

unrestrained configurations are shown in Appendix 1 and 2, respectively. The statistical model used is in Appendix 3.

Statistical Analysis

The statistical method used was Analysis of Variance. The method was used to determine the contribution of the various factors to the amount of force required for full penetration of the two different wedges. The analysis focussed on the significance of the wedge main effect and its interaction with other variables.

The relationship between the four scenarios above and the main effects and interactions are below.

1. Complete Interchangeability of the Wedges. Wedge main effect not significant or significant with means at practically the same value. Also no interactions with the wedge are significant.
2. Interchangeability with Calibration. Wedge main effect significant, difference between wedges practically significant. No interactions with the wedge are significant.
3. Interchangeability with Calibration and Specification of the mattress. Wedge main effect and mattress wedge interaction is significant. Bed rail interaction with wedge not significant.
4. No calibration possible. Bed rail interaction with wedge significant and of practical importance.

It is worth mentioning that the mattress main effect, bed rail main effect and the mattress bed rail interaction effect are not relevant to the problem about the interchangeability of the wedges. If the mattress main effect is significant, this would suggest that different mattresses have different average forces required for displacement, where the average is taken over wedges and bed rails. Similarly, the bed rail main effect describes the difference in average forces by bed rail where the average is taken over wedges and mattresses. Finally, the bed rail-mattress interaction would suggest that the mean forces for displacement of the bed rails differed depending on which mattress was used.

Results

Unrestrained Data

The analysis of variance used the full model except for the three way interaction, which was absorbed into the error term. Table 1 contains the analysis of variance results from the unrestrained test data. The average force required to displace the bed rail was

12.125 lbf (SD = 12.21, min = 2 max = 53). The table shows that all main effects were significant, as well as the wedge-mattress interaction and the bed rail mattress interaction.

Table 1
Analysis of Variance for the Unrestrained Data

Source	DF	Type III SS	Mean Square	F Value	Pr > F
WEDGE	1	85.8	85.8	40.6	0.0004
BEDRAIL	4	1764.6	441.2	208.6	0.0001
MATTRESS	2	475.0	237.5	112.3	0.0001
WEDGE*BEDRAIL	4	20.1	5.0	2.4	0.1493
WEDGE*MATTRESS	2	28.9	14.4	6.8	0.0227
BEDRAIL*MATTRESS	7	1198.5	171.2	80.9	0.0001

Results from PROC GLM in SAS[®]. DF=Degrees of freedom. SS=sum of squares. About degrees of freedom: For main effects, this is the number of levels minus 1. For interaction terms it is $(L_1-1)*(L_2-1)$, where L_j is the number of levels for factor j . The bedrail*mattress interaction has one fewer degree of freedom because one combination (bedrail 1 and mattress 1) was not tested. Overall F statistic 94.74, with 20 and 7 degrees of freedom, $p < 0.0001$.

As shown above, all terms except for the wedge-bed rail interaction were significant. (All p values as shown in the Pr > F column in the table are less than 0.05 for all variables except wedge-bedrail interaction). Since the wedge main effect and the wedge-mattress interaction were significant, it would appear that the situation is that either wedge could be used, providing that the standard is calibrated to the choice of wedge and mattress. This is the third scenario, Interchangeability with Calibration and Specification of the mattress.

Because the mattress-wedge interaction is significant, the amount of calibration required is related to the choice of mattress and wedge.

Table 2
Difference in Force of the two Wedges Required to Displace the Bed Rail
(pounds of force)

Mattress Type	Bed Rail type					Mean
	1	2	3	4	5	
1	NA	0.0	0.0	3.0	3.0	1.5
2	8.0	3.0	7.5	4.5	9.0	6.4
3	1.0	2.0	0.0	4.0	7.5	2.9
Mean	4.5	1.7	2.5	3.8	6.5	3.8

Table 2 shows that there was on average a 3.8 pound difference overall between the two wedges. The analysis showed a mattress-wedge interaction in table 1, indicating that the calibration would vary by both mattress and wedge. Since we found a mattress-wedge interaction, the calibration factor for the difference between wedges would vary by mattress type. On average there was a difference of 1.5 pounds for mattress 1, 6.4 pounds for mattress 2 and 2.9 pounds for mattress 3.

Restrained Data

The purpose of the experiment with the restrained data was to simulate test conditions for bed rails that require much more force to displace. The average displacement force was 29.9 lbf (SD=9.1, min=15, max=50). Data were collected on mattress/bed combinations 2 and 3 only because it was not possible to use the restrained setup on the first mattress/bed combination. This left a total of 18 measurements, with 2 mattresses and 5 bed rails.

The analysis of variance procedure was the same as for the unrestrained bed rails.

Table 3
Analysis of Variance for the Restrained Data

Source	DF	Type III SS	Mean Square	F Value	Pr > F
WEDGE	1	402.0	402.0	33.3	0.0103
BEDRAIL	4	539.3	134.8	11.2	0.0379
MATTRESS	1	451.6	451.6	37.4	0.0088
WEDGE*BEDRAIL	4	67.8	16.9	1.4	0.4061
WEDGE*MATTRESS	1	10.6	10.6	0.9	0.4184
BEDRAIL*MATTRESS	3	115.7	38.6	3.2	0.1827

Notes: See table 1. Overall *F* statistic 8.14, with 14 and 3 degrees of freedom, $p = 0.0549$.

Only wedge, bed rail and mattress main effects were significant as shown by *p-values* in the table above of 0.0103, 0.0379 and 0.0088 respectively. No interactions were significant. However, it is important to remember that only two mattresses were tested in this experiment, rather than three as in the unrestrained experiment. It does not seem appropriate to conclude that there might not be some untested mattress that significantly interacts with the wedge or bed rail.

Table 4
Difference in Force of the two Wedges Required to Displace the Bed Rail
(pounds of force)

Mattress Type	Bed Rail type					Mean
	1	2	3	4	5	
1	NA	NA	NA	NA	NA	NA
2	10	4.0	15.0	2.5	10.5	8.4
3	NA	7.5	8.5	9.0	20.0	11.3
Mean	10.0	9.5	8.8	6.5	9.5	9.7

Since the mattress main effect is significant, the choice of the mattress matters in terms of the absolute level of force. On average, measurements from mattress 2 were 26.8 pounds, while mattress 3 averaged 33.9 pounds. But since the mattress-wedge interaction is not significant, it is not necessary to calibrate for mattress and wedge combination.

Having selected a mattress, the differences in mean forces are somewhat consistent for the two wedge types. For mattress 2, wedge 1 averaged 22.6 pounds, while wedge 2 averaged 31 pounds, a difference of 8.4 pounds (as shown above in table 4). Similarly, for mattress type 3, wedge 1 averaged 28.3 pounds, while wedge 2 averaged 39.5 pounds, a difference of 11.3 pounds. But correcting by 9.7 pounds in either case would not be far off, rather than the mattress specific factors.

The restrained data seems to follow the general pattern of the unrestrained data. Fortunately while the choice of bed rail does affect the amount of force required, it does not interact with the type of wedge. On the other hand, mattress plays an important and significant role, both affecting the absolute amount of force required and the difference in forces between the two wedges.

Conclusion

The results suggest case 3 for the unrestrained tests (interchangeability of the wedges with calibration and specification of the mattress) and case 2 for the restrained test (interchangeability of the wedges with calibration). Some caution is required in interpreting the results of the restrained experiment, however, because there was one fewer mattress/bed combination tested. Not only would this affect the possibility of finding a mattress wedge interaction but also the smaller sample size lowers the statistical power to find any significant effect. It is possible that repeating the restrained test with another mattress might show a mattress wedge interaction.

The experiment showed that there was no interaction between bed rail and wedge. This means that calibration does not involve the bed rail. Once a mattress or its performance characteristics are specified, from a statistical point of view, either wedge could be used for testing the bed rail, providing the appropriate calibration for that wedge is applied.

Appendix 1
Unrestrained Bed Rail Data

Wedge	Mattress	Bedrail	Final Sequence	Force
1	1	1	15	NA
2	1	1	16	NA
1	1	2	17	3.0
2	1	2	18	3.0
1	1	3	20	2.0
2	1	3	19	2.0
1	1	4	14	6.5
2	1	4	13	9.5
1	1	5	11	5.0
2	1	5	12	8.0
1	2	1	8	10.0
2	2	1	7	18.0
1	2	2	5	7.5
2	2	2	6	10.5
1	2	3	1	5.0
2	2	3	2	12.5
1	2	4	9	8.5
2	2	4	10	13.0
1	2	5	4	8.5
2	2	5	3	17.5
1	3	1	27	52.0
2	3	1	28	53.0
1	3	2	23	5.5
2	3	2	24	7.5
1	3	3	25	10.0
2	3	3	26	10.0
1	3	4	21	11.5
2	3	4	22	15.5
1	3	5	30	8.5
2	3	5	29	16.0

Appendix 2
Restrained Bed Rail Data

Wedge	Mattress	Bedrail	Final Sequence	Force
1	2	1	28	36.0
2	2	1	27	46.0
1	2	2	24	21.0
2	2	2	23	25.0
1	2	3	21	18.0
2	2	3	22	33.0
1	2	4	25	23.0
2	2	4	26	25.5
1	2	5	29	15.0
2	2	5	30	25.5
1	3	1	11	NA
2	3	1	12	NA
1	3	2	14	25.5
2	3	2	13	33.0
1	3	3	16	28.5
2	3	3	15	37.0
1	3	4	19	29.0
2	3	4	20	38.0
1	3	5	18	30.0
2	3	5	17	50.0

Appendix 3

Statistical Models

The statistical model is

$$\begin{aligned} \text{FORCE} = & \mu + \beta_1 \text{WEDGE} + \beta_{2j} \text{BEDRAIL}_j + \beta_{3k} \text{MATTRESS}_k \\ & + \beta_{12j} \text{WEDGE} * \text{BEDRAIL}_j + \beta_{13k} \text{WEDGE} * \text{MATTRESS}_k \\ & + \beta_{23jk} \text{BEDRAIL} * \text{MATTRESS}_{jk} + \varepsilon \end{aligned}$$

where FORCE is the displacement force measured, β 's are parameters to be estimated, ε is the overall error term, and μ is the intercept. All terms are fixed effects. WEDGE, BEDRAIL and MATTRESS are main effects, and WEDGE*BEDRAIL and other terms that appear to be multiplication are interaction effects.

The number of levels of each main effect term is the number of different possibilities minus 1. For example WEDGE has only one term which is 1 for wedge 1 and zero for wedge 2 (or the reverse). There is more detail on the number of levels following table 1.

This model was estimated and Type III sums of squares and other statistics were obtained. See the notes following table 1.

Tables 2 and 4 show differences by bed rail and mattress for the two wedges. The table holds bed rail and mattress constant. The equation for the difference between measurements based on the model above is

$$\begin{aligned} \text{FORCE}(\text{WEDGE1}) - \text{FORCE}(\text{WEDGE2}) = & \beta_1 + \beta_{12j} \text{WEDGE} * \text{BEDRAIL}_j \\ & + \beta_{13k} \text{WEDGE} * \text{MATTRESS}_k \\ & + u \end{aligned}$$

where the terms are as defined the same as in the first model, except that u is an error term that is the difference of two error terms,

The other terms disappear from the equation because bed rail and mattress are held constant. All that are left are wedge-bed rail and wedge-mattress interactions, plus β_1 , a term that symbolizes the difference between the two wedges.

TAB E



**UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207**

Memorandum

Date: September 10, 2001

TO : Patricia Hackett, Project Manager, Bed Rails
Directorate for Engineering Science

THROUGH: James Hyatt, Director 
Division of Mechanical Engineering
Directorate for Laboratory Sciences

FROM : Robert Hundemer (301)-413-0180 
Mechanical Engineering Technician
Division of Mechanical Engineering
Directorate for Laboratory Sciences

SUBJECT : Bed Rail Test Data

The purpose of this memo is to report test data that was gathered as a result of bed rail testing at the CPSC Engineering laboratory during 2001.

BSI D 2.1.2

Testing was performed according to the draft British Standards Institute (BSI) standard D 2.1.2 entitled *Specification for Safety Requirements and Test Methods for Children's Bedguards for Domestic Use*. Four different bed rails were tested.

1) Rolling Cylinder Test

This test was conducted using an 8-inch diameter tube, 12 inches long, weighing 27.25 lbs. The mattress used was a 4-inch thick foam mattress placed on a box spring. The whole bed assembly was tilted 15 degrees. The bed rail was centered between the ends and pushed against the mattress side. The test cylinder was rolled into the bed rail from approximately 10.25 inches. According to the standard, the bed rail shall not be displaced more than 10 mm (0.4 in.) after performing the test 3 times. The results of this testing can be found in Table 1.

Table 1: BSI Rolling Cylinder Test Results

BED RAIL	Results After 3 Impacts
Bed rail #1	4.5 inch gap
Bed rail #2	1 inch gap
Bed rail #3	3.4 inch gap
Bed rail #4	1.5 inch gap

2) *Static Test*

Tests were performed on these bed rails using the 33lb. CAMI dummy. The CAMI was placed 12 inches from the edge of the bed parallel to the bed rail. The bed rails were then pulled at the center away from the mattress. The force at which the bed rail was displaced 10 mm (0.4 in.) was recorded and can be found in Table 2. According to the standard, the bed rail shall not be displaced more than 10 mm (0.4 in.) after applying a force of 250 N (56 lbf.) for 10 seconds.

Table 2: BSI Static Test Results
(in pounds)

Bed Rail	Force Required to Detach From Bed
Bed rail #1	5
Bed rail #2	8
Bed rail #3	9
Bed rail #4	9

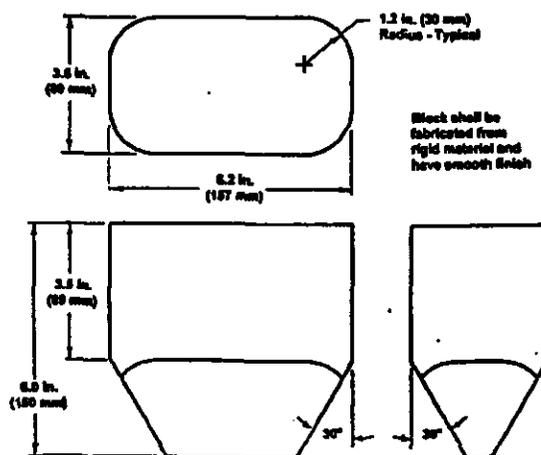
Wedge Testing

A randomized, full factorial test design, was developed by Laboratory Science (LS) and Hazard Analysis (HA) staff. A total of 60 tests were performed. The purpose was to evaluate the differences, if any, between two wedge probes when used with a variety of mattress and bed rails.

