Manufactured Housing Consensus Committee

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TO: **MHCC**

FROM: **Robert E. Solomon**

DATE: **October 12, 2010**

SUBJECT: **Letter Ballot – Part 3280**

A ballot is enclosed for your review and completion. The ballot is based on the revisions proposed to 24 CFR Part 3280, MANUFACTURED HOME CONSTRUCTION AND SAFETY STANDARDS. These are the actions discussed at the April, 2010 MHCC in person meeting.

Your letter ballot on the proposed changes is being done in accordance with the MHCC by-laws. As such, per Section A.8.6, you are being asked to vote:

- Affirmative
- *Affirmative with comment
- *Negative
- *Abstain

*A reason must accompany your vote.

Please complete and return your ballot as soon as possible but no later than **October 26, 2010.** As noted on the ballot form, please return the ballot to **Kelly Carey** either via e-mail to **mhccaooffice@nfpa.org** or via fax to 617-984-7110. You may also mail your ballot to the attention of Kelly Carey at NFPA, 1 Batterymarch Park, Quincy, MA 02169.

PROPOSAL BALLOT DUE BY: OCTOBER 26, 2010

3280HUD HUD-MHCC

Manufactured Housing Construction Safety Standards - Staff Liaison: Robert E. Solomon

Return Completed Ballot To: Kelly Carey
E-Mail to: mhccaooffice@nfpa.org
Fax to: 617-984-7110
Mail: One Batterymarch Park, Quincy, MA 02169

Committee Action Key:
A = Accept
R= Reject
APA = Accept in Part
APR = Accept in Principle
APP = Accept in Principle in Part
H = Hold

With respect to the Committee Actions on the Proposals which accompanied the ballot, please record me as voting: (check one):

☐ **Affirmative On All Items. I agree with all committee meeting actions without comment. Please return this Ballot Page only to NFPA.**

☐ **Affirmative With Exception(s): I agree with all committee meeting actions Except for the Affirmative with comment, Negative and /or Abstention checked below. *Reasons must accompany these votes.**

When possible, reasons are requested via e-mail in a Word Document.

Date:_____ Signed:_____

Name: _____ **(Type or Print black ink)**

Proposal No.	Log No.	Section	Committee Action	Affirm with Comment*	Negative*	Abstain*
3280HUD-	66	3285.403	Reject	☐	☐	☐
3280HUD-	69	710(d)	Accept in Principle	☐	☐	☐
3280HUD-	70	3280.703 3280.707(a)(2)	Accept in Part	☐	☐	☐
3280HUD-	72	3280.806	Reject	☐	☐	☐
3280HUD-	75	3280.8715(a)(4)	Accept	☐	☐	☐
3280HUD-	CP3	3280.806	Reject	☐	☐	☐

3280HUD- Log #66 Final Action: Reject
(3285.403)

