking Portal, as described above.

Written Submissions: Submit written submissions in the following way: Mail/Hand delivery/Courier (for paper, disk, or CD-ROM submissions), preferably in five copies, to: Office of the Secretary, Consumer Product Safety Commission, Room 820, 4330 East West Highway, Bethesda, MD 20814; telephone (301) 504-7923.

Instructions: All submissions received must include the agency name and docket number for this rulemaking. All comments received may be posted without change, including any personal identifiers, contact information, or other personal information provided, to: http://www.regulations.gov. Do not submit confidential business information, trade secret information, or other sensitive or protected information that you do not want to be available to the public. If furnished at all, such information should be submitted in writing.

Docket: For access to the docket to read background documents or comments received, go to: http://www.regulations.gov, and insert the docket number, CPSC 2012-___, into the "Search" box, and follow the prompts.

FOR FURTHER INFORMATION CONTACT: Celestine T. Kiss, Project Manager, Consumer Product Safety Commission, Directorate for Engineering Sciences, 4330 East West Highway, Bethesda, MD 20814; e-mail: CKiss@cpsc.gov.

SUPPLEMENTARY INFORMATION:

A. Background and Statutory Authority

The Consumer Product Safety Improvement Act of 2008, ("CPSIA," "Pub Law 110-314") was enacted on August 14, 2008. Section 104(b) of the CPSIA requires the Commission to promulgate consumer product safety standards for durable infant and toddler products. These standards are to be "substantially the same as" applicable voluntary standards or more stringent than the voluntary standard if the Commission concludes that more stringent requirements would further reduce the risk of injury associated with the product. The term "durable infant or toddler product" is defined in section 104(f)(1) of the CPSIA as a durable product intended for use, or that may be reasonably expected to be used, by children under the age of 5 years. Infant swings are one of the products specifically identified in section 104(f)(2)(F) as a durable infant or toddler product.

In this document, we propose a safety standard for infant swings. The proposed standard is based on the voluntary standard developed by ASTM International (formerly the American Society for Testing and Materials), ASTM F 2088-11b, "Standard Consumer Safety Specification for Infant Swings" ("ASTM F 2088-11b"). The ASTM standard is copyrighted but can be viewed as a read-only document, only during the comment period for this proposal, at: http://www.astm.org, by permission of ASTM.

The information discussed in this preamble supporting the proposed safety standard for infant swings can be found in the staff briefing package, which is available at http://www.cpsc.gov/.

B. The Product

1. Definition

ASTM F 2088-11b defines an "infant swing" as a "stationary unit with a frame and powered mechanism that enables an infant to swing in a seated position. An infant swing is intended for use with infants from birth until a child is able to sit up unassisted." ASTM F 2088-11b also covers "cradle swings," which are defined as "an infant swing which is intended for use by a child lying flat." Cradle swings are distinguishable from other types of swings because they enable a child to lie flat on their back, even when the swing is in motion. ASTM F 2088-11b also covers "travel swings," which are a "low profile, compact swing having a distance of 6 in. or less between the underside of the seat bottom and the support surface (floor) at any point in the seat's range of motion."

2. The Market

Based on a 2005 survey conducted by American Baby Group, titled, "2006 Baby Products Tracking Study," and Centers for Disease Control and Prevention birth data, we estimate that approximately 2.7 million infant swings are sold in the United States each year. We estimate that there are at least 10 manufacturers or importers supplying infant swings to the U.S. market. Eight firms are domestic manufacturers, and two are domestic importers with a foreign parent company.

The Juvenile Products Manufacturers Association ("JPMA") is the major U.S. trade association that represents juvenile product manufacturers and importers. The

JPMA provides a certification program that allows manufacturers and importers to use the JPMA seal if they voluntarily submit their products for testing to determine if they meet the voluntary standard. Currently, infant swings produced by 5 of the 10 firms, 4 manufacturers and 1 importer, have been certified by the JPMA as compliant with the ASTM voluntary infant swing standard.

C. Infant Swings and the ASTM Voluntary Standard

1. Introduction and Consultation Requirement

Section 104(b)(1)(A) of the CPSIA requires us to consult representatives of "consumer groups, juvenile product manufacturers, and independent child product engineers and experts" to "examine and assess the effectiveness of any voluntary consumer product safety standards for durable infant or toddler products." ASTM F 2088 is the primary infant swing standard in effect in the United States. Through the ASTM process, we consulted with manufacturers, retailers, trade organizations, laboratories, consumer advocacy groups, consultants, and members of the public.

2. The ASTM Voluntary Standard

ASTM F 2088 was first published in September 2001. It has been updated seven times, with the latest edition, ASTM F 2088-11b, published in November 2011. The key provisions of the current ASTM infant swing standard include: definitions; general requirements; performance requirements; specific test methods; and requirements for marking, labeling, and instructional literature.

a. Definitions. ASTM F 2088-11b contains definitions for key terms found in the standard.

b. General Requirements and Specific Test Methods. ASTM F 2088-11b contains general requirements that infant swings must meet, as well as mandated test methods that must be used to ensure that the product meets those requirements. It includes:

- restrictions on sharp edges and points, small parts (as well as their protective caps), lead paint, and wood parts;
- specifications to prevent scissoring, shearing, and pinching;
- specifications on openings (intended to prevent finger and toe entrapment), labeling (intended to prevent labels from being removed and ingested or aspirated), and coil springs; and
- requirements for toy accessory items, including mobiles that accompany infant swings.

c. Performance Requirements and Specific Test Methods. ASTM F 2088-11b contains performance requirements that infant swings must meet, as well as mandated test methods that must be used to ensure that the product meets those requirements. The standard includes:

- structural integrity requirements, including dynamic and static load requirements, which are meant to ensure that the swing can withstand a certain amount of force;
- stability requirements, meant to ensure that the swing does not tip over;
- requirements to prevent unintentional folding of the swing;
- restraint system requirements;
- a requirement to ensure that infants are not able to slip through the leg opening and strangle (because their bodies can slip through, but their heads cannot);

- requirements for cradle swings to ensure that infants will remain flat; and
- requirements for the battery compartment of swings, which require, for example that the compartment contain a means to prevent battery leakage.

d. Marking, Labeling, and Instructional Literature. ASTM F 2088-11b has requirements for marking, labeling, and instructions that must accompany an infant swing, including warnings advising caregivers to:

- always use the restraint system in the swing;
- never leave an infant unattended in a swing;
- stop using the swing when an infant is able to climb out of it;
- always use the most reclined seat position in swings with a certain adjustable seat recline until the infant can hold their head up unassisted; and
- never place travel swings on an elevated surface.

D. Incident Data

1. Introduction

There have been 2,268 incidents reported to us regarding infant swings from January 1, 2002 through May 18, 2011. All the incidents involved children under the age of 3 years. Of those reported incidents, there were 15 fatalities, 600 nonfatal injuries, and 1,653 noninjury incidents. We believe that the incidents captured in this data reflect the range of hazard patterns seen in infant swings.

Table 1 is a summary of the 15 fatalities reported to us from January 1, 2002 through May 18, 2011. We analyzed each fatality and determined: (1) the cause of the infant's death, which is usually based on the conclusion of the medical examiner; and (2) whether the infant swing caused or contributed to the fatality. There were five deaths that

can be categorized as slump-over deaths. These fatalities, as well as the two other fatalities that were caused by the infant swing, are explained in more detail in Section E of this preamble.

Table 2 lists the hazards seen in infant swings. We determined the percentage of the incident reports attributable to each hazard, as well as the percentage of reported injuries attributable to each hazard. The percentages have been rounded up or down to represent a whole number. The hazards are explained in more detail in Section E of this preamble.

Information on fatalities, injuries, and noninjury incident reports that are attributable to unreasonable product misuse are mentioned only in the tables in this section. Examples of unreasonable product misuse include: placing two children in a swing meant for one child, or failing to use the restraint system. In addition, information is included only in the tables in this section on fatalities, injuries, and noninjury incident reports where: (1) it is unknown whether the infant swing contributed to the incident; or (2) there is insufficient information included in the report to determine what happened.

Fatalities, injuries, and noninjury incidents where the swing caused or contributed to the incident are discussed fully in Section E of this preamble.

