February 4, 2008

TO: **PARTIES INTERESTED IN EVALUATION REPORTS ON CONTINUOUS ROD TIE DOWNS FOR LIGHT FRAME WALL CONSTRUCTION**

SUBJECT: Proposed Acceptance Criteria for Continuous Rod Tie-downs, Subject AC 391-0208-R1 (BG/WM/JS)

Dear Madam or Sir:

A new acceptance criteria, as presented in the enclosed criteria draft, is being posted on the ICC-ES web site to allow public comment. The proposed acceptance criteria is intended to apply to components used to secure light framed walls against tensile forces, including tensile forces resulting from placement as a tie-down for a shear wall. The components include threaded steel rods, fasteners, and other connectors to provide a continuous assembly.

This proposal is a variation on proposed AC348, the Acceptance Criteria for Continuous Tie-down Systems, which was removed from consideration by the Evaluation Committee in October 2007. The enclosed November 16, 2007, letter from the group that initiated the proposal provides some explanations for AC391's content.

The following are ICC-ES staff comments, corresponding to the sections in the enclosed AC391 draft:

1. General: The proposed criteria resembles AC155, the Acceptance Criteria for Hold-downs (Tie-downs) Attached to Wood Members. However, the deformation limits and specifics of the testing methods are lacking, at least with respect to the details in AC155.

2. Section 1.2.1: Lines 16-20 imply the tie-downs are used with shear walls only. The tie-downs also could be used to resist tension forces due to wind uplift. Clarification of the intended scope is needed. In lines 19-20, compression framing is excluded from the scope. Should tension framing also be excluded?

3. Section 1.4: The distinction between a continuous tie-down and a continuous tie-down assembly may need to be clarified. Also, once the distinction is clarified, each term should be used consistently throughout the proposed critieria.

4. Section 2.3.8: The second sentence with respect to sample size is unclear.

5. Section 3.1.2: What is a “steel jig” in the context of this acceptance criteria? Sections 4.1 to 4.3 are unclear on the subject of the steel jig also. An illustration of the jig needs to be provided.

6. Section 3.2.2.1: Section 3.3 of AC155 provides details on the potential adjustments that need to be made to test results. Some of these adjustments should apply here.

7. Section 3.4: What exactly are the situations where testing is preferred over calculation? If this is not clarified, testing may end up being used to obtain higher values than calculation, which needs to be avoided. Therefore, AC391 should be clear where calculations must be done. Please review the format of AC155, particularly Sections 3.3 to 3.6, for some guidelines.

8. Section 4.0. More detail is needed on testing. For example, Sections 4.1.2.1 and 4.2.1.1 both indicate component testing is needed, but the rest of Section 4.0 seems to explain testing of assemblies. Also, Section 4.3 is vague on testing an assembly. Illustrations like those in AC155 may help. Cyclic testing protocol may be needed for earthquake resistance. Test procedures issued by SEAOSC and ISO could be used in this criteria and in AC155, although the parties interested in AC155 have yet to support either protocol or a suitable alternative.

9. Section 4.3.1.2: Line 257 refers to a “device” but this term is not used elsewhere nor is it defined. This issue should be resolved.

10. Section 5.2.3: The meaning of “high-strength” threaded rod is vague. How is it distinguished from low-strength rod?

11. Section 6.2.2.2: Deflection limits are included in AC13 and AC155, and the proposed AC348, which establishes some precedence for placing deflection limits in this criteria.

12. Section 6.4.1: The statements in IBC Section 2304.9.5 may be preferable with respect to treated wood. Also, would the tie-downs be permitted for exterior exposure? If so, should corrosion resistance be addressed?

You are cordially invited to submit written comments, within 30 days of the date of this letter. An explanation of the alternate criteria process can be found on our web site at http://www.icc-es.org/Criteria_Development/alternative_criteria_process.shtml.

