United States
CONSUMER PRODUCT SAFETY COMMISSION
Washington, D.C. 20207

VOTE SHEET

DATE: NOV 2 6 1997

TO : The Commission
Sadye E. Dunn, Secretary

FROM : Jeffrey S. Bromme, General Counsel
Stephen Lemberg, Asst. General Counsel
Harleigh Ewell, Attorney, GCRA (Ext. 2217)

SUBJECT: Options for Bunk Beds

This vote sheet concerns the staff's briefing package on possible regulatory options to address the hazard of children's entrapment in bunk beds. A draft advance notice-of proposed rulemaking ("ANPR") is at Tab G of the package for the Commission's consideration. Please indicate your vote on the following options. (Please note that Options I and II are not mutually exclusive, and you may vote for both if you are so inclined.)

I. ISSUE AN ANPR FOR BUNK BEDS. Please check the relevant option(s) below.

____ 1. APPROVE THE DRAFT FEDERAL REGISTER NOTICE (BRIEFING PACKAGE TAB G) WITHOUT CHANGE.

____ 2. PUBLISH THE DRAFT FEDERAL REGISTER NOTICE WITH CHANGES (please specify).

____ 3. OTHER (please specify).

_____ _____
(Signature) (Date)

II. THE STAFF SHOULD CONTACT THE ASTM F15.30 SUBCOMMITTEE AND REQUEST APPROPRIATE REVISIONS TO THE ASTM STANDARD,

_____ _____
(Signature) (Date)

NOTE: This document has not been reviewed or accepted by the Commission.
Initial fch **Date** 11/26/97

CPSA 6 (b)(1) Cleared
____ No Mfrs/PrvtLblrs or Products Identified

11/26/97

iii. TERMINATE THE CURRENT STAFF ACTIVITIES RELATING TO ENTRAPMENT HAZARDS OF BUNK BEDS.

_____ _____
(Signature) (Date)

iv. TAKE OTHER ACTION (please specify).

_____ _____
{Signature) (Date)

Comments/Instructions:

OPTIONS PACKAGE FOR BUNK BEDS

November 1997

For Further Information, Contact:
John D. Preston
Project Manager
Directorate for Engineering Sciences
301-504-0494, Ext. 1315

Table of Contents

United States
CONSUMER PRODUCT SAFETY COMMISSION
Washington, D.C. 20207

MEMORANDUM

DATE: NOV 2 6 1997

TO : The Commission
Sadye E. Dunn, Secretary

Through: Jeffrey S. Bromme, General Counsel
Pamela Gilbert, Executive Director

FROM : Ronald L. Medford, Assistant Executive Director
Office of Hazard Identification and Reduction
John D. Preston, Project Manager, ES
(301) 504-0494 Ext. 1315

SUBJECT: Options for Addressing Fatal Entrapment Incidents Associated with Bunk Beds

I. ISSUE

Whether the U.S. Consumer Product Safety Commission (CPSC) should begin a proceeding that could result in a mandatory rule to address entrapment hazards associated with bunk beds. This issue is being brought to the Commission for consideration because of the continuing problem of non-conformance to the current voluntary standard, ASTM F1427-96, by numerous companies in the last several years.

II. BACKGROUND

Bunk beds have been long recognized as a potential source of serious injury to children. Industry originally developed safety guidelines for bunk beds in 1978, and then incorporated these guidelines into an American National Standards Institute (ANSI) voluntary standard in 1981. In May 1986, the American Furniture Manufacturers Association (AFMA) published Voluntary Bunk Bed Safety Guidelines, which were developed by an Inter-Industry Bunk Bed Committee (IIBBC).

On August 26, 1986, the Consumer Federation of America (CFA) filed a petition with CPSC requesting the promulgation of a mandatory safety regulation for bunk beds. In its petition, CFA cited three different risks of injury posed by bunk beds: inadequate mattress supports that can allow the mattress to fall to the bunk below or to the floor, entrapment in

NOTE: This document has not been reviewed or accepted by the Commission.
Initial rla Date 11/26/97

CPSA 6 (b)(1) Cleared
No Mfrs/PrvtLblrs or 11/26/97

the space between the guardrails and the mattress, and entrapment between the bed and the wall. CFA alleged that the voluntary industry guidelines did not fully address the hazards posed to consumers.

On July 1, 1988, AFMA published Revised Voluntary Bunk Bed Safety Guidelines, effective in April 1989, which strengthened certain requirements (see Voluntary Standards Activities at III B below).

On July 21, 1988, the Commission voted to deny the petition filed by the CFA but directed the staff to prepare a letter to AFMA and IIBBC, urging that AFMA reconsider the CPSC staff comments that had not been included in the Revised Voluntary Bunk Bed Safety Guidelines. This August 1988 letter also requested that AFMA a) submit the revised guidelines to a voluntary standards organization such as ANSI or ASTM for development as a voluntary safety standard and b) develop and provide to the Commission a plan and proposed implementation date for a certification program.

In October 1992, ASTM published a Standard Consumer Safety Specification for Bunk Beds, ASTM F1427-92, in response to the Commission's August 1988 recommendation to AFMA. This standard was revised and republished in June 1994 and again in September 1996. The requirements addressing entrapment hazards in the current (1996) ASTM standard are summarized in a memorandum from Engineering Sciences at Tab A. Staff currently believes that the ASTM voluntary standard for bunk beds addresses the most common entrapment hazards associated with these products (see additional discussion in IIIB below).

III. DISCUSSION

A. Incident Data (TAB B)

From January 1990 through September 1997, CPSC received reports of 85 bunk bed-related deaths to children under the age of 15. As shown below, 54 (64 percent) were the result of entrapment. An additional 23 children died when they inadvertently became hung from the bed by such items as belts, ropes, clothing, and bedding. Eight children died in falls from bunk beds. Almost all (96 percent) of the entrapment victims were ages three and younger, whereas hanging and fall victims tended to be older than three years.

Available data indicate that the number of bunk bed-related deaths has not decreased in recent years and that entrapment continues to be associated with the majority of fatal incidents. To better evaluate the extent of the entrapment problem, staff also developed national estimates of the total number of entrapment deaths that occurred each year, using statistical methodology that examined the extent of overlap between data-reporting sources. Nationally, about ten bunk bed entrapment deaths were projected to have occurred each year since 1990.

FATAL BUNK BED INCIDENTS REPORTED TO CPSC,
BY YEAR AND HAZARD PATTERN

	Hazard Pattern			
Year	Total	Entrap.	Hanging	Falls
Total	85	54	23	8
1990	7	5	2	--
1991	15	10	2	3
1992	4	3	1	--
1993	19	10	7	2
1994	10	6	3	1
1995	12	5	5	2
1996	11	10	1	--
1997	7	5	2	--

SOURCE: CPSC Data Files, January 1990 - September 1997

U.S. CONSUMER PRODUCT SAFETY COMMISSION/EHHA

CPSC staff reviewed available information on entrapment-related incidents, which accounted for the majority of deaths, to obtain additional detail about the circumstances involved. In all, CPSC received reports of 103 entrapment incidents from January 1990 through September 1997, including 54 that involved deaths and 49 that involved "near-misses" (a child was entrapped, but usually with no or minor injury, often because another person intervened). Where reported, most incidents involved wooden bunk beds, and entrapment occurred most often on the top bunk. Common areas of entrapment were under the guardrail, within the end structures of the bed, and between the bed and the wall.

With three exceptions, almost all of the incidents involving fatal entrapment in the structure of bunk beds apparently occurred on beds not meeting the requirements addressing entrapment in the ASTM voluntary standard. Two of the incidents involving beds that appeared to conform to the entrapment provisions in the voluntary standard involved entrapment on the upper bunk. These beds had guardrails that did not run the entire length of the bed. In these two incidents, a child slipped through the space between the end of the guardrail and the bed's end structure and became wedged between the bed and a wall. In the third incident involving a bunk bed that appeared to conform, a child became entrapped by the head in an opening between the underside of the upper bunk foundation support and a curved tubular member in the bed end structure (see additional discussion in IIIB below).

B. Voluntary Standards Activities

In 1978, an Inter-Industry Bunk Bed Safety Task Group developed a Bunk Bed Safety Guideline for voluntary use by manufacturers and retailers of bunk beds intended for home

use. Members of this group included the National Association of Bedding Manufacturers, the National Association of Furniture Manufacturers, the Southern Furniture Manufacturers Association, and the National Home Furnishings Association. The guideline became effective on January 1, 1979.

In February 1981, an American National Standard for Bedding Products and Components (ANSI Z357.1) was published. For the most part, this standard contained dimensional requirements for mattresses and foundations for all beds. However, it also incorporated the requirements of the 1978 industry safety guideline for bunk beds.

In May 1986, AFMA published Voluntary Bunk Bed Safety Guidelines developed by an Inter-Industry Bunk Bed Committee (IIBBC). CPSC staff participation with this committee was limited to one or two meetings of the IIBBC after the guidelines had been developed. In July 1988, AFMA published Revised Voluntary Bunk Bed Safety Guidelines, with an effective date of April 1989. A majority of the revisions were made as a result of CPSC staff comments on the May 1986 guidelines, which included comment that the requirements addressing entrapment in openings in guardrails were not adequate and that bunk beds should be required to be sold with two guardrails. The 1989 revised guidelines did require two guardrails to accompany a bunk bed, and there were no exceptions to a requirement that any opening in the structure of the upper bunk be less than 3½ inches to prevent entrapment.

