STATE OF MISSOURI
PUBLIC SERVICE COMMISSION
JEFFERSON CITY
December 14, 2001

CASE NO: MX-2000-449

Office of the Public Counsel
P.O. Box 7800
Jefferson City, MO 65102

General Counsel
Missouri Public Service Commission
P.O. Box 360
Jefferson City, MO 65102

Enclosed find certified copy of a ORDER OF RULEMAKING in the above-numbered case(s).

Sincerely,

Dale Hardy Roberts

Dale Hardy Roberts
Secretary/Chief Regulatory Law Judge

COMMENT: 4 CSR 240-124.040(2)(E)2.B., provides "failure and ultimate load capacity tests shall be performed on three samples of each component part and must also be witnessed by the authorized representative." The Association believes that the testing required by this subsection duplicates the tests required by subparagraph (2)(E)2.C., and suggests that subparagraph (2)(E)2.B., be deleted.

RESPONSE: The Commission believes that subparagraph (2)(E)2.B. simply states the fact that load capacity tests must be performed on three samples of each component of an anchoring system and must be witnessed. Subparagraph (2)(E)2.C. expands further to explain the details of those tests. The Commission believes that the text in subparagraph (2)(E)2.B. is sufficient.

COMMENT: 4 CSR 240-124.040(2)(E)2.C., provides "The anchor will be approved for all soil test probe values at or above the soil test probe value in which the anchor is tested." This language applies to pullout tests conducted in the field and is inappropriately placed in the subsection dealing with laboratory tests. This sentence should be deleted from subparagraph (2)(E)2.C. and incorporated into subparagraph (2)(E)2.A.

RESPONSE AND EXPLANATION OF CHANGE: The Commission agrees that the language mentioned is out of place and should be deleted from subparagraph (2)(E)2.C. and placed in subparagraph (2)(E)2.A.

4 CSR 240-124.040 Commission Approval of Manufactured Home Tie-Down Systems

(2) Applications for an approval shall be submitted to the director and shall be executed by the owner or seller of the system on forms that shall be provided by the director upon request. To be complete, the applications shall include:

(E) A copy of the plans and specifications of the system for which the approval is sought.

1. Detailed drawings and installation instructions of each type of anchor system and for each type of component for which approval is sought must accompany the submittal;

A. Each drawing shall show model identification, all dimensions, types of welds or fastening, types of material, methods of securing strap, methods of attachment, orientation after installation in soil, direction(s) of applied load(s), and location of model number on the system and each component.

B. Each drawing shall bear the seal of a registered professional engineer, registered in the state of Missouri.

2. Each anchor system model must be tested and certified by a recognized testing agency to be in conformance with the standards promulgated by the commission and accepted engineering practice.

A. Pullout tests shall be performed on three (3) samples of each anchor system model and the failure load for all three (3) tests must equal or exceed four thousand seven hundred twenty-five (4,725) pounds. An authorized representative of the commission must certify that three (3) pullout tests were performed on each anchor system model. The anchor shall be installed with the specified tie attached, in a soil type for which the anchor is designed and pulled at an angle between forty degrees (40°) and fifty degrees (50°). The anchor will be approved for all soil test probe values at or above the soil test probe value in which the anchor is tested. The device shall be set up as required by the installation instructions. The test report shall include a photograph or drawing. The load at failure and the type of failure shall be described. The anchoring system must be capable of meeting or exceeding the Zone 1 wind load requirements of the Federal Manufactured Home Construction and Safety Standards 24 CFR 3280.306.

B. Failure and ultimate load capacity tests shall be performed on three (3) samples of each component part and must also be witnessed by an authorized representative of the commission.

C. Laboratory destruction tests shall be performed on each anchor system model and the failure load must equal or exceed four thousand seven hundred twenty-five (4,725) pounds. These tests are needed to establish the required strengths of the components and component connections of an anchor.

3. The result from each test will indicate:

A. Point and mode of failure;

B. Force required for failure;

C. Description of test procedure;

D. Test equipment used.

4. The report of the results of the test in specified soil or rock groups will also include:

A. Method of installation;

B. Date of installation;

C. Date of test;

D. Soil profile description and soil test probe values.

5. The anchor manufacturer shall furnish and ship with each anchoring system, information on the types of soil in which the anchor has been tested and certified for installation, instructions on the method of installation, and procedure for identifying soil types. A copy of the installation instructions must be filed with the director.