All comments received in the 30-day comment period will be considered in preparing a proposed criteria that may be considered at a future Evaluation Committee meeting. Comments received will be posted on the web site shortly after the close of the comment period.

Your cooperation is requested in forwarding to the Los Angeles business/regional office all material directed to the Evaluation Committee. Parties interested in the deliberations of the committee should refrain from communicating, whether in writing or verbally, with committee members. The committee reserves the right to refuse communications that do not comply with this request.

Newly approved acceptance criteria may involve test methods or test protocols that are not currently included in the scope of testing services offered by accredited testing laboratories. As noted in the ICC-ES Rules of Procedure for Evaluation Reports, the scope of the laboratory's accreditation must include the type of testing that is to be reported to ICC-ES. We encourage accredited laboratories to expand their scopes of accreditation to include testing under newly approved acceptance criteria. Please note that testing laboratories must be accredited by the International Accreditation Service (IAS) or by another accreditation body that is a signatory to the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement. For further information, please contact IAS at (562) 699-0541, extension 3309, or send an e-mail to pmccullen@iasonline.org.

If you have any questions, please contact the undersigned at (800) 423-6587, extension 3260, or Woods McRoy, Senior Staff Engineer, at extension 5686. You may also reach us by e-mail at es@icc-es.org.

Yours very truly,

Brian C. Gerber, S.E.
Principal Structural Engineer

BG/raf

Enclosure

cc: Evaluation Committee

November 16, 2007

Mr. Brian Gerber, SE
Principal Structural Engineer
ICC Evaluation Service
5360 Workman Mill Road
Whittier, CA 90601

SUBJECT: Comments on AC348
Proposed Acceptance Criteria for Continuous Tie-down Systems

Dear. Mr. Gerber:

Please find a new draft criterion for a continuous threaded rod system in lieu of the cancelled AC348 from last October's ICC Birmingham meeting.

The following continuous rod system ICC legacy report holders participated in the production of this document in alphabetical order:

a) Earthbound Corporation - Ed Chin P.E./ Thomas Espinosa
b) Go Bolt - Ward Gould
c) Hurribolt - Joe Hale / Jason Milligan
d) Tiemax - Bill Wade

We believe this document of our combined efforts addresses the following points that AC 348 did not:

1) Calculations of the components of a threaded rod assembly are acceptable in lieu of full scale testing.

2) Anchors (calculated or tested) may be submitted as a integral component of the rod assembly.

3) Quality Control and continual documented trace ability of high strength threaded rod (does not matter if domestic or imported) is required.

4) The report holder may optionally submit to use a shrinkage compensating or take-up device in their system if the building design professional or local jurisdiction requires it. The take-up device shall conform to requirements of AC316 or already have a listed evaluation.

5) This AC is structured to not unfairly highlight or exclude any particular continuous threaded rod system applicant. We feel this document is generic enough for all current manufacturers, yet maintains the quality control we seek for this important life safety product.

We look forward in working with you in this next version of this AC.

Please call or email if you have any questions.

Edward Chin, PE
Vice President
Earthbound Corporation

Ward Gould
President
Go-Bolt, Inc

Joe Hale
Senior Engineer
Hurri-Bolt, Inc.

Bill Wade
Director of Sales and Marketing
TIE MAX

PROPOSED ACCEPTANCE CRITERIA FOR CONTINUOUS ROD TIE-DOWNS

AC391

Proposed February 2008

PREFACE

Evaluation reports issued by ICC Evaluation Service, Inc. (ICC-ES), are based upon performance features of the International family of codes and other widely adopted code families, including the Uniform Codes, the BOCA National Codes, and the SBCCI Standard Codes. Section 104.11 of the *International Building Code*® reads as follows:

> **The provisions of this code are not intended to prevent the installation of any materials or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material, design or method of construction shall be approved where the building official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety.**

Similar provisions are contained in the Uniform Codes, the National Codes, and the Standard Codes.