In an August 1988 letter, CPSC staff requested that AFMA consider additional recommendations and develop either an ANSI or ASTM voluntary standard for bunk beds and sponsor a third-party certification program for bunk beds. In response, AFMA stated that a certification program would be established upon publication of an ASTM bunk bed standard.

In October 1992, an ASTM Standard Consumer Safety Specification for Bunk Beds, ASTM F1427-92, was published in response to the August 1988 Commission staff request. The performance requirements in that standard primarily addressed falls from the upper bunk, entrapment in the upper bunk structure or between the upper bunk and a wall, and security of the foundation support system. The standard also had a requirement for a warning label and for instructions to accompany the bed. In June 1994, the ASTM bunk bed standard was republished with additional provisions (again requested by CPSC staff) to address collapse of tubular metal bunk beds. The most current version of the ASTM bunk bed standard was published in September 1996 and contained additional revisions suggested by CPSC staff. These addressed entrapment in lower bunk bed end structures; mattress size information on the warning label and carton; and the name and address of the manufacturer, distributor, or seller on the bed.

Staff currently believes that the provisions in the ASTM Standard Consumer Safety Specification for Bunk Beds, ASTM F1427-96, address the most common entrapment hazards associated with these products, but, as previously stated, entrapment fatalities have occurred on conforming bunk beds. Staff is aware of three fatalities that occurred on beds that appeared to conform to the entrapment requirements. In two of these fatalities, an 18-month-old infant and a child who was almost 5 years old became entrapped between the upper bunk

bed structure and a wall when each passed through a space between the end of a side guardrail and the bed end structure. The current standard permits guardrails that terminate before reaching the bed end structure provided that there is no more than 15 inches between either end of the guardrail and the bed end structures (see ES memo itemizing current entrapment requirements at Tab A).

A third death occurred when a 22-month-old child was playing with an older sibling on a bunk bed and placed his head into a tapered opening between the underside of the upper bunk foundation and a structural member (see sketch at Tab C). Based on a review of the incident, the staff believes that this child was standing on the lower bunk mattress and, when his feet slipped off the mattress, he was suspended by his head. The current standard only addresses openings in the lower bunk end structures that are within a height of 9 inches above the sleeping surface of the mattress. Staff believes that additional entrapment provisions may be needed to address these fatalities.

C. Product, Market and Conformance Information

An Economics memo at Tab D states that industry sources estimate that about 500,000 bunk beds are sold annually for residential use (excluding institutional sales), and that sales have been relatively stable over time. The annual retail value of sales has been estimated by AFMA at about $150 million. Industry sources estimate the average retail price of bunk beds to be about $300, but prices range from about $100 to $700. Bunk beds are marketed in specialty stores, furniture stores, department stores, and by mail order. There is also a market for used bunk beds in thrift shops, garage sales, and classified advertising.

Trade sources estimate the expected useful life of bunk beds to be 13-17 years. Based on available information, there are about 7-9 million bunk beds available for use, including bunk beds not in active use, and those in use as two separate beds.

CPSC staff is aware of at least 106 bunk bed manufacturers, which are believed to produce the bulk of annual sales. Of the 106 identified firms, 40 are either members of AFMA or are members of the ASTM subcommittee that developed the existing voluntary standard for bunk beds. According to AFMA, these 40 firms represent 75-80 percent of the total annual shipments of bunk beds. While it is likely there are many other small regional manufacturers or importers of bunk beds, such manufacturers/importers are likely to account for a much smaller share of the U.S. market.

From June through August 1994, the Office of Compliance (Compliance) identified and sent letters of inquiry to 85 bunk bed manufacturers/importers, as part of a voluntary standard conformance monitoring project. Responses to these letters revealed 17 companies marketing bunk bed designs that presented potential entrapment hazards. Based on these responses, as well as retail inspections, consumer complaints, and reported incidents since November 1994, 41 manufacturers have recalled wooden and metal bunk beds that did not conform to the entrapment requirements in the ASTM standard. The recalls affected over one-half million bunk beds (see TAB E).

In February 1997, Compliance assigned a total of 45 inspections of bunk bed retailers nationwide. Examination of 77 beds from 35 different manufacturers by CPSC regional office staff revealed that 12 bed designs, each fabricated by a different manufacturer, were not in conformance with the entrapment requirements of the ASTM voluntary standard. However, problems identified through these inspections resulted in recalls together with correction for future production.

As noted above, staff has identified 106 manufacturers and importers of wooden and metal bunk beds. Compliance believes that the actual number of manufacturers and importers could be much higher. Because of the relative ease of constructing bunk beds, many small companies are formed each year. These companies are normally not associated with industry organizations, are often unaware of the voluntary standard, or misinterpret its requirements. As a result, they may produce hazardous, nonconforming beds.

Although the voluntary standard improves the safety of bunk beds, it is not mandatory that companies comply. Some manufacturers contacted by Compliance do not see an urgency to comply with a "voluntary" standard, nor do they recognize the hazards associated with non-compliance. As a result, entrapment hazards continue to exist on beds in use and for sale. As Compliance identified beds with potential entrapment hazards, it sought voluntary recalls and future design changes. Currently, all 106 manufacturers identified by CPSC staff are producing beds that conform to the entrapment requirements in the ASTM F1427 bunk bed standard. However, the small, regional manufacturers that periodically enter into the marketplace are not likely to be aware of the voluntary standard, or the hazards that are associated with bunk beds. Further, without a mandatory standard there is little guarantee that firms will continue to assure that their bunk beds conform to the voluntary standard.

Staff believes that the adoption of a mandatory standard would increase the level of awareness and the sense of urgency by manufacturers to make beds that comply. This would reduce the number of non-complying beds manufactured in the future, and thus reduce entrapment deaths. In addition, Compliance indicated that a mandatory standard is needed for the following reasons (seeTab F):

1. A lack of manufacturer identification on the beds has resulted in extremely low recall effectiveness rates. A mandatory standard could require companies to include identification on the beds and make them accountable for the products they sell.

2. A mandatory standard would allow the staff to seek penalties for violations. Publicizing fines for non-compliance with a mandatory standard would deter other manufacturers from making non-complying beds.

3. A mandatory standard would allow state and local officials to assist CPSC staff in identifying non-complying bunk beds and take action to prevent the sale of these beds.

4. Under a mandatory standard, retailers and distributors would also violate the law if they sold non-complying bunk beds. Retailers and retail associations would then pressure manufacturers and importers to provide complying bunk beds.

5. The bunk bed industry is extremely competitive. Manufacturers who now conform with the ASTM standard have expressed concern about those firms that do not. Non-conforming beds undercut the cost of conforming beds. A mandatory standard would establish a level playing field and take away any competitive cost advantage for unsafe beds.

6. As a result of CPSC's Recall Round-Up, the staff continues to receive reports of incidents and other information concerning bunk bed entrapment hazards. Adoption of a mandatory standard would further help reduce deaths and injuries.

7. A mandatory standard would help prevent non-complying beds made by foreign manufacturers from entering the United States. CPSC could use the resources of U.S. Customs to assist in stopping hazardous beds at the docks.

D. Cost/Benefit Considerations (TAB D)

To provide some preliminary information on additional costs to conform to the entrapment requirements of the existing voluntary standard, Economics staff contacted four manufacturers who modified their production for this reason. The most expensive modification was the addition of a second guardrail to the top bunk. Two firms estimated that the additional guardrail would add $15-20 to the retail price of these products. The other manufacturers, marketing beds in the "mid to upper" price range, estimated a $30-40 increase in the retail price of their products. This increased cost would be incurred only by those firms which do not now conform to the voluntary standard.

Economics estimates that the costs to society of bunk bed entrapment deaths is about $174-346 per bed over its expected useful life. Economics also found that the costs of bringing bunk beds into conformance with entrapment requirements range from $15-40. If the measures taken to address bunk bed-related entrapment deaths were only about 4 to 23 percent effective in reducing these deaths, the costs and the benefits of such an activity would be about equal (see table on page 5 of Economics memo at Tab D).

IV. OPTIONS

1. If the Commission believes that conformance to the voluntary standard for bunk beds is not satisfactory and/or that the voluntary standard does not adequately address entrapment hazards, and preliminarily believes that a rule may be reasonably necessary to address an unreasonable risk of injury, it could publish an Advance Notice of Proposed Rulemaking (ANPR) to begin a rulemaking proceeding.

2. If the Commission believes that changes to the ASTM voluntary standard are justifiable to address hazards the standard does not currently address, the Commission could direct the staff to contact the ASTM F15.30 Subcommittee and request a revision of certain provisions in the standard.

3. If the Commission believes that conformance to the voluntary standard is acceptable and that the current voluntary standard is adequate to address all hazards associated with the use of bunk beds, or if the Commission believes that available information does not indicate preliminarily that a rule may be reasonably necessary to address an unreasonable risk of injury, the Commission could terminate the project.