1) *Test Materials*

The two types of test probes used were made from plastic or wood and were different in size and shape. The plastic probe weighed 1.5 lbs. The probe is the same as that used in the Bunk Bed Entrapment Standard CFR16 1213 (See Figure 1). The second probe is made of wood and weights 6.5 lbs. (See Figure 2). This probe was designed by CPSC Human Factors (ESHF) staff based on the anthropometric data of a 3-4 month old child. The plastic probe had weight added to it to equal that of the wood probe.

Figure 1: Plastic Probe from Bunk Bed Standard



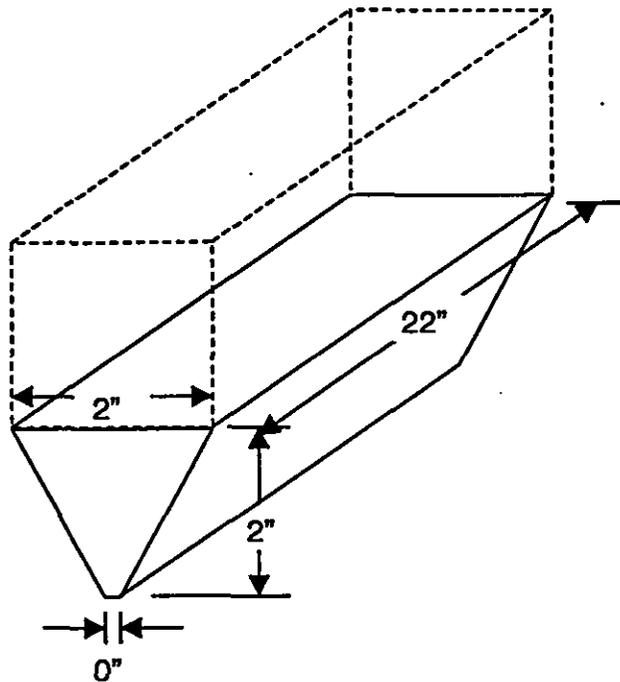


Figure 2: Wood Probe

Three types of mattresses/bed combinations were used. The first type was a crib mattress that weighed approximately 11.5 lbs., was 4 inches thick, and placed on a toddler bed frame. The second type was a twin bed mattress made of lightweight foam, four inches thick that weighed approximately 6.5 lbs. with a smooth material covering. The third type mattress was a twin bed size made from medium density foam, six inches thick, that weighed approximately 34 lbs. with a quilted fabric covering. Both the light and medium weight mattresses were placed on a twin size, wood frame, box spring having a smooth covering. The bed frame was made of steel L beam construction.

Five different bed rails were used for evaluation including one that was obtained from the United Kingdom (UK). This bed rail is constructed of a tubular metal/netting and differs from the others in that the arms extended all the way across, between the box spring and the mattress and then down the opposite side. The intent of this design was to keep the bed rail from being pulled away from the box spring. The other four bed rails were made of metal/netting or plastic. The bed rails attach to the bed by arms that slide between the box spring (or frame) and the mattress with only the mattress's weight and friction to hold them in place.

2) *Test Conditions*

Two conditions, unrestrained and restrained, were used for testing the bed rails. The unrestrained condition is typical of the way bed rails are used in that only the mattress weight is used to hold the bed rail in place.

The restrained condition augments the mattress weight by using a clamp to help hold the bed rail in place. The clamp was a 1 x 2-inch board fitted with an abrasive strip. This was put over the arms of the bed rails and held firm against the arms with a bungee cord. Additionally, the mattress was restrained from sideways movement away from the bed rail. Two steel uprights were attached to the box spring frame to restrain the mattress from moving sideways. Restrained testing was performed in order to simulate a newer designed bed rail that would offer more resistance to displacement than present bed rails.

The toddler bed was not tested in the restrained condition because the spacing of the frame members.

3) *Test Method*

A bed rail, mattress / bed and probe were selected for each test. The bed rail was installed centered along the mattress edge. There was a 1-inch of gap established between the mattress edge and the bed rail. The probe was positioned between the mattress and the bed rail at the center of the bed rail in the gap. A force gage was attached to the probe and force was applied in a manner to force the probe through the gap. The force that it took to allow the probe's widest dimension to pass the horizontal plane that extends from the top surface of the mattress toward the guard portion of the bed rail was recorded. The results can be found in Table 3.

Table 3: Test Results for Probe Comparison Test
(in pounds)

Platform	Average Force		Range of Force	
	Plastic	Wood	Plastic	Wood
Unstrained test for crib mattress	4	11.3	2-6.5	2-9.5
Unstrained test for med. weight mattress*(4 bed rails)	8.9	12.3	5.5-11.5	7.5-16
<i>Data includes fifth bed rail type.</i>	<i>17.5</i>	<i>20.4</i>	<i>5-52</i>	<i>7.5-53</i>
Unstrained test for light weight mattress**	7.8	14.3	5-8.5	10.5-18
Restrained test for crib mattress***	N/A	N/A	N/A	N/A
Restrained test for med. weight mattress*	28.25	39.5	25.5-30	33-50
Restrained test for light weight mattress**	22.6	26.6	15-36	25-46

- *Four bed rails were used for testing, the fifth one (from the UK) could not be installed.
- ** Four bed rail types of similar attachment methods are reported together. The data using a fifth bed rail from the UK is reported in the Italics.
- *** No Restrained tests were possible on this product.

4) Torso Probe Testing

Tests with the wood probe shortened to 4.5 inches and weighing 1.13 pounds were also conducted. The 4.5-inch dimension was based on anthropometric data for a 3-5 month old infant, as reported by CPSC Human Factors (ESHF) staff. For the remainder of this memo, this probe will now be referred to as the Torso Probe. Results of this testing can be found in Table 4. In order to pass the standard, the bed rail is installed as intended by the manufacturer and the probe is placed in the proper test position. A 30-pound force is applied to the probe. In the case of the adjacent-type PBRs, the probe cannot pass the plane of the mattress top.

Table 4: Torso Probe Testing Results
(in pounds)

Platform	Average Force	Range of Force
Unstrained test for crib mattress*	6	4-8
Unstrained test for med. weight mattress**	19	7.7-34.5
Unstrained test for light weight mattress	9.9	8.5-11

- *Four bed rail used for testing, the fifth one (from the UK) could not be installed.
- ** The bed rail from the UK was found to require forces in the 34lbs range. This is because it attaches to the other side of the bed making it difficult to move. Another bed rail had a force of 26lbs because the torso probe became trapped in the mesh side.

5) Wedge Probe Testing

Testing was performed using a 90-degree wood wedge probe on a prototype bed rail designed and constructed by LS staff. This wedge is 4.5 inches long and 4.5 inches deep with a 90-degree angle and was developed by ESHF staff. For the remainder of this memo, this probe will be referred to as the Wedge Probe. The prototype bed rail is designed to sit on top of the mattress surface as opposed to other designs which consists of a vertical rail that sits adjacent to the mattress. Due to the differences in design, another test method was used. In this test, the Right Angle Wedge Probe is placed flat on the mattress with the tapered end between the mattress and the underside of the guard portion of the rail. The Wedge Probe is then pushed under the guard to a depth of ½-inch. A 30-pound force is then gradually applied to the top surface of the probe in a direction toward the bed rail and parallel to the mattress surface. The Wedge Probe cannot penetrate under the guard portion to the entire thickness of the probe, or 4.5 inches. The force required for the Wedge Probe to penetrate to a depth of 4.5 inches or greater, was recorded. Results of this testing can be found in Table 5.

Table 5: Wedge Probe Testing Results
(in pounds)

Platform	Measured Force per Position on Bed Rail		
	Right	Middle	Left
Light weight mattress	30+	30+	30+
Toddler bed	30+	30+	30+

6) **Bed Rail Test with Fitted Sheet**

Additional testing was conducted to examine what effect having a fitted sheet on the mattress might have. The test was performed using the Torso Probe. The medium mattress (6 inches thick) and four bed rails were used. Tests were performed using a fitted sheet and then again without the fitted sheet. Table 6 outlines the results.

Table 6: Fitted Sheet Testing Forces
(in pounds)

Bed Rail	Force Measured With Fitted Sheet	Force Measured Without Fitted Sheet
Bed rail 1	6	7
Bed rail 2	1.3	2
Bed rail 3	1.3	1.3
Bed rail 4	4	7

TAB F



UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

Memorandum

Date: September 27, 2001

To : Patricia L. Hackett, Division of Mechanical Engineering
Project Manager, Portable Bed Rails
Ext. 1309

Through : Hugh McLaurin, Associate Executive Director *HLM*
Directorate for Engineering Sciences
Nick Marchica, Director, Division of Mechanical Engineering *NM*

From : Scott Heh, Mechanical Engineer, Division of Mechanical Engineering *SH*
Ext. 1308

Subject: Portable Bed Rails - Response to Comments and Discussion of a Draft
Proposed Standard

On October 3, 2000, the U.S. Consumer Product Safety Commission (CPSC) published an Advance Notice of Proposed Rulemaking (ANPR) that initiated a rulemaking proceeding to address the risk of death associated with portable bed rails (PBRs) for children. Four comments were received in response to the ANPR. The Commission briefing package on the ANPR contained a CPSC staff draft PBR standard that was submitted to ASTM for consideration as an ASTM standard. Since then, staff revised the draft standard in several areas. The following discussion responds to issues raised by the ANPR respondents and summarizes relevant provisions in the revised draft proposed standard. It also includes a discussion on the potential effectiveness of a PBR safety standard.

ANPR Comments

Comment

Evenflo, a PBR manufacturer, and the Juvenile Products Manufacturers Association (JPMA) asserted that the primary factor in the fatal incidents is that the children were sleeping in inappropriate bedding since the majority of incidents involved children under the age of 2 years. PBRs are only intended for children who can get in and out of an adult bed unassisted (generally starting around 2 years of age). Evenflo and JPMA suggested that public education that warns caregivers not to place infants in adult beds is the best way to approach this problem. The respondents also noted that the number of entrapment deaths associated with PBRs is very small in comparison to the number of fatal incidents involving infants in adult beds who become

entrapped between mattresses and walls or infants who fall from adult beds. Evenflo further asserted that PBRs do not present an unreasonable risk of death any more than do windows, since there are almost as many fatal incidents involving children rolling from beds and out of windows.

Response

Unlike a window, a PBR is marketed as a safety device intended to keep a child from falling out of bed. The entrapment hazard is very likely not perceived by the parent or caregiver. It is apparent from a review of the 14 fatal incidents that these deaths would not have occurred had the PBR not been present. The CPSC staff agrees that PBRs should not be used in place of a crib when placing infants down to sleep. However, the staff believes that given the incident data, it is evident that use of PBRs with infants is reasonably foreseeable. The PBR safety device should both keep a child from falling out of bed and prevent fatal entrapments for foreseeable users. It is therefore appropriate to develop a performance standard that is based on intended users of the product and foreseeable younger users for whom the product is not intended.

Comment

JPMA asserted that the work of the ASTM Portable Bed Rails Subcommittee has thus far resulted in a standard that addresses labeling, as well as performance criteria related to openings and protrusions. In reference to the ANPR briefing package, JPMA claimed that it was inaccurate for the CPSC staff to characterize the ASTM standard as dealing with only labeling issues.

Response

“ASTM F 2085 Standard Consumer Safety Specification for Portable Bed Rails” was approved on March 10, 2001. This standard contains general requirements relating to existing federal standards that apply to all children’s products (e.g., sharp points and edges, and small parts). The standard also contains requirements for marking and labeling on the product and retail packaging, and for the instructional literature. The standard does not include requirements that address entrapment in openings or strangulation associated with clothing catch points on protrusions.

Comment

Evenflo and JPMA submitted comments on the 50-pound push-out test for PBRs proposed by CPSC staff. The 50-pound test was based on the push out strength characteristics of 5-yr-old children. Evenflo asserted this test does not take into account other, more likely causes of a gap between a PBR and a mattress, such as incorrect installation. JPMA expressed concern that, in a rush to develop a standard to address entrapment risks for infants, such standards not create a serious risk of injury to toddlers for whom such products are intended. JPMA also expressed concern about the standard creating PBRs that are essentially “fixed”, or immovable, partial barriers. To support its concern about fixed bed rails and barriers, JPMA cited fatal incident data related to infants trapped between mattresses and walls and fatal incident data involving adult entrapment within fixed rails on hospital beds that was reported by the Food and Drug Administration (FDA).

Evenflo also commented on the issue of a partial barrier. Evenflo noted that two of the fatal incidents occurred between an opening formed by the vertical end member of a PBR and a bedpost. Evenflo asserted that this underlines the dangers of putting children (under appropriate age) in adult-sized beds, and is not specifically a deficiency in PBR performance.

Response

The primary characteristic of the sleeping environment that leads to an entrapment risk is the existence or creation of a gap that is capable of entrapping a child's body. Products such as bunk beds and cribs have fixed guardrails. The risk of entrapment in these products is addressed in established standards that prohibit openings of a size that could permit entrapment. In addition, a Hospital Bed Safety Working Group is currently developing standards to limit the sizes of openings and gaps in hospital beds formed by fixed bed rails, mattresses, and other bed components that pose an entrapment hazard for adults, primarily for infirmed persons. This working group consists of representatives from federal agencies such as the FDA and the Veteran's Administration, representatives from hospital bed manufacturers and medical care facilities, and other interested parties.

The CPSC staff made revisions to the draft proposed bed rail standard that address some of the issues related to a fixed or immovable PBR. The original proposed 50-pound push-out test addressed the creation of a gap between a mattress and a PBR when the PBR moves away from the mattress. However, there are other possible actions that could result in a hazardous gap. For example, a gap could be created when a mattress deforms, or when a mattress slides away from an immovable PBR. In addition, a gap could be formed by a combination of PBR movement and mattress movement or deformation. In order to address these possibilities, the CPSC staff revised the proposed draft standard to replace the push-out test with a test that utilizes a torso probe and a wedge probe. The procedure involves placing the pointed end of the probe into the opening between the mattress and PBR. This opening may extend in a vertical plane for PBRs that are installed adjacent to the mattress side, or the opening may extend in the horizontal plane for PBRs that are installed such that they overlap the top mattress surface. The probe dimensions are based on the hip dimensions of children 3 to 5 months of age. A 30-pound force (representing the weight of a child) is applied to the probe. While applying the 30-pound force, the opening may enlarge, either through PBR movement, mattress movement, mattress deformation, or some combination of these actions. If the probe penetrates the opening to a certain depth, it fails the test. This ensures that if part of a child's body enters an opening, the opening will remain small enough to prevent entrapment that could lead to asphyxiation. Compared to the previously proposed 50-pound push-out test, the torso probe and wedge probe procedures are a better test of the PBR, bed, and mattress as a system. Testing with a probe is consistent with other product standards that address entrapment related deaths, such as standards for playground equipment and bunk beds.