ICC-ES may consider alternate criteria, provided the report applicant submits valid data demonstrating that the alternate criteria are at least equivalent to the criteria proposed in this document, and otherwise meet the applicable performance requirements of the codes. Notwithstanding that a product, material, or type or method of construction meets the requirements of the criteria proposed in this document, or that it can be demonstrated that valid alternate criteria are equivalent to the criteria in this document and otherwise meet the applicable performance requirements of the codes, ICC-ES retains the right to refuse to issue or renew an evaluation report, if the product, material, or type or method of construction is such that either unusual care with its installation or use must be exercised for satisfactory performance, or malfunctioning is apt to cause unreasonable property damage or personal injury or sickness relative to the benefits to be achieved by the use of the product, material, or type or method of construction.

PROPOSED ACCEPTANCE CRITERIA DRAFT FOR CONTINUOUS ROD TIE-DOWNS

1.0 INTRODUCTION

1.1 Purpose: The purpose of this acceptance criteria is to establish requirements for continuous rod tie-downs attached to structural members to be recognized in an ICC Evaluation Service, Inc. (ICC-ES), evaluation report under the 2006 International Building Code® (IBC) and the 2006 International Residential Code® (IRC). Bases of recognition are IBC Section 104.11 and IRC Section R104.11.

The reason for the development of this criteria is to establish guidelines for the evaluation of continuous rod tie-downs, since the IBC, IRC, and associated referenced standards do not specify qualification, installation, design, and quality requirements for these systems.

1.2 Scope:

1.2.1 This criteria provides methods to establish the Allowable Stress Design (ASD) design loads for continuous rod tie-downs by test and calculation. This acceptance criteria is limited to determining the continuous tie-down systems' resistance to tension loading only. Continuous rod tie-down systems shall be considered to be independent from the rest of the lateral load resisting system (e.g., shear wall). Lateral load resisting system variables, including shear wall geometry, shear resisting element size, shear resisting element material, fastening, and compression framing shall be considered and designed separately and are outside the scope of this criteria.

1.2.2 This criteria is applicable to continuous rod tie-down components and assemblies as defined in Section 1.4.1 and 1.4.2, respectively, of this criteria.

1.2.3 The following anchorage devices are outside the scope of this criteria:

1.2.3.1 Devices consisting of a structural steel strap with a bent end, where the bent end of the device is cast-in-place in concrete or masonry construction, or devices that are connected to wood members and installed partially embedded into concrete or masonry construction, such as cold-formed structural steel straps, die-stamped sill-plate connectors, or similar cold-formed or structural steel devices.

1.2.3.2 Straight structural-steel straps installed to collect and transfer tension forces from their point of origin to load-resisting elements.

1.2.3.3 Anchors to concrete or masonry that are elements of the continuous rod tie-down assemblies shall be evaluated in accordance with the requirements of applicable code or acceptance criteria.

1.3 Codes and Reference Standards:

1.3.1 2006 International Building Code® (IBC), International Code Council.

1.3.2 2006 International Residential Code® (IRC), International Code Council.

1.3.3 ACI 318-05, Building Code Requirements for Structural Concrete and Commentary, American Concrete Institute.

1.3.4 ACI 530-05, Building Code Requirements for Masonry Structures and Specifications for Masonry Structures, American Concrete Institute.

1.3.5 ANSI/AF&PA NDS-2005, National Design Specification for Wood Construction (NDS), 2005 edition, American Forest & Paper Association.

1.3.6 ASTM A 193/A193M-07, Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High Temperature or High Pressure Service and Other Special Purpose Applications, ASTM International.

1.3.7 ASTM A 325-07a, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength, ASTM International.

1.3.8 ASTM A 354-07a, Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners, ASTM International.

1.3.9 ASTM A 434-06, Standard Specification for Steel Bars, Alloy, Hot-Wrought or Cold-Finished, Quenched and Tempered, ASTM International.