2. Fatality Summary

Table 1 – Infant Swings Fatality Summary, January 1, 2002 through May 18, 2011

Description of Fatality	**Number of Fatalities**
Cause of Death ("COD") Positional Asphyxia, Slump-Over Death	4
COD Undetermined, Slump-Over Death	1
COD Positional Asphyxia, Attributable to Swing Restraint Issue	1
COD Undetermined, Attributable to Swing Seat Issue	1
COD Positional Asphyxia, Attributable to Product Misuse	2
COD Undetermined, Attributable to Product Misuse	2

COD Undetermined, Unknown whether Swing Contributed to Fatality	4

3. Incident Summary

Table 2 – Infant Swings Hazard Summary, January 1, 2002 through May 18, 2011

Hazard	**Percentage of Reported Incidents**	**Percentage of Reported Injuries**
Restraint Issues, Both Inadequate Restraint Design and Restraint Failure	27%	33%, including 1 fatality and 1 fall that resulted in a hospitalization
Broken, Detached or Loose Swing Components (*e.g.*, arm, leg, motor housing or hardware)	25%	20%
Seat Issues, Both Inadequate Seat Design and Seat Failure	16%	12%, including 1 fatality
Inadequate Clearance Between the Seat and the Swing Frame	13%	22%
Electrical or Battery Issues	9%	1%
Swing Instability	4%	2%, including 1 fall that resulted in a hospitalization
Broken or Detached Toys or Mobiles	2%	4%
Miscellaneous, Including Reports of Product Misuse and Reports with Insufficient Information	4%	7%

E. Assessment of Voluntary Standard ASTM F 2088-11b and Description of Proposed Changes to ASTM F 2088-11b

1. Introduction

Infant swing hazards are best analyzed in conjunction with an assessment of the existing provisions of ASTM 2088-11b. In this section, we describe each hazard in detail. Following the description of the hazard is a summary of the requirements currently found in ASTM 2088-11b, if any provisions exist in the standard that are meant to address the hazard. If the existing standards are not adequate to address the hazard, we present our recommended changes. In most cases, it is helpful to compare the existing

language in ASTM F 2088-11b with the proposed language containing our recommended changes. When this is done, bold lettering indicates new language, and language that is struck through, indicates language that we propose should be deleted. In each case, consistent with section 104 of the CPSIA, the change must be more stringent than the existing voluntary standard in order to further reduce the risk of injury associated with the hazard.

2. Slump-Over Deaths

a. Description of Hazard

Of the 15 reported fatalities, 5 deaths have been deemed slump-over deaths. In 3 instances, the medical examiner or investigating officials specifically described the infant as being "slumped over." In 2 additional cases, the description of the infant's position suggests slump-over deaths. Slump-over deaths occur when very young children (in these cases, infants between the ages of 2 weeks old and 3 months old) lack the neck muscle tone and strength to keep their head up. In 4 of the 5 slump-over deaths, the official cause of death, as determined by the medical examiner, is positional asphyxia. Positional asphyxiation occurs when the position of the child's body (such as compression of their neck from their head being slumped over) prevents the child from breathing. In one case, the cause of death was undetermined, but we have concluded, based on a review of the fatality, that it was a slump-over death.

b. Assessment of ASTM F 2088-11b

Section 8.3.1(4) of ASTM F 2088-11b requires the following warning label on all infant swings that have an adjustable seat recline with a seat back angle greater than 50°: "Use only in most reclined seat position until infant can hold head up unassisted." Infant

swings with a seat back angle greater than 50° require the infant to be able to support their head, while a swing with a seat back angle less than 50° is more reclined and allows the infant to lay their head on the seat back.

We have determined that there is no engineering solution, such as a restraint, that would adequately address slump-over deaths. By including the warning statement in ASTM F 2088-11b, the ASTM committee recognizes the need for the statement in order to prevent slump-over deaths in infant swings. We agree and are not proposing any additional changes to the voluntary standard to address this issue. However, we are seeking comments related to slump-over deaths in section L of this preamble.

3. Restraint Design and Restraint Failures

a. Description of Hazard

Issues related to restraints comprised 27 percent of the reports we received from the public. Restraint issues accounted for 33 percent of the reported injuries. Most of the reported injuries are attributable to restraint design issues, while the remainder are attributable to restraint failure.

Restraint design hazards arise when the restraint system is unable to contain a child in the swing seat, even when the restraint is assembled properly and is functioning according to the manufacturer's intent. Common reports in this category include infants who are able to lean forward or to the side and fall out of the seat. Some infants are strong enough to push themselves back and up with their feet, causing them to fall backward out of the swing, usually landing headfirst. One infant fatality and one fall that resulted in a hospitalization are attributable to restraint design problems.

Restraint failures include belt buckles or straps that break. In some reports,

the restraint system detaches from the swing completely. When the restraint system does fail in some way, the result is usually a fall from the swing, which can result in serious injuries.

b. Assessment of ASTM F 2088-11b

Section 6.4 of ASTM F 2088-11b requires all infant swings to have a waist and crotch restraint system. The standard also requires that swing restraint systems be tested to ensure that the attachment points of the system can withstand a certain amount of force, comparable to the amount of force an infant might apply. Manufacturers must ensure that the restraint system is attached to the swing and will not become detached through normal use.

ASTM F 2088-11b also contains a shoulder strap/harness requirement for infant swings with a seat back angle greater than 50.° Infants seated in swings with a seat back angle greater than 50° are much more likely to be able to lean forward or to the side, or be able to push backward. When this happens, the infant may fall out of the seat completely, or they may come into contact with the frame of the swing. Having shoulder straps on swings with a seat back angle exceeding 50° will aid in keeping the infant positioned in the swing seat.

c. Description of Proposed Changes

The shoulder strap requirement is intended to address many restraint issues. The proposed rule would change section 7.12, which provides the method for testing seat back angles in order to determine whether the seat back angle is greater than 50.° Currently, the method involves placing a hinged board in the seat swing and using an inclinometer to measure the seat back angle. The proposed rule would result in more

accurate, repeatable testing, by clarifying the test method to include: (1) placing the seat in the most upright use position (currently the language only requires placing the seat in "the most upright position"); (2) removing all positioning accessories, such as pillows, that might interfere with the measurement; (3) positioning the belt restraint systems in order to limit interference with the measurement; and (4) mandating that the hinged board be made of steel because it better replicates the weight of a child in a seat. Currently, the hinged board can be made of wood. These changes would result in a more stringent standard by ensuring that measurements are more accurate and repeatable, thus, reducing the number of injuries associated with swings.

d. Proposed Change in Standard

Currently, ASTM F 2088-11b contains the following test method for measuring the seat back angle at section 7.12:

> 7.12 *Seat Back Angle Measurement*–Place the back of the swing in the most upright position. Place the hinged boards with the hinged edge into the junction of the swing back and seat (see Fig. 8). Place the inclinometer on the floor and zero the reading. Manually pivot the swing to its furthermost back position. While maintaining this position, place the inclinometer up against the back recline board to obtain the seat back angle as shown in Fig. 9.

We are proposing that section 7.12 of ASTM F 2088-11b be replaced by the following language:

> 7.12 *Seat Back Angle Measurement*–Place the back of the swing in the most upright **use** position. **Remove positioning accessories, including pillows. Orient the belt restraint segments to limit interaction with the hinged boards.** Place the hinged boards with the hinged edge into the junction of the swing back and seat (see Fig. 8). Place the inclinometer on the floor and zero the reading. Manually pivot the swing to its furthermost back position. While maintaining this position, place the inclinometer up against the back recline board to obtain the seat back angle as shown in Fig. 9. **Hinged boards shall be made of C1020 steel using a 4 by 4 in.**

(101 by 101 mm) plate hinged to a 4 by 9 in. (101 by 225 mm) plate. The thicknesses shall be adjusted so that the mass is equal to 17.5 lbm.

4. Broken, Detached, or Loose Components

a. Description of Hazard

Broken, detached, and loose components, such as arm, leg, motor housing, and hardware account for the third highest number of injuries (20%) and second most number of incident reports (25%). When part of the frame fails, or when hardware (such as screws) fall out of the product, the swing is likely to collapse with the infant seated inside the swing.

b. Assessment of ASTM F 2088-11b

Currently, the ASTM standard requires that the durability of a swing's arm, leg, motor housing, and hardware be tested by dropping a 25 pound weight onto the seat of the swing 50 times, or cycles. This is called dynamic loading in the ASTM standard and is meant to test the structural integrity of the swing. If any part of the swing breaks, or changes in such a way that would cause the product not to fully support a child, the swing fails the test.

c. Description of Proposed Changes

The proposed rule would make two changes to the dynamic load test that is found in section 7.2.1 of ASTM F 2088-11b. One change is a significant modification, and the other is a test clarification. The modification would increase the number of cycles from 50 to 500. We tested swing samples from different manufacturers, as well as a range of models and designs. The testing revealed that 500 cycles was the point at which the least robust swings started to show signs of fatigue that might result in structural failures of the

swing components. Increasing the number of test cycles from 50 to 500 will lead to a reduction in injuries in infant swings that occur when the arm, leg, motor housing, or hardware of a swing fails.