Submitter: James P. Lozier, Hurricane Harness Corp.
Recommendation: Add text as follows:
INTERLOCKING METAL PAN MOBILE HOME ROOF PROTECTION
HURRICANE HARNESS (over-the-roof) Tie-DOWN SYSTEM
This Proposal is Predicated on the Belief;
Whereas; we have found that the bulk of instances, when interlocking aluminum metal pan roof systems are exposed to extreme high winds, such as a hurricane or the outer band winds of a tornado. un-repairable damage occurs to the overall building structure once the fasteners attaching the metal roof panels to the structural frame begin to tear or rip through the aluminum metal pan base, under the pressure differentials (lift) created by airfoil (vacuum) as a consequence of the high velocity winds passing over the surface plane of the roof. This event becomes compounded by the high velocity of wind entering the carport or other building add-on causing a mode of (wind capture), a formative release of energy forces the underside of the roof panels to lift resulting in complete devastation to the roof system, in addition to the roof line/siding section, where developments may become less than a desirable situation to the overall building structure and to the homeowner.
To mitigate; this negative force of pressure differential, pre-installed aluminum tubular channels are permanently fastened perpendicular across the top of the interlocking ribs of the metal roof system without disturbing the flow of rain water at the eave, mid span, and ridge locations of the building. Variable lengths of an extreme strong, low elongation strap are cut to length, placed over the channels and fastened into ratchets which attach to a variety of anchoring methods on opposite sides of the building. This engineered design provides an uninterrupted continuous load path from one anchor to the other. The ratchets apply a uniform counteractive load throughout the channel systems and throughout the entire roof assembly. The structure literally becomes sandwiched within the strapping and the anchors with addition to providing a positive dead load to the outer wall systems and column supports, increasing the resistance to the lateral wind force being applied to the main structure during a storm event.
Property loss; as a result of Hurricane Andrew on August 24, 1992, and most recently, Hurricane Charlie on August 13, 2004, demonstrated the vulnerability to manufactured homes in high wind zones. Thus, to prevent future storms ending in similar fashion, the (FMHCSS), should consider this secondary measure of protection which once applied, will visually alleviate any unforeseen building deficiencies within the structural confines of the building.
The Hurricane Harness (over-the-roof) Tie-Down System; provides protection to mobile homes. In collaboration with the late Honorable Dr. Herbert Saffir, co-writer to the Saffir-Simpson scale; found that in the bulk of instances, when a category 2 hurricane strikes land, winds (96-110), the safety and security of a mobile home becomes greatly jeopardized. His analysis of this safety devise, led us to the development of our strong, low elongation strap design. Through compliance with the (NFPA), we will greatly reduce he risk of property loss caused by hurricanes and reduce the overwhelming financial burdens placed upon our State and Federal governments post storm recovery efforts following the aftermath, from future hurricane disasters.

Substantiation: Hurricane Resistant Mobile Home with Add-On, Over-the Roof Structure Tie-Down System.
Note: Supporting material is available for review at NFPA Headquarters.
Committee Meeting Action: Reject
Committee Statement: The proposal did not include any specific language for use of the tie down system. The MHCC did not know how to develop language that would be appropriate for inclusion in CFR Title 24, Part 3285. Development of performance language for 3285.403 that broadly addresses a tie down system to supplement the current anchoring criteria might be a subject to be considered by the MHCC in the future.
In addition to the concerns noted above and perhaps most important, the system that is described appears to be of a proprietary nature. If the submitted system was accepted, this could result in having a requirement in the standard that might only be capable of being designed and installed by a sole source. This is generally a circumstance that standards of any sort should avoid at all cost.

3280HUD- Log #69 Final Action: Accept in Principle
(710(d))

Submitter: Kevin G. Jewell, Austin, TX

Recommendation: Revise text to read as follows:

3280.710(d) Venting system terminations shall be not less than ~~three~~ ten feet from any motor-driven air intake discharging into habitable areas.

Substantiation: Per public testimony, three foot separation is a potential air quality safety hazard.

This change is intended to reduce that safety hazard.

Public Testimony implies benefit of health and marketing outweighs compliance costs.

Committee Meeting Action: Accept in Principle

Revise the requirement as follows:

3280.710(d) Venting Systems. When located within 10 feet of any motor driven air intake discharging into habitable areas, must terminate at least 3 feet above the intake.

Committee Statement: This change accomplishes what the submitter intended but clarifies that it only applies when an air intake discharges into a habitable space. The revised language also clarifies a possible misinterpretation that would have required a 10 foot tall stack.

3280HUD- Log #70 **Final Action: Accept in Part**
(3280.703, 3280.707(a)(2))

Submitter: Donald Emen, Rinnai America Corp.

Recommendation: Revise text to read as follows:

3280.703 Minimum standards. Under *APPLIANCES*. In this section, I would like to add ANSI Z21.86 standard. The justification for this addition is to include this standard for vented space heating appliances or direct heating equipment.