1.3.10 ASTM A 449-07b, Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use, ASTM International.

1.3.11 ASTM A 563-07a, Standard Specification for Carbons and Alloy Steel Nuts, ASTM International.

1.3.12 ASTM D 2395-07a, Standard Test Method for Specific Gravity of Wood and Wood-Based Materials, ASTM International.

1.3.13 ASTM D 4442-07, Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials, ASTM International.

1.3.14 ASTM D 4444-92 (2003), Standard Test Methods for Use and Calibration of Hand-Held Moisture Meters, ASTM International.

1.3.15 ASTM E 4-07, Standard Practices for Force Verification of Testing Machines, ASTM International.

1.4 Definitions:

1.4.1 Continuous Rod Tie-Down: A continuous rod tie-down is installed in light-framed steel or wood walls and is used to resist tension loads caused by wind or seismic forces. Continuous rod tie-downs shall consider and include all components needed to transfer tension loads from a structure into a foundation.

1.4.2 Continuous Rod Tie-Down Assembly: A continuous rod tie-down assembly consists of the following components: (1) rods, (2) an anchor, (3) a structural framing member having specified dimensions and properties, (4) intermediate connectors or coupling devices used to attach the continuous rod tie-down components, and (5) bearing plates or washers used to enhance the performance of the assembly for resistance to tension loads.

2.0 BASIC INFORMATION

2.1 General: The following information shall be submitted:

2.1.1 Product Description: Complete information pertaining to the continuous rod tie-down components, including material specifications, scaled production drawings showing all dimensions and tolerances, and the manufacturing process (including welds when applicable). Material specifications shall comply with applicable reference

standards.

2.1.2 Installation Instructions: Installation details and drawings, noting installation requirements and/or limitations

2.1.3 Packaging and Identification: A description of field identification of the continuous rod tie-down components. For components that do not comply with code-referenced standards, identification provisions shall include the ICC-ES evaluation report number. Components shall be accompanied by packaging/labeling that clearly identifies the manufacturer (such as a registered trademark), the model number, and the ICC-ES evaluation report number (ICC-ES ESR-XXX).

2.2 Testing Laboratories: Testing laboratories shall comply with Section 2.0 of the ICC-ES Acceptance Criteria for Test Reports (AC85) and Section 4.2 of the ICC-ES Rules of Procedure for Evaluation Reports.

2.3 Test Reports: Test reports shall comply with AC85, and include the following:

2.3.1 A description of the tested continuous rod tie-down assembly and its components, or individually tested components, including a drawing detailing all pertinent dimensions of the assembly and/or components shall be provided. The description shall also include information concerning each component of the tested continuous rod tie-down when testing assemblies, as defined in Section 1.4.2 of this criteria.

2.3.2 Actual dimensions, species, moisture content for each wood test specimen.

2.3.3 A description of any modifications made to the wood members used in continuous rod tie-down assembly testing.

2.3.4 The measured steel physical properties of the continuous rod tie-down components, including yield strength, tensile strength, and base-metal thickness.

2.3.5 A description of the components, including the information required in Section 3.2 of this criteria.

2.3.6 A detailed drawing of the test setup, depicting location and direction of load application, location of displacement instrumentation and their point of reference, and details of any deviations from the test requirements as outlined in Section 4.0 of this acceptance criteria. Additionally, photographs shall supplement the detailed drawings of the test setup and failure modes.

2.3.7 Individual and average maximum test load values observed. Description of the nature, type and location of failure exhibited by each tested continuous rod tie-down assembly or component, and a description of the general behavior of the test assembly or components during load application.

2.3.8 The sample size shall be in accordance with Section 4.2 of this criteria as a minimum. Testing performed as per a recognized test method requiring sample sizing in excess of this minimum shall be performed as per the recognized test method requirements.

2.3.9 Descriptions of the test method and loading procedure used, rate of loading, and time to maximum loads in conformance to Section 4.4.2.