The proposal also would make a clarification to the dynamic load test. Currently, when setting up the swing, if the product has more than one height position, recline position, or facing direction, the product must be tested in the configuration most likely to fail. The proposed rule would account for tray positions and any other adjustable features. This will result in more repeatable and accurate testing, which will reduce the risk of injury in swings.

d. Proposed Change in Standard

Currently, ASTM F 2088-11b contains the following test method at sections 7.2.1.2 and 7.2.1.3:

> 7.2.1.2 Set-up the swing in accordance with the manufacturer's instructions. If the swing seat has more than one height position, recline position, or facing direction, test the product in the configuration most likely to fail.
>
> 7.2.1.3 Place the shot bag on the seating surface of the swing and allow swinging motion to come to rest. Secure the swing so that the seat cannot move during the test. The means of securing the seat shall not affect the outcome of the test. Raise the shot bag a distance of 1 in. above the seat of the swing. Drop the weight onto the seat 50 times with a cycle time of 4 +/- 1s/cycle. The drop height is to be adjusted to maintain the 1 in. drop height as is practical.

We are proposing that sections 7.2.1.2 and 7.2.1.3 of ASTM F 2088-11b be replaced by the following language:

> 7.2.1.2 Set-up the swing in accordance with the manufacturer's instructions. If the swing seat has more than one height position, recline position, ~~or~~ facing direction, **tray position, or other adjustable feature,** test the product in the configuration most likely to fail.

7.2.1.3 Place the shot bag on the seating surface of the swing and allow swinging motion to come to rest. Secure the swing so that the seat cannot move during the test. The means of securing the seat shall not affect the outcome of the test. Raise the shot bag a distance of 1 in. above the seat of the swing. Drop the weight onto the seat ~~50~~ **500** times with a cycle time of 4 +/- 1s/cycle. The drop height is to be adjusted to maintain the 1 in. drop height as is practical.

5. Seat Design and Seat Failures

a. Description of Hazard

Seat issues account for 16 percent of reported incidents and 12 percent of injuries. Seat issues can be broken down into two subcategories of hazards. One is seat design issues, and the other is seat failure issues. Reports included in the seat design subcategory include seats that lean, or deflect, to one side. If a seat deflects substantially, the infant could fall out of the swing or bump against the swing frame. Some reports include scenarios where infants attempt to reach an object outside the swing, the seat deflects, and the victim falls out of the seat. Swing seat deflection is most common in swings supported by a single swing arm, which offers less support.

Seat failures include the following scenarios:

- The infant swing seat detaches from the swing frame completely;
- The back of the seat does not hold in the upright position and falls unexpectedly;
- The seat itself folds inward; and
- For swings with a fabric seat that fits over a frame, the fabric padding slips off.

In most cases, if the seat fails, the infant will fall out of the seat. In one case, it was determined that a seat failure contributed to an infant's death.

b. Assessment of ASTM F 2088-11b

Currently, ASTM does not require testing for seat deflection. Our testing revealed that some swing seats deflect significantly. After reviewing the incidents reported to us, we noticed that swings supported by a single arm, which might make the swing less structurally sound, may be more likely to have seats that deflect in a way that could be dangerous for the occupant.

Currently, seat failure issues are addressed by dynamic loading (described in section [E][4] of this preamble on broken, detached, and loose swing components) and by static loading, which requires the tester to place a 75-pound weight (or three times the manufacturer's maximum recommended weight, whichever is greater) in the center of the swing seat. At the conclusion of the static load test, if the swing seat fails in any way, for example by detaching from the frame or folding inward, the product fails the static load test.

c. Description of Proposed Changes

In regard to seat design issues, the proposed rule would add a new performance requirement and a new test method to the static load requirements that would measure seat deflection. The proposed new test method would require the tester to place a 5-pound weight onto the seat and measure the distance from the lowest point on the swing seating surface to the floor. Nominally loading the seat with 5 pounds will account for the presence of cloth seats that relax significantly when not weighted, which could interfere with the measurement. The tester then would place a 75-pound weight (or three times the manufacturer's maximum recommended weight, whichever is greater) onto the swing and record the same measurement. The two measurements are compared, and the change in vertical deflection cannot be more than 4 inches. This test will reveal whether

the swing is likely to deflect or deform under severe loading conditions. In addition to the seat deflection test, the swing must still meet the current static load requirement (using the same 75-pound weight) and cannot fail in any way that could create a hazardous environment for the child.

In regard to seat failures, we believe that more robust dynamic load testing will reveal any seat failure issues that are likely to occur in the swing. The modification and testing clarification to the dynamic load test, as described in section (E)(4)(c) of this preamble, will enable testers to better assess any hazards related to the seat, such as the possibility that the seat will detach from the swing frame.

d. Proposed Change in Standard

In addition to the modification and testing clarification to the dynamic load test, described in section (E)(4)(c) and contained in section (E)(4)(d) of this preamble, we propose a new static load performance requirement and test method. We are proposing that the following section 6.1.2.1 be added to ASTM F 2088-11b:

> **6.1.2.1 The swing seat shall not have a change in vertical deflection greater than 4 in. The change in vertical deflection shall be calculated by subtracting the distance measured in 7.2.2.2 from the distance measured in 7.2.2.3.**

Currently, ASTM F 2088-11b contains the following test method at section 7.2.2.2:

> 7.2.2.2 By any necessary means, place a static load of 75 lb (34.1 kg) or 3 times the manufacturer's maximum recommended weight, whichever is greater, in the center of the seat distributed by a wood block. Gradually apply the weight within 5 s and maintain for 60 s.

We are proposing that section 7.2.2.2 be replaced by the following language and that the language currently found in 7.2.2.2 of ASTM F 2088-11b be moved to 7.2.2.3 and changed as follows:

> **7.2.2.2 Place a static load of 5 lbm (2.3 kg) in the center of the seat distributed by a wood block. Measure and record the vertical distance from the floor to the lowest point on the infant swing's seating surface. Remove the load.**
>
> 7.2.2.3 By any necessary means, place a static load of 75 lb (34.1 kg) or 3 times the manufacturer's maximum recommended weight, whichever is greater, in the center of the seat distributed by a wood block. Gradually apply the weight within 5 s and maintain for 60 s. **Measure and record the vertical distance from the floor to the lowest point on the loaded infant swing's seating surface.**

<u>6. Inadequate clearance between the swing seat and the swing frame</u>

a. Description of Hazard

Thirteen percent of reported incidents are attributable to inadequate space between the infant seat and the swing frame. This hazard is responsible for the second most number of injuries (22%). When there is inadequate clearance between the seat and frame, an infant's head can become caught, or the infant's limbs can hit the swing frame while the swing is in motion.

b. Assessment of ASTM F 2088-11b

We believe that this hazard can be addressed by ensuring that the infant is kept securely within the seat's boundaries. If an infant is unable to maneuver outside the seat's boundaries, the infant's head is unlikely to be trapped in the swing frame or their limbs are unlikely to get into a position where they may hit the frame. The shoulder restraint requirement, mandated in ASTM F 2088-11b for swings with a seat back angle

greater than 50°, is sufficient to address situations involving inadequate clearance between the seat and seat frame.

c. Description of Proposed Changes

In section (E)(3)(c) of this preamble, we describe several clarifications to the seat back angle test used to determine which swings require a shoulder harness. These clarifications will result in a more stringent standard, by ensuring that measurements are more accurate and repeatable, thus, reducing the number of injuries associated with swings.

d. Proposed Change in Standard

We propose adding several clarifications to the seat back angle test that is used to determine which swings require a shoulder harness. These clarifications have been discussed previously in section (E)(3)(c) of this preamble, and the proposed changes are contained in section (E)(3)(d) of the preamble.

7. Electrical or Battery Issues

a. Description of Hazard

Infant swings typically rely on a/c power, batteries, or a combination of both, to operate the product. Nine percent of the reports we received related to electrical or battery issues associated with infant swings.. Common reports included: the motor overheating, batteries leaking, or the detection of smoke. Issues related to electrical or battery problems accounted for 1 percent of all reported injuries.

b. Assessment of ASTM F 2088-11b

Currently, ASTM F 2088-11b contains standards that regulate battery compartments only. Section 6.7 of ASTM 2088-11b requires that the battery

compartment be marked permanently to show the correct battery polarity, size, and voltage. Battery compartments are also required to have a means to contain the electrolyte material in the event that the battery leaks. ASTM 2088-11b also contains a requirement prohibiting nonrechargeable batteries from being recharged with a/c power. In addition, section 8.4 of ASTM 2088-11b requires all swings that use more than one battery to contain warnings. The warnings advise consumers not to mix old and new batteries, not to mix different kinds of batteries, and not to leave batteries in the swing when storing the product for long periods of time. There are no other requirements regarding the design and operation of the electrical components of swings.

c. Description of Proposed Changes

The proposed rule would impose several new requirements to address hazards related to the electrical components of swings. We are proposing: (1) an electrical overload test; (2) an accessible component temperature requirement; and (3) a requirement to ensure that swings that run on a/c power are safe.