Vented Gas-Fired Space Heating Appliances - ANSI Z21.86-2008, with Addendum Z21 86a-2005 and Z21.86b-2007.

Under *APPLIANCES*. In this section, I would like to add ASHRAE Standard 103. The justification for this addition is to include the standard used in testing for the Annual Fuel Utilization Efficiency (AFUE) for vented space heating appliances or direct heating equipment:

Method of Testing for Annual Fuel Utilization Efficiency of Residential Central Furnaces and Boilers - ANSI/ASHRAE standard 103-2007 (Supersedes ANSI/ASHRAE Standard 103 - 1993)

3280.707 (a)(2) Heat producing appliances.

Revise this section to add the AFUE as required for Direct Heating Equipment as per the DOE standard 10 CFR 430 Part 32(i).

Gas and oil Burning comfort heating appliances shall have a flue loss of not more than 25 percent, ~~and~~ a thermal efficiency and annual fuel utilization efficiency of not less than that specified in nationally recognized standards (See 3280.703)

Substantiation: The purpose of this proposal is to add the ANSI Z21.86 for gas-fired space heating appliance to the MHCC. This standard covers a wide variety of products -- including direct-vent wall furnaces.

Note: Supporting material is available for review at NFPA Headquarters.

Committee Meeting Action: Accept in Part

Accept change to 3280.703.

Reject change to 3280.707(a)(2).

Committee Statement: The committee did not believe that it has sufficient documentation relating to the "...annual fuel utilization of efficiency..." criteria mentioned in the second part of the change. The proponent has been asked to provide additional information at a future meeting of the MHCC.

3280HUD- Log #72 **Final Action: Reject**
(3280.806)

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Recommendation: Add text to read as follows:
(a) All receptacle outlets shall be:
(1) Of grounding type;
(2) Installed according to Article 406.3 of the National Electrical code, NFPA No. 70-2005.
(3) Except when supplying specific appliances, be parallel-blade, listed tamper-resistant, 15-ampere, 125-volt, either single or duplex.
Substantiation: The 2008 National Electrical Code has adopted requirements for tamper-resistant receptacles as follows:
"406.11 Tamper-Resistant Receptacles in Dwelling Units. In all area specified in 210.52, all 125-volt, 15- and 20-ampere receptacles shall be listed tamper-resistant receptacles." 210.52 specifies required receptacles for dwelling units, where a dwelling unit is defined as "A single unit, providing complete and independent living facilities for one or more persons, including permanent provisions for living, sleeping, cooking and sanitation."
What follows is essentially the substantiation provided by NEMA for the 2008 National Electrical Code development cycle.
Pediatric Burns:
During a 10-year period, from 1991 to 2001, over 24,000 children in the United States were injured when they inserted foreign objects into electrical receptacles. Every year an average of at least 2,400 children are injured when tampering with electrical receptacles.
I have included a summary of electrical burn and shock incidents occurring to children under the age of 10. This information is taken from the National Electrical Injury Surveillance System (NEISS) for the years 1991 to 2001 Electronic Injury surveillance System (NEISS) is a national probability sample of hospitals in the U.S. and its territories. Patient information is collected from each NEISS hospital for every emergency visit involving an injury associated with consumer products. From this sample, the total number of product-related injuries treated in hospital emergency rooms nationwide can be estimated.
NEISS collects data from a statistically valid sample of hospitals nationwide. NEISS calculates historic estimates based on these samples using statistical tools (weights, sampling error, trend data, adjustment for changes in sampling frame...). NEISS provides at least 2 numbers for each query conducted on their web site:
- The first number is the actual sample for monitored hospitals. These are actual cases that were communicated to NEISS.
- The second number is the historic estimate calculated by NEISS as explained above.