6. The director, upon receipt of new or additional information relating to the performance of any anchoring system, or a similar anchoring system, may request from the manufacturer of that anchoring system, additional testing or supplemental information.

7. Rock anchors shall be tested in specified rock. Rock anchors shall be field-tested in natural rock strata or in a rock sample. There must be twelve-inch (12") minimum radius of rock around the drilled hole. The natural rock strata or rock sample must be geologically described;

FILED
DEC 14 2001
Secretary of State
Missouri Public Service Commission

Title 4—DEPARTMENT OF ECONOMIC DEVELOPMENT
Division 240—Public Service Commission
Chapter 124—Manufactured Home Tie-Down Systems

ORDER OF RULEMAKING

By the authority vested in the Missouri Public Service Commission under section 700.076, RSMo 2000, the commission adopts a rule as follows: MX-2000-449

4 CSR 240-124.045 is adopted.

A notice of proposed rulemaking containing the text of the proposed rule was published in the *Missouri Register* on July 16, 2001 (26 MoReg 1447-1456). Changes have been made in the text of the proposed rule, and are reprinted here. This proposed rule becomes effective thirty (30) days after publication in the *Code of State Regulations.*

SUMMARY OF COMMENTS: Written comments were submitted by the Missouri Manufactured Housing Association (Association). There was no public hearing held. The Association submitted comments concerning the following proposed rule: 4 CSR 240-124.045.

COMMENT: 4 CSR 240-124.045(1)(C), defines anchoring systems as follows: "Anchoring systems means a combination of ties, anchoring equipment, and ground anchors that will, when properly designed and installed, resist overturning and lateral movement of the manufactured home from wind forces." The Association maintains that the use of the words "ground anchors" is too restrictive, and further maintains that the use of the word "ground" in the definition creates an unnecessary limitation. The Association suggests that the word "ground" be deleted from the definition.

RESPONSE AND EXPLANATION OF CHANGE: The Commission agrees and proposes that the word "ground" should be deleted as suggested.

COMMENT: 4 CSR 240-124.045(6)(A), discusses the performance of anchors and states "Failure shall be considered to have occurred when the connection between the tie and anchor moves more than two inches vertically or three inches horizontally when pulled at an angle of forty-five degrees under a force of 4,725 pounds." The Association believes this wording is ambiguous and would be more clearly stated by focusing on the movement of the head of the anchor. The Association also proposes to change the angle of pull from forty-five degrees to a range of forty to fifty degrees for the reasons already stated in comments on 4 CSR 240-124.040(2)(E)2.A. Therefore the Association proposes to reword this subsection as follows: Failure shall be considered to have occurred when the head of the anchor moves more than two inches vertically or three inches horizontally when pulled at an angle of between 40-degrees and 50-degrees under a force of 4,725 pounds.
RESPONSE AND EXPLANATION OF CHANGE: The Commission agrees and proposes that 4 CSR 240-124.045(6)(A) be changed accordingly.

COMMENT: 4 CSR 240-124.045(6)(B) deals with installation and testing of anchors and requires that each anchor be installed with a "minimum of 750 pounds of pre-load with a minimum of four wraps after installation." The Association's engineers stated that pre-tensioning to 750 pounds is a requirement that is impossible to monitor because of the inevitable relaxation in tension that occurs following installation. There is a nationally excepted standard for anchor installation and the engineers suggested that it be followed. Using the language contained in the national standard the Association proposes to reword the second sentence of subsection (6)(B) as follows: Each anchor shall be installed and pre-tensioned until it is flush with the stabilizer plate. The slotted bolt must have a minimum of four wraps of the strap after installation.
RESPONSE AND EXPLANATION OF CHANGE: The Commission agrees and proposes that 4 CSR 240-124.045(6)(B) be changed accordingly.

COMMENT: 4 CSR 240-124.045(8) deals with spacing of anchors in wind zone 1 conditions. Subsection (A) and (B) each deal with anchor spacing in relation to beam spacing. However, approximately eighty percent of the manufactured homes sold have beam spacing measurements which are not addressed by either subsection (A) or (B). For instance, many manufactured homes have 99.5 inch beam spacing. The Association believes this proposed rule should be revised to be more all-inclusive.
RESPONSE AND EXPLANATION OF CHANGE: The Commission agrees and proposes that 4 CSR 240-124.045(8) be changed accordingly.