2.4 Product Sampling: Sampling shall comply with Section 3.1 of AC85 for welded continuous rod tie-down components. Sampling shall comply with Section 3.2 of AC85 and Section 4.2 of this criteria for continuous rod tie-down components fabricated without welds.

3.0 TEST AND PERFORMANCE REQUIREMENTS

3.1 General:

3.1.1 Allowable loads for continuous rod tie-downs attached to structural members shall be based on measured (tested) or calculated strength characteristics, and measured (tested) or calculated displacement characteristics.

3.1.2 Allowable steel-strength loads for continuous rod tie-downs components shall be based on measured (tested) strength or calculated strength of the components.

3.1.3 For applications in accordance with the IRC, allowable loads for continuous rod tie-downs shall be based on prescriptive applications according to Section R602.10.6 of the IRC.

3.1.4 Tension Load Testing:

3.1.4.1 Continuous rod tie-down components shall be tested such that a tension load is applied in reference to the intended application of the components when attached to a steel jig as described in Sections 4.1 through 4.3. The allowable steel-strength tension load capacity shall be calculated as follows: 1). (average or least?) peak load/factor of safety = allowable design load; 2). (average or least?)

measured load at deflection limit.

3.1.4.2 (Optional) Continuous rod tie-down assemblies shall be tested and evaluated for an allowable tension load capacity for use with alternate braced wall panels described in IRC Section R602.10.6.1 or IRC Section R602.10.6.2. Testing shall comply with applicable requirements in Section 4.0 of this criteria, and the assembly tension capacity shall be evaluated in accordance with Section 3.3 of this criteria.

3.2 Test Materials:

3.2.1 Wood Materials:

3.2.1.1 All wood materials shall be solid-sawn lumber intended for structural use with allowable values substantiated by accepted procedures, such as those referenced in the NDS and/or Section 2303 of the IBC.

3.2.1.2 The moisture content of the wood members shall be determined in accordance with ASTM D 4442 or D 4444.

3.2.2 Steel: The steel properties of the tested continuous rod tie-down components, including yield point, tensile strength, and uncoated base-metal steel thickness shall be determined by testing. Where permitted by the referenced standard, mill certificates shall be provided for the specific heat or lot of material subjected to the load tests of this acceptance criteria.

3.2.2.1 Standard Steel Components Used in Typical Assemblies: If tested yield and tensile strengths of the steel components exceed specified values, the allowable loads from tests in Section 3.4.1 shall be proportionally

reduced. If materials with higher properties than stated in the referenced specifications are unique to their product offering and these higher yield and tensile strengths are confirmed within the quality documentation, then the reductions are not necessary.

3.2.3 Components: Components that are used in continuous rod tie-down assembly testing shall be sampled from the same manufacturer's lot in accordance with Section 4.2 of this criteria.

3.2.3.1 Anchor bolts/rods shall comply with a recognized standard.

3.3 Factors of safety: Factors of safety for Determination of Allowable Design Loads from Tested Results:

3.3.1 Anchorage to Concrete or Masonry: Factors of safety shall be as set forth in the applicable acceptance criteria (AC01, AC58, AC106, AC193, or AC308).

3.3.2 Threaded Rods and Couplers: For threaded rod and coupling components used to extend the continuity of the anchors, the minimum factor of safety shall be 2.5.

3.4 Continuous Rod Tie-Down Design Load Calculations: In lieu of testing described in Section 4.0, calculations determining the allowable design load shall be submitted in accordance with the following:

3.4.1 Threaded Rod Capacities: Threaded rod capacities for ASD shall be calculated in accordance with IBC Section 2205.1.

3.4.2 Bearing Plate Capabilities: For plate stresses, materials and

structural capacities for ASD shall be calculated in accordance with IBC Section 2205. For plate bearing against wood, structural capacities shall be calculated in accordance with Section 3.4.5 of this criteria.