Additional discussion related to the issues of fixed bed rails and partial bed rails is included below in the section on potential effectiveness.

Potential Effectiveness of Proposed Standard for Portable Bed Rails

Incident Information

The proposed draft safety standard for PBRs primarily addresses entrapment risks associated with these products. There is also a test provision in the draft standard that addresses the risk of strangulation due to a child's clothing catching on a protrusion on the PBR. From 1/1/90 to 08/22/01, the CPSC has reports of 14 fatalities to children (ranging from 3 months to 4 years of age) that are associated with the use of PBRs. Eight of these incidents involved children under the age of 1-year. Four incidents involved children between one and two years of age. Two children were older than 2 years (2 ½ years and 4 years). Three of the children were disabled, including the two oldest children.

In 10 of the 14 incidents, the child was found entrapped in a gap that formed between the mattress and the PBR. In one of the 14 fatalities, the child became entrapped when he slipped through the bars of the bed rail and his head was pinned against the mattress. Two of the 14 incidents were associated with entrapments in an opening that was formed between the end of a bed rail and a fixed end structure on the bed (e.g., a bedpost). One of the 14 incidents involved strangulation when a child's shirt collar caught on a metal tab on the outside of a bed rail. Four fatal incidents involved a PBR installed on a toddler bed. Two incidents involved PBRs installed on wooden bunk beds. The remaining eight incidents appear to have occurred on traditional beds¹ (See Attachment 1).

There are provisions in the draft standard that address all of the scenarios observed in the fatal incidents. These provisions are performance requirements, warning label and instructions requirements, or a combination of the two. CPSC technical staff estimates that performance provisions in the draft proposed standard could have prevented from seven to twelve incidents. The upper end of this range includes all of the incidents involving an entrapment in openings formed by the rail and mattress or openings within the rail itself (eleven incidents) and the strangulation incident associated with a protrusion. The lower end of this range excludes rail/mattress entrapment incidents that occurred on toddler beds (three incidents) and bunk beds (two incidents), since the draft proposed standard does not require that PBRs be tested on toddler beds and all types of bunk beds. The two incidents involving openings between the end of a PBR and a rigid end structure are excluded from both estimates.

The draft proposed standard does include a provision that requires testing a PBR on the lower bed foundation² of a tubular metal bunk bed. One common characteristic of many toddler beds and bunk beds is that they typically do not have a "box spring" type of mattress support. The mattress may sit on evenly spaced tubular metal rod "slats," as is the case on many toddler beds and bunk beds. On other bunk bed designs, the mattress may be supported by wooden slats. Some bunk bed designs may use a mattress that has a rigid, built-in, lower frame that sits on top of a lip in the bunk bed structure. These designs may utilize slats, or sometimes just a few cross-

¹ One of these was described as a "youth bed"

² The lower bed foundation is the lower bunk that has a bed foundation that is less than 30-inches above the ground. Any bed foundation that is greater than 30-inches above the ground is already required to have guardrails on both sides per the bunk bed mandatory standard (16 CFR Parts 1213, 1500, and 1513).

frame wires, to provide back-up mattress support should the primary mattress support fail. Still other bunk bed designs use a solid wooden board, sometimes called a bunkie board, as the mattress support. PBRs designed to meet the standard requirements on tubular metal bunk beds and traditional adult beds may also reduce the risk of entrapment between the mattress and rail on many types of non-adult beds.

The fatal incidents that occurred in openings formed between the end of a PBR and a rigid bed structure (e.g., a bedpost of a headboard) are addressed in the standard through warning label and installation requirements. These warnings direct the consumer to install a PBR with a minimum spacing of 9-inches from both the head and foot of the bed. This installation ensures that if a child's body falls through an opening between the bedpost and end of the rail, the child's head will also fall through the opening and no entrapment will occur. While the staff considers it necessary to include obvious and clear warnings to address this hazard pattern, the level of effectiveness of these warnings must be considered low in comparison to performance requirements that necessitate certain product design characteristics.

"Fixed" Portable Bed Rails

Other factors that may influence effectiveness of a standard are related to the creation of an essentially fixed PBR. Some of the discussions with manufacturers and in the ASTM PBR Subcommittee have focused on the fact that PBR designs would need to change drastically in order to meet the proposed tests. While current PBRs can be dislodged from the side of the mattress with relatively low forces (ranging approximately from 5-lbf to 20-lbf when applied perpendicular to the vertical face of the rail), new PBRs designed to meet the draft requirements would require a very firm attachment making it difficult to dislodge the PBR. It is very likely that this attachment would be on the mattress itself and that the rail would have to extend partly over the top surface of the mattress. This approach has the potential to greatly reduce the likelihood of the formation of a hazardous gap between the mattress and the PBR.

One issue to consider with a "fixed" PBR is the potential for a hazardous gap between the end of a rail and a bedpost. If a consumer installs a PBR with a less than 9-inch gap to the bedpost, a fixed PBR may present more of an entrapment hazard than non-fixed PBRs that are more easily dislodged. The likelihood of this occurrence cannot be quantified by analysis of the available data. The incident data available to CPSC staff does not identify any close call incidents or other incidents in which a child fell to the ground through a gap between the bedpost and the end of a PBR because the PBR dislodged. However, there were 14 reported incidents from 1/1/90 to 3/09/01 in which children fell to the ground between gaps in mattresses and PBRs, possibly indicating that the PBR dislodged to such a great degree that an entrapment was avoided.

Another issue associated with "fixed" PBRs is the reliance on correct consumer installation. First, as discussed above, the consumer must ensure that the PBR is installed with at least a 9-inch gap from the head and foot of the bed. Second, the consumer must ensure that the attachment mechanism is fully employed. This likely involves one or more additional installation steps in comparison to the installation of current PBR designs. The likelihood that a caregiver would install the rail incorrectly, or that an incorrectly installed PBR would pose an increased entrapment hazard compared to current PBRs will be highly dependent on the product

design. This issue reinforces the need for new PBR designs that are easily installed on a variety of beds and mattress types, and designs that minimize the potential for incorrect installation that could result in an entrapment hazard. These features must be accompanied with clear and noticeable warnings and instructions for proper installation on the product.

Effectiveness of Standard

Based on the above considerations, the CPSC staff preliminarily estimates that the overall effectiveness of a PBR safety standard in preventing deaths related to entrapment and strangulation could range from approximately 50% to as high as 85%.

ATTACHMENT 1

FATAL INCIDENTS, TYPES OF BEDS AND ENTRAPMENT ZONE

Deaths	TYPE OF BED			ENTRAPMENT OR CATCH ZONE		
	standard bed	toddler bed	bunk bed	mattress/rail gap	end struct. gap	protrusion
Document #						
1 900209HCC2155	X			X [2]		
2 920310HCC1596 9151029634	X			X		
3 91112HCC1470 X91B0438A1			X	X		
4 920302HCC0122 X9231206A1 9106182347	X					X
5 940110HCC1085		X		X		
6 950815HCC4107 9406185601	X				X	
7 960215HCC5012 X961288A 9555036345	X [1]			X		
8 960402HCC5086 X9641825A1 X9720379A	X			X		
9 970127CCN0290 G9710223A			X	X		
10 980327HCC3723 X9832550A		X		X		
11 990317HCC0349 9837042368		X			X	
12 990712HCC0579 9837061207	X			X		
13 000814CCC2740 9931005502		X		X		
14 000913HWE6005 H0090103A X0072883A	X			X		
TOTALS	8	4	2	11	2	1

[1] described as a youth bed

[2] child fell through gap between bars in bed rail, rather than between bedrail and mattress

TAB G



UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

Memorandum

Date: September 25, 2001

To : Patricia L. Hackett, Division of Mechanical Engineering
Project Manager, Portable Bed Rails
Ext. 1309

Through : Hugh McLaurin, Associate Executive Director *HLM*
Directorate for Engineering Sciences
Nick Marchica, Director, Division of Mechanical Engineering *NM*

From : Scott Heh, Mechanical Engineer, Division of Mechanical Engineering *SH*
Ext. 1308

Subject: Summary of ASTM Activities Associated with Portable Bed Rails

The following is a chronology of events that summarizes ASTM Portable Bed Rail Subcommittee activities.

- Feb. 1998 CPSC staff requested that ASTM develop a provisional standard to address the risk of deaths (primarily related to entrapment) associated with the use of portable bed rails. The ASTM F-15 Executive Committee endorsed the CPSC request.
- March 1998 Juvenile Products Manufacturers Association (JPMA) held a conference call with manufacturers to discuss incident data and the need for a safety standard.
- Feb. 1999 CPSC staff attended an ASTM organizational meeting for portable bed rails.
- May 1999 CPSC staff developed and sent a draft proposed bed rail standard to the ASTM Task Group for review.
- July 1999 During an industry teleconference, manufacturers agreed to test their products to the CPSC proposal and bring results to the next meeting.
- Sept. 1999 Portable Bed Rail Subcommittee held a meeting and voted to form two task groups. One group is to develop labeling and instruction requirements for bed rails and submit these requirements for ballot as soon as possible. The second task group is to work on bed rail performance requirements. Once completed, performance requirements are to be sent to ballot for addition to the standard.

- Dec. 1999 CPSC staff met with members of the Subcommittee at the CPSC Engineering Laboratory to discuss the draft proposed performance standard and to observe bed rail design concepts that may address entrapment hazards. A few Subcommittee members explained why they believed the CPSC staff proposed requirements and rationale are inappropriate.
- Jan. 2000 CPSC staff participated in a teleconference with members of the Bed Rail Subcommittee to discuss bed rail manufacturers' test results and the items of disagreement in the proposed CPSC draft standard. Some manufacturers reported that their products do not meet the proposed requirements. Other manufacturers said they had not yet tested their products but they would guess that they also would not pass the test. The attendees agreed to submit the CPSC draft proposed standard for Subcommittee ballot so that the entire Subcommittee membership could vote and provide written comments on the proposed requirements.
- Jan. 2000 ASTM balloted concurrently at the Main Committee and Subcommittee levels a proposed new standard for labeling and instruction requirements for portable bed rails.
- Feb. 2000 At a Subcommittee meeting, the attendees reviewed the ballot on a proposed labeling and instruction standard. Revisions were made to the draft standard and it was scheduled for another ballot by May 2000.
- The Subcommittee members voted to withdraw a ballot containing CPSC staff proposed performance requirements. The reasons given for withdrawing the standard were that it would receive several negative votes and that certain issues should be resolved before performance requirements are balloted. The Subcommittee suggested another meeting at the CPSC so that manufacturers and other members can explain their concerns.
- April 2000 Portable Bed Rail Subcommittee held a meeting at the CPSC offices where manufacturers and other Subcommittee members expressed their concerns about balloting the CPSC staff draft standard.
- Oct. 2000 Portable Bed Rail Subcommittee meeting held at ASTM Headquarters. Task groups formed to look at static and dynamic testing.
- Nov. 2000 Portable Bed Rail Subcommittee meeting held in Bethesda, MD. Performance testing issues were discussed.
- March 2001 Final Approval of "ASTM F 2085 Standard Consumer Safety Specification for Portable Bed Rails." The standard primarily addresses warning label and instructional literature requirements.

- April 2001 Portable Bed Rail Subcommittee meeting held in Orlando, FL. CPSC project staff participated via phone. Dynamic testing task group reported some testing results.
- July 2001 CPSC staff revised a draft proposed portable bed rail standard and submitted to the Portable Bed Rail Subcommittee Chairman on 7/20/01. CPSC staff requested distribution of the draft standard to the Subcommittee for review.
- Sept. 2001 CPSC staff met with representatives from a major portable bed rail manufacturer to discuss issues related to the revised draft standard that was proposed by CPSC staff and to discuss potential new portable bed rail designs.
- Sept. 2001 CPSC staff made some further refinements to the draft standard. On 9/19/01, CPSC staff submitted the revised draft standard to the ASTM Portable Bed Rail Task Group and requested distribution to the Subcommittee.
- Sept. 2001 ASTM Portable Bed Rail Task Group meeting scheduled for 9/26/01 at CPSC Headquarters.
- Oct. 2001 ASTM Portable Bed Rail Subcommittee meeting scheduled for 10/24/01 in West Conshohocken, PA.

TAB H

Appendix D

**Wall Side Incidents (Excluding Bunk Beds) 1/1/90 to 10/26/00
Children Ages 0-5 Years of Age**

	TOTAL	<2 Years	2 Years & Over
	273*	257	16
Entrapments	234	224	10
Between Wall & Bed with No Entrapment Reported	31	31	0
Window Falls From Bed	8	2	6

*If window falls are eliminated from the total wall side incidents then 96% of the wall side incidents involve children under 2 years of age.

Red=Children 2 and over

ENTRAPMENTS

Document #	Date	Age/Sex	City/State	Narrative
1 9013008353	02/11/1990	3 MO M	Atlanta, GA	Trapped between mattress and wall. Asphyxia/body compression.
2 9036018022	02/22/1990	2 MO M	Islip, NY	Became wedged between bed and wall. Positional asphyxia.
3 S9210673A 9013013525	04/14/1990	6 MO M	Decatur, GA	Fell between a bed and wall. Asphyxia due to mechanical compression of the chest.
4 9026031395	04/24/1990	2 MO F	Superior Township,	Found between bed mattress and wall asphyxiation.
5 910910HCC0243 9006058119	04/29/1990	1 MO F	Sacramento, CA	Became wedged between a bed and wall. Positional asphyxia.
6 9024012859	05/05/1990	6 MO M	Baltimore, MD	Wedged between wall and mattress. Mechanical asphyxia.
7 900606668	05/22/1990	5 MO F	Bakersfield, CA	Fell between a bed and wall and was pinned. Traumatic asphyxia.
8 910730HCC2245 9028009489	05/26/1990	4 MO M	Silver Creek, MS	Lodged between bed and wall. Asphyxia.
9 910508CWE5007 9035005722 X9084052A	06/06/1990	4 MO F	Hobbs, NM	Died as a result of being wedged between a bedroom wall and the mattress of a bed. Asphyxia.
10 9017611581	06/15/1990	6 MO M	Chicago, IL	Became wedged between a bed and wall. Asphyxia.
11 9022017031 911001HCC0005	06/15/1990	6 MO F	Lake Charles, LA	Caught between bed and wall. Traumatic asphyxia.
12 9012067255	06/17/1990	3 MO F	West Palm Beach, FL	Wedged between mattress and wall. Positional and compression asphyxia.
13 9029203480	06/22/1990	2 MO M	St Louis, MO	Wedged between wall and bed. Suffocation.