V. CONCLUSIONS AND RECOMMENDATIONS

There has been a continuing pattern of non-conformance to the voluntary standard. Since November 1994, there have been eight recalls of wooden and metal bunk beds that did not conform to the standard. The recalls involved 41 manufacturers and affected over one-half million beds. The most recent recall, in September 1997, involved five companies and affected 16,500 beds. One of these beds was involved in a fatal entrapment incident. Given the nature of the industry, which allows small regional firms to quickly come into and go out of business, the staff believes that it is very likely that there will continue to be serious conformance problems with the voluntary standard. Staff believes that the adoption of a mandatory standard together with continued enforcement action would increase the awareness and sense of urgency by manufacturers, thereby increasing the degree of conformance to the entrapment provisions. In addition, while the staff currently believes that the ASTM voluntary standard for bunk beds addresses the most common entrapment hazards associated with these products, staff is aware of three entrapment fatalities that occurred in conforming beds. Therefore, the staff recommends that the Commission issue an Advance Notice of Proposed Rulemaking (ANPR) to begin a regulatory proceeding and seek public comment on a) the need for a mandatory standard and b) additional requirements to address fatalities known to have occurred on beds conforming to the current voluntary standard. A draft ANPR is attached at Tab G.

A

United States
CONSUMER PRODUCT SAFETY COMMISSION
Washington, D.C. 20207

MEMORANDUM

DATE: November 13, 1997

TO : The File
Through : Andrew G. Stadnik, AED ES
FROM : John D. Preston, ES

SUBJECT : Entrapment Requirements in ASTM F1427-96 .

The entrapment requirements in the ASTM Standard Consumer Safety Specification for Bunk Beds, ASTM F1427, are intended to address incidents in which children slid feet-first into completely bounded openings in the structure of the beds. If such openings are large enough to permit passage of a child's torso but not large enough to permit passage of a child's head, the child may become entrapped by the head and strangle.

Following are the requirements addressing entrapment in the current ASTM Standard, ASTM F1427-96:

4.2 *Mattress and Foundation Size and Fit:* There shall be no gaps between the interior bed structure and the edges of the mattress and foundation that will permit complete passage of the wedge block in Fig . 1 (see attached).

4.5 *Guardrails:*

4.5.1 Two guardrails shall accompany any bed in which the underside of the foundation is over 35 in. (890 mm) from the floor. Guardrails may be separate from or integral with the ladder.

4.5.2 Guardrails shall be attached in a manner that requires the intentional release of a fastening device or be so designed that they cannot be removed unless forces are applied sequentially in different directions.

4.5.4 With no mattress on the bed, there shall be no openings in the rigid bed structure below the lower edge of the guardrail that would permit complete passage of the wedge block shown in Fig. 1.

45.5 A guardrail may terminate before reaching the bed end structure, providing there is no more than 15 in. (380 mm) between either end of the guardrail and the bed end structures in the same plane.

4.6 *Bed End Structure:*

4.6.2 There shall be no openings in the rigid end structures of the upper bunk that will permit the free passage of the wedge block shown in Fig. 1. This requirement shall only apply to that portion of the bed end structure that is above the foundation support system of the upper bunk.

4.6.3 There shall be no openings in the end structures of the lower bunk that will permit free passage of the wedge block shown in Fig. 1, unless they are large enough to permit the free passage of a 9 in. (230 mm) diameter rigid sphere. This requirement does not apply to openings that are below the level of the lower bunk foundation support system or above a level that is 9.0 in. (230 mm) above the sleeping surface of the maximum thickness mattress and foundation combined as recommended by the manufacturer.

To address the three known fatalities that occurred on bunk beds conforming to the entrapment requirements in the current voluntary standard, ES suggests that consideration should be given to 1) prohibiting guardrails on the wall side of a bunk bed that do not run the full length of the bed and 2) extending the current requirements addressing entrapment in lower bunk end structures to cover the entire structure from the level of the lower bunk mattress support system to the level of the upper bunk mattress support system

Attachment

ATTACHMENT .

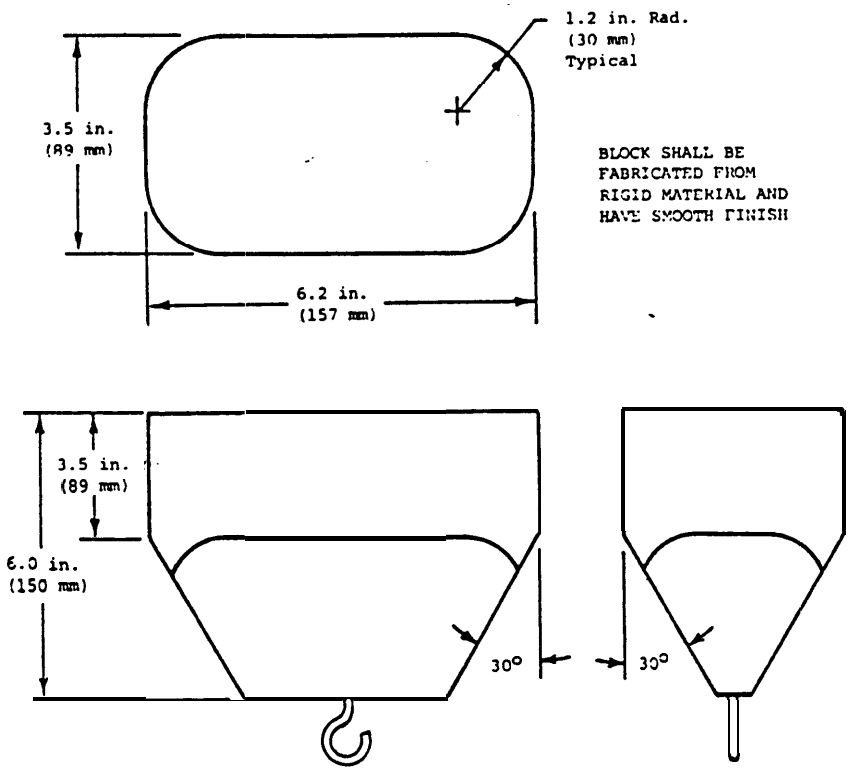

FIG. 1 Wedge Block for Tests in 5.2.3, 5.5.1, and 5.6.1

B

United States
CONSUMER PRODUCT SAFETY COMMISSION
Washington, D.C. 20207

MEMORANDUM

DATE: NOV I 8 1997

TO : John Preston, ESME

Through: Mary Ann Danello, Ph.D., Associate Executive Director
Directorate for Epidemiology and Health Sciences
Susan Ahmed, Ph.D., Director
Division of Hazard Analysis (EHHA)

FROM : Deborah K. Tinsworth, EHHA DKT

SUBJECT: Bunk Bed Deaths and Injuries

This memorandum provides current information on bunk bed-related deaths and injuries. Incidents involving entrapment are described in greater detail, in support of efforts to determine whether mandatory U.S. Consumer Product Safety Commission (CPSC) action is needed to address bunk bed entrapment hazards.

DEATHS

Based on a review of CPSC's files of in-depth investigations, death certificates, medical examiner and coroner reports, newspaper clippings, and other reported incidents, CPSC received information on 85 bunk bed-related deaths to children younger than 15 that occurred from January 1990 through September 1997.[1] Of these, 54 (64 percent) were the result of entrapment. An additional 23 children died when they became hung from the bed with such items as belts, ropes, clothing, and bedding. Eight children died in falls from bunk beds (Table 1).

While trends cannot be inferred from these data, it appears that the number of bunk bed deaths have not decreased in recent years, and that entrapment continues to be associated with the majority of fatal incidents.

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[1] These deaths were neither a complete count of all that occurred during this time period, nor a sample of known probability of selection. However, they provide a minimum number and illustrate the circumstances involved in some serious bunk bed-related incidents.

TABLE 1

FATAL BUNK BED INCIDENTS REPORTED TO CPSC,
BY YEAR AND HAZARD PATTERN
(JANUARY 1990-SEPTEMBER 1997)

		Hazard Pattern		
Year	Total	Entrap.	Hanging	Falls
Total	85.	54	23	a
1990	7	5	2	--
1991	15	10	2	3
1992	4	3	1	--
1993	19	10	7	2
1994	10	6	3	1
1995	12	5	5	2
1996	11	10	1	--
1997	7	5	2	--

SOURCE: CPSC data files, January 1990-September 1997
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Table 2 illustrates that the ages of those fatally injured in bunk bed incidents varied by hazard pattern. Over 96 percent of those who died in entrapment incidents were age 3 and younger, **and** all but one were younger than 5. However, over 80 percent of those who died in hanging incidents were age 6 and older. Fall deaths involved both pre-school and older victims, although the number reported may have been too small to draw any firm conclusions.

Over 60 percent of those fatally injured in bunk bed incidents were male.