3.4.3 Nuts and Couplers: Nuts and couplers shall comply with ASTM A 563. High strength grade nuts and couplers shall be used with corresponding high strength threaded rod.

3.4.4 Allowable Design Load: The allowable design loads for continuous rod tie-down assemblies shall equal the lowest determined allowable load of any component or connection of components comprising the intended assembly.

3.4.5 Steel to Wood Bearing Calculations: Calculated allowable resistance values for steel to wood bearing connections shall be determined in accordance with the NDS.

3.4.6 Wood to Wood Compression Calculations: Calculated allowable resistance values for wood to wood connections in compression shall be determined in accordance with the NDS.

3.4.7 (Optional) Derivation of Allowable Tension Capacities for Continuous rod tie-down Assemblies complying with the IRC: The provisions of this section are applicable when requesting evaluation of a continuous rod tie-down system for compliance with IRC Section R602.10.6 as a tie-down assembly. The allowable tension load for short-term load duration, such as wind/earthquake loads, of the tie-down assembly shall be limited to the lowest allowable load resulting from tests or analyses.

3.4.7.1 Strength Criterion: An allowable tension load based on the strength of the tie-down assembly shall be derived in accordance with Section 3.1.1 and Section 3.1.2 of this criteria, as applicable, and shall not be less than that required by IRC Table R602.10.6, depending on the application.

4.0 TEST METHODS

4.1 Apparatus:

4.1.1 Testing Machine: A testing machine that is capable of operation at a constant rate of motion of the movable crosshead or a constant rate of loading, and a force measuring device that is calibrated in accordance with ASTM E 4, shall be used.

4.1.2 Displacement Measurements: All displacements during tests shall be measured by dial gauges or linear variable displacement transformers (LVDTs), having a least reading of 0.001 inch (0.025 mm).

4.1.2.1 When testing continuous rod tie-down components on a steel jig, the displacement gauge shall measure the relative movement between the component to component assembly or between the component to substrate assembly. Placement of the dial gauges or LVDTs shall ensure accurate measurement of the relative movement.

4.2 Test Sample Size:

4.2.1 Continuous rod tie-down Component Testing:

4.2.1.1 Differences in continuous rod tie-down component size, configuration, and material specifications shall be the basis for establishing a test sample

size.

4.2.1.2 A minimum of three continuous rod tie-downs for each configuration (size, component, and material specifications) shall be tested on a steel jig.

4.2.1.3 If the maximum test load for a tested component varies by more than 20 percent from the average, testing shall be conducted on three additional continuous rod tie-down components.

4.2.2 Continuous rod tie-down Assembly Testing:

4.2.2.1 Differences in assembly configuration and component specifications as summarized in Section 1.4.2 of this criteria shall be the basis for establishing a test sample size.

4.2.2.2 A minimum of three continuous rod tie-down assemblies shall be tested for their intended usage and for each selected combination of variables affecting the continuous rod tie-down assembly performance.

4.2.2.3 If the maximum test load for a tested assembly varies by more than 20 percent from the average, testing shall be conducted on three additional continuous rod tie-down assemblies.

4.3 Test Setup:

4.3.1 General:

4.3.1.1 Continuous rod tie-down components and assemblies shall be tested individually in such a manner to simulate the essential function of the continuous rod tie-down component or assembly. Test loads shall be applied with

reference to the intended end-use application of the continuous rod tie-down component or assembly.

4.3.1.2 The anchor bolt/rod shall be fastened to the test apparatus in such a manner that the connection to the test bed does not affect the test results. Additionally, the anchor bolt/rod shall be attached to the device with a nut and washer in accordance with the end-use application (manufacturers' installation instructions).

4.3.2 Continuous rod tie-down Assembly Testing:

4.3.2.1 Continuous rod tie-down assembly testing shall only require the application of load up to the displacement limitations described in Section 4.4.3 of this criteria.