14	9012063188	06/25/1990	5 YR F	Miami, FL	Became wedged between a bed and wall. Positional asphyxia.
15	X9176301A	07/06/1990	5 MO M	Lenoir, NC	Died of asphyxia when he got wedged between the bed and wall.
16	9034040245	07/09/1990	10 MO M	Newark, NJ	Found partly off bed with head on floor near wall. Positional asphyxia.
17	9006143375	07/14/1990	5 MO M	Los Angeles, CA	Child found trapped between a bed and wall. Mechanical asphyxia.
18	X90A0002A	08/01/1990	3 MO F	Los Angeles, CA	Asphyxiated when she wedged herself between a mattress and wall.
19	9024023314	08/09/1990	3 MO M	Elkton, MD	Found wedged between mattress and wall. Asphyxia.
20	9017047786	08/10/1990	12 MO F	Rockfork, IL	Wedged between a bed and wall. Asphyxia.
21	9055023432	08/29/1990	7 MO F	Kingston, WI	Rolled on bed and became trapped between bed and unfinished wall covered with plastic. Suffocation.
22	9026051416	09/07/1990	2 MO M	Detroit, MI	Found wedged between wall and mattress. Positional asphyxia.
23	X9165555A X90A0194A	09/20/1990	6 MO F	St Louis, MO	Died of asphyxia after rolling between a queen size bed mattress and wall.
24	9045022811	10/17/1990	3 MO F	Drangeburg, SC	Caught between wall and bed. Suffocation/airway obstruction.
25	X90B0377A 9048093568 911004HCC0014 S91B0133A	10/19/1990	5 MO M	Dallas, TX	On a twin bed and wedged his head between the mattress and wall causing fatal positional asphyxia.
26	910206HCC2090 9029308952	11/01/1990	5 MO M	Sappington, MO	Wedged between wall and bed. Compression/positional asphyxia.
27	910731HCC1345 9012124926	12/23/1990	5 MO M	Fort Lauderdale, FL	Positional asphyxia as a result of being suspended by his neck between a standard size mattress/bed and a wall.
28	9117600904	01/06/1991	5 MO F	Chicago, IL	Found trapped between mattress and wall. Asphyxia.
29	X9122624A 9106008220	01/19/1991	2 MO M	San Marcos, CA	Died of asphyxia after being placed on a queen size bed and got pinned between the wall and bed.
30	9140004966	03/16/1991	6 MO M	Lawton, OK	Entrapment between bed and wall. Mechanical asphyxia/compression of nose and mouth.
31	910924HCC0255 9140008185	03/17/1991	11 MO F	Oklahoma City, OK	Found wedged between an adult bed, cardboard boxes and an interior wall. Asphyxia.
32	9112041624	04/06/1991	3 MO M	Tampa, FL	Wedged between bed and wall. Asphyxia.
33	9119008631	04/12/1991	7 MO F	Des Moines, IA	Trapped between mattress and wall. Positional asphyxia.
34	9117608552	04/27/1991	4 MO M	Chicago, IL	Trapped between mattress and wall.. Asphyxia.

35	9142051320	05/18/1991	8 MO M	Philadelphia, PA	Stuck between wall and mattress. Mechanical asphyxia.
36	9104011975 910523HEP2641	05/21/1991	1 MO M	Phoenix, AZ	Became wedged between bed and wall. Traumatic asphyxia.
37	9136030183	05/31/1991	2 MO M	Manhattan, NY	Wedged between bed and wall. Positional asphyxia.
38	9126037163	06/10/1991	4 MO M	Perry, MI	Head caught between wall and bed. Asphyxia.
39	9142054421	06/18/1991	3 MO F	Meadville, PA	Found with head between a wall and a mattress on an adult bed. Suffocation.
40	9139060565	06/30/1991	3 MO F	Toledo, OH	Caught between mattress and wall. Positional asphyxia.
41	9151034177	07/01/1991	2 MO M	Norfolk, VA	Wedged between mattress and wall. Suffocation.
42	9139060577	07/10/1991	12 MO F	Toledo, OH	Became wedged between mattress and wall. Positional asphyxia.
43	9104017622 911015HCC0019	07/24/1991	4 MO M	Tucson, AZ	Caught between bed and wall. Positional asphyxia.
44	9117038088	07/27/1991	4 YR F	Urbana, IL	Wedged between a bed and wall. Suffocation/severe cerebral spastic disease.
45	910823HCC1384 X9186509A	07/29/1991	5 MO F	Philadelphia, PA	Died when became wedged between a wall and bed.
46	9132006674	08/01/1991	3 MO F	Reno, NV	Wedged between mattress and wall. Positional asphyxia.
47	9140018180	08/26/1991	2 MO F	Oklahoma City, OK	Wedged between a bed and wall. Asphyxia.
48	9146004353	09/03/1991	4 MO F	Sioux Falls, SD	Found wedged between a bed and wall. Positional asphyxia.
49	920114HCC1525 9134049982	09/16/1991	5 MO M	Merchantville, PA	Placed on an adult size double bed and was found between the bed and wall in an inverted, suspended position. Asphyxia.
50	9126057778	10/10/1991	2 MO M	Detroit, MI	Head caught between wall and mattress. Asphyxia.
51	9133006175	10/18/1991	12 MO M	Nashua, NH	Wedged between bed and wall. Positional asphyxia.
52	920130HCC1540 9137043965	10/29/1991	3 MO M	Morganton, NC	Suffocated when his face/head wedged between a pillow and closet after maneuvering off parent's bed.
53	9147046630	11/10/1991	3 MO M	Chattanooga, TN	Entrapment between bed and wall. Positional asphyxia.
54	91108047391	12/02/1991	4 MO M	Indianapolis, IN	Found between mattress and wall. Face down on a shirt. Positional asphyxia.
55	9101035197	12/03/1991	6 MO F	Gadsden, AL	Found with head between wall and mattress. Suffocation.
56	NEISS	12/19/1991	19 MO F	Unknown	Found child lodged between brother's bed and the wall. Usually sleeps in crib. Anoxia.

57	9125042899	12/19/1991	21 MO F	Westfield, MA	Wedged self between bed and wall. Asphyxia.
58	X9385819A	00/00/1992	7 MO ?	Santa Ana, CA	Asphyxiated when caught between a bed box spring and wall.
59	929001683	01/15/1992	5 MO M	Des Moines, IA	Entrapped between mattress and wall. Compression asphyxia.
60	9248045898	04/09/1992	8 MO M	Houston, TX	Wedged between bed and wall. Asphyxia due to mechanical compression of the chest.
61	9206055825	04/21/1992	7 MO F	Placentia, CA	Wedged between bed's box springs and wall. Positional asphyxia.
62	920515CWE7037 F9257002A	04/28/1992	5 MO F	Russellville, AR	Placed in mother's bed and found face down and lodged between the top mattress and the wall.
63	9227011950	05/02/1992	2 YR M	Minneapolis, MN	Found between the mattress and wall. Chest compression/positional asphyxia.
64	9246003074	05/30/1992	8 MO F	Pierre, SD	Found pinned between a bed and wall. Suffocation.
65	9237028785	06/19/1992	3 MO M	Greenville, NC	Fell and became trapped between the bed and wall. Asphyxia/chest compression.
66	9206083198	06/20/1992	8 MO F	Fresno, CA	Wedged between mattress and wall. Asphyxia.
67	920703HWE4002 F9274002A 9206096154	06/22/1992	3 MO F	San Diego, CA	Placed in twin size bed and found in a prone position with her head toward the foot of the bed wedged between the bed and the wall.
68	920807HCC1799 X9284745A 9251025978	07/03/1992	4 MO F	Springfield, VA	On a queen size bed and became wedged between the wall the edge of the bed. Chest compression/mechanical asphyxia.
69	9221029979	07/04/1992	12 MO M	Pikeville, KY	Fell off mattress and was wedged between the wall and mattress. Mechanical asphyxia/compression of torso and face.
70	9205012863	07/18/1992	7 MO M	Paragould, AR	Slipped between bed and wall. Suspended by head/asphyxia.
71	9222023700	07/26/1992	2 MO M	Slidell, LA	Trapped between the wall and mattress. Asphyxia.
72	930429HCC3186 9222026016	08/03/1992	6 MO M	Marrero, LA	Died of asphyxia as a result of falling into crevice created when a twin mattress pull away from the wall. Found lying of the box spring and pressed between the wall and mattress.
73	9212100809	09/06/1992	3 MO F	Ormond Beach, FL	Became positioned between mattress and wall. Asphyxia.
74	9217616925	09/07/1992	4 MO M	Chicago, IL	Trapped between a mattress and wall. Asphyxia.

75	9044009271 920930HCC1877	10/07/1992	2 YR M	Warwick, RI	Wedged head between adult bed mattress and wall. Traumatic compression/asphyxia.
76	9236073529	10/09/1992	5 MO M	Rochelle, NY	Wedged between the bed and wall. Asphyxia.
77	9229025561	10/10/1992	13 MO M	Cape Girardeau,	Entrapped between a bed and wall. External chest compression/asphyxia.
78	9246006219	11/21/1992	1 MO M	Rapid City, SD	Asphyxiated when pinned between wall and bed.
79	9266049162	12/13/1992	11 MO M	Queens, NY	Suspended between bedframe and wall. Asphyxia/hanging.
80	NEISS	01/24/1993	6 MO M	Unknown	Child was found wedged between bed and wall apparently fell off bed. Cardiac arrest.
81	934004082	01/25/1993	4 MO F	Phoenix, AZ	Became trapped between a wall and bed. Mechanical asphyxia.
82	9317602227	01/29/1993	2 MO F	Chicago, IL	Trapped between wall and bed. Suffocation.
83	9348024079	02/14/1993	4 MO M	Infant, TX	Caught between bed and wall. Postural asphyxia.
84	9316001779 93413CWE5013	03/22/1993	16 MO M	Rexburg, ID	Fell into crack between bed and wall with head caught, face in bedding and body suspended.
85	9313016340	04/01/1993	5 MO M	Atlanta, GA	Caught between bed and wall. Positional asphyxia.
86	9348048347	05/31/1993	3 MO M	Midland, TX	Asphyxiated between bed mattress and wall. Asphyxia.
87	9315003758	06/01/1993	5 MO M	Lihue, HI	Rolled to edge of bed and got trapped between the bed and wall. Asphyxia/smothering.
88	9312067117	06/15/1993	5 MO M	Gainesville, FL	Fell between bed and wall. Positional asphyxia/entrapment.
89	X9386918A 940228HCC1678 9334036010	06/15/1993	2 MO F	Asbury Park, NJ	Died after being found wedged between the wall and the bed.
90	9306113539	06/17/1993	6 MO F	Los Angeles, CA	Body became wedged between the bed and wall. Positional asphyxia.
91	9339081831	07/11/1993	8 MO F	Toledo, OH	Found wedged between wall and bed. Positional asphyxia.
92	940608HCC2149 9328043995	07/13/1993	1 MO F	Erie, MI	Died from asphyxia due to a head injury when head became pinned between the wall and twin size bed.
93	940608HCC2148 9328043603	07/17/1993	7 MO F	Warren, MI	Compressed between bed and wall. Asphyxia.
94	9340017916	07/23/1993	5 MO F	Tulsa, OK	Wedged between bed and wall. Positional asphyxia.
95	9326051092	08/03/1993	6 MO M	Madison Heights, MI	Found wedged between a waterbed and wall. Positional asphyxia.

96	950526HCC4042 9316005118	08/24/1993	6 MO F	Boise, ID	Found trapped between the adult bed and the wall. Found face down on bedding and entangled in a blanket. Asphyxia.
97	9348092798	09/05/1993	3 MO M	Houston, TX	Wedged between mattress and wall. Asphyxia.
98	9355026492	09/20/1993	6 MO F	Wauwatosa, WI	Found suspended between bed and wall. Asphyxia.
99	X9442737A 9386059142	10/21/1993	6 MO M	Brooklyn, NY	Died after being caught between a bed and wall.
100	9327030282 950525HCC2109	10/30/1993	1 MO M	Minneapolis, MN	Found wedged between a bed mattress and wall. Positional asphyxia.
101	9349009328	11/04/1993	10 MO F	Salt Lake City, UT	Found wedged between mattress and wall. Positional asphyxia.
102	9306166725	11/04/1993	8 MO M	Fresno, CA	Rolled off bed and wedged between mattress and wall. Asphyxia.
103	9306206509 X9421812A 940223HCC3072	11/08/1993	7 MO F	Torrance, CA	Fell between mattress and wall. Suffocation.
104	9347045607	11/14/1993	3 MO M	Memphis, TN	Body wedged between wall and bed. Suffocation.
105	9344008513	11/14/1993	9 MO M	Providence, RI	Found unresponsive wedged between bed and wall. Positional asphyxia and suffocation.
106	9313056358	11/15/1993	3 MO M	Atlanta, GA	Wedged between wall and bed. Positional asphyxia.
107	9318049641 950808HCC2184	11/28/1993	5 MO M	Indianapolis, IN	Found unresponsive between the mattress and wall. Positional asphyxia.
108	P9711837A	12/08/1993	2 YR F	Unknown	Found with head/neck between bed and wall hanging.
109	9321036234	12/08/1993	3 YR M	Glasgow, KY	Was hung by his chin between bed and wall. Positional asphyxia.
110	9342120533	12/31/1993	1 MO F	Allentown, PA	Compressed between mattress and wall. Positional and compression asphyxia.
111	X9421866A 9417002222	01/29/1994	6 MO M	Mundelein, IL	Died after becoming wedged between the twin bed and wall.
112	9439018593	01/31/1994	5 MO M	East Cleveland, OH	Wedged between bed and wall. Mechanical asphyxia.
113	X94B0491A 9453010426	03/03/1994	22 Day M	Tacoma, WA	Died when wedged between a wall and bed.
114	9417806199	03/27/1994	7 MO M	Chicago, IL	Trapped between mattress and wall. Asphyxia.
115	X9474827A	03/29/1994	3 MO F	Charlotte, NC	Wedged between a bed mattress and a wall.
116	940427CWE5012 F9445012A 9441008523	04/10/1994	9 MO F	Clatskanie, OR	Died of suffocation in a blanket when she rolled off of an adult bed and became wedged in a space between the bed and a closet door.
117	9424013655	05/03/1994	4 MO F	Baltimore, MD	Wedged between bed and wall. Positional asphyxia.