TABLE 2

FATAL BUNK BED INCIDENTS REPORTED TO CPSC, BY VICTIM AGE AND HAZARD PATTERN (JANUARY 1.990 - SEPTEMBER 1997)

Age (years)	Total	Hazard Pattern Entrap.	Hanging	Falls
Total	85	54	23	8
< 1	17	15	1	1
1	17	17	--	--
2	15	13	1	1
3	8	7	--	1
4	4	1	1	2
5	1	--	1	--
6	3	--	3	--
7	3	1	2	--
a	2	--	2	--
9	3	--	2	1
10+	12	--	10	2

SOURCE:. CPSC data files, January 1990-September 1997
U.S. CONSUMER PRODUCT SAFETY COMMISSION\EHHA

INJURIES

Based on data from CPSC's National Electronic Injury Surveillance System (NEISS), there were an estimated 35,000 bunk bed-related injuries to children under the age of 15 treated in U.S. hospital emergency rooms in 1996. Almost one-half (47 percent) of the victims were younger than 5 years. A review of the descriptive comments received for each injury revealed that **falls** from the bed or ladder were involved in almost all cases where the circumstances were reported. Virtually none of the incidents involved entrapment or hanging. Less than two percent of the victims were admitted for further hospitalization.

Notably, over one-half **(52** percent) of the injuries involved **the head/face area.** The arm/hand **area was** involved in about 27 percent of the injuries, followed by the leg/foot area, with about **14** percent of the injuries.

Lacerations, contusions, and abrasions accounted for almost 60 percent of the injuries. However, about 20 percent of the injuries were fractures, primarily to the arm/hand area.

About 60 percent of the victims were male.

ENTRAPMENT INCIDENTS

Entrapment-related incidents, which accounted for the majority of deaths, were reviewed in further detail to provide additional information about the circumstances involved. Both fatal and "near-miss" incidents were included. The "near-miss" incidents, usually reported through consumer complaints, were those in which a child became entrapped in the bed, often requiring rescue by the parent or caregiver. In these cases, there were generally no injuries or injuries were minor (contusions/abrasions). However, "near-miss" incidents were included because they were judged to have the potential for death or serious injury.

In all, CPSC received reports of at least 103 entrapment incidents from January 1990 through September 19.97, including 54 that involved deaths[2] and 49 that involved "near-misses."

Location of Entrapment

As shown in Table 3, 69 of the entrapment incidents involved the top bunk, 22 involved the bottom bunk, and one involved a ladder. In 11 cases, the involvement of the top or bottom bunk was not reported.

Where information was available, it appeared that all but three of the incidents involving fatal entrapment in the structure of bunk beds occurred on beds not meeting the requirements addressing entrapment in the ASTM voluntary standard. Two incidents involved entrapment on the upper bunk of beds that appeared to conform to the entrapment requirements in the voluntary standard. In these incidents, an 18-month old infant and a child who was almost 5 years old slipped through the space between the end of the guardrail and the bed end structure and became wedged between the bed and a wall. The voluntary standard permits such openings provided that the space is not greater than 15 inches in width. In the third incident involving

[2]A national estimate of the total number of entrapment deaths that occurred each year was also developed, using statistical methodology that examined the extent of overlap between data reporting sources (capture/recapture). About ten bunk bed entrapment deaths were projected to have occurred annually since 1990 (95% confidence interval = (6.0,14.4)).

TABLE 3

LOCATION OF BUNK BED ENTRAPMENT
FOR FATAL AND "NEAR-MISS" INCIDENTS
(JANUARY 1990 - SEPTEMBER 1997)

Location of Entrapment	Total	Type of Incident	
		Fatal	Near-Miss
Total	103	54	49
Top Bunk	69	39	30
Guardrail	45	27	18
Bed/Wall	11	9	2
End Structure	11	1	10
Add-On Rail	1	1	--
Unk	1	1	--
Bottom Bunk	22	10	12
Guardrail	1	--	1
Bed/Wall	4	4	--
End Structure	12	3	9
Add-On Rail	2	2	--
Other	3	1	2
Ladder	1	1	--
Unknown Bunk	11	4	7
Guardrail	2	--	2
Bed/Wall	1	1	--
End Structure	4	--	4
"Safety Rails"	1	1	--
Other	1	--	1
Unk	2	2	--

SOURCE: CPSC data files, January 1990-September 1997
U.S. CONSUMER PRODUCT SAFETY COMMISSION\EHHA

a bunk bed that appeared to conform, a 22-month-old child became entrapped by the head in a:n opening between the underside of the upper bunk foundation support and a curved structural member in the bed end structure.

Top Bunk

A total of 45 (66 percent) of the incidents that occurred on the top bunk involved children who became entrapped, often by the neck or head, in spaces between the guardrail and siderail or between the guardrail and mattress, usually on the side of the bed away from the wall. One additional incident, however, involved an "add-on" guardrail, used on the wall side of the bed.

The 11 victims who became entrapped between the bed and the wall on the top bunk were usually on beds without guardrails. However, in a couple of cases of bed/wall entrapment, the guardrails did not extend the complete length of the bed, and the victim slipped down and became entrapped in an area without guardrail protection.

Most of the 11 victims entrapped in the end structures of the top bunk were involved in "near-miss," rather than fatal incidents.

Bottom Bunk

The most commonly reported area of entrapment on the bottom bunk was the end structure of the bed (12 cases), although most incidents were nonfatal. Other incidents involved entrapment between the bed and wall (4 cases), and on "add-on" safety rails (2 cases). One case reported the involvement of a guardrail. However, most lower bunks are not sold with guardrails, so this may have been an after-market feature.

Ladder

One fatal incident involved a toddler whose head and neck became caught in a 5.5 inch space between the steps of a ladder on a bunk bed.

Unknown Bunk

The cases for which the involvement of the upper or lower bunk was not specified involved locations of entrapment similar to those described above. Entrapment in the end structures, between the bed and wall, on guardrails, and on an "add-on" rail was reported in these incidents.

Materials of Construction

Where specified, 73 percent of the bunk beds involved in fatal entrapment incidents, and 85 percent of those involved in 'near-miss" incidents, were constructed-of wood. Others were made of metal.

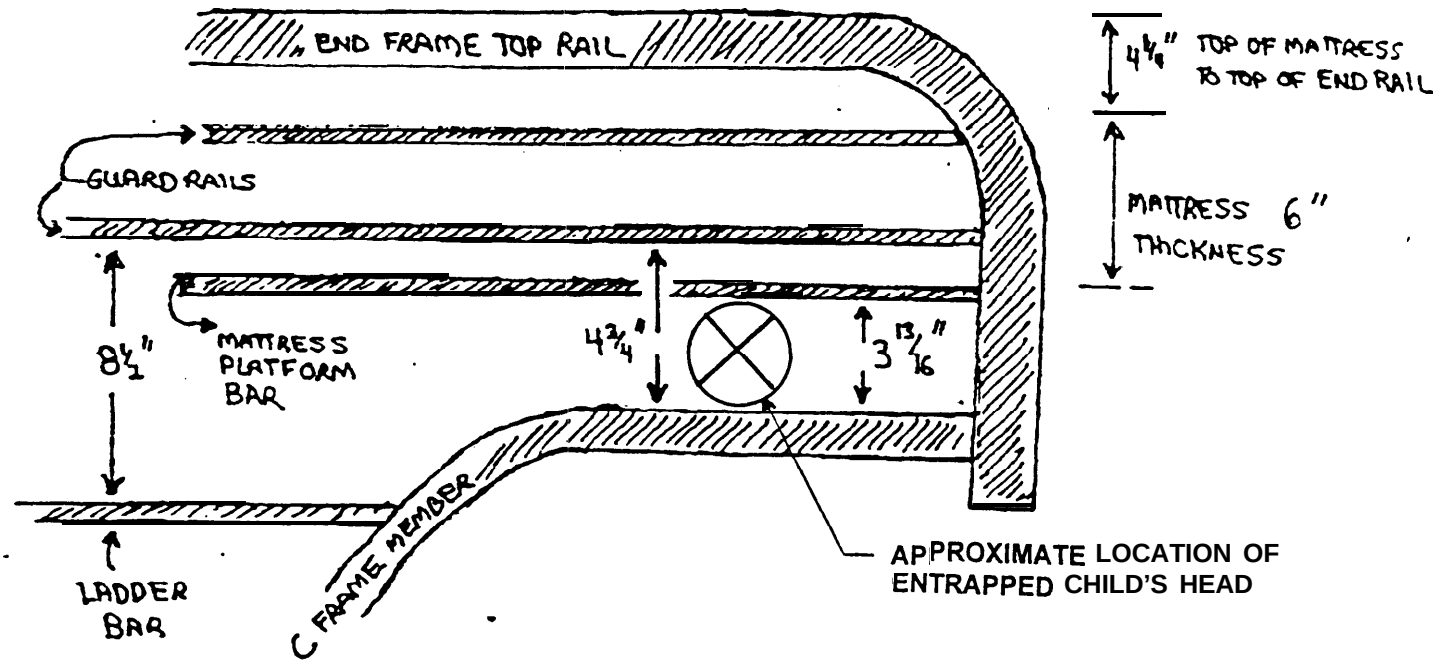
At least six of the wooden bunk beds involved in fatal entrapment incidents were described as homemade.

Date of Bed Purchase

For 37 of the 54 incidents involving fatalities (69 percent), no information on the age of the bed was available. Of the remaining fatal incidents, it appeared that very few (possibly four) involved beds that were purchased in 1992 or later, after the 1992 initial publication of the ASTM voluntary standard for bunk beds. For the three fatal incidents involving beds that appeared to conform to the provisions of the ASTM standard, one involved a bed purchased from a retail chain in June 1991, one involved a bed purchased from a furniture liquidator in December 1994, and one involved a bed for which the age was unknown.