COMMENT: The Association believes that Table D attached to 4 CSR 240-124.045 should be revised. The criss-cross strapping system is recommended for use in homes where the 40-degree to 50-degree anchor angle cannot be achieved. Therefore, in order to make the caption of the table more descriptive the Association proposes to delete the words "For elevated single section homes (or portions thereof)" and in its place insert the words: For use in lieu of Diagonal Tie-Down Strap Spacing Table in circumstances where 40-degree to 50-degree anchor angle cannot be achieved. The Association further proposes to modify the wording under the drawing in Table D. Presently the wording is as follows: "50-degree minimum strap angle applies only to homes with 75.5 inch or less I-beam spacing." The Association believes that this is an incorrect statement. The Association proposes to reword it as follows: 50-degree minimum strap angle applies to all homes.
RESPONSE AND EXPLANATION OF CHANGE: The Commission agrees and proposes that the caption of Table D be revised to reflect the suggested change. Rather than revise and reword the "50-degree minimum strap angle applying to homes with 75.5 inch or less I-beam spacing" reference, the Commission proposes to delete that text all together because the reference is incorrect and not necessary.

COMMENT: The Association proposes to reword the heading of Table E attached to 4 CSR 240-124.045 as follows: Table E strapping system for use in lieu of Diagonal Tie-Down Strap Spacing Table in circumstances where 40-degree to 50-degree anchor angle cannot be achieved. The Association also maintains that in the opinion of the Association's engineers the method of strapping shown in Table E is incorrect. The Association provided an example drawing to detail the correct strapping method and to propose a more technical reference to the name of the method.
RESPONSE AND EXPLANATION OF CHANGE: The Commission agrees and proposes that the caption of Table E be revised to reflect the suggested change with the exception of referencing a 40-degree to 50-degree strap angle, instead of a 40-degree to 50-degree anchor angle. The Commission also agrees that the cross strapping diagrams are incorrect and should be revised as suggested, with the exception that the vertical straps, which should not be eliminated. Vertical straps are still required for purposes of uplift in this diagram.

COMMENT: The Association maintains that the regulations as written prohibit the use of vertical ties to stabilize a home, and that vertical ties are not required in wind zone one but are required in wind zones two and three. Missouri is wind zone one. However, the Association believes that in certain circumstances, vertical ties may be a useful alternative and therefore should not be prohibited in the proper circumstance.
RESPONSE: Missouri regulations do not prohibit vertical ties; the regulations do state however, that vertical ties are not required in wind zone one. Since the use of vertical ties are not prohibited by State regulations, then anyone could install them if desired.

4 CSR 240-124.045 Anchoring Standards

(1) Definitions. The following definitions, as well as those set out in section 700.010, RSMo apply to this chapter:

(C) Anchoring systems means a combination of ties, anchoring equipment, and anchors that will, when properly designed and installed, resist overturning and lateral movement of the manufactured home from wind forces;

(6) Anchors.

(A) Each anchor, when installed in classified soil, must be capable of resisting a minimum allowable working load of three thousand one hundred fifty (3,150) pounds in the direction of the tie, plus a fifty percent (50%) overload (four thousand seven hundred twenty-five (4,725) pounds total) without failure. Failure shall be considered to have occurred when the head of the anchor moves more than two inches (2") vertically or three inches (3") horizontally when pulled at an angle of between forty degrees (40°) and fifty degrees (50°) under a force of four thousand seven hundred twenty-five (4,725) pounds.