Electrical components (such as motors, batteries, and circuit boards) in a swing can overheat, and this can cause the components to melt, smoke, explode, or cause a fire. We are proposing a test to address this hazard; the proposed test is substantially similar to the test found in the ASTM F 963-08, "Standard Consumer Safety Specification for Toy Safety" ("ASTM F 963-08"). The proposed test would check to ensure that a normal electrical load cannot overload the electrical circuit. It would require the swing to be locked in a fixed position and operated continuously until a peak temperature can be recorded. For swings that operate continuously, the test would be stopped 60 minutes after the peak temperature is recorded. Under the proposal, a swing will fail the overload

test if it causes battery leakage, explosion, smoke, or a fire. For swings that operate on batteries and a/c power, the proposal would require both power sources, as well as any type of battery that can be used, to be tested separately to ensure that they all meet the requirement.

The proposed accessible component temperature requirement would state that, during the electrical overload test, no accessible component may achieve a temperature exceeding 160.° Accessible components are those that a child or caregiver would be able to touch. This test is meant to protect the public from burns caused by very hot electrical components.

The proposed rule also would require swings that run on a/c power (*i.e.*, swings that come with an electrical cord that is plugged into a wall socket) to comply with 16 CFR part 1505, the requirements for electrically operated toys and other electrically operated articles intended for children. The regulations at 16 CFR part 1505 contain established labeling, manufacturing, design, construction, and performance requirements intended to ensure that toys and electrical items intended for children are safe for their use.

The addition of new requirements for electrical components, including the electrical overload test, the accessible component temperature requirement, and the a/c power requirement, will reduce the number of injuries associated with swings. These provisions would ensure that motors and batteries do not overheat and catch fire, that accessible components do not become hot enough to burn a child or a caregiver, and that swings that run on a/c power are safe, as measured by well-established CPSC regulations already in place that govern electrical toys and other products intended for children.

d. Proposed Change in Standard

Currently, the introductory heading of ASTM F 2088-11b section 6.7 is:

6.7 *Swings Containing Battery Compartment(s) (remote control devices are exempt from the requirements in 6.7):*

We are proposing that the introductory heading of section 6.7 of ASTM F 2088-11b be replaced by the following:

6.7 ***Electrically Powered Swings* (remote control devices are exempt from the requirements in 6.7):**

In addition to complying with the existing sections 6.7.1, 6.7.2, and 6.7.3 of ASTM F 2088-11b (which deal with batteries and battery compartments only), we propose adding the following:

6.7.4 The surfaces of the batteries, switch, motor, or any other accessible electrical components shall not achieve temperatures exceeding 160°F (71°C) when tested in accordance with 7.13. At the conclusion of the test, the stalled motor condition shall not cause battery leakage, explosion, smoking, or a fire to any electrical component. This test shall be performed prior to conducting any other testing within the Performance Requirements section.

6.7.5 Swings operating from an a/c power source, nominally a 120-V branch circuit, shall conform to 16 CFR 1505.

We also propose adding the following test method to ASTM F 2088-11b at section 7.13:

7.13 *Electrical Overload Test*—The test shall be conducted using a new swing. The swing shall be tested using fresh alkaline batteries or an a/c power source. If the swing can be operated using both, then both batteries and a/c power must be tested separately. If another battery chemistry is specifically recommended by the manufacturer for use in the swing, repeat the test using the batteries specified by the manufacturer. If the swing will not operate using alkaline batteries, then test with the type of battery recommended by the manufacturer

at the specified voltage. The test is to be carried out in a draft-free location, at an ambient temperature of 68 ± 9°F (20 ± 5°C).

7.13.1 Operate the swing at the maximum speed setting with the swing seat locked in a fixed position. Do not disable any mechanical or electrical protective device, such as clutches or fuses. Operate the swing continuously, and record peak temperature. The test may be discontinued 60 min after the peak temperature is recorded. If the swing shuts off automatically or must be kept "on" by hand or foot, monitor temperatures for 30 s, resetting the swing as many times as necessary to complete the 30 s of operation. If the swing shuts off automatically after an operating time of greater than 30 s, continue the test until the swing shuts off.

8. Instability

a. Description of Hazard

Swing instability occurs when one leg of the swing lifts up or the swing tips over completely. Swing instability accounted for 4 percent of the reported incidents and 2 percent of the reported injuries involved. In some incidents, the swing was on an elevated surface and inched along until it fell off the surface. This scenario resulted in a hospitalization from the fall.

b. Assessment of ASTM F 2088-11b

ASTM F 2088-11b contains performance requirements and test methods meant to prevent swing instability. The first requirement and test method is the "Unintentional Folding" test, which requires a force to be applied to the end of the swing leg in the direction normally associated with folding. This test will ensure that the swing will not fold and collapse while in use.

The second requirement and test method is the "Stability in the Direction of Swing Motion" test. This test is used on swings that have designs in which the swing moves back and forth with a horizontal swing motion. The test requires that the swing be

placed on an inclined surface of 20.° In this position, the swing cannot tip over or it fails the test. The swing is then rotated 180° and again placed on the inclined surface where, again, it must not tip over in order to pass. For swings with a horizontal swing motion, this is the best test to ensure that they will not tip over.

In addition, ASTM F 2088-11b has a warning label requirement to address situations where a consumer might put a swing, usually a smaller travel size swing, on an elevated surface. This action resulted in a very serious injury to a child when the swing fell off the elevated surface. Section 8.3.1(5) of ASTM F 2088-11b requires travel swings to have the following warning: "Always place swing on floor. Never use on any elevated surface."

c. Description of Proposed Changes

The proposed rule would clarify the test methods for both the "Unintentional Folding" test and the "Stability in the Direction of Swing Motion" test. The clarifications are meant to address swing designs that are not tested adequately using the existing requirements.

The current "Unintentional Folding" test works well with swings that have an A-frame design. An A-frame swing has two legs that are shaped like the letter "A," with a bar that connects the top of the "A's." Two arms hang from the bar and support the swing. However, some swings on the market have an L-shaped design. These swings have two L-shaped legs that come together at the top. Where the two "Ls" join, a single arm hangs down to support the swing. For swings with an L-shaped design, the current test (which requires the force to be placed on the end of the leg in the direction normally associated with folding) will not adequately test the swing to ensure that it will not fold

while in use. Our testing on L-shaped infant swing designs revealed that forces placed at the end of the L-shaped legs created a twisting motion. This twisting motion may not exercise the latch to the same extent as a force applied to the end of a leg in an A-frame infant swing.

Additionally, for this test, we want to clarify the location of the applied force. The phrase, "end of the leg," could be interpreted inconsistently over various infant swing leg designs.

Thus, the proposed rule would require that the test address all swing designs, and it would do so by adding language that would require the tester to put the force "at the lowest point on the leg that results in the greatest force on the latch in the direction normally associated with folding." This will adequately test A-frame swings and L-shaped swings.

The proposed rule would make clarifications to the stability test, as well. The current test is appropriate for swings with a horizontal swing motion. Swings with a horizontal swing motion move back and forth. However, some swings move from side to side or have another type of swing motion. For these swings, the current test will not adequately predict stability issues. Therefore, the proposal would change the stability test to account for swings with other types of swing motions. Swings with a horizontal swing motion would continue to be tested in the same way (placing the swing on an inclined surface and then rotating it 180°). However, for swings with other than a horizontal motion, the proposed rule would require the tester to test the swing on the inclined surface in the most onerous swing orientations. This will ensure that all swings will be tested in the position most likely to fail.

Currently, the stability test requires the tester to account for different height positions, recline positions, and facing directions in order to ensure that the swing is safe in any configuration. For both swings with a horizontal swing motion and swings with other types of swing motions, we propose taking into consideration the direction of motion, the tray position, and any other adjustable features to ensure that the swing will be tested adequately in all possible configurations.