Information on the age of the bed was reported in 45 of the 49 "near-miss" incidents. Of these, 34, or about three-fourths, appeared to have been purchased in 1992 or later.

C



DETAIL DRAWING OF THE ENTRAPMENT AREA (NOT DRAWN TO SCALE)

D

United States
CONSUMER PRODUCT SAFETY COMMISSION
Washington, D.C. 20207

MEMORANDUM

DATE: November **19, 1997**

TO : John D. Preston, ES
Chief Engineer for Children's Products

Through: Warren J. Prunella, Associate Executive Director
for Economic Analysis WJP

FROM : Fay H. Dworkin, Ph.D., Senior Staff Coordinator, EC FHD
Terrance R. Karels, EC TRK

SUBJECT: Bunk Bed Entrapment Hazards; Preliminary Economic Considerations

The CPSC staff is investigating entrapment hazards with bunk beds. This memo contains background information on the market, and presents a preliminary look at costs and benefits of conformance to a standard.

The Product

Bunk beds are essentially stackable twin beds constructed of wood or metal frames. The average retail price of bunk beds has been estimated by some manufacturers at about $300, but they can range in price from **$100** to $700 each. They are marketed extensively: in specialty stores, furniture stores, department stores, and by mail order. There is also a market for used bunk beds, in thrift stores, garage sales, and classified advertising.

Manufacturers

Every manufacturer of bedroom furniture is a potential producer of bunk beds. Further, smaller manufacturers can also produce these products, because bunk beds have a straightforward design. Larger manufacturers display their products at national trade shows and are often likely to belong to trade associations; however, smaller manufacturers need not depend on national exposure to reach their limited local or regional purchasers. For these reasons, the precise number of firms is unknown. Through trade sources, staff has developed a list of **106** manufacturers of bunk beds. While this list is believed to be comprehensive (comprising the bulk of total annual sales),

Compliance staff believe there is a number of small firms beyond the 106 identified.

The American Furniture Manufacturers Association (AFMA) represents manufacturers of bunk beds. Of the 106 identified firms, 40 are either members of AFMA or have standing with the ASTM committee that drafted the existing voluntary standard for bunk beds. These 40 firms represent 75-80% of total annual shipments of bunk beds, according to AFMA. By inference, the remaining 66 manufacturers identified by the staff and other manufacturers unknown to the Commission, account for the rest of the 20-25 percent of annual shipments.

Sales and Use

There are no reported data on U.S. sales of bunk beds. Industry sources estimate that about 500,000 bunk beds are sold annually for residential use and that sales have been relatively stable over time. The annual retail value of sales has been estimated by the trade group at about $150 million.

According to trade sources, the estimated expected useful life of bunk beds is 13-17 years. Based on EC's Product Population Model, there are on the order of 7-9 million bunk beds available for use; this includes bunk beds not in active use, and those which are in use as two separate beds.

Conformance with Existing **Voluntary Standard**

Compliance staff (CA) has reported that all 40 firms that are either members of AFMA or which have ASTM standing produce bunk beds that are in conformance with the existing voluntary standard. Also, in a conformance survey, CA staff contacted the remaining 66 identified firms. CA staff report that after taking a number of corrective actions, including recalls, all of these firms are now in conformance.

There are no known agency or publicly available data concerning the historical changes in extent of conformance with the voluntary standard since 1979 (the initial year industry guidelines were available), Based on its best judgment, CPSC's Directorate for Engineering Sciences (ES) estimates that roughly 50 percent of production was in conformance from 1979 to 1986. This rough estimate is based in part on the fact that, although the guidelines were available during this period, even some firms represented on the ASTM standards committee did not follow them.

The industry publicized the availability of guidelines in 1986 and CPSC staff became involved in the standards process. ES and CA staff believe that these factors raised industry awareness of the existence and importance of the voluntary standard and estimate that conformance may have increased to roughly **75** percent of production from 1986 to 1992. In 1992, ASTM published its bunk bed standard, and CA became active in monitoring

products for conformance to that standard. ES staff estimate that 90 percent (or more) of production since 1992 may conform to the ASTM standard.

Many of the bunk beds produced in the early to mid '80s, which may have had substantially less conformance than currently produced beds are probably no longer in use. Therefore, although we cannot precisely estimate what proportion of bunk beds in current use conforms to the standard, the figure probably falls between 50 and 90 percent. It therefore seems reasonable to assume a "conforming" range between these extremes, on the order of from 70 to 85 percent. Under this assumption, roughly 15 to 30 percent of bunk beds in use since the early 1990s did not conform to the ASTM voluntary standard.

Costs of Conformance

Manufacturers incur additional costs to conform to the existing voluntary standard. Increased costs would be incurred only by those firms which do not now conform to the voluntary standard. In order to provide some preliminary information regarding these costs, we contacted four manufacturers that modified production to conform to the standard.

Two of these manufacturers stated that the cost of additional materials needed to address entrapment was nominal compared to overall materials costs, and that redesign costs would not be significant on a per-unit basis. They estimated that the addition of a second guardrail to the top bunk added $15-20 to the retail price of a bed. The other manufacturers, marketing bunk beds in the "mid to upper" price range, estimated that the addition of the second guardrail resulted in a $30-40 per bed increase in the retail price.

Benefits of Conformance

The expected societal costs of bunk bed entrapment deaths represent the potential benefits of preventing them. (Avoidance of other incidents do not contribute significantly to monetized benefits since they generally produce few or minor injuries, according to EH.) According to EH, conformance with the voluntary standard would have addressed 37 of 39 top bunk deaths and 2 of 3 bottom bunk end structure deaths reported to the CPSC from January, 1990 to September, 1997. Therefore, conformance with the voluntary standard would have addressed at least 72% (39÷54) of reported fatalities due to entrapment. Nationally, EH projected that about 10 (95% confidence interval, 6.0 to 14.4) bunk bed entrapment fatalities occurred annually since 1990. Therefore, the voluntary standard could have addressed about 72% of this range, or an estimated 7 deaths per year nationally. Put another way, a *fully* effective voluntary standard would be expected to avert at least 72% of all bunk bed entrapment fatalities.

In order to determine the expected benefits of a voluntary standard, we need to know the fatality *risk* of bunk bed entrapments, defined as "deaths per nonconforming bunk bed", and the expected reduction in risk. The risk level computation requires information on the number of bunk beds that were in use over the period of reported fatalities. The risk reduction factor depends on the effectiveness level of the standard.

The midpoint of the estimated number of bunk beds in use is 8 million units. If 15-30 percent of bunk beds that were in use did not conform to the standard, then fatalities may be assumed to have been spread over an estimated 1.2 to 2.4 million nonconforming (NC) beds (. 15 X 8 million to .30 X 8 million). Therefore, the risk of a fatal entrapment that a voluntary standard could avert is from 2.9 to 5.8 deaths per million NC beds (7 ÷ 2.4 to 7 ÷ 1.2). At an assumed societal cost of $5 million per death, the annual societal value of averting all such fatalities is from $14.60 to $29.00 per bed (2.9 deaths per million NC beds X $5 million, at the lower end of the range, to 5.8 deaths per million NC beds X $5 million), at the upper end. If we assume a useful life of 15 years for a bunk bed and a discount rate of 3%, the estimated present *value* of averting the entrapment fatalities addressed by the voluntary standard ranges from $174 to $346 per bed. This is the total potential benefit of averting 100% of the risk of death from a NC bed, over its useful life.

A less than 100% effective voluntary standard would produce proportionately less benefits. For example, a 50% effective standard would yield from $87 (.50 X $174) to $173 (.50 X $346) per bed in benefits and a 20% effective standard would yield from $34.80 (.20 X $174) to $69.20 (.20 X $346) per bed.

Preliminary Consideration of Costs and Benefits

The relationship between costs and benefits depends on the effectiveness of a voluntary standard. Two factors, discussed and estimated in previous sections of this memo, enter into the calculation of the level of effectiveness required to put costs and benefits in balance:

o the cost of conformance: $15-40 per bed, and

o the proportion of NC bunk beds in use: 15-30% (yielding potential benefits of from $346 to $174 per bed, respectively, since the lower the proportion, the higher the risk and the corresponding benefits of avoiding the risk).

The minimum level of effectiveness of a standard to address bunk bed-related entrapment deaths which would provide benefits in rough balance with costs is the cost of conformance divided by the potential benefits. The following table shows the required effectiveness level for each of the four combinations of costs/benefits:

Minimum Level of Effectiveness (%) of Bunk Bed Standard to Balance Costs and Benefits

Potential Benefits	Cost of Conformance	
	$15	$40
$174 (30% NC Beds)	8.6%	23.0%
$346 (15% NC Beds)	4.3%	11.6%

These estimates show that, even at the higher cost of conformance and lower benefit level, a voluntary standard would only need to avert 23% of fatalities (fewer than 1 in 4) to be cost-effective. Furthermore, a standard would only need to be 4.3% effective (avert about 1 in 25 deaths) at the lower cost/higher benefit combination to be cost-effective.