118	9448083950	05/07/1994	5 MO M	Pasadena, TX	Caught between wall and mattress. Asphyxia due to mechanical compression.
119	9413021574	05/15/1994	6 MO M	Columbus, GA	Head fell between mattress and wall. Positional asphyxia.
120	9466030920	06/06/1994	2 MO M	Manhattan, NY	Wedged between mattress and wall. Positional asphyxia.
121	9404018569	06/29/1994	11 MO M	Phoenix, AZ	Trapped between mattress and wall. Positional asphyxia.
122	9466036770	07/09/1994	6 MO F	Bronx, NY	Wedged between bed and wall. Mechanical asphyxia/compression.
123	941123CCC1118 9445016302	07/13/1994	2 MO M	Johnsonville, SC	Wedged between twin bed and wall. Asphyxia.
124	9417613228 950616HCC2148	07/13/1994	2 MO M	Chicago, IL	Trapped between mattress and wall. Suffocation.
125	9448077176	07/22/1994	4 MO F	Houston, TX	Caught between wall and bed. Asphyxia due to mechanical compression of the chest.
126	9404022160 941214CCC3158	08/11/1994	8 MO M	Phoenix, AZ	Entrapped between mattress and wall. Positional asphyxia.
127	9430004757	08/11/1994	11 MO M	Butte, MT	Became wedged between bed and wall. Mechanical asphyxia.
128	940921CAA3756 X9496230A	08/21/1994	16 MO F	Wynne, AR	Found dead in her toddler bed of suffocation. She was between the mattress of the bed and the wall.
129	950525HCC2107 9401026282	08/25/1994	10 MO M	Sadmsom, AL	Died form asphyxia while in an adult bed reaching for his bottle between the bed and wall. Found with face pressed against the wall.
130	9421024170	08/23/1994	5 MO F	Manchester, KY	Rolled between bed and wall. Head wedged between mattress and wall. Acute respiratory insufficiency.
131	9417061961	09/30/1994	3 MO F	Granite City, IL	Head wedged between mattress and wall. Asphyxia/smothering.
132	9412119009	10/21/1994	12 MO M	Kissimmee, FL	Positioned between bed and wall. Positional asphyxia.
133	9439097392	11/01/1994	7 MO F	Toledo, OH	Entrapped between wall and mattress. Positional asphyxia.
134	9426081571	12/25/1994	6 MO F	Pontiac, MI	Wedged between mattress and wall. Positional asphyxia.
135	9541003000	01/14/1995	17 MO F	Portland, OR	Wedged between bed and wall on baseboard heater. Hyperthermia and burns.
136	9522004314	01/20/1995	4 MO M	Luling, LA	Found upside down wedged between wall and bed. Asphyxia.
137	9566009373	01/29/1995	3 MO F	Brooklyn, NY	Wedged between mattress and wall. Asphyxia/compression of chest.
138	9508003085	02/17/1995	3 MO M	Crystola, CO	Wedged between bed and wall. Asphyxia.

139	95120278704	02/27/1995	6 MO M	Orlando, FL	Entrapment between bed and wall. Positional asphyxia.
140	9522028961	04/30/1995	9 MO F	Tallulah, LA	Trapped between mattress and wall. Asphyxia.
141	X9561557A	06/15/1995	6 MO F	Lakeland, FL	Died sleeping with her face between a mattress and a wall.
142	9537033223	07/15/1995	5 MO M	Morehead City, NC	Wedged between wall and bed. Positional asphyxia.
143	9529019782	07/31/1995	5 MO M	Joplin, MO	Rolled off bed and became wedged between mattress and wall. Suffocation/compression.
144	9548100462	08/03/1995	1 MO F	Fort Worth, TX	Upper torso of infant trapped between bed and wall with face pressed next to the bed. Suffocation.
145	X9683704A 9535392197	08/13/1995	3 MO M	Albuquerque, NM	Died of asphyxia when he became wedged between the wall and bed.
146	X95B0696A	09/13/1995	7 MO M	Homestead, FL	Positional asphyxia caused by wedging on the floor between a wall and bed.
147	9518038051	09/15/1995	6 MO M	Evansville, IN	Caught between wall and bed. Positional asphyxia.
148	9529023391	09/16/1995	12 MO F	Neosho, MO	Became wedged between bed and wall. Suffocation/compression.
149	9510004556	09/23/1995	3 MO F	Newark, DE	Became wedged between bed and wall. Positional asphyxia.
150	9505021085	10/31/1995	5 MO M	Pine Bluff, AR	Wedged between bed and wall. Compression asphyxia.
151	9501037097	11/19/1995	8 MO F	Selma, AL	Became trapped between bed and wall. Traumatic asphyxia.
152	9522039956	12/31/1995	4 MO F	Shreveport, LA	Pinned between the bed and wall. Suffocation.
153	9618900028	01/10/1996	2 MO M	Indianapolis, IN	Wedged between bed wall. Positional asphyxia.
154	9636015357	02/12/1996	11 MO F	Buffalo, NY	Wedged between bed and wall. Positional asphyxia.
155	9651018419	05/10/1996	6 MO F	Lynchburg, VA	Entrapment between wall and mattress. Asphyxia.
156	9617027910	05/24/1996	2 YR M	Lafayette Township, IL	Wedged between bed and wall on the floor. Child had cerebral palsy. Positional asphyxia.
157	9639046953	06/13/1996	9 MO M	Cincinnati, OH	Head lodged between mattress and wall. Anoxic encephalopathy/positional asphyxia.
158	9648089562	07/05/1996	4 MO F	Houston, TX	Wedged between wall and bed. Asphyxia due to smothering.
159	9648089777	07/11/1996	3 MO M	Austin, TX	Wedged between the wall and bed. Suffocation.
160	9629019393	08/02/1996	6 MO M	Troy, MO	Wedged between adult bed and wall positional asphyxia.
161	9606193226 X96C0683A	08/12/1996	10 MO F	Paramount, CA	Wedged between mattress and wall. Positional asphyxia.

162	9602001605	08/16/1996	4 MO M	Anchorage, AK	Trapped between mattress and wall. Smothering/positional asphyxia.
163	9627021087	08/17/1996	9 MO M	Coon Rapids, MN	Slipped off bed and became entrapped in sheets between bed and wall. Positional asphyxia.
164	9648084707	08/20/1996	5 MO F	Port Lavaca, TX	Found face down between wall and mattress. Suffocation. Interatrial septal defect of heart.
165	9641018569 X9694015A	08/21/1996	6 MO F	Roseburg, OR	Suffocation. Entrapment between mattress and wall.
166	9635008461	08/26/1996	7 MO M	Albuquerque, NM	Suffocated by being wedged between wall and mattress.
167	9613040438	09/06/1996	2 MO F	Atlanta, GA	Wedged between bed and wall. Positional asphyxia.
168	9604028169	09/14/1996	2 MO M	Glendale, AZ	Trapped between wall and bed. Positional asphyxia.
169	9648097874	09/15/1996	5 MO F	San Antonio, TX	Wedged between bed and wall. Positional asphyxia.
170	9617053389 X96A000*A	09/28/1996	6 MO M	Hinsdale, IL	Lodged between bed and wall. Suffocation.
171	9617063809	10/19/1996	7 MO M	Oak Lawn, IL	Trapped between bed and wall. Asphyxia.
172	9621030714	10/21/1996	7 MO M	Louisville, KY	Trapped between bed and wall. Suffocation.
173	9624033636	11/02/1996	4 MO F	Baltimore, MD	Upside down between mattress and wall. Positional asphyxia.
174	9645031325	12/13/1996	4 MO M	Clinton, SC	Lodged between mattress and wall. Asphyxia/compression.
175	9655038339	12/18/1996	5 MO M	Watertown, WI	Fell between wall and bed and became stuck. Suffocation.
176	9713013703 990105CCC2155	01/11/1997	7 MO M	Atlanta, GA	Trapped between bed and wall. Positional asphyxia.
177	9713011524	01/31/1997	6 MO M	Eastpoint, GA	Wedged between mattress and wall. Compression asphyxia.
178	9740007312	02/12/1997	15 MO M	Tulsa, OK	Pinned between bed and wall. Asphyxia/suspension and neck compression.
179	980529CCC1463 9766008766	02/13/1997	11 MO M	Queens, NY	Child slipped off bed and was wedged between the bed and wall with his head and neck wrapped in a blanket. Asphyxia.
180	X9730850A	02/14/1997	6 MO M	Brooklyn, NY	Asphyxia by compression of head and neck when he became wedged between the bed mattress and wall.
181	9728005542	03/08/1997	6 MO M	Pascagoula, MS	Fell between mattress and wall. Smothering/compression of face.
182	9513012797	03/25/1997	5 MO M	East Point, GA	Trapped between bed and wall. Positional asphyxia.
183	9718016864	03/28/1997	7 MO M	Valpapaiso, IN	Became lodged between bed and wall. Compression asphyxia.

184	X9782764A 9748045243	04/22/1997	5 MO M	Dallas, TX	Died of positional asphyxia. Found wedged between a bed and wall.
185	9748062747	05/28/1997	3 MO M	San Antonio, TX	Wedged between the mattress and wall. Positional asphyxia.
186	9705013356 980513HCC3809	06/15/1997	4 MO M	West Memphis,	Wedged between mattress of a "half" bed and wall. Positional asphyxia.
187	9704020883	06/30/1997	1 MO M	Tempe, AZ	Wedged between mattress and wall. Positional asphyxia.
188	9713051469	07/05/1997	3 MO M	Athens, GA	Trapped between mattress/wall. Probable positional asphyxia.
189	971203HWE5001 F97A0009A 9706170355	07/17/1997	6 MO F	San Jose, CA	Sleeping on parents bed and found off the bed trapped in a 1 ft area between the bed and wall which the parents had stuffed with pillows and blankets. She was face down in the pillows with her feet in the air.
190	9705015803	07/30/1997	6 MO F	Little Rock, AR	Wedged and suspended between bed wall. Positional asphyxia.
191	X981609A	08/04/1997	4 MO M	Milwaukee, WI	Died of positional asphyxia. Placed on a full size bed and was found slipped down between the bed's mattress and wall.
192	9745021177 X97A0318A	08/18/1997	1 MO M	Aiken, SC	Scouted off mattress and wedged against wall. Positional asphyxia.
193	9755024532	08/20/1997	4 MO M	Wauwatosa, WI	Found trapped between mattress and wall. Mechanical asphyxia.
194	9740020707	08/26/1997	15 MO F	Shawnee, OK	Slipped between mattress and wall and became wedged. Mechanical asphyxia.
195	9734051925	09/03/1997	12 MO F	Vineland, NJ	Traumatic asphyxia. Found wedged between bed and wall.
196	9755027355	09/05/1997	7 MO M	Wauwatosa, WI	Became wedged between the mattress and wall of an adult bed. Positional asphyxia.
197	9730005608	09/19/1997	6 MO M	Ashland, MT	Lodged between wall and water bed. Suffocation.
198	9717057458	09/26/1997	5 MO M	Oak Park, IL	Entrapped between bed and wall. Compressional asphyxia.
199	9739105006	10/26/1997	7 MO M	Cincinnati, OH	Wedged between mattress and wall. Positional asphyxia.
200	971110CWE7069 F97B7052A	11/04/1997	23 MO M	Broken Arrow, OK	Found unresponsive in a twin bed wedged between the bed and wall and also entangled in bedding.
201	9737061225 X9811517A	12/04/1997	4 MO F	Durham, NC	Wedged between mattress and wall. Positional asphyxia.
202	9734066216	12/31/1997	3 YR M	Camden, NJ	Trapped between bed and wall. Mechanical and positional asphyxia.
203	980617HWE5018 F9865018A 9806092931	05/01/1998	8 MO M	San Jose, CA	Placed in a queen size bed and found unresponsive, wedged between the wall and bed.
204	9812055532	05/03/1998	6 MO M	Lynn Haven, FL	Wedged between wall and mattress. Positional asphyxia.

205	9812065973	05/04/1998	6 MO M	Pensacola, FL	Entrapped between bed and wall. Positional asphyxia.
206	9855202546 X9972588A	05/16/1998	20 MO M	Milwaukee, WI	Trapped between mattress and wall. Asphyxia.
207	9826036490	06/05/1998	5 MO M	Flint, MI	Wedge between bed and wall. Positional asphyxia.
208	9848097758	06/11/1998	4 MO F	Brownsville, TX	Wedge between the wall and bed mattress. Asphyxia.
209	9818021895	07/02/1998	5 MO M	Fort Wayne, IN	Pinned between the mattress and wall. Positional asphyxia.
210	9824022060 X9884748A	07/15/1998	3 MO F	Baltimore, MD	Found wedge between mattress and wall. Positional asphyxia.
211	9826048536	07/28/1998	3 MO F	Detroit, MI	Found wedge between wall and mattress. Positional asphyxia.
212	980928HCC4008 X9895189A	09/16/1998	11 MO F	Reno, NV	Placed to sleep on a youth bed positioned against a wall on one side and had a bed rail on the other side. Found wedge between the wall and the bed.
213	9839073532	09/18/1998	6 MO M	Toledo, OH	Became wedge between mattress of bed and wall. Positional asphyxia.
214	9851039048	09/19/1998	3 YR M	Oak Hill, VA	Trapped between bed and wall. Postural asphyxia. Down's Syndrome.
215	98942086462 991207CCC0160	09/20/1998	2 MO M	Altoona, PA	Head wedge between bed and wall. Mechanical suffocation.
216	9836072738	09/29/1998	6 MO M	Huntington, NY	Found between mattress and wall. Positional asphyxia.
217	X9931090A	10/14/1998	2 MO F	Moosup, CT	Found wedge between a small twin bed and wall.
218	991220HCC3078 9853033620	10/23/1998	1 YR M	Renton, WA	Placed on a twin size bed and found wedge between the bed and wall.
219	9848139439	12/30/1998	4 MO M	Austin, TX	Suffocated between mattress and wall.
220	9819022755	10/28/1998	7 MO F	Mason City, IA	Head got stuck between mattress and wall. Mechanical asphyxia.
221	9853042576	12/29/1998	4 YR F	Oak Harbor, WA	Head became trapped between bed and wall. Asphyxia/positional compression of neck.
222	9927004772	01/30/1999	6 MO M	Minneapolis, MN	Found entrapped between a wall and mattress. Chest compression asphyxia.
223	9949003193	04/03/1999	5 MO F	West Valley, UT	Wedge between mattress and wall. Positional asphyxia.
224	9926034100	04/25/1999	3 MO M	Commerce Township, UT	Wedge between wall and mattress. Positional asphyxia.
225	9949000090	06/05/1999	6 MO M	Salt Lake City, UT	Found unresponsive between mattress and wall. Positional and/or compression asphyxia.
226	X0020333A	06/28/1999	7 MO M	Grand Rapids, MI	Died from suffocation when his head got wedge between a mattress and wall with his head buried in a blanket.