The test clarifications to the unintentional folding and stability tests will ensure that all types of swings, in all possible configurations, are adequately tested to ensure that the swing remains upright and functioning while the infant is placed in the swing. This will reduce the number of injuries associated with swings that fold unexpectedly or tip over.

d. Proposed Change in Standard

Currently, ASTM F 2088-11b contains the following test method at sections 7.3.2.3, 7.3.2.4 and 7.3.2.5:

> 7.3.2.3 Position the product on the inclined surface with the axis of swinging motion parallel to the stop and the lower most frame member(s) in contact with the stop as shown in Fig. 5. If the product contains an axis of swinging motion that does not remain parallel to the stop during the full cycle of the swinging motion, the product shall be tested in the positions most likely to fail.
>
> 7.3.2.4 If the swing seat has more than one height position, recline position, or facing direction, test the product in the configuration most likely to fail.
>
> 7.3.2.5 Rotate the swing frame 180° and repeat the steps in 7.3.2.2-7.3.2.4.

We are proposing that the following section 7.3.2.3 replace the existing sections 7.3.2.3, 7.3.2.4 and 7.3.2.5 of ASTM F 2088-11b:

7.3.2.3 For a product with a horizontal axis of swing motion, position the product on the inclined surface with the axis of swinging motion parallel to the stop and the lower most frame member(s) in contact with the stop as shown in Fig. 5. ~~If the product contains an axis of swinging motion that does not remain parallel to the stop during the full cycle of the swinging motion, the product shall be tested in the positions most likely to fail.~~ If the swing seat has more than one height position, recline position, ~~or~~ facing direction, **direction of motion, tray position, or other adjustable feature,** test the product in the configuration most likely to fail. Rotate the swing frame 180° **and repeat the procedure.**

To account for products with a swing motion that is not horizontal, we are proposing that the text of ASTM F 2088-11b section 7.3.2.4 be as follows:

7.3.2.4 For a product with other than a horizontal axis of swing motion, position the product on the inclined surface in the most onerous swing orientation, such that the product is in contact with the stop. If the swing seat has more than one height position, recline position, facing direction, direction of motion, tray position, or other adjustable feature, test the product in the configuration most likely to fail.

Currently, ASTM F 2088-11b contains the following test method at sections 7.4.1:

7.4.1 With the unit in the manufacturer's recommended use position, apply a force of 10 lbf (45 N) at the end of a leg in the direction normally associated with folding, while holding opposite leg(s) stationary. Gradually apply the force over 5 s, and maintain for an additional 10 s. Repeat this test on each leg.

We are proposing to replace section 7.4.1 of ASTM F 2088-11b as follows:

7.4.1 With the unit in the manufacturer's recommended use position, apply a force of 10 lbf (45 N) at the ~~end of a leg~~ **lowest point on the leg that results in the greatest force on the latch** in the direction normally associated with folding, while holding opposite leg(s) stationary**.** Gradually apply the force over 5 s, and maintain for an additional 10 s. Repeat this test on each leg.

<u>9. Broken or Detached Toys and Mobiles</u>

a. Description of Hazard

Many swings come with infant toys or mobiles meant to entertain infants in the swing. Two percent of the incident reports and 4 percent of the injury reports are attributable to broken and detached toys and mobiles. Some injuries occurred when mobiles completely detached from the swing and fell onto the child.

b. Assessment of ASTM F 2088-11b

Currently, ASTM F 2088-11b requires toy mobiles included with infant swings to be tested for detachment. The test method, contained in section 7.11 of ASTM F 2088-11b, requires the tester to pull the mobile in a vertical downward direction toward where the occupant would be. A detachment, other than that of a soft toy, is considered a failure.

c. Description of Proposed Changes

The proposed rule would clarify that the standard must account for mobiles that may fail if they are pulled in a direction other than straight downward vertically. It would require that the direction of force be in the most onerous position that is below the horizontal plane. In other words, a child in a swing will always be pulling in a downward direction, but under the proposal, the test would account for a child who pulls down, but slightly to the right or slightly to the left. To help manufacturers and third party conformity assessment bodies, we propose including a graphic in the standard illustrating the area below the horizontal plane. Our proposal would eliminate detachments that might occur from forces applied to the mobile in inadvertent directions, and the proposal will reduce the risk of injuries associated with this hazard.

d. Proposed Change in Standard

Currently, ASTM F 2088-11b contains the following test method at section 7.11.3:

> 7.11.3 Gradually apply a vertical downward force of 10 lbf in the direction of the occupant to the end of the mobile furthest from the swing attachment point. Apply the force within 5 s and maintain for an additional 10 s.

The proposal would revise section 7.11.3 of ASTM F 2088-11b as follows:

> 7.11.3 Gradually apply a ~~vertical downward~~ force of 10 lbf ~~in the direction of the occupant~~ to the end of the mobile **or component** furthest from the swing attachment point. **The direction of the force shall be in the most onerous direction that is at or below the horizontal plane passing through the point at which the force is applied (see Fig. 8a).** Apply the force within 5 s ~~and~~ maintain for an additional 10 s **and release within 1 s**. **The test is complete after the release.**

We also propose adding the following Figure 8a, Mobile Attachment Strength, to ASTM F 2088-11b:

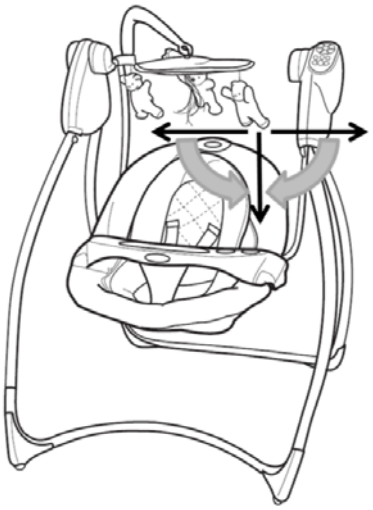

Fig. 8a Mobile Attachment Strength

10. Miscellaneous

a. Description of Hazard

Four percent of the reported incidents and 7 percent of all injuries are attributable to miscellaneous causes. Of the incidents that we found to be product related, most include small parts, including pieces of fabric that detach and can result in a choking hazard. Other reports involve sharp protrusions and surfaces that can cause cuts and scrapes.

b. Assessment of ASTM F 2088-11b

We have evaluated these incidents and have determined that ASTM F 2088-11b addresses these incidents. For example, there are already requirements that prohibit small parts and sharp edges that can pose injury hazards to children. Consequently, we are not proposing any changes based on the incidents reported in this category.

11. Summary of CPSC recommended changes to ASTM F 2088-11b

In conclusion, the proposed rule would add two new requirements to ASTM F 2088-11b that will make the standard more stringent than the current voluntary standard and will reduce the risk of injury associated with infant swings: (1) a performance requirement and test method to address electrical overload in infant swing motors and batteries, as well as an accessible component temperature requirement and a requirement to ensure that swings that run on a/c power are safe; and (2) a performance requirement and test method to address seat deflection. We also propose two major modifications to ASTM F 2088-11b that will make the standard more stringent than the current voluntary standard and will reduce the risk of injury associated with infant swings: (1) an increase in the number of test cycles used in the dynamic load test, from 50 cycles to 500 cycles and (2) a modification to the mobile test to account for mobiles that can be pulled in downward directions other than straight down vertically. Finally, the proposal would

clarify the test methods for the dynamic load test, the stability test, the unintentional folding test, and the seat back angle measurement method. Each of these clarifications would make the resulting standard more stringent than the current voluntary standard and will result in a reduction of injuries because they will result in more accurate and repeatable testing of infant swings, which will lead to safer products.

F. Effective Date

The Administrative Procedure Act ("APA") generally requires that the effective date of the rule be at least 30 days after publication of the final rule. 5 U.S.C. § 553(d). To allow time for infant swings to come into compliance, we intend for the standard to become effective 6 months after the publication of the final rule in the *Federal Register*. We invite comment on how long it will take infant swing manufacturers to come into compliance.

G. Regulatory Flexibility Act

1. Introduction

The Regulatory Flexibility Act ("RFA"), 5 U.S.C. §§ 601–612, requires agencies to consider the impact of proposed rules on small entities, including small businesses. Section 603 of the RFA requires us to prepare an initial regulatory flexibility analysis and make it available to the public for comment when the notice of proposed rulemaking is published. The initial regulatory flexibility analysis must describe the impact of the proposed rule on small entities. In addition, it must identify any significant alternatives to the proposed rule that would accomplish the stated objectives of the rule and, at the same time, reduce the economic impact on small businesses. Specifically, the initial regulatory flexibility analysis must contain:

- A description of and, where feasible, an estimate of the number of small entities to which the proposed rule will apply;
- A description of the reasons why action by the agency is being considered;
- A succinct statement of the objectives of, and legal basis for, the proposed rule;
- A description of the projected reporting, recordkeeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities subject to the requirements, and the type of professional skills necessary for the preparation of reports or records; and
- Identification, to the extent possible, of all relevant Federal rules which may duplicate, overlap, or conflict with the proposed rule.