E

United States
CONSUMER PRODUCT SAFETY COMMISSION
Washington, D.C. 20207

MEMORANDUM

DATE: October 8, 1997

TO : John Preston
Engineering Sciences

Through: Alan H. Schoem
Assistant Executive Director
Office of Compliance

Through: Marc J. Schoem
Director
Division of Corrective Actions

FROM : Catherine A. Cumberland
Compliance Officer
Division of Corrective Actions

SUBJECT: Bunk Bed Recalls

Since November 1994, there have been eight recalls of wooden bunk beds that did not conform to the entrapment requirements in the ASTM standard. The recalls involved 41 manufacturers and importers and affected approximately 531,000 bunk beds. The most recent recall involved five companies and affected 16,500 beds.

Bunk Bed Recalls - Entrapment

Recalls:	# Recalled
Press Release 11-3-94 El Rancho Furniture	14,000
Press Release 5-9-95 Backwoods Brill Dover Fine Pine H&H Houston Wood Lexington Mafco Sumter Tech Designs Woodcrest	320,000
Press Release 9-28-95 Catalina	5,000
Press Release 9-28-95 Artwood Brewster D&J Furn. Imports Irons Pine Lee Anderson Nordwins Pine Cone Rustics Room Improvement Bunk Bed Shop	41,000
Press Release 12-14-95 Quality Craft Sentury Royce	31,400
Press Release 11-27-96 Bedder Bunk Oakland Wood P.J. Sleep Shop Stoney Creek Wholesale Importers	100,000
Press Release 04-07-97 Acme Trading Corp. Chicken & Egg Furniture IEM Furniture Lewis Furniture Mfg. Co. Silver Eagle Corp.	3,100

Press Release 09-24-97	**16,500**
Heartland Furn.	
Temple Pine Fum.	
Rosalco	
Springhill Woodcrafters	
Kidron Woodcraft	
	531,000

F

United States
CONSUMER PRODUCT SAFETY COMMISSION
Washington, D.C. 20207

Office of Compliance

MEMORANDUM

DATE: October 28, 1997

TO : John Preston
Project Manager
Engineering Sciences

Through: Alan H. Schoem
Assistant Executive Director
Office of Compliance

FROM : Marc J. Schoem
Director
Division of Corrective Actions
Office of Compliance

SUBJECT: Bunk Beds

The Office of Compliance believes the adoption of a mandatory standard should increase the level of awareness and the sense of urgency by manufacturers to make beds that comply. In addition, we believe a mandatory standard is needed for the reasons listed on the attached sheet.

Attachment

Issues In Support Of A Mandatory Standard

1. A lack of manufacturer identification on the beds has resulted in extremely low recall effectiveness rates. A mandatory standard could require companies to include identification on the beds and make, them accountable for the products they sell.

2. A mandatory standard would allow the staff to seek penalties for violations. Publicizing fines for non-compliance with a mandatory standard would deter other manufacturers from making non-complying beds.

3. A mandatory standard would allow state and local officials to assist CPSC staff in identifying non-complying bunk beds and take action to prevent the sale of these beds.

4. Under a mandatory standard, retailers and distributors would also violate the law if they sold non-complying bunk beds. Retailers and retail associations would then pressure manufacturers and importers to provide complying bunk beds.

5. The bunk bed industry is extremely competitive. Manufacturers who now conform with the ASTM standard have expressed concern about those firms that do not. Non-conforming beds undercut the cost of conforming beds. A mandatory standard would establish a level playing field and take away any competitive cost advantage for unsafe beds.

6. As a result of CPSC's Recall Round-Up, the staff continues to receive reports of incidents and other information concerning bunk bed entrapment hazards. Adoption of a mandatory standard would further help reduce deaths and injuries.

7. A mandatory standard would help prevent non-complying beds made by foreign manufacturers from entering the United States. CPSC could use the resources of U.S. Customs to assist in stopping hazardous beds at the docks.

G

 Billing Code 6355-01

CONSUMER PRODUCT SAFETY COMMISSION

Bunk Beds

Advance Notice of Proposed Rulemaking; Request for Comments and Information

AGENCY: Consumer Product Safety Commission.

ACTION: Advance notice of proposed rulemaking.

SUMMARY: The Commission has reason to believe that unreasonable risks of injury and death may be associated with bunk beds constructed so that children can become entrapped in the beds' structure or become wedged between the bed and a wall.

This advance notice of proposed rulemaking ("ANPR") initiates a rulemaking proceeding that could result in a rule mandating bunk bed performance requirements to reduce this hazard. This rule could be issued under either the Federal Hazardous Substances Act ("FHSA") or the Consumer Product Safety Act ("CPSA"), or separate rules might be issued under the FHSA and CPSA addressing bunk beds intended for use by children or adults, respectively.

The Commission solicits written comments from interested persons concerning the risks of injury and death

associated with bunk beds, the regulatory alternatives discussed in this notice, other possible ways to address these risks, and the economic impacts of the various regulatory alternatives. The Commission also invites interested persons to submit an existing standard, or a. statement of intent to modify or develop a voluntary standard, to address the risks of injury and death described in this notice.

DATE: Written comments and submissions in response to this notice must be received by the Commission by [insert date that is 75 days after publication].

ADDRESSES: Comments should be mailed, preferably in five copies, to the Office of the Secretary, Consumer Product Safety Commission, Washington, D.C. 20207-0001, or delivered to the Office of the Secretary, Consumer Product Safety Commission, Room 502, 4330 East-West Highway, Bethesda, Maryland; telephone (301) 504-0800. Comments also may be filed by telefacsimile to (301)504-0127 or by email to cpsc-os@cpsc.gov. Comments should be captioned "ANPR for Bunk Beds."

FOR FURTHER INFORMATION CONTACT: John Preston, Directorate for Engineering Sciences, Consumer Product Safety Commission, Washington, D.C. 20207; telephone (301) 504-0494, ext. 1315.

SUPPLEMENTARY INFORMATION:

A. Background; History of Voluntary Standards Activities

Bunk beds have been long recognized as a potential source of serious injury to children. In 1978, an Inter-Industry Bunk Bed Safety Task Group developed a Bunk Bed Safety Guideline for voluntary use by manufacturers and retailers of bunk beds intended for home use. Members of this group included the National Association of Bedding Manufacturers, the National Association of Furniture Manufacturers, the Southern Furniture Manufacturers Association, and the National Home Furnishings Association. The guideline became effective on January 1, 1979.

In February 1981, an American National Standard for Bedding Products and Components (ANSI 2357.1) was published. For the most part, this standard contained dimensional requirements for mattresses and foundations for. all beds. However, it also incorporated the requirements of the January 1, 1979, industry safety guideline for bunk beds. In May 1986, the American Furniture Manufacturer's Association ("AFMA") published Voluntary Bunk Bed Safety Guidelines developed by the Inter-Industry Bunk Bed Committee ("IIBBC").

On August 26, 1986, the Consumer Federation of America ('CFA") filed a petition with CPSC requesting the promulgation of a mandatory safety regulation for bunk beds. In its petition, CFA cited three different risks of injury

posed by bunk beds: inadequate mattress supports that can allow the mattress to fall to the bunk below or to the floor, entrapment in the space between the guardrails and the mattress, and entrapment between the bed and the wall. CFA alleged that the voluntary industry guidelines did not fully address the hazards posed to consumers.

In July 1988, AFMA published Revised Voluntary Bunk Bed Safety Guidelines, with an effective date of April 1989. A majority of the revisions were made as a result of CPSC staff comments on the May 1986 guidelines, which included comments that the requirements addressing entrapment in openings in guardrails were not adequate and that bunk beds should be required to be sold with two guardrails. To prevent entrapment, the 1989 revised guidelines did require two guardrails to accompany a bunk bed, and required that any opening in the structure of the upper bunk be less than 3% inches.

On July 21, 1988, the Commission voted to deny the petition filed by the CFA, but directed its staff to prepare a letter to AFMA and IIBBC urging that AFMA reconsider the CPSC staff comments that had not been included in the Revised Voluntary Bunk Bed Safety Guidelines. That letter was sent in August 1988. It also requested (a) that AFMA consider additional staff recommendations, (b) that AFMA submit the revised guidelines to a voluntary standards organization such as ANSI or ASTM for development as a voluntary safety standard, and (c) that AFMA develop, and

provide to the Commission, a plan and proposed implementation date for a certification program to ensure that bunk beds complied with the guidelines. AFMA responded that a certification program would be established upon publication of an ASTM bunk bed standard.

In October 1992, .ASTM published the Standard Consumer Safety Specification for Bunk Beds, ASTM F1427-92, in response to the Commission's August 1988 request. The performance requirements in that standard primarily addressed falls from the upper bunk, entrapment in the upper bunk structure or between the upper bunk and a wall, and security of the foundation support system. The standard also had a requirement for a warning label and for instructions to accompany the bed. In June 1994, the ASTM bunk bed standard was republished with additional provisions (requested by CPSC staff) to address collapse of tubular metal bunk beds. The most current version of the ASTM bunk bed standard was published in September 1996 and contains additional revisions suggested by CPSC staff. These address entrapment in lower bunk end structures; mattress size information on the warning label and carton; and the name and address of the manufacturer, distributor, or seller on the bed.