For example, the 2002 NEISS report shows a sample count of 129 electrical burn and shock incidents and a historical estimate of 3277.
For the purpose of this analysis, we calculated a ratio, based on 10 years of data, between sample and historic estimate (we queried receptacle-related incidents concerning children ages 1 month to 10 years old). We then applied this ratio to our analysis. The intent is not to provide exact values but to attribute weight to major topics (age, type of injury, objects used...). These estimates have been calculated to identify the major issues associated with children tampering with electrical receptacles.
Analysis of the NEISS information shows that at least 71 percent of all incidents occur at home, making dwelling units the prime location for receptacle-related pediatric electric burns. The vast majority of injured children are under age 6. Victims age 2 and under represent 39 percent of cases, while those ages 3 to 6 represent 50 percent of all cases.
The incidents occurred as the result of the child inserting an object into a receptacle. The following is a breakdown of the percent of incidents in which a child inserted a specific type of object into a receptacle:

INSERT TABLE 3280HUD_L72 HERE

Many of these objects are not perceived as dangerous by parents, perhaps explaining young children's easy access to them and frequent rate of insertion.
The results of these incidents are very rarely fatal, but will result in electric shocks and mild to sever burns. Most incidents are relatively superficial first or second-degree burns, where children are treated for reddened skin or blisters

Hairpin	32 percent
Key	17 percent
Wire	7 percent
plug and cord	11 percent
pin/needle/screw/nail	5 percent
paper clip/staple	5 percent
Tweezers/file/tool/knife	3 percent
jewelry/belt buckle	1 percent
body part (finger)	12 percent
open outlet	1 percent
Unknown	6 percent

and released from the Emergency Room with topical treatment. Yet 8.7 percent - that is over 200 children per year - need to be hospitalized. 2 percent of all burns are 3rd degree. These are burns so severe that they result in deeply charred skin and can require a skin graft if the burn is over 1 in. in size. Children are more susceptible to electric burns due to their tender skin and the frequent presence of liquid (saliva, juice, milk). These burns can leave permanent, visible scars.

It is important to note that the NEISS report also includes the following four fatalities:

1991 - 2 year old male, Shawnee, OK, child place key in electrical receptacle
1994 - 23 month old male, Traverse City, MI, child stuck keys in electrical receptacle
1995 - 3 year old female, Great Falls, MT, contact with electric receptacle, cardio respiratory arrest
1998 - 2 year old female, Springfield, MO, stuck unknown object into 110V receptacle

In addition to the 1991-2001 reports, the 2002 National Electronic Injury Surveillance System (NEISS) report is included. The 2002 report states that there were 129 reported incidents, which indicates that there were an estimated total of 3, 277 incidents in 2002 alone. The 2002 data covers all electrical outlet and receptacle incidents occurring in dwellings. The 2002 data contains more detailed information than the NEISS reports for previous years and may be used to provide a better understanding of the reported incidents.

A study conducted by Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP) reported similar data. For example: almost 80 percent of the Canadian incidents occurred in the home (compared with 71 percent in the US). 40 percent were 3-6 years of age (compared with 50 percent in the US). A recent presentation of the CHIRPP data concludes that "legislated standards for the manufacture and use of child safe outlets along with education for parents and children" was called for. I have included CHIRPP raw data for electrical injuries to children ages 9 or less for 1996 - 2003.

Preventative Measures:

Parents, teachers, baby-sitters, grandparents and other caregivers are usually well aware of the dangers related to electricity and to receptacles in particular. Children are often taught to stay away form electric appliances and devices. Public health organizations such as hospitals, maternity wards and the CPSC provide adults with warnings and advice to "child-proof" their homes. There are several preventative measures available.

One option is to provide children with 24/7 permanent surveillance. No research is required to understand that this is an impossible request for the vast majority of parents or caregivers managing multiple children and tasks at any time.

Another commonly used solution is the "plastic receptacle cap". This small cap usually has 2 plastic blades that insert into the receptacle openings and block access to the live electrical contacts. Yet these caps can be poor protective systems. In 1997, the Biokinetics Lab at Temple University in Philadelphia studied 4 different receptacle caps. They tested these caps with 47 children ages 2 to 4 years old. One type of cap was removed by 100 percent of the 2 year-olds in less than 10 seconds. Other caps were removed in less than a minute by most other children.