2. The Market

Based on a 2005 survey conducted by American Baby Group titled, "2006 Baby Products Tracking Study," along with Centers for Disease Control and Prevention birth data, we estimate that approximately 2.7 million infant swings are sold in the United States each year. We estimate that there are at least 10 manufacturers or importers supplying infant swings to the U.S. market. Eight of these firms are domestic manufacturers, and two of these firms are domestic importers with foreign parent companies.

Under the U.S. Small Business Administration ("SBA") guidelines, a manufacturer of infant swings is small if it has 500 or fewer employees, and an importer is considered small if it has 100 or fewer employees. Based on these guidelines, six domestic manufacturers and both domestic importers known to supply infant swings to the U.S. market are small businesses. The remaining entities are two large domestic

manufacturers. There may be additional unknown small manufacturers and importers operating in the U.S. market.

The JPMA runs a voluntary certification program for juvenile products. Certification under the JPMA program is based on the ASTM voluntary infant swing standard. Two of the six small manufacturers produce swings that are certified as compliant with the ASTM voluntary infant swing standard by the JPMA. Of the importers, one imports swings that have been certified as compliant with the ASTM voluntary infant swing standard.

3. Impact on Small Business

a. Costs of Complying with the Voluntary Standard

Section 104(b) of the CPSIA requires us to promulgate consumer product safety standards for durable infant and toddler products. These standards are to be "substantially the same as" applicable voluntary standards or more stringent than the voluntary standard if we conclude that more stringent requirements would further reduce the risk of injury associated with the product. The extent to which each firm will be impacted by the proposed rule depends on whether the firm's infant swings currently comply with the ASTM voluntary standard. Small firms whose infant swings already comply with the voluntary standard will only potentially incur costs related to our recommended additions and modifications to the standard.

b. Small Manufacturers

Two of the small manufacturers have infant swings known to comply with the voluntary standard. The costs, if any, to these firms associated with our recommended

changes are not expected to be significant. Any impact may be mitigated if the costs are treated as new product expenses and amortized over time.

The costs to the four manufacturing firms whose infant swings may not be compliant with the voluntary standard could be more significant. Meeting the existing voluntary standard could require manufacturers to redesign their product. However, we believe that the actual costs to most manufacturers will not be high, and any costs that are incurred can be mitigated if they are treated as new product expenses and amortized over time. This scenario also assumes that the four firms whose swings are not JPMA certified do not meet the ASTM voluntary standard. In fact, we have identified many instances in which a juvenile product not certified by the JPMA does comply with the ASTM voluntary standard. To the extent that the firms may already supply infant swings that meet the ASTM voluntary standard, the costs incurred will be less.

c. Small Importers

Importers of infant swings would need to find an alternate source if their existing supplier does not come into compliance with the proposed standard. Purchasing compliant, higher quality infant swings could increase the cost of the product. Importers could pass on some of these increased costs to consumers. Some importers could respond to the rule by discontinuing the import of infant swings. The impact of this decision could be mitigated by replacing swings with a different infant or toddler product. Deciding to import an alternative infant or toddler product would be a reasonable and realistic way to offset any lost revenue.

Both of the known importers are subsidiaries importing their infant swings from a foreign parent company. Finding an alternative supply source would not be an option for

these firms. However, they could respond to the rule by discontinuing the import of their noncompliant infant swings and replacing them with another infant or toddler product. This is more likely to be necessary for the importer supplying infant swings that are not believed to be compliant with the voluntary standard.

d. Costs of Complying with our Recommended Changes

We are proposing two new requirements, two major modifications, and several testing clarifications to ATSM F 2088-11b.

The proposed electrical and battery requirements would result in low or no costs to small firms. A firm's inability to comply with these requirements would most likely be the result of a defect that would be remedied by replacing the battery or other power source. According to one source in the industry, it is already fairly common for manufacturers to test their products to ensure that the electrical system will not overheat.

The proposed seat deflection test, depending on the swing design, would result in some costs to smaller firms. Swings likely to be affected are those in which a single swing arm supports the seat. In most cases, manufacturers of these types of swings would be able to produce infant swings that comply with the proposed requirement by using stronger materials. It is possible that a few firms may opt to redesign their product, which would be more costly. In either case, only a small number of firms will be affected.

The proposed modifications to the dynamic load test, which would increase the number of cycles in the test from 50 to 500, may have an impact on some swing manufacturers but have little or no impact on others. If there are modifications associated with this change, they might be substantial. Some products might only need stronger

screws or a better way of attaching swing components. Some swings might require a complete product redesign. Therefore, it is unclear how many products will be affected by modifying this requirement and what the costs will be.

We expect that the proposed modification to the infant mobile requirement would have a significant impact on swing manufacturers whose products require modifications to comply. Not only would these products need to be redesigned, the hard tool used to manufacture the swing component would need to be changed. The hard tool is the mold of the desired infant swing component shape. During the manufacturing process, the component is made by injecting plastic or other material into the tool. Hard tools are usually made by an outside firm, which means that production of the swing would cease until the tool is designed and created. While this will be costly for some firms, it is expected to impact only a small number of firms whose mobiles would not meet the proposed change.

The testing clarifications would not require product modifications. These changes are meant to ensure that testing is consistent and repeatable. There would be no economic impact on small firms as a result of these changes.

4. Alternatives

Under the CPSIA, we must promulgate consumer product safety standards that are substantially the same as the voluntary standards for durable infant or toddler products, or promulgate consumer product safety standards that are more stringent than the voluntary standards, if the Commission determines that more stringent standards would further reduce the risk of injury associated with such products. Adopting the voluntary standard without change is one alternative that could reduce the potential cost

to small businesses. However, small firms that are not complaint with the voluntary rule still would incur costs to become compliant with the existing ASTM standard for infant swings, regardless of whether we recommend changes.

A second alternative is to set an effective date longer than 6 months to allow firms additional time to comply with the mandatory standard. More time would give manufacturers an opportunity to make any necessary changes to their product and provide importers time to find an alternative supply source or replace noncompliant swings with an alternative infant or toddler product, if necessary.

5. Conclusion of Initial Regulatory Flexibility Analysis

It is possible that the proposed standard, if finalized, could have a significant impact on some small businesses whose infant swings are not ASTM compliant. Further, it is possible that some swings that are already ASTM compliant might incur costs associated with our recommended changes. For manufacturers, the extent of these costs could entail expensive product redesign. Importers may need to find alternative sources of infant swings or replace swings with another infant or toddler product.

We invite comments describing:

- the possible impact of this rule on small manufacturers and importers; and
- significant alternatives to the proposed rule that would accomplish the stated objectives of the proposed rule, and at the same time, reduce the economic impact on small businesses.

H. Environmental Considerations

The Commission's regulations address whether we are required to prepare an environmental assessment or an environmental impact statement. If our rule has

"little or no potential for affecting the human environment" it will be categorically exempted from this requirement. 16 CFR 1021.5(c)(1). The proposed rule falls within the categorical exemption.

I. Paperwork Reduction Act

1. Introduction

This proposed rule contains information collection requirements that are subject to public comment and review by the Office of Management and Budget ("OMB") under the Paperwork Reduction Act of 1995 (44 U.S.C. §§ 3501–3521). In this document, pursuant to 44 U.S.C. § 3507(a)(1)(D), we set forth:

- a title for the collection of information;
- a summary of the collection of information;
- a brief description of the need for the information and the proposed use of the information;
- a description of the likely respondents and proposed frequency of responses to the collection of information;
- an estimate of the burden that shall result from the collection of information; and
- notice that comments may be submitted to the OMB.

2. Title and Description of the Collection of Information

The title for this collection of information is "Safety Standard for Infant Swings." The proposed rule would require each infant swing to comply with ASTM F 2088-11b, Standard Consumer Safety Specification for Infant Swings. Sections 8.1 and section 9.1 of ASTM F 2088-11b contain requirements for marking, labeling, and instructional literature. These requirements fall within the definition of "collection of information," as

defined in 44 U.S.C. § 3502(3). Specifically, 5 CFR 1320.3(c)(2) states that a collection of information includes information that an agency requires another entity, such as an infant swing manufacturer or importer, to obtain or compile for the purpose of disclosure to the public through labeling.

Section 8.1 of ASTM F 2088-11b requires that the following items be clearly and legibly marked on each infant swing and its retail carton:

- the name and the place of business (city, state, and zip code) or telephone number of the manufacturer, importer distributor, or seller;
- a model number, stock number, catalog number, item number, or other symbol expressed numerically, or otherwise, such that only articles of identical construction, composition, and dimensions bear identical markings; and
- a code mark or other means that identifies the date (month and year, as a minimum) of manufacture.