Because of continued reports of deaths and other incidents associated with bunk beds, and because of indications that there is inadequate compliance with the voluntary ASTM standard, the CPSC staff prepared a briefing

package that summarized the available information. Copies of this briefing package can be obtained from the Commission's Office of the Secretary. After considering the available information, the Commission decided to publish this advance notice of proposed rulemaking to begin a rulemaking proceeding that could result in performance or other standards to address the risk of entrapment associated with bunk beds.

B. Incident Data

From January 1990 through September 1997, CPSC received reports of 85 bunk-bed-related deaths of children under age 15. As shown below, 54 (64 percent) were caused by entrapment. An additional 23 children died when they were inadvertently hanged from the bed by such items as belts, ropes, clothing, and bedding. Eight children died in falls from bunk beds during this period. Almost all (96 percent) of the entrapment victims were ages 3 and younger, whereas hanging and fall victims tended to be older than 3 years. The Commission continues to receive reports of incidents and other information concerning bunk bed entrapment hazards.

Available data indicate that the number of bunk-bed-related deaths has not decreased in recent years and that the majority of fatal incidents continue to involve entrapment. To better evaluate the extent of the entrapment problem, the Commission's staff also developed national estimates of the total number of entrapment deaths that occurred each year, using statistical methodology that

examined the extent of overlap between data-reporting sources. These estimates projected that about 10 bunk bed entrapment deaths have occurred each year in the United States since 1990.

FATAL BUNK BED INCIDENTS REPORTED TO CPSC,
BY YEAR AND HAZARD PATTERN

	Hazard Pattern			
Year	Total	Entrap.	Hanging	Falls
Total	85	54	23	8
1990	7	5	2	--
1991	15	10	2	3
1992	4	3	1	--
1993	19	10	7	2
1994	10	6	3	1
1995	12	5	5	2
1996	11	10	1	--
1997	7	5	2	--

SOURCE: CPSC Data Files, January 1990 - September 1997
U.S. CONSUMER PRODUCT SAFETY COMMISSION/EHHA

CPSC staff reviewed available information on entrapment-related incidents, which accounted for the majority of deaths, to obtain additional detail about the circumstances involved. In all, CPSC received reports of 103 entrapment incidents from January 1990 through September 1997, including 54 that involved deaths and 49 that involved -near-misses" (where a child was entrapped, but usually with

no or minor injury, often because another person intervened). Most reported incidents involved wooden bunk beds, and entrapment occurred most often on the top bunk. Common areas of entrapment were under the guardrail, within the end structures of the bed, and between the bed and the wall.

With three exceptions, almost all of the incidents involving fatal entrapment in the structure of bunk beds occurred in areas of the beds that apparently did not Conform to the entrapment provisions in the current voluntary standard. Two of the three exceptions involved entrapment on the upper bunk. These beds had guardrails that did not run the entire length of the bed and, in each of the two incidents, a child slipped through the space between the end of the guardrail and the bed's end structure and became wedged between the bed and a wall. (The current standard permits guardrails that terminate before reaching the bed's end structure, provided there is no more than 15 inches between either end of the guardrail and the bed's closest end structure.)

The third death involving a conforming bunk bed occurred when a 22-month-old child was playing with an older sibling on a bunk bed and placed his head into a tapered opening between the underside of the upper bunk foundation and a structural member. This child is believed to have been standing on the lower bunk mattress, and, when his feet slipped off the mattress, he was suspended by his head. (The

current standard only addresses openings in lower bunk end structures that are within 9 inches above the sleeping surface of the mattress.)

C. Market Information

Industry sources estimate that about 500,000 bunk beds are sold each year for residential use (excluding institutional sales), and that sales have been relatively stable over time. The annual retail value of sales has been estimated by AFMA at about $150 million. Industry sources estimate the average retail price of bunk beds to be about $300, but prices range from about $100 to $700. Bunk beds are marketed in specialty stores, furniture stores, department stores, and by mail order. There is also a market for used bunk'beds in thrift shops, garage sales, and classified advertising.

Trade sources estimate the expected useful life of bunk beds to be 13-17 years. Based on available information, there are about 7-9 million bunk beds available for use, including bunk beds that are not currently used for sleeping, and those that are now used as two separate beds.

CPSC staff is aware of at least 106 bunk bed manufacturers, which are believed to produce the bulk of annual sales. Of the 106 identified firms, 40 are either members of AFMA or are members of the ASTM subcommittee that developed the existing voluntary standard for bunk beds. According to AFMA, these 40 firms represent 75-80 percent of the total annual shipments of bunk beds. While there are

likely many other small regional manufacturers or importers of bunk beds in addition to the 106 identified firms, these are not likely to account for a significant share of the U.S. market.

D. Compliance with the Existing Voluntary Standard

There has been a continuing pattern of nonconformance to the voluntary standard. From June through August 1994, the Commission's Office of Compliance (Compliance) identified and sent letters of inquiry to 85 bunk bed manufacturers/importers, as part of a voluntary standard conformance monitoring project. Responses to these letters revealed that 17 companies were marketing bunk bed designs that presented potential entrapment hazards. Based on these responses, as well as on retail inspections, consumer complaints, and reported incidents, 41 manufacturers have, since November 1994, recalled wooden and metal bunk beds that did not conform to the entrapment requirements in the ASTM standard. The recalls involve over one-half million bunk beds.

In February 1997, Compliance assigned 45 inspections of bunk bed retailers nationwide. Examination of 77 beds from 35 different manufacturers by staff from CPSC's regional offices revealed that 12 bunk bed designs, each from a different manufacturer, did not conform with the entrapment requirements of the ASTM voluntary standard. Problems identified through these inspections resulted both in voluntary recalls of already produced beds and in

corrections of future production. The most recent recall, in September 1997, involved five companies and pertained to 16,500 beds. One of these beds was involved in a fatal entrapment incident.

As noted above, CPSC's staff identified 106 manufacturers and importers of wooden and metal bunk beds. The Commission believes that the actual number of manufacturers and importers could be much higher. Because of the relative ease of constructing bunk beds, many small companies are formed each year. These may quickly go in and out of the business of making bunk beds. These companies are normally not associated with industry organizations, and are often unaware of the voluntary standard or misinterpret its requirements. Accordingly, the Commission preliminarily concludes that it is very likely that there will continue to be serious conformance problems with the voluntary standard.

E. The Potential Need *for* **a Mandatory Standard**

Although the voluntary standard improves the safety of bunk beds, companies are not required to comply with it. Some manufacturers contacted by Compliance did not see an urgency to comply with a "voluntary,, standard, and they did not recognize the hazards associated with noncompliance. As a result, entrapment hazards will continue to exist on beds in use **and** for sale. Currently, all 106 manufacturers identified by CPSC staff appear to be producing beds that conform to the entrapment requirements in the ASTM F1427 bunk bed standard. However, small regional manufacturers that periodically enter the marketplace may not be aware of

the voluntary standard, or of the hazards that are associated with bunk beds.

The Commission believes that a mandatory entrapment standard may be needed for the following reasons:

1. The adoption of a mandatory standard could increase the awareness and sense of urgency of manufacturers regarding compliance with the entrapment provisions, thereby increasing the degree of conformance to those provisions.

. 2. A mandatory standard would allow the Commission to Seek penalties for violations. Publicizing fines for noncompliance with a mandatory standard would deter other manufacturers from making noncomplying beds:

3. A mandatory standard would allow state and local officials to assist CPSC staf-f in identifying noncomplying bunk beds and take action to prevent the sale of these beds.

4. Under a mandatory standard, retailers, and distributors would violate the law if they sold noncomplying bunk beds. Retailers and retail associations would then insist that manufacturers and importers provide complying bunk beds.

5. The bunk bed industry is extremely competitive. Manufacturers who now conform with the ASTM standard have expressed concern about those firms that do not. Nonconforming beds can undercut the cost of conforming beds. A mandatory standard would establish a. level playing field and take away any competitive cost advantage for unsafe beds.

6. A mandatory standard would help prevent noncomplying beds made by foreign manufacturers from entering the United States. CPSC could use the resources of U.S. Customs to assist in stopping hazardous beds at the docks.

7. The absence of manufacturer identification on many beds has resulted in extremely low recall effectiveness rates. A mandatory standard could require companies to include identification on the beds.

8. Although the Commission currently believes that the ASTM voluntary standard for bunk beds adequately addresses the most common entrapment hazards associated with these products, the Commission is aware of three entrapment fatalities that occurred in conforming beds. A mandatory standard could modify the provisions in the voluntary standard so as to address the deaths that can occur on beds that comply with the voluntary standard.

Therefore, the Commission decided to issue an ANPR to begin a rulemaking proceeding and to seek public comment on all aspects of this proceeding, including (a) the need for a mandatory standard and (b) any additional requirements that may be needed to address fatalities known to have occurred on bunk beds conforming to the current voluntary standard.

However, the available information does not support a conclusion that changes to currently produced bunk beds would significantly reduce the number of fatalities due to falls and hangings. Thus, although information on these

hazards is welcome, the Commission does not at this time intend to propose performance requirements to address falls or hangings from bunk beds.

F. Cost/Benefit Considerations

To provide some preliminary information on additional costs to conform to the entrapment requirements of the existing voluntary standard, CPSC's Economics staff contacted four manufacturers who had modified their production for that reason. The most expensive modification was the addition of a second guardrail to the top bunk. Two firms estimated that the additional guardrail would add $15-20 to the retail price of these products. The other two manufacturers, who market beds in the "mid to upper,, price range, estimated a $30-40 increase in the retail price of their products. This increased cost would be incurred only by those firms that do not now conform to the voluntary standard.