227	X9982839A	07/24/1999	5 MO F	Coconut Creek, FL	Found deceased, wedged between the bed and wall. Positional asphyxia.
228	9904026377	08/17/1999	5 MO M	Tucson, AZ	Asphyxiation. Trapped between mattress and wall.
229	X0030930A	09/15/1999	4 MO F	Petersburg, VA	Found wedged between a bed and wall. Mechanical asphyxia.
230	X89C4317A	09/08/1999	7 MO M	Chicago, IL	Died of asphyxia between a wall and mattress.
231	9949008659	09/18/1999	7 MO M	Tooele, UT	Found wedged between mattress and wall. Positional asphyxia.
232	991221HCC2143 X99C3918A	11/07/1999	8 MO M	Crawfordsville, SD	Died of thermal injuries. Found wedged between a bed and wall on a space heater.
233	9924041071	12/22/1999	22 MO M	Cheverly, MD	Wedged between bed and wall. Positional asphyxia.
234	X00A4985A	07/07/2000	3 MO ?	Marshal, MN	Child placed on double bed for a nap at babysitters'. Found wedged between bed and wall. Asphyxia

BETWEEN BED AND WALL WITH NO ENTRAPMENT REPORTED

1	9048009102	01/01/1990	4 MO F	Val Verde, TX	Rolled into gap of mattress and wall. Suffocated on plastic mattress cover.
2	9051014883	04/10/1990	7 MO M	Spring Grove, VA	Fell between bedboard and wall into a pile of clothing. Asphyxia.
3	9041011778	06/10/1990	11 MO M	Portland,	Suffocated between bed and wall.
4	9001036457	12/19/1990	2 MO M	Goodwater, AL	Smothered between a bed and wall. Positional asphyxia.
5	NEISS	05/22/1991	1 MO M	Unknown	Layed on bed and was found later between bed and wall. Anoxia.
6	9121024709	09/26/1991	1 MO M	Jackson, KY	Fell between bed and wall. Asphyxiation.
7	9115005289 911025HWE5018	10/20/1991	2 MO M	Kailua, HI	Child was found lying between the double bed and wall. Asphyxia.
8	X9284689A	03/01/1992	15 MO M	Washington, DC	Died from falling between a bed and wall and landing on an electric floor heater.
9	NEISS 9253019959	07/28/1992	6 MO F	Unknown	Child was found between the bed and wall. Anoxia.
10	9320007344	03/25/1993	9 MO F	Wichita, KS	Found between wall and bed without pulse or respirations. Anoxic encephalopathy.
11	NEISS	07/20/1993	7 MO F	Unknown	Found wrapped up in comforter between bed and wall. DOA.
12	9342077376	08/12/1993	3 MO M	Lower Paxton	Positioned between bed and wall. Postural asphyxia.
13	NEISS	09/30/1993	4 MO F	Unknown	Found unresponsive between bed and wall. Anoxia.
14	X9432259A	01/31/1994	5 MO M	East Cleveland,	Died of asphyxia between a bed and wall.
15	9448039513	04/17/1994	6 MO M	Midland, TX	Suffocated between waterbed and wall.

16	9448090459	08/14/1994	3 MO F	Pecos, TX	Rolled off bed between the bed and wall with curtain below child. Positional asphyxia.
17	9404025070	09/13/1994	8 MO M	Tucson, AZ	Asphyxiated between bed and wall.
18	960417HWE5015 F9645014A	04/09/1996	13 MO M	Sacramento, CA	Died of positional asphyxia when he rolled off the surface of an adult bed onto a pile of clothes stacked between the bed and wall. He was found upside down in the clothes.
19	X96C0643A	07/29/1996	2 MO M	New Britain, CT	Found unresponsive, face down in a space between a wall and a full size bed with his head on a soft pillow.
20	9649007982	10/14/1996	7 MO F	Brigham City, UT	Found unresponsive between bed and wall with head in blanket. Positional asphyxia.
21	9621035242 9608021250	10/27/1996	9 MO M	Durango, CO	Fell between bed and wall. Positional asphyxia.
22	970520HCC2202 9629205458	12/01/1996	4.5 MO M	St Louis, MO	Died after being found face down on a plastic bed full of clothing which was between the wall and bed upon which he had been placed.
23	9648133661	12/21/1996	4 MO M	Longview, TX	Fell off bed and was found face down between bed and wall. Positional asphyxia.
24	9718018977	06/21/1997	5 MO F	Ft Wayne, IN	Rolled over between the wall and bed. Positional asphyxia.
25	9708014156	07/17/1997	4 MO M	Grand Junction,	Slipped between bed and wall. Positional asphyxia.
26	9726054848	08/29/1997	7 MO F	Flint, MI	Found between bed and wall. Positional asphyxia.
27	9806067041	05/04/1998	1 MO M	Sacramento, CA	Fell between bed mattress and wall. Probable positional asphyxia.
28	X9920710A	12/27/1998	10 MO M	New York, NY	Died of positional asphyxia as a result of being found between the bed and wall.
29	NEISS	04/02/1999	1 MO M	Unknown	Found dead when he had fallen between bed and wall. Anoxia.
30	NEISS	04/02/1999	1 MO M	Unknown	Found dead. Had fallen between bed and wall. Anoxia.
31	X0083365A	07/03/2000	5 MO M	Cleveland, OH	Child asphyxiated (positional) when he fell between bed and wall.

WINDOW FALLS FROM BED

1	X90B0332A	08/27/1990	3 YR M	Oakland, CA	Died after he fell out of a window on the 11th floor when he was playing on his bed and lost his balance.
2	X9231421A	03/10/1992	5 YR M	Washington, DC	Died after falling through a 4th floor window screen while playing on a bed.
3	X9274012A	06/28/1992	3 YR M	Pawtucket, RI	Died following a fall out of a screened window while jumping on a bed.

4	X9376149A	05/11/1993	20 MO F	Buffalo, NY	Died following a fall from a window after climbing an adjacent bed.
5	970909CWE5010 F9785010A	09/03/1997	4 YR M	Honolulu, HI	Died after he fell from a 4th story window when he was playing on a bed and landed against the screen, falling through.
6	N9850101A	04/29/1998	3 YR M	Brooklyn, NY	Died of injury received in a fall from a 9th floor window while jumping on his bed.
7	980921HCC2839 X9895168A	09/05/1998	23 MO M	Minneapolis, MN	Died of blunt force cranial trauma received in a 6 floor fall. He had been jumping on a bed adjacent to a window and pushed the screen out.
8	980915HCN0417 G9890133A	09/14/1998	2 YR M	Chicago, IL	Died following a fall from a 3rd story window while playing on a bed.

TAB I



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

P. Aackett
 CPSA 6 (b)(1) Cleared 12-7-00
 No Mfrs/Prvtlbrs of
 Products Identified
 Excepted by _____
 Firms Notified, _____
 Comments Processed: _____

MEMORANDUM

DATE: December 5, 2000

TO : ES
 Through: Sadye E. Dunn, Secretary, OS
 FROM : Martha A. Kosh, OS
 SUBJECT: ANPR for Portable Bed Rails, 65 FR Reg.58968,
 October 3, 2000

ATTACHED ARE COMMENTS ON THE CH 01-1

<u>COMMENT</u>	<u>DATE</u>	<u>SIGNED BY</u>	<u>AFFILIATION</u>
CH 01-1	12/01/00	Mary E. Fise General Counsel	Consumer Federation of America 1424 16 th St, NW Suite 604 Washington, DC 20036
CH 01-2	12/01/00	Russ Butson Director of Product Safety	Evenflo Company, Inc. 707 Crossroads Court Vandalia, OH 45377
CH 01-3	12/04/00	Eduardo Montorro	<u>Montorro@Bellsouth.net</u>
CH 01-4	12/05/00	Rick Locker	Juvenile Products Manufacturers Assoc. 236 Rte 38 West Suite 100 Moorestown, NJ 08057

bed rail
comments
CH01-1 002



Consumer Federation of America

December 1, 2000

Office of Secretary
Consumer Product Safety Commission
Washington, DC 20207-0001

Copy of comments filed by e-mail to cpsc-os@cpsc.gov.

RE: "ANPR for Portable Bed Rails" 65 Fed. Reg. 58968, October 3, 2000

Consumer Federation of America (CFA) strongly supports promulgation by CPSC of a mandatory rule declaring certain portable bed rails to be banned hazardous substances under the Federal Hazardous Substances Act. CFA is a non-profit association of over 270 pro-consumer groups, with a combined membership of over 50 million, that was founded in 1968 to advance the consumer interest through advocacy and education.

Such a rule is necessary to address fatalities due to entrapment of children between portable bed rails and beds or between the rods or bars of the portable bed rail itself. At least 14 children have died as a result of entrapment incidents involving portable bed rails. While the Federal Register notes states that the Commission is aware of 40 non-fatal incidents (nine of which resulted in injury), we believe it is very highly likely that thousands of non-fatal incidents involving partial or temporary entrapments have occurred during the life of these products. We have been told by consumers that it is a common experience for a bed rail to slide away from the bed and for children to slide through the opening (some entrapped for a short time and others not). But for the luck of these children, they too could have died in a portable bed rail entrapment. As a product intended to be used *without adult supervision*, at night or during daytime nap periods, it is imperative that such near miss events be viewed very seriously.

It is appropriate for the Commission to move forward on this rulemaking particularly in light of the industry's failure to develop provisions in a voluntary safety standard to eliminate the entrapment risk. CFA participates in the ASTM/JPMA voluntary safety standard subcommittee for bed rails. Earlier this year, CFA made a motion at a subcommittee meeting to adopt the CPSC staff-

Portable Bed Rails ANPR
CFA Comments
Page two

drafted proposed performance requirements. The motion failed to obtain a second on the motion because CFA was the only non-industry voting member of the subcommittee present. The failure of the industry to even second the motion and allow discussion of the proposal is an indicator of the industry's committed unwillingness to address the entrapment risk through a voluntary standard.

Portable bed rails are used by parents as safety devices to keep their children from falling out of bed and injuring themselves. It is unconscionable that, despite their knowledge about the risk of fatal entrapment in their product and consumers' reliance on the product as a safety device, manufacturers have not developed a safety standard to eliminate this risk.

CFA strongly urges the Commission to proceed with this rulemaking and develop a mandatory rule declaring certain portable bed rails to be banned hazardous substances unless the products meet certain physical or performance characteristics (such as those proposed earlier this year by CPSC staff).

Thank you very much for your attention to these comments.

Sincerely,



Mary Ellen R. Fise
General Counsel

Bed rail comment

002

CH01-2

evenflo

Evenflo Company, Inc.
707 Crossroads Court
Vandalia, Ohio 45377
(937) 415-3300

Russ BUTSON
Director of Product Safety
(937) 415-3168
russ.butson@evenflo.com

December 1, 2000

Office of the Secretary
Consumer Product Safety Commission
Room 502
4330 East-West Highway
Bethesda, Maryland 20814

Transmitted via fax to: (301) 504-0127

RE: ANPR for Portable Bed Rails

Dear Sir or Madam:

Having reviewed CPSC's ANPR for Portable Bed Rails (PBR's), Evenflo appreciates this opportunity to provide comments regarding the ANPR.

Evenflo wishes to express its opposition to promulgation of mandatory performance standards for portable bed rails. Reasons for our opposition revolve around both the lack of necessity for separate mandatory standards in addition to voluntary standards now being developed by the American Society for Testing and Materials ("ASTM") as well as CPSC characterization of the safety risks associated with PBR's.

1. First and foremost, the issue of children being injured and killed in incidents where a PBR was present is an issue of children sleeping in inappropriate bedding. Data contained in the CPSC's working group presentation "Options to Address Portable Bed Rail-Hazards" to the chair and commissioners indicate a fatality rate from falls for infants and early toddlers sleeping in adult beds as approximately 22 times the fatality rate when a PBR is present and claimed to be related to the fatality. We believe more children will be saved from death and injury if the CPSC, bed rail industry, and other sleep-products manufacturers put their collective efforts into educating caregivers about the hazards of exposing young children to inappropriate sleep practices.
2. The "Options to Address Portable Bed Rail Hazards" presentation includes reference to 8 deaths resulting from falls from windows in the subject 10 year period. These are presumably instances wherein a child rolls off a bed and out a window. No one would reasonably claim the window had a defect which allows these incidents to occur. Rather, the root cause of these incidents must be caregiver inattentiveness or neglect. Yet the number of fatalities involving the presence of a bedrail is not significantly more than those involving windows. Therefore, bedrails do not constitute "an unreasonable risk of injury or death" any more than do windows.

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3. CPSC has characterized in its press release of September 21, 2000 the 40 non-fatal incidents, 31 of which resulted in no injuries to the child, as "near miss" incidents. This characterization was first made during CPSC's working group presentation in the context of "fatalities and near misses". This implies that any incident associated with PBR's that was not a fatality was nearly a fatality. This characterization is misleading, and only serves to inhibit rational discussion, as well as to severely overestimate the risks associated with PBR use which have help to drive the ANPR.
4. The incident data contained in both the ANPR and "Options to Address Portable Bed Rail Hazards" presentation is cursory and does not report adequately the investigation of these incidents. The presentation and subsequent ANPR then associates the presence of a bedrail during the incident as the primary cause of fatalities and injuries. However, without additional detail, in many cases it is impossible to determine if the bedrail was a primary cause, contributing cause, or only peripherally associated with the incidents. As such, it is inappropriate to propose mandatory rulemaking without a sufficient factual basis.
5. The working group presentation and the ANPR appear to fault the ASTM group for the time it has taken in its attempts to promulgate a standard. While this may have taken longer than anticipated, it is more likely than not that this group is struggling with what is appropriate to address in the standard, rather than avoiding a standard as implied during the working group presentation
6. Most of the incidents cited in the working group's presentation indicate children becoming entrapped between the PBR and the mattress resulting in asphyxia. The presentation then goes on to recommend a 50 pound minimum pushout force based on a 95th percentile five year old. However, this does not take into account other, more likely causes of a gap between the PBR and the mattress, such as incorrect installation. Although on the surface CPSC's approach appears to solve a problem, we are extremely concerned that it may take several years to discover that new rulemaking has solved a problem which didn't exist, and didn't solve one that did.
7. Of the 14 fatal incidents, 7 of these resulted strictly from entrapment of the child between the PBR and the bed. Ages of the users are 3, 4, 5, 5, 6, 7, and 15 months. Children of these ages lack sufficient strength to move a PBR out of position, which is what CPSC claims is the primary failure mode. These are more likely instances of incorrect installation. Furthermore, 6 of the 7 were grossly underage for sleeping outside of a crib.
8. Of the remaining 7 incidents, 2 involved portions of the beds the occupants were placed in, namely a bed post to a headboard. This underlines the dangers of putting children in adult-sized beds, not specifically a deficiency in PBR performance. Again, these 2 were under appropriate age for sleeping outside a crib (both 7 months old).