This information is necessary in order to assist us and consumers when there is a need to identify: (1) the firm supplying the infant swing, (2) the model number (or other identifying mark) of the infant swing, and (3) the date the swing was manufactured.

Section 9.1 of ASTM F 2088-11b requires all firms supplying swings to provide written, easy to read, instructions regarding assembly, maintenance, cleaning, and use. Instructional literature ensures that consumers are aware of how to use the product as the manufacturer intended.

The information required in sections 8.1 and 9.1 of ASTM F 2088-11b is intended to address safety issues that might arise with the product. The instructional literature in section 9.1 of ASTM F 2088-11b is meant to prevent safety problems by providing

assembly and maintenance information to consumers. The information required in section 8.1 of ASTM F 2088-11b is intended to help us and the consumer identify the firm and the product, should a safety issue arise.

3. Description of the Respondents and the Estimated Burden

The respondents affected by this collection of information are manufacturers or importers of infant swings. We estimate the burden of this collection of information as follows:

Table 3 – Estimated Annual Reporting Burden

16 CFR Section	Number of Respondents	Frequency of Responses	Total Annual Responses	Hours per Response	Total Burden Hours
1223.2(a)	5	5	25	1	25

There are 10 known entities supplying infant swings to the U.S. market. Five entities produce labels that comply with the standard. We assume these five entities produce labels that comply with the standard because they claim that their infant swings comply with ASTM F 2088-11b, and the swings are certified by the JPMA as conforming to ASTM F 2088-11b. Therefore, we assume that their products meet the marking and labeling requirements of ASTM F 2088-11b. For these entities, there would be no additional burden. Under the OMB's regulations at 5 CFR 1320.3(b)(2), the time, effort, and financial resources necessary to comply with a collection of information that would be incurred by persons in the "normal course of their activities" are excluded from a burden estimate, where an agency demonstrates that the disclosure activities required to comply are "usual and customary." Therefore, because these five entities already produce labels that comply with the standard, we estimate tentatively, that with respect to

these five entities, there are no burden hours associated with section 8.1 of ASTM F 2088-11b because any burden associated with supplying these labels would be "usual and customary" and not within the definition of "burden" under the OMB's regulations.

We assume that the remaining five entities use labels on their products and their packaging but may need to modify their existing labels. Based on our experience with other rules under section 104 of the CPSIA, we estimate that the time required to make these modifications is about 1 hour per model. Each entity supplies an average of five different models of infant swings; therefore, the estimated burden hours associated with labels is 1 hour per model x 5 entities x 5 models per entity = 25 hours.

We estimate that the hourly compensation for the time required to create and update labels is $28.36. We base the hourly compensation figure on data available from the U.S. Bureau of Labor Statistics. This information can be found in the U.S. Bureau of Labor Statistics' September 2011 data in Table 9, "Employer Costs for Employee Compensation," for all sales and office workers in goods-producing private industries, which can be found at: http://www/bls.gov/ncs. Therefore, the estimated annual cost to industry associated with the proposed labeling requirements is $709.00 ($28.36 per hour x 25 hours = $709.00).

Section 9.1 of ASTM F 2088-11b requires instructions to be supplied with the product. Infant swings are products that generally require assembly, and products sold without such information would not be able to compete successfully with products supplying this information. Under the OMB's regulations at 5 CFR 1320.3(b)(2), the time, effort, and financial resources necessary to comply with a collection of information that would be incurred by persons in the "normal course of their activities" are excluded

from a burden estimate, where an agency demonstrates that the disclosure activities required to comply are "usual and customary." Therefore, because we are unaware of infant swings that generally require some installation but lack any instructions to the user about such installation, we tentatively estimate that there are no burden hours associated with section 9.1 of ASTM F 2088-11b because any burden associated with supplying instructions with infant swings would be "usual and customary" and not within the definition of "burden" under the OMB's regulations.

4. Conclusion

Based on this analysis, the proposed standard for infant swings would impose a burden to industry of 25 hours at a cost of $709.00 annually.

5. Request for Comments

In compliance with the Paperwork Reduction Act of 1995 (44 U.S.C. § 3507(d)), we have submitted the information collection requirements of this rule to the OMB for review. Anyone who would like to submit comments regarding information collection should do so by [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER], to the Office of Information and Regulatory Affairs, OMB (see the ADDRESSES section at the beginning of this notice). Pursuant to 44 U.S.C. § 3506(c)(2)(A), we invite comments on:

- whether the collection of information is necessary for the proper performance of the CPSC's functions, including whether the information will have practical utility;
- the accuracy of the CPSC's estimate of the burden of the proposed collection of information, including the validity of the methodology and assumptions used;

- ways to enhance the quality, utility, and clarity of the information to be collected;
- ways to reduce the burden of the collection of information on respondents, including the use of automated collection techniques, when appropriate, and other forms of information technology; and
- the estimated burden hours associated with label modification, including any alternative estimates.

J. Preemption

Section 26(a) of the CPSA, 15 U.S.C. § 2075(a), provides that where a consumer product safety standard is in effect and applies to a product, no state or political subdivision of a state may either establish or continue in effect a requirement dealing with the same risk of injury unless the state requirement is identical to the federal standard. Section 26(c) of the CPSA also provides that states or political subdivisions of states may apply to the Commission for an exemption from this preemption under certain circumstances. Section 104(b) of the CPSIA refers to the rules to be issued under that section as "consumer product safety rules," thus implying that the preemptive effect of section 26(a) of the CPSA would apply. Therefore, a rule issued under section 104 of the CPSIA will invoke the preemptive effect of section 26(a) of the CPSA when the rule becomes effective.

K. Testing and Certification

Once there is a safety standard in effect for infant swings, it will be unlawful for anyone to manufacture, distribute, or import an infant swing into the United States that is not in conformity with this standard. 15 U.S.C. § 2068(1).

In addition, section 14(a)(2) of the CPSA, 15 U.S.C. § 2063(a)(2), imposes the requirement that products subject to a children's product safety rule must be tested by a third party conformity assessment body accredited by the Commission to test the product. As discussed in section A of this preamble, section 104(b)(1)(B) of the CPSIA refers to standards issued under this section as "consumer product safety standards." Under section 14(f)(1) of the CPSA, 15 U.S.C. § 2063(f)(1), the term "children's product safety rule" includes all standards enforced by the Commission. Thus, the infant swing standard will be a children's product safety rule, subject to third party testing and certification.

Before the requirement for third party testing and certification for infant swings can go into effect, we must issue a notice of requirements to explain how laboratories can become accredited as third party conformity assessment bodies to test infant swings to the new safety standard. We plan to issue the notice of requirements in the future.

L. Request for Comments

This proposed rule begins a rulemaking proceeding under section 104(b) of the CPSIA to issue a consumer product safety standard for infant swings. We invite all interested persons to submit comments on any aspect of the proposed rule. In particular, we seek comments on the following:

- We discuss slump-over deaths in section (E)(2) of this preamble. We invite comments related to whether it would reduce the risk of slump-over deaths if we revise the standard to state that infants who cannot hold their head up should not be placed in any infant swing, or in the alternative, whether infants who cannot hold their head up should only be placed in cradle swings, which allow an infant to lie flat. We invite comments related to whether the warning statement

contained in section 8.3.1(4) of ASTM F 2088-11b (which requires the following warning label on all infant swings having an adjustable seat recline with a seat back angle greater than 50°: "Use only in most reclined seat position until infant can hold head up unassisted") is sufficient to warn caregivers of the risk of slump-over deaths. We also invite comments related to whether 50° is the appropriate seat back angle to use in the warning, and what warnings should be on swings that do not have an adjustable seat back; and

- We discuss seat deflection hazards in section (E)(5) of this preamble. If a swing seat deflects, or leans, substantially, an infant could fall out of the swing or bump against the frame. We invite comments on whether the proposed performance requirement and test method adequately will predict whether a swing seat is likely to deflect.

Comments should be submitted in accordance with the instructions in the **ADDRESSES** section at the beginning of this notice.

List of Subjects in 16 CFR Part 1223

Consumer Protection, Imports, Incorporation by Reference, Infants and Children, Labeling, Law Enforcement, Safety and Toys.

Therefore, the Commission proposes to amend Title 16 of the Code of Federal Regulations by adding a new part 1223 to read as follows:

PART 1223-SAFETY STANDARD FOR INFANT SWINGS

Sec.