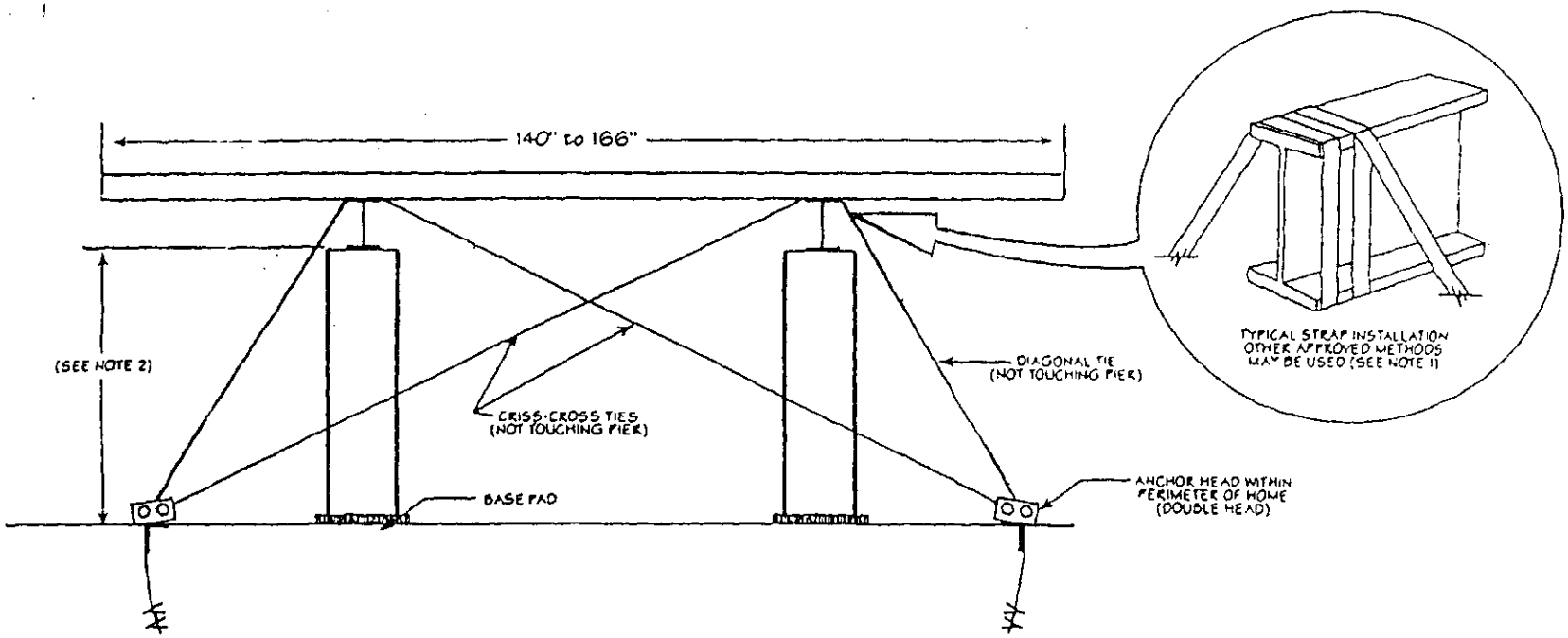
(B) Each manufactured anchor shall be tested and installed in accordance with the terms of its specified testing procedures and the anchor manufacturer's instructions. Each anchor shall be installed and pre-tensioned until it is flush with the stabilizer plate. The slotted bolt must have a minimum of four (4) wraps of the strap after installation.

(8) Spacing for Federal Manufactured Home Construction and Safety Standards Wind Zone 1 Conditions.

(A) If the floor width is one hundred sixty-six inches (166") (typical fourteen (14)-wide), with I-beam spacing ninety-five inches (95") or greater center to center and the distance from the top of the footer to the top of the I-beam is no higher than sixty-four inches (64"), anchors shall be spaced eight feet (8') apart for classified soil, or five feet (5') apart for unclassified soil.

(B) If the floor width is one hundred forty-one inches (141") (typical twelve (12)-wide), with I-beam spacing seventy-five and one-half inches (75.5") or greater center to center and the distance from the top of the footer to the top of the I-beam is no higher than fifty-two inches (52"), anchors shall be spaced six feet (6') apart for classified soil, or four feet (4') apart for unclassified soil.

TABLE (D)
ALTERNATIVE STRAPING SYSTEM FOR SINGLE SECTION HOMES
For use in lieu of diagonal tie down strap spacing in circumstances where 40 degree to 50 degree strap angle cannot be achieved