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9. Of the remaining 5 incidents, 1 involved a 19 month old hung by his neck from the top bed of a bunk bed with the back of his head on the PBR. Had the PBR not been present, the child would at least have fallen between the bed and the wall either to the bed below or to the floor and possibly still have been hung between the wall and the bed frame. Not only was this child too young to be outside of a crib, placing this young of a child in the top of a bunk bed may be considered gross neglect.
10. Of the remaining 4 incidents, 1 suffocation was likely exacerbated by and possibly caused by the presence of a plastic sheet covering much of the child's face.
11. Of the remaining 3 incidents, 1 was a strangulation resulting from catching a portion of the child's collar on a protrusion. This is an item which is simple to address in ASTM's performance standard.
12. The remaining two incidents both involve appropriately aged children, though both mentally impaired in some way, which may have had their injuries mitigated by some performance standard. However, without additional information about the incidents, it is difficult to determine how the PBR contributed to the fatalities.
13. Fourteen fatalities over a 10 year period assuming a production rate of 733,000 units per year yields a fatality rate of 0.0000019 fatalities per unit per year. Adding in injuries yields a rate of 0.0000031 fatalities/injuries per unit per year. This is an exceedingly low incident rate, particularly considering the majority of these could have easily been prevented through proper use. It also belies the sentiment expressed during the working group presentation that "this is a safety product that is killing people".

Evenflo applauds CPSC's continuing efforts to reduce the risk of injury to consumers, especially children. Evenflo shares this commitment, and as such, is compelled to voice its belief that this goal can be better served outside of the context of mandatory rulemaking.

Thank you for your time and consideration.

Sincerely,



Russ Butson

evenflo

707 Crossroads Court
Northwoods Business Center II
Vandalia, Ohio 45377

Phone: (937) 415-3308
Fax: (937) 415-3113

Number of pages including cover sheet:

4

DATE: December 1, 2000

FAX TO: Office of the Secretary
Consumer Product Safety Commission
(301) 504-0127

FROM: Russ Butson
Director of Product Safety
Extension: 3168

SUBJECT: ANPR for Portable Bed Rails

Please see the attached letter.

*Bed Rail
comment
CH 01-3*

December 4, 2000

Office of the Secretary
Consumer Product Safety Commission
Washington, DC 20207-0001

Re: ANPR for Portable Bed Rails

To Whom It May Concern:

I am writing to you regarding the proposed rulemaking for the banning of portable bed rails that present a risk of injury. I believe that the Labeling Rule should be put into effect. The Commission should issue a rule banning PBRs that do not contain specific warning and instructions.

After reading about the fourteen instances in which a PBR was associated with a loss of life, it is obvious that something needs to be done. PBRs should not be banned altogether, but the labeling and instructions need to be improved upon. Without PBRs, children will fall out of beds, and will still result in serious injury.

PBRs definitely need to be improved upon, and hopefully there will be a rule issued to improve this situation and stop these tragic losses.

Sincerely,

Eduardo Montorro
Robert Garnett
Harold Gomez
Amy Rodriguez

Stevenson, Todd A.

From: Eddie Montorro [Montorro@Bellsouth.net]

Sent: Monday, December 04, 2000 11:20 PM

To: cpsc-os@cpsc.gov

Cc: Garnett@bfgbc.org; Gomez_Harold@Hotmail.com

Subject: ANPR for Portable Bed Rails

Attached, please find my comment on the proposed rule for portable bed rails.

Bed rails
CH 01-4

TO: OS@CPSC.GOV

**In The Matter of the Advance Notice of Proposed Rulemaking (ANPR)
For Portable Bed Rails**

**COMMENTS BY THE JUVENILE PRODUCTS MANUFACTURERS ASSOCIATION
("JPMA") IN THE MATTER OF THE ANPR PORTABLE BED RAILS**

The Juvenile Products Manufacturers Association ("JPMA" or "the Association") is a not-for-profit trade association comprised of more than 400 manufacturers, importers and distributors of juvenile products, which are used in the care of infants. The Association is dedicated to the promotion of the safe responsible use of such products for infants. JPMA promotes public information and safety campaigns, such as Baby Safety Month, adherence to voluntary and mandatory safety standards, and distributes millions of safety brochures and product inserts to the public, promoting sound infant care practices.

The Association is submitting these comments in response to the Advanced Notice of Proposed Rulemaking ("ANPR") stating the intention of the U.S. Consumer Product Safety Commission ("CPSC" or "Commission") to consider promulgating rules for a category of products generally recognized as portable bed rails. JPMA is concerned that the proposed rulemaking could result in adoption of a scheme of regulation that encourages "risk-taking behavior" by care givers by promoting use of products in a manner not reasonably intended. Use of these products is generally associated with aiding toddlers to transition from a crib to an adult bed. They are not and have never been intended to be a substitute for a crib for infants. Additionally, the Association is gravely concerned that, in a rush to create standards that address hazards associated with the unreasonable misuse of the product with infants on adult beds, such standards not create a serious risk of injury to the toddlers for whom such products are intended. JPMA believes that various proposals submitted by the CPSC staff could result in performance requirements that pose a significantly increased risk of serious injury or death to toddlers with whom such products are intended for use. To date, intended users of these products have not been subject to a risk of serious injury or death. The data collected by the CPSC Staff indicate that children in the 2-5 year age range are not subject to any serious risk of injury in connection

with product currently marketed. We note that the development of a bed rail designed to eliminate or reduce the entrapment hazard for infants for whom the product is not intended, could create an entrapment hazard for older children for whom the product is intended. While there have been a handful of deaths associated with infants placed in adult beds in the past decade, during the same time period entrapments between the mattress and walls on adult beds resulted in approximately 271 deaths of children age 5 and under. All advocates for children's safety generally agree that the public needs to be better educated about the risk of death from suffocation or entrapment when infants are inappropriately placed to sleep on adult beds. The American public finds these products useful and relatively safe in aiding the transition from cribs to adult beds. The Government has a responsibility to the public to develop standards in a way that does not increase the risk of injury to children.

I. The Product Category

A portable bed rail is an after-market device intended to be installed on adult or youth beds to assist a child transitioning from sleeping in a crib to sleeping in such beds. The products are generally recognized as intended for use by children who can get in and out of bed unassisted. Manufacturers generally recommend use of these products only for children who have outgrown their cribs. A typical portable bed rail contains a partial barrier designed to attach to the adult bed. These products usually clamp onto the side of the bed or contain perpendicular horizontal arms that are inserted between the mattress support or box springs and the mattress. There is a significant variety of designs and methods of attaching the products to the adult beds. The public generally recognizes this products as a transitional aid for children old enough to move from a crib to an adult bed. The bed rail's purpose is to prevent the toddler from accidentally rolling out of bed while sleeping. It generally provides a positive tactile reinforcement to the sleeping child. When confronted, most children usually roll away from the barrier back towards the center of the bed. A bed rail is not a substitute for a crib. They are not designed nor intended for use with infants. Most parents follow the manufacturer's instructions for age and weight recommendations and do not use the product with infants, who should not be placed to sleep in an adult bed.

II. Background

The CPSC commissioners voted on September 21, 2000 to issue an Advance Notice of Proposed Rulemaking on portable bed rails, following dissension in a voluntary standards group on how to address an alleged hazard with infants for whom the products were not intended to be used.

In or about early 1998, the CPSC staff requested the American Society for Testing and Materials ("ASTM") to consider convening a work group to develop a safety standard for portable bed rails. The ASTM F-15 Executive Committee agreed to convene such a work group.

In or about the middle of 1999, the CPSC staff submitted ideas for a proposed standard to the ASTM work group. Participants of the work group reviewed and tested various proposals. By September 1999, the ASTM Portable Bed Rail Subcommittee voted to form two Task Groups - one group would develop labeling and instructional requirements and submit these requirements to ballot as soon as possible; the second Task Group focused on performance requirements.

In February 2000, the Subcommittee attendees voted to withdraw a ballot containing CPSC staff proposed performance requirements. The reasons given for withdrawing the standard were that it would receive several negative votes and that certain issues should be resolved before performance requirements are balloted.

In April 2000, the Subcommittee met again, with CPSC staff in attendance. The proposed standard, its rationale and proposed design changes were discussed. Several manufacturer members of the Subcommittee believed that the proposed CPSC requirements were too severe and lacked adequate rationale. Some manufacturers contended that incidents involving infants represent a misuse of the product and that standard requirements should not be based on these cases. Further, some Subcommittee members contended that the resulting performance criteria were unreasonably severe when the anthropometric data of infants and the strength data for five-year-olds are combined. The CPSC staff agreed that portable bed rails should not be used in place of a crib when placing infants down to sleep.

One of the primary concerns expressed by manufacturer members of the Subcommittee was that the adoption of the CPSC staff proposed standard could result in bed rail designs that

present an equal or greater risk of entrapment than current bed rails on the market. The basis for their concern was that new bed rails designed to meet the CPSC staff draft requirements would be more complex than current designs. The increased complexity could increase the possibility that consumers would install them incorrectly or perhaps make modifications to the bed rails. Either action could defeat the safety features on the bed rail, and possibly even increase the possibility of entrapment.¹ Given the known data on entrapments against walls and fitted barriers, there was also concern that such a standard not create greater risks for the intended user.

¹ These concerns were noted in the *"Options to Address Portable Bed Rail Hazards"*, Briefing Memorandum of Patricia L. Hackett, CPSC Director for Engineering Sciences, dated June 2000; additionally, these concerns were referenced in *"Statement of Honorable Mary Sheila Gall in Support of Issuance of an ANPR on Portable Bed Rails"* dated September 21, 2000.

It must be stressed that the ASTM Work Group has always indicated its willingness to develop standards to reduce the risk associated with misuse of the product with infants, while at the same time acknowledging that such products should not be used with infants. It appears that a genuine difference of view developed with some CPSC staff participants. The ASTM Work Group was concerned about efforts to impose unrealistic requirements that would have the effect of creating a new generation of bed rails with "wall-like" characteristics. Additionally, participants were concerned about efforts to promote singular designs which might prove to be design restrictive in the marketplace. With the abundance of data that clearly indicates serious injuries and deaths occurring because of entrapment between adult beds and walls, a legitimate concern existed that complicated fixed, immovable partial barriers on the other side of the bed could create a pattern of serious risk and injury to intended users of the product. Historically, children in the 2-5 age range have not experienced serious injuries on the non-wall side of the bed where such barriers are traditionally used. As recently as October 2000, the ASTM Work Group continued to indicate its willingness to develop a standard to reduce risk to the unintended infant user. Upon information and belief, a concerted effort is underway to develop a performance standard based upon suggested reasonable physiological characteristics of infants at risk.²

Additionally, it should be noted that the work of the ASTM Subcommittee has thus far resulted in a standard that addresses labeling, as well as performance criteria related to openings and protrusions. It was inaccurate of the CPSC staff to characterize the standard as only dealing with minor insignificant labeling issues. Indeed, two of the incidents cited in the ANPR involved protrusions or openings which the standard seeks to address and which are not reflective of current designs on the marketplace.³

² Statement based upon attendance and observation of October ASTM Portable Bed Rail Subcommittee.

³ IDI 920310HCC1596 involved an incident on 8/2/91 involving a 3-month-old entrapped between the opening created by the bottom of the bed rail on one side and the mattress on the other, and IDI920302HCC0122 dated 11/10/91 involved a child hanging by a shirt collar, which caught on a metal tab protruding from the exterior of a bed rail. It is worth noting that these incidents were not the subject of standards proposed by the CPSC staff.

III. There Is No Risk of Serious Injury in Evidence for Intended Users of the Product

An analysis of the data cited in the ANPR indicates that the children involved in the fatal incidents were primarily children significantly under two years of age. Only 3 of the deaths cited involved older children and appear to involve individuals who were disabled in some capacity and incidents where the products themselves may not have caused the death. Since 1990, when aberrant incidents are excluded, there are no incidents or evidence of serious injury or death involving children over 2 years of age associated with use of this product.⁴ Furthermore, a review of the incident data cited in the ANPR leads us to believe that the incidents of bed rail fatalities from 1988 to November 2000 are extremely limited and rare. An analysis of the data indicates that the incidents cited as a justification for the rule are misleading.⁵ There appears to be only a handful of fatalities in more than a decade involving misuse of the product and placement of infants under 7 months of age in adult beds. Many of the incidents cited would also not have been prevented by the standard previously proposed by the CPSC staff.

This data must be contrasted to the high number of incidents of death involving children 1 month to 5 years of age during the same period involving incidents on the wall side of the bed.

⁴ Refer to IDIs listed in Portable Bed Rails ANPR, FR Vol. 65, No. 192, October 3, 2000, cited at p. 58969

⁵ IDI 91112HCC1470 involved a 15 month old hanging from a bunk bed, a situation in which bed rails were not intended to be applied; IDI920302HCC0122 involved a 15 month old hanging by a shirt on an exterior protrusion; IDI950815HCC4107 involved a 7 month old who became entrapped between the end of the bed rail and the end structure of a bed (even with an immovable fixed bed rail, this incident could have occurred); IDI960215HCC5012 involved a 2 ½ year old developmentally impaired child who suffocated on a plastic rubber sheet; IDI970127CCN0290 involved a 19 month old who became entrapped on the upper bunk of a bunk bed on the wall side of the bunk bed. IDI980327HCC3723 involved a mentally impaired 4 year old; IDI990317HCC0349 involved a 7 month old boy whose neck became wedged not between the bed rail and mattress, but between the headboard and a fixed bed rail installed on the side of the bed. None of the foregoing incidents would have been addressed or prevented by the CPSC staff's proposed standard. In many instances, it is unclear whether the bed rail was truly portable and in some of the instances the bed rail may have been fixed or modified as a fixed barrier.