1223.1 Scope.

1223.2 Requirements for infant swings.

Authority: The Consumer Product Safety Improvement Act of 2008, Pub. L. 110-314, § 104, 122 Stat. 3016 (August 14, 2008).

§ 1223.1 Scope.

This part establishes a consumer product safety standard for infant swings.

§ 1223.2 Requirements for Infant Swings.

(a) Except as provided in paragraph (b) of this section, each infant swing must comply with all applicable provisions of ASTM F 2088-11b, Standard Consumer Safety Specification for Infant Swings, approved on October 1, 2011. The Director of the Federal Register approves this incorporation by reference in accordance with 5 U.S.C. § 552(a) and 1 CFR part 51. You may obtain a copy from ASTM International, 100 Bar Harbor Drive, P.O. Box 0700, West Conshohocken, PA 19428; http://www.astm.org. You may inspect a copy at the Office of the Secretary, U.S. Consumer Product Safety Commission, Room 820, 4330 East West Highway, Bethesda, MD 20814, telephone 301-504-7923, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal_register/code_of_federal regulations/ibr_locations.html.

(b) Comply with the ASTM F 2088-11b standard with the following additions or exclusions:

(1) In addition to complying with section 6.1.2 of ASTM 2088-11b, comply with the following:

(i) 6.1.2.1 The swing seat shall not have a change in vertical deflection greater than 4 in. The change in vertical deflection shall be calculated by subtracting the distance measured in 7.2.2.2 from the distance measured in 7.2.2.3.

(2) Instead of complying with the introductory heading in 6.7 of ASTM 2088-11b, comply with the following:

(i) 6.7 *Electrically Powered Swings* (remote control devices are exempt from the requirements in 6.7):

(3) In addition to complying with 6.7.3 of ASTM 2088-11b, comply with the following:

(i) 6.7.4 The surfaces of the batteries, switch, motor, or any other accessible electrical components shall not achieve temperatures exceeding 160° F (71° C) when tested in accordance with 7.13. At the conclusion of the test, the stalled motor condition shall not cause battery leakage, explosion, smoking, or a fire to any electrical component. This test shall be performed prior to conducting any other testing within the Performance Requirement section.

(ii) 6.7.5 Swings operating from an a/c power source, nominally a 120-V branch circuit, shall conform to 16 CFR 1505.

(4) Instead of complying with section 7.2.1.2 of ASTM 2088-11b, comply with the following:

(i) 7.2.1.2 Set-up the swing in accordance with the manufacturer's instructions. If the swing seat has more than one height position, recline position, facing direction, tray position, or other adjustable feature, test the product in the configuration most likely to fail.

(5) Instead of complying with 7.2.1.3 of ASTM 2088-11b, comply with the following:

(i) 7.2.1.3 Place the shot bag on the seating surface of the swing and allow swinging motion to come to rest. Secure the swing so that the seat cannot move during the test. The means of securing the seat shall not affect the outcome of the test. Raise the shot bag a distance of 1 in. above the seat of the swing. Drop the weight onto the seat 500 times, with a cycle time of 4 +/- 1s/cycle. The drop height is to be adjusted to maintain the 1 in. drop height as is practical.

(6) Instead of complying with section 7.2.2.2 of ASTM 2088-11b, comply with the following:

(i) 7.2.2.2 Place a static load of 5 lb (2.3 kg) in the center of the seat distributed by a wood block. Measure and record the vertical distance from the floor to the lowest point on the infant swing's seating surface. Remove the load.

(7) In addition to complying with the changes to section 7.2.2.2 of ASTM 2088-11b as described in paragraph (b)(6) of this section, comply with the following:

(i) 7.2.2.3 By any necessary means, place a static load of 75 lb (34.1 kg) or 3 times the manufacturer's maximum recommended weight, whichever is greater, in the center of the seat distributed by a wood block. Gradually apply the weight within 5 s and maintain for 60 s. Measure and record the vertical distance from the floor to the lowest point on the loaded infant swing's seating surface.

(8) Instead of complying with section 7.3.2.3 of ASTM 2088-11b, comply with the following:

(i) 7.3.2.3 For a product with a horizontal axis of swing motion, position the product on the inclined surface with the axis of swinging motion parallel to the stop and the lower most frame member(s) in contact with the stop as shown in Fig. 5. If the

swing seat has more than one height position, recline position, facing direction, direction of motion, tray position, or other adjustable feature, test the product in the configuration most likely to fail. Rotate the swing frame 180° and repeat the procedure.

(9) Instead of complying with section 7.3.2.4 of ASTM 2088-11b, comply with the following:

(i) 7.3.2.4 For a product with other than a horizontal axis of swing motion, position the product on the inclined surface in the most onerous swing orientation such that the product is in contact with the stop. If the swing seat has more than one height position, recline position, facing direction, direction of motion, tray position, or other adjustable feature, test the product in the configuration most likely to fail.

(10) Do not comply with 7.3.2.5 of ASTM 2088-11b.

(11) Instead of complying with section 7.4.1 of ASTM 2088-11b, comply with the following:

(i) 7.4.1 With the unit in the manufacturer's recommended use position, apply a force of 10 lbf (45 N) at the lowest point on the leg that results in the greatest force on the latch in the direction normally associated with folding, while holding the opposite leg(s) stationary. Gradually apply the force over 5 s, and maintain for an additional 10 s. Repeat this test on each leg.

(12) Instead of complying with section 7.11.3 of ASTM 2088-11b, comply with the following:

(i) 7.11.3 Gradually apply a force of 10 lbf to the end of the mobile or component furthest from the swing attachment point. The direction of force shall be in the most onerous direction that is at or below the horizontal plane passing through the

point at which the force is applied (see Fig. 8a). Apply the force within 5 s, maintain for an additional 10 s, and release within 1 s. The test is complete after the release.

(13) In addition to Figure 8 of ASTM 2088-11b, use the following:

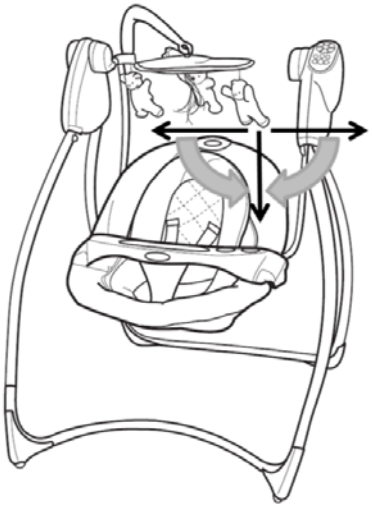

Figure 8a Mobile Attachment Strength

(14) Instead of complying with section 7.12 of ASTM 2088-11b, comply with the following:

(i) 7.12 *Seat Back Angle Measurement* – Place the back of the swing in the most upright use position. Remove positioning accessories, including pillows. Orient the belt restraint segments to limit the interaction with the hinged boards. Place the hinged boards with the hinged edge into the junction of the swing back and seat (see Fig. 8). Place the inclinometer on the floor, and zero the reading. Manually pivot the swing to its furthermost back position. While maintaining this position, place the inclinometer up against the back recline board to obtain the seat back angle as shown in Fig. 9. Hinged boards shall be made of C1020 steel using a 4 by 4 in. (101 by 101 mm) plate hinged to a 4 by 9 in. (101 by 225 mm) plate. The thicknesses shall be adjusted so that the mass is equal to 17.5 lbm.

(15) In addition to complying with the changes to section 7.12 of ASTM 2088-11b as described in paragraph (b)(14) of this section, comply with the following:

(i) 7.13 *Electrical Overload Test* – The test shall be conducted using a new swing. The swing shall be tested using fresh alkaline batteries or an a/c power source. If the swing can be operated using both, then both batteries and a/c power must be tested separately. If another battery chemistry is specifically recommended by the manufacturer for use in the swing, repeat the test using the batteries specified by the manufacturer. If the swing will not operate using alkaline batteries, then test with the type of battery recommended by the manufacturer at the specified voltage. The test is to be carried out in a draft-free location, at an ambient temperature of 68 +/- 9° F (20 +/- 5° C).

(ii) 7.13.1 Operate the swing at the maximum speed setting with the swing seat locked in a fixed position. Do not disable any mechanical or electrical protective device, such as clutches or fuses. Operate the swing continuously, and record peak temperature. The test may be discontinued 60 min. after the peak temperature is recorded. If the swing shuts off automatically or must be kept "on" by hand or foot, monitor temperatures for 30 s, resetting the swing as many times as necessary to complete the 30 s of operation. If the swing shuts off automatically after an operating time of greater than 30 s, continue the test until the swing shuts off.

Dated: _____.

_____

Todd A. Stevenson,
Secretary, Consumer Product Safety Commission