Since that test, UL has provided this industry with strict product guidelines, but this does not deal with existing older caps, and some caps still remain un-listed. Also caps can only provide protection when they are inserted. When they have been removed to plug in an appliance there is no longer any protection. When a child pulls out a lamp cord there in no longer any protection. Receptacle caps provide protection only when they are in place. Unfortunately, this can only be ensured by constant vigilance to be certain that the cap has not been removed.

There are also receptacle cover plates available in the market that are intended to provide increased protection for children. However, there is no standardized test program to evaluate these plates for tamper resistance and they are typically not UL listed as they can unintentionally introduce a hazard by restricting the full insertion of a plug. These "child proof" plates must also be considered a temporary solution, as it is common practice for homeowners to swap out cover plates for more decorative models from the huge selection at the local hardware store.

Some may believe AFCIs and GFCIs are effective in preventing incidents such as those described above. First, AFCIs are not intended to protect against such incidents. They are intended to prevent arcing-initiated fires, not burns to the finger. While GFCIs can provide some level of protection, they are only required on a limited number of circuits and only protect against some of the circumstances associated with such incidents.

Listed tamper-resistant receptacles provide the most effective means of preventing children from inserting foreign objects into receptacles. Tamper-resistant receptacles have the advantage of being passive protective devices. Once the tamper-resistant receptacle is installed, a plug may be inserted and withdrawn for normal everyday operation, and the tamper resistant feature of the receptacle remains unaffected. The tamper-resistant receptacle continuously provides protection without any user intervention. Decorative cover plates can be installed without affecting the protection. Tamper-resistant receptacles have been used in hospitals for many years. Section 517.18(C) of the National Electrical Code (NEC) recognizes the hazard of children inserting foreign objects into a receptacle and requires tamper resistance in Pediatric Locations. UL has established rigorous testing and evaluation requirements in UL 498 for

tamper-resistant receptacles to ensure that an object inserted into one of the plug blade openings cannot come into contact with a live part in the receptacle. These requirements take into consideration the capabilities of small children, resulting in a receptacle. These requirements take into consideration the capabilities of small children, resulting in a receptacle that is effectively tamper-resistant to a child. Tamper-resistant receptacles are not necessarily tamper-proof for adults attempting to defeat the tamper-resistant feature. For over 20 years, these products have been used in the pediatric area of hospitals with no report of injuries.

In order to ensure the elderly and individuals with disabilities would not encounter excessive force to insert a plug into a tamper-resistant receptacle, NEMA wiring device manufacturers conducted tests to compare the insertion forces required to insert a plug into a standard receptacle and into a tamper-resistant receptacle. A NEMA 5-15P, 15 amp, 125 volt plug was used. The typical insertion forces observed could be characterized as approximately 1 -1.5 lbf is required to overcome the initial resistance of the tamper-resistant mechanism. This is followed by a drop in force as the plug blades have opened the tamper-resistant mechanism and are passing through. As insertion continues, at the point where the blades reach and become engaged with the receptacle contacts the force increases. This is where the maximum force is observed. The typical insertion force varied from 10 -20 lb, depending on the design of the receptacle. There was no appreciable difference in insertion force between tamper-resistant receptacles and receptacles without the tamper-resistant mechanism. The overriding forces required to engage the receptacle contacts are far greater than the force exerted by the tamper-resistant mechanism.

Consideration has been given to the fact that some homes do not have small children, or that a dwelling owner should be given the choice of whether or not to include tamper-resistant receptacles. While a home may not have small children at a particular point in time, houses are sold, and kids visit grandparents and neighbors. Controlling where children are and are not isn't possible, but providing a safer environment for them is...for about $50.00 per house.

Tamper-resistant receptacles are permanently installed...and forgotten, while providing the best child safety available.