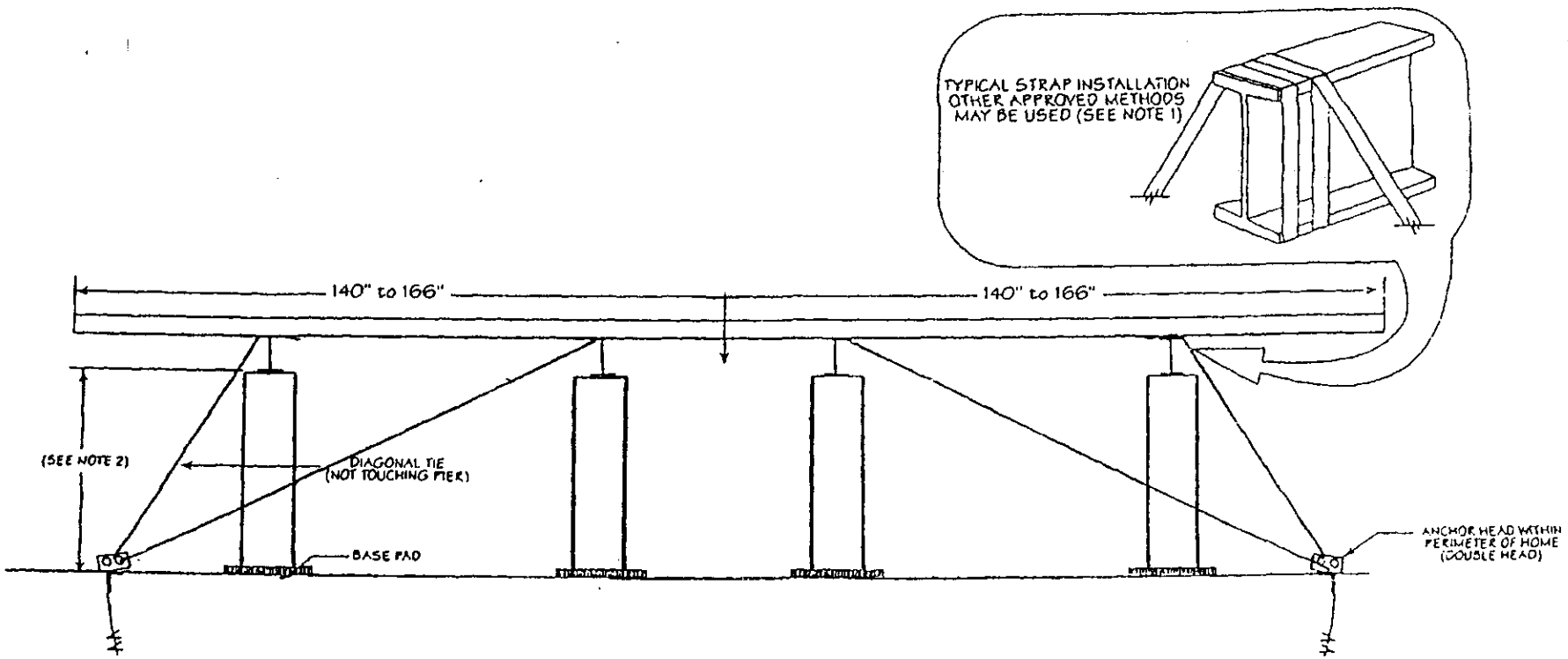


NOTES:

1. Inset drawing shows typical strap installation. All anchors, devices, and tiedown straps to be rated for a 3150 lbs. working load (4725 lbs. overload capacity), in classified soils.

2. Pier height is measured from the top of the ground to the top of the I-Beam. Pier heights exceeding 80" must have piers and tiedowns designed by a Professional Engineer. Minimum pier height is 12"

TABLE (E)
ALTERNATIVE STRAPING SYSTEM FOR MULTI-SECTION HOMES
For use in lieu of diagonal tie down strap spacing in circumstances where 40 degree to 50 degree strap angle cannot be achieved



NOTES:

1. Inset drawing shows typical strap installation. All anchors, devices, and tiedown straps to be rated for a 3150 lbs. working load (4725 lbs. overload capacity), in classified soils.

2. Pier height is measured from the top of the ground to the top of the I-Beam. Pier heights exceeding 80" must have piers and tiedowns designed by a Professional Engineer. Minimum pier height is 12".

STATE OF MISSOURI

OFFICE OF THE PUBLIC SERVICE COMMISSION

I have compared the preceding copy with the original on file in this office and I do hereby certify the same to be a true copy therefrom and the whole thereof.

WITNESS my hand and seal of the Public Service Commission, at Jefferson City, Missouri, this 14th day of Dec. 2001.

Dale Hardy Roberts

Dale Hardy Roberts
Secretary/Chief Regulatory Law Judge