The CPSC's own data indicate that there were 271 deaths between January 1, 1990 and May 17, 2000 involving an incident on the wall side of the bed. The deaths on the wall side included entrapments between the wall and the bed/mattress, incidents with no entrapment indicated, and incidents involving falls from the bed out of windows. A majority of incidents (232) involved children under one year of age. With the exception of falls out of windows, almost all of the wall-side deaths involved asphyxia in adult beds of varying sizes.⁶ Additionally, there were 47 deaths of children 1 month to 2 years old during the same period involving a fall from beds (exclusive of bunk beds) with most of them (38) involving children under 1 year old. Most of the children died when they fell into or onto an object (a bucket or bag of clothes, for example). Approximately 70% of the children died from asphyxia/suffocation/drowning.⁷

⁶ Memorandum re "Portable Youth Bed Rail Entrapments and Hangings" from Joyce McDonald to Patricia Hackett dated June 7, 2000.

⁷ Ibid, Appendix C.

Recent data collected by the U.S. Food & Drug Administration ("FDA") also indicates that, according to the FDA's medical device reporting system, 371 patients became trapped in hospital bed rails from 1985 to 1999. Most of the entrapments involved frail, elderly or confused patients or a category of patients categorized as "high risk" patients. According to the FDA, they routinely send out safety alerts to help prevent entrapment injuries, but still receive more than 2 dozen reports of deaths and injuries annually.⁸

The foregoing data is illustrative of the scope of the problem that could be faced by the agency and the public if it were to require that portable bed rails be designed in such a way that would make it unlikely that an entrapped child would be able to extricate themselves. We believe that the advantage of the portable bed rails currently on the marketplace is that the products themselves do not create entrapment or entanglement risks that can result in serious injury or death to their intended users. Children over 2 years of age generally possess cognitive and physiological abilities that enable them to extricate themselves from problematic situations. The ability of the older child to dislodge the product and remove him/herself from a situation of danger should not be compromised by the agency's effort to develop rules for portable bed rails. The above data illustrates that there is a greater risk in creating fixed, immovable partial barriers. Additionally, we would note that even if portable bed rails were to be subject to a standard that made them "fixed", since these products are not integrated and designed as original equipment with adult beds, the movement of the bed from the wall or the mismatching of mattresses to underlying box springs could in and of itself create dangerous gaps. We are concerned that any standard developed to address the relatively rare risk to infants, who are not the intended users of the product, never create an increased risk of injury for the primary intended users of the product.

CONCLUSION

Existing data indicates that portable bed rails as exist on the marketplace today do not necessarily present an unreasonable risk of injury. It is questionable whether portable bed rails

⁸ Telephone inquiry with FDA

can reasonably be determined to even be a "hazardous substance", as that term is defined under the Federal Hazardous Substances Act ("FHSA"), 15 U.S.C. §1261 et seq. We do not believe that portable bed rails present a mechanical hazard pursuant to the requirements of 15 U.S.C. §1261(f)(1)(D) or a mechanical hazard sufficient to be banned pursuant to Section 2(q)(1)(A) of the FHSA.

The ANPR issued offers a variety of regulatory alternatives in an attempt to reduce a statistically minimal identified risk to infants for whom the products are not intended to be used. On average, it appears that the handful of incidents involving serious injury or death have occurred to children that are, on average, under 7 months of age. The ASTM Section F15.11 Portable Bed Rail Subcommittee has evidenced an intention to try to reduce this remote risk, while recognizing that the paramount message to consumers should be to keep infants in cribs and not place them in adult beds with portable bed rails. This is a message that all parties should consistently reinforce. At the same time, the Commission should proceed cautiously to ensure that it does not implement a performance standard that has the unintended effect of increasing the risk of serious injury or death to older children for whom the product is intended to be used.

Based on the foregoing, please note the following:

1. JPMA supports the development of an ASTM voluntary standard addressing labeling and certain performance criteria of portable bed rails.
2. JPMA is opposed to a mandatory rule declaring portable bed rails to be banned hazardous substances.
3. If the ASTM voluntary standard is not developed and implemented, the Association would support a rule banning portable bed rails that did not contain specified warnings and instructions.

Thank you for the opportunity to provide these preliminary comments on the ANPR.

Respectfully submitted,

JUVENILE PRODUCTS
MANUFACTURERS ASSOCIATION
236 Route 38 West, Suite 100

Moorestown, N.J. 08057
(856) 231-8500

Stevenson, Todd A.

From: Rick Locker [fblocker@lockerlaw.com]
Sent: Tuesday, December 05, 2000 5:25 PM
To: cpsc-os@cpsc.gov.
Subject: ANPR PORTABLE BED RAILS



JPMA Bed Rail
Comments.wpd

Enclosed please find Comments on the ANPR submitted by the Juvenile Products Manufacturers Association ("JPMA"). Thank you for allowing us to file these Comments. If you have any questions or require additional information please don't hesitate to contact the Association.

TAB J



UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

Memorandum

Date: September 26, 2001

TO : Patricia L. Hackett, Engineering Sciences
THROUGH: Warren J. Prunella, Associate Executive Director for Economic Analysis *wjp*
FROM : Terrance R. Karels, Economic Analysis *TRK*
SUBJECT : Portable Bed Rails --- Preliminary Regulatory Analysis

Attached is the Preliminary Regulatory Analysis for the mandatory safety rule for portable bed rails. The Analysis is required under the Federal Hazardous Substances Act.

Attachment



**Proposed Rule for Portable Bed Rails
Preliminary Regulatory Analysis**

Terrance R. Karels
Directorate for Economic Analysis
September, 2001

Introduction

The Consumer Product Safety Commission is considering a mandatory safety rule for portable bed rails. The proposed rule would incorporate a standard developed by CPSC staff that addresses the risk of head entrapment and strangulation deaths and injuries to children when using these products. There have been 14 portable bed rail entrapment deaths since 1990.

The proposed rule is published under the authority of the Federal Hazardous Substances Act (FHSA), which requires that the Commission publish a preliminary regulatory analysis of the proposed rule and reasonable alternatives. The report provides a summary of the requirements of the proposed rule, background product information, and, as required by the FHSA, a discussion of the likely benefits and costs of the proposed rule.

In addition to the requirements of the FHSA, the Commission is required under the Regulatory Flexibility Act of 1980 (RFA) to address and give particular attention to the economic effects of the proposed rule on small entities. The Commission also is required by the National Environmental Policy Act (NEPA) to consider the potential environmental impact of the proposed rule. The report addresses both the RFA and NEPA requirements.

Requirements of the Proposed Rule

Epidemiological data indicate that there were 14 child deaths involving portable bed rails since 1990. The proposed mandatory rule addresses these entrapment deaths, and strangulations resulting from clothing catching on any protrusions. The rule is a combination of product performance and labeling requirements intended to minimize incidents to children resulting from normal use and reasonably foreseeable misuse of portable bed rails.

The rule requires that portable bed rails be tested by inserting a wedge probe between the portable bed rail and the mattress and the application of 30 pounds of force for a duration of 5 seconds. In order to pass this test, the wedge probe cannot create an opening of the distance between the rail and mattress that would permit the complete passage of the wedge probe, or an opening that would allow the probe to penetrate to a depth of 4.5 inches. With mattress-top bed rails, the test also requires that the bed rail not be "displaced horizontally," such that the guard moves off of the top of the mattress. The performance requirements also forbid certain protrusions that extend from the surface of the portable bed rail.

The rule also requires a permanent label, providing information about the product and the manufacturer, and other warnings about the proper use of portable bed rails. The warning information would also be required in the product's instructional literature.

Product and Market Information

Portable bed rails are safety guard rails, that are intended to be installed on an adult bed to prevent children from falling out of the bed. They are intended for children who can get in and out of an adult bed unassisted, typically from 2 to 5 years of age. The most common type of portable bed rail is of tubular metal, with a mesh or hard plastic restraining rail. The rails use arms to be slipped under the mattress, with the weight of the mattress securing the rail to the bed.

Compliance staff reported that 11 firms produced portable bed rails over the period 1988 through 1998. *Industry sources report that there are now 3-5 manufacturers of these products; all of these firms are major suppliers of juvenile products to the US market. Another firm may be importing small quantities of portable bed rails into the US, but the extent of such imports is considered to be small.*

Staff earlier estimated annual sales of portable bed rails at 750,000 units per year. Industry sources indicate that this could be considered a conservative estimate. The

average retail price for these products has been estimated by industry at about \$18. These rails are expected to remain available for use by consumers for 2-4 years, based on Human Factors and industry information.

Potential Costs of Proposed Rule

The costs associated with the proposal include the cost of compliance for any firms producing portable bed rails. Information available to staff indicates that no firms are now producing bed rails that would comply with the proposed standard. In order to provide some preliminary information, we contacted industry sources to obtain estimates of these costs.

The primary cost of complying with the proposed standard is considered to be in research and development of portable bed rails that meet the requirements of the rule. Since the firms have not yet analyzed the components of the proposed standard, all firms would bear some research and development costs. These "up-front costs" would be one-time costs and, from an accounting perspective, would be amortized over the entire future production of the complying bed rails, which may span several years. Thus, on a per-unit basis, these costs may approach zero if production of these designs continues over time.

There also will be increased costs of additional materials associated with bringing existing designs into compliance, or in future designs of complying portable bed rails. One firm, which has not yet developed a complying prototype, preliminarily estimates that the average retail price of portable bed rails would increase by about \$7 per unit, based on available information. This represents an increase of about 40% over that of current rails. Another manufacturer, who is developing a prototype, agreed that materials cost increases should increase retail prices by about 40%. These cost increases are the result of additional or different materials necessary to withstand the forces resulting from the proposal's wedge probe test.

One source, describing the proposal as a new paradigm in bed rails, suggested that his firm may discontinue production of the product. This could lead to some market dislocations; these difficulties would be short-term because, if a market for these products continues to exist, other firms will enter or expand production.

Potential Benefits of Proposed Rule

The proposed rule is intended to address the risk of entrapment deaths of children from portable bed rails. The potential benefits would be a decrease in these entrapment deaths. Avoidance of other incidents (such as near-entrapments) do not contribute significantly to the monetized benefits since, according to Epidemiology staff, they produce no or only minor injuries. All of the entrapment deaths involved children under the age of 5.

The societal costs of bed rail entrapment deaths represent the maximum potential benefits of preventing them. Staff reported that, over the period January 1, 1990 through August 22, 2001, there were 14 child fatalities associated with deaths in portable bed rails, or about 1.2 per year. ES estimates that that the standard would have been effective at eliminating 50% to 85% of the deaths it addresses, or about 7 to 12 of the 14 deaths during the 1990 through August 2001 time period. On an annual basis, this amounts to a reduction of about 0.60 deaths (7 deaths/11.67 years) to about 1.03 deaths (12 deaths/11.67 years) each year.

Industry sources indicate that some 750,000 portable bed rails are sold annually, and that sales have been stable over time. According to Human Factors staff, the period of first use of these products is 2 years, and that some units would find use with subsequent children. Human Factors staff report that 4 years would be the upper bound of the expected useful life of portable bed rails.

If we assume that the expected useful life of portable bed rails is 2 years, there would be about 1.5 million of these products in use at any given time; the risk of death would have ranged from 0.40 per million (0.60 deaths per year/1.5 million in use) to 0.69 per million (1.03 deaths per year/1.5 million in use). If we assume a statistical value of life of \$5 million (which is consistent with current economic literature), the expected cost of these deaths would range from about \$2.00 per bed per year ($0.40/\text{million} \times \5 million) to about \$3.45 per bed rail per year ($.69/\text{million} \times \5 million). Assuming a 2 year useful life, the expected benefits of the standard would range from about \$4.00 to about \$6.90 over its expected useful life.

An assumption of a 4-year product life, as opposed to 2 years, does not affect the benefits estimate. If a four year useful life is used, there would be about 3 million units in use per year, and the risk of death would range from 0.20 per million (0.60 deaths per year/3 million in use) to about 0.343 per million (1.03 deaths per year/3 million in use). The expected cost of deaths would then range from \$1 per year ($0.2/\text{million} \times \5 million) to \$1.72 per year ($0.343/\text{million} \times \5 million). Over the 4 year expected life of the product, the expected costs of these deaths range from \$4 to \$6.90.

Comparison of Costs and Benefits

The costs associated with the proposed rule are expected to take two forms: research and development costs, and costs of additional material needed to construct complying beds. By their nature, R&D costs per unit are spread out over the number of units made during the entire production period, and over a period of several years may approach zero. Manufacturers estimate that additional materials needed to comply with the rule would be about \$7 per unit.

The expected benefits of the proposed rule would be the reduction in the societal costs associated with entrapment deaths from portable bed rails. These benefits depend upon the effectiveness of the proposal in reducing these deaths. Engineering staff

estimates that the proposed rule would be 50% to 85% effective in reducing these deaths. Based on this level of effectiveness, the rule would result in benefits of \$4 to \$6.90 per complying unit, over its expected useful life. Thus, the estimated costs of the standard are generally comparable to the upper end of the benefits estimate.

Alternatives

In February 1999, CPSC staff requested that the ASTM develop a standard for portable bed rails to address the hazards of deaths associated with these products. In May 2000, staff presented a draft proposed bed rail standard to ASTM for its consideration. The relevant ASTM subcommittee has expressed willingness to continue work on the draft standard, but was not able to reach agreement on the balloting of the draft. The Subcommittee is scheduled to meet in October 2001. The Commission may choose to defer action on a mandatory standard for portable bed rails in favor of the industry's voluntary standard work.

Effects on Small Entities

The Commission is required by the Regulatory Flexibility Act of 1980 (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996, to address and give particular attention to the economic effects of the proposed rule on small businesses.

The Commission staff has identified 11 firms that have produced portable bed rails over the past 10 years. According to industry sources, 3-5 firms remain actively marketing these products. The Small Business Administration guidelines classify the manufacture of juvenile products under "Manufacturing Industries, not elsewhere classified." Under that category, firms would be considered to be small if they have less than 500 employees, are independently owned, and are not dominant in the field. Under

this definition, none of the 3-5 firms currently producing these products would qualify as a small business.

Preliminary Environmental Assessment

The proposed rule would not cause manufacturers to dispose of existing materials of construction or existing packaging. Inventories of finished products would not be rendered unsalable, since the proposed rule would apply to products manufactured after the effective date.

The proposed rule is not expected to have a significant effect on the materials used in the production and packaging of portable bed rails, or in the number of units discarded after the rule incorporating the standard were issued in final form. Therefore, no significant environmental effects are expected to result from the proposed rule on portable bed rails.