Tamper-resistant receptacles may not have prevented all the incidents in the NEISS reports but they undoubtedly would have provided a significant reduction in the injuries to children. Since most of the incidents occurred in homes, adopting an NEC requirement for tamper-resistant receptacles in dwelling units where children are likely to come into contact with receptacles will substantially reduce the type of child injuries described in the NEISS reports.

Note: Supporting material is available for review at NFPA Headquarters.

Cost:

NEMA estimates that the cost difference to fit a new home with tamper-resistant receptacles in lieu of standard receptacles in about $50.00. This estimate includes required GFCI receptacles and outdoor receptacles.

Committee Meeting Action: Reject

Committee Statement: The MHCC notes that such provisions are currently governed in the 2009 edition of NFPA 70, National Electrical Code. the MHCC does not want to necessarily cherry pick provisions from the referenced Codes and Standards if they already require a specific provision.

3280HUD- Log #75 Final Action: Accept
(3280.715(a)(4))

Submitter: Michael Lubliner, Washington State University
Recommendation: New text to replace MHCSS: 3280.715(a)(4) Air tightness of Supply Duet Systems
A supply duct system shall be considered substantially air tight when:
1) Total duct leakage is less than or equal to 5 percent of the floor area, when tested at a differential positive or negative pressure of 1/10th in. water (25 Pa).
Or
2) Other approved standards engineering practice test method that results in comparable duct leakage rates.
Testing shall be conducted after all factory supply ducts are installed. Supply duct testing shall occur at a frequency determined in the quality assurance plan. Frequency shall be no less than one per 50 floors or one floor per five full days of production.

Substantiation: This proposal:
1. improve the existing MHCSS duct leakage testing which: a) is rarely conducted and does not specify a minimum QA testing frequency, b) results greater ductwork leakage at the current 80 percent ratio requirement, and c) does not allow flexibility for alternative test approaches that are shown to be equivalent.
2. is consistent with EPA Energy Star, USDOE Building America Program and MFG typical practices.
3. testing of duct systems and use of duct mastic for air sealing and adequate mechanical fastening will generally result in less than 5 percent total leakage. This in turn will improve energy efficiency, durability and environmental air-quality with respect to moisture control related issues.
4. defines a test and provides flexibility to allow a DAPIA/manufacturer to propose alternative equivalent testing. This is important since Fleetwood, ASHRAE and ASTM are in the process of developing alternative procedures that can be shown to be equivalent, while providing additional QA benefits.
5. frequency of testing is generally defined by mfg QA, and specifies a minimum testing frequency based on QA experience of those conducting duct leakage in-plant testing for Energy Star labeling, and federal residential energy tax credits qualification.
6. The test is flexible enough that it can be conducted in floors prior to the HVAC box installation or after the home sections are connected.
Committee Meeting Action: Accept

3280HUD- Log #CP3 Final Action: Reject
(3280.806)

Submitter: HUD Manufactured Housing Consensus Committee,
Recommendation: Add new Section 3280.806(e):
(e) Receptacle Outlets. Receptacle outlets must not be installed in or within reach (30 inches) of a shower or bathtub space. Countertop or cabinet spaces containing receptacle outlets which may be used for connection to an entertainment center, television, computer or other appliance must be located at least 30 inches in any horizontal direction from the tub surround or shower enclosure.

Substantiation: The HUD Program Office has been made aware of certain designs in bathrooms where mini entertainment centers have been setup in bathrooms in very close proximity to bathtub enclosures. The office is concerned with the electrocution hazard that these setups entail and is suggesting these changes to minimize that chance.
Committee Meeting Action: Reject
Committee Statement: The committee believes the concern raised in the proposal is best handled by an interpretive bulletin from HUD rather than by a change to the MHCSS. This is not necessarily a concern but addressing it as an interpretive bulletin can also discuss related problems such as running extension cords to power entertainment systems, heat tubs and shower enclosures.