CPSC estimates that the costs to society of bunk bed entrapment deaths is about $174-346 per bed over its expected useful life. The costs of bringing bunk beds into conformance with entrapment requirements range from $15-40 per bed. If the measures taken to address bunk-bed-related entrapment deaths were only about 4 to 23 percent effective in reducing these deaths, the costs and the benefits of such an activity would be about equal. In fact, the Commission

expects that a mandatory standard would be substantially more effective than this.

G. Statutory Authorities for This Proceeding

What statute is appropriate for regulating bunk beds? CPSA § 3(a)(1), 15 U.S.C. 2052(a)(l). The Federal Hazardous Substances Act ("FHSA") authorizes the regulation of unreasonable risks of injury associated with articles intended for use by children that present mechanical (or electrical or thermal) hazards. FHSA § 2(f)(D), 15 U.S.C. 1261(f)(D). The hazards associated with bunk beds that are described above are mechanical. See FHSA § 2(s), 15 U.S.C. 1261(s). The Consumer Product Safety Act ("CPSA") authorizes the regulation of unreasonable risks of injury associated with "consumer products," which include bunk beds-whether intended for the use of children or adults. CPSA § 3(a)(1), 15 U.S.C. § 2052(a)(l). Thus, bunk beds intended for the use of adults can be regulated only under the CPSA, while bunk beds intended for the use of children potentially could be regulated under either the FHSA or the CPSA. Bunk beds probably would be considered as intended for use by children only if they have smaller than twin-size mattresses or incorporate styling or other features especially intended for use or enjoyment by children.

Section 30(d) of the CPSA, however, provides that a risk associated with a consumer product that can be reduced to a sufficient extent by action under the FHSA can be

regulated under the CPSA only if the Commission, by rule, finds that it is in the public interest to do so. 15 U.S.C. 2079(d). Accordingly, children's bunk beds could be regulated only under the FHSA, unless the Commission finds that it is in the public interest to regulate them under the CPSA. Thus, assuming that "adult" and "children's" bunk beds each present an unreasonable risk of injury, the Commission could:

1. Issue a rule for children's bunk beds under the FHSA and a rule for adult bunk beds under the CPSA; or

2. Issue a rule under the CPSA for both adult and children's bunk beds, and issue a rule under CPSA § 30(d) that it is in the public interest to do so.

A possible reason for finding that it is in the public interest to regulate both adult and children's bunk beds under the CPSA would be to avoid confusion as to which act applied to a particular bunk bed. The Commission will make a decision on which act(s) should be used if and when it decides to issue a proposed rule addressing the hazards of bunk beds. As discussed below, the procedure and statutory findings required to issue a rule for bunk beds are essentially identical under either act. Accordingly, any final rule may be issued under the CPSA, the FHSA, or a combination of the two acts.

What effect will the existence of the voluntary standard have on the rulemaking? The Commission may not issue a standard under either the CPSA or the FHSA if industry has adopted and implemented a voluntary standard to

address the risk, unless the Commission finds that "(i) compliance with such voluntary . . . standard is not likely to result in the elimination or adequate reduction of such risk of injury; or (ii) it is unlikely that there will be substantial compliance with such voluntary . . . standard." In this case, it appears that a high percentage of bunk beds comply with ASTM F1427-92. Accordingly, the Commission has addressed the issue of whether the relatively high degree of compliance with the ASTM standard (possibly 90 percent or more) constitutes "substantial compliance" that would prevent the Commission from issuing a mandatory standard for bunk beds.

Neither statute defines the term "substantial compliance." However, guidance is provided by the legislative history of the CPSA:

> In determining whether or not it is likely that there will be substantial compliance with such voluntary . . . standard, the Commission should determine whether or not there will be sufficient compliance to eliminate or adequately reduce an unreasonable risk of injury in a timely fashion. Therefore, compliance generally should be measured in terms of the number of complying products rather than in terms of complying manufacturers.

H.R. Conf. Rep. No. *208,* 97th Cong., 1st Sess. *873* (1981). "Adequately reduce" means to reduce the risk "to a sufficient extent that there will no longer exist an unreasonable risk of injury." *Id.* This legislative history

suggests that substantial compliance means that there will be sufficient compliance with the voluntary standard to reduce the product's risk to the point that the risk is no longer "unreasonable."

Factors that are relevant both to a determination of unreasonable risk and to whether there is substantial compliance are the severity of the remaining injuries and the vulnerability of the injured population. The CPSC staff's analysis shows that issuing a mandatory rule could save a significant number of children's lives. Thus, the injuries are severe, and the affected population is extremely vulnerable. The cost/benefit information discussed above indicates a likelihood that the benefits of a rule for bunk beds would bear a reasonable relationship to its costs, and the remaining risks from bunk beds are thus "unreasonable." See 15 U.S.C. 1262(i)(2)(B), 2058(f)(3)(E). Accordingly, the Commission preliminarily concludes that there currently is not substantial compliance with the ASTM standard.

Rulemaking procedure. Before adopting a CPSA standard or FHSA rule, the Commission first must issue an ANPR as provided in section 3(f) of the FHSA or section 9(a) of the CPSA. 15 U.S.C. 1262(f), 2058(a). If the Commission decides to continue the rulemaking proceeding after considering responses to the ANPR, the Commission must then publish the text of the proposed rule, along with a preliminary regulatory analysis, in accordance with section 3(h) of the FHSA or section 9(c) of the CPSA. 15 U.S.C. 1262(h),

2058(c). If the Commission then wishes to issue a final rule, it must publish the text of the final rule and a final regulatory analysis that includes the elements stated in 3(i)(l) of the FHSA or section 9(f)(2) of the CPSA. 15 U.S.C. 1262(i)(l), 2058(f)(2). And before issuing a final regulation, the Commission must make certain statutory findings concerning voluntary standards, the relationship of the costs and benefits of the rule, and the burden imposed by the regulation. FHSA § 3(i)(2), CPSC § 9(f)(3), 15 U.S.C. 2058(f)(3).

H. Regulatory Alternatives Under Consideration

The Commission is considering alternatives to reduce the number of injuries and deaths associated with bunk beds. In addition to possible performance standards similar to the current ASTM standard, additional performance standards may be developed to supplement the entrapment provisions of the ASTM standard. Further, the potential for labeling or instructions requirements and information and education campaigns to reduce the risk will be considered, either instead of or in addition to a mandatory standard.

It is also possible that a voluntary standard could be developed that would adequately reduce the risks of entrapment, falls, and hanging. The Commission is not aware of any voluntary standard in effect that applies to the identified risks of bunk beds other than ASTM F1427-96. As noted above, the Commission has preliminarily concluded that the degree of compliance with this ASTM standard may be insufficient and some fatalities have occurred that are not

adequately addressed by that standard. However, if improved voluntary standards are developed and implemented, the Commission would take that into account in deciding whether a mandatory standard is necessary.

H. Solicitation of Information and Comments

This ANPR is the first step of a proceeding which could result in a mandatory performance, labeling, or instructions standard for bunk beds to address the risk of entrapment. All interested persons are invited to submit to the commission their comments on any aspect of the alternatives discussed above. In particular, CPSC solicits the following additional information:

1. The models and numbers of bunk beds produced for sale in the U.S. each year from 1990 to the present;

2. The names and addresses of manufacturers and distributors of bunk beds;

3. The number of persons injured or killed by the hazards associated with bunk beds;

4. The circumstances under which these injuries and deaths occur, including the ages of the victims;

5. An explanation of designs that could be adapted to bunk beds to reduce the risk of entrapment;

6. Characteristics of the product that could or should not be used to define which products might be subject to the requested rule, and which products, if any, are intended for use by children, and which for adults;

7. Other information on the potential costs and benefits of potential rules;

8. Steps that have been taken by industry or others to reduce the risk of injuries from the product;

9. The likelihood and nature of any significant economic impact of a rule on small entities;

10. The costs and benefits of mandating a labeling or instructions requirement.

Also, in accordance with section 3(f) of the FHSA and section 9(a) of the CPSA, the Commission solicits:

1. Written comments with respect to the risk of injury identified by the Commission, the regulatory alternatives being considered, and other possible alternatives for addressing the risk.

2. Any existing standard or portion of a standard which could be issued as a proposed regulation.

3. A statement of intention to modify or develop a voluntary standard to address the risk of injury discussed in this notice, along with a description of a plan (including a schedule) to do so.

Comments should be mailed, preferably in five copies, to the Office of the Secretary, Consumer Product Safety Commission, Washington, D.C. 20207-0001, or delivered to the Office of the Secretary, Consumer Product Safety Commission, Room 502, 4330 East-West Highway, Bethesda, Maryland 20814; telephone (301) 504-0800. Comments also may be filed by telefacsimile to (301)504-0127 or by email to cpsc-os@cpsc.gov. Comments should be captioned "ANPR for Bunk

Beds." All comments and submissions should be received no later than [insert date that is 75 days from publication].

Sayde E. Dunn, Secretary
Consumer Product Safety Commission