4.3.2.2 Wood test members shall be conditioned to reach equilibrium with a moisture content of 11 to 19 percent when the continuous rod tie-down assemblies are tested. Section 3.2.1.2 of this criteria contains details on measuring wood moisture content.

4.4 Test Procedure

4.4.1 Preloading: An initial load, or preload, shall be applied for tension load testing of continuous rod tie-down components or assemblies as follows: (1) The nut securing the bearing plate against the substrate shall be tightened as defined in the manufacturers installation instructions. (2) The testing machine load shall be recorded at this point (identified as preload). (3) Displacement measuring devices shall then be zeroed.

4.4.2 Test Load Application and Recording: The test load shall be applied at a uniform crosshead rate between 0.03 and 0.20-inch (0.8 to 5.1 mm) per minute until failure or maximum load occurs. Loads shall be recorded to a precision of 1 percent during application of test loads.

4.4.3 Displacement Recording: The displacements shall be recorded to the nearest 0.001 inches (0.025 mm), and a sufficient number of readings shall be taken to permit determining the load at strength-level-response displacement limits of 0.50 inch (12.6 mm) for continuous rod tie-down assembly testing on wood structural members and of 0.37 inch (9.4 mm) for continuous rod tie-down assembly testing on a steel jig.

5.0 QUALITY CONTROL

5.1 Quality Documentation: Quality documentation complying with the ICC-ES Acceptance Criteria for Quality Documentation (AC10) shall be submitted.

5.2 Material Traceability: The evaluation report holder shall demonstrate continuous material traceability of all continuous rod tie down components within the quality documentation. This requirement includes documenting the batch or heat lot number on high strength or heat treated threaded rods and high strength couplers.

5.2.1 Mechanical Properties Testing Requirements: If high strength rod threaded rods defined in Section 5.2.2 are components of the tested assemblies, the applicant shall provide mill certificates and mechanical property test reports in their Quality Control manual on each batch or heat lot they procure.

5.2.1.1 The report holder shall obtain continual mechanical

property test reports for the finished threaded product by the producing manufacturer in lieu of testing by an accredited testing laboratory.

5.2.1.2 If the mechanical property test report is not available per 5.2.1.1, then the report holder shall obtain independent testing from an accredited testing laboratory, on each batch or heat lot they procure.

5.2.2 High strength threaded rod shall be limited to the following standards: ASTM A 193, A 325, A 354, A 434 and A 449.

5.2.3 Couplers and nuts used with high strength threaded rod shall comply with the requirements set forth in the rod specifications described in Section 5.2.2 of this criteria. Where such requirements are not specified, the couplers and nuts shall conform to ASTM A 563.

6.0 EVALUATION REPORT RECOGNITION

6.1 General: The evaluation report shall describe the continuous rod tie-down components with respect to material specifications.

6.2 Engineered Applications of Continuous rod tie-down components and Assemblies: The evaluation report shall provide a table specifying the following information:

6.2.1 Continuous rod tie-down component dimensions.

6.2.2 Allowable steel-strength load of the continuous rod tie-down assembly shall be determined in accordance with Section 3.3 or 3.4 of this criteria, with the following footnoted information:

6.2.2.1 A statement indicating that wood shrinkage and the corresponding impact on the continuous rod tie-down's allowable values shall be considered by the registered design professional.

6.2.2.2 A statement indicating that the anchor bolt/rod elongation and the corresponding impact on the continuous rod tie-down's allowable values shall be considered by the registered design professional.

6.2.3 The lowest of the allowable loads, or at the option of the evaluation report applicant, all of the allowable loads of the continuous rod tie-down assembly, determined in accordance with Section 3.3 or 3.4 of this criteria, with the following footnoted information:

6.2.3.1 A statement indicating that the assembly shall have an allowable strength equal to or exceeding the required strength of the assembly determined by applying the ASD (Allowable Stress Design) load combinations referenced in the applicable code.

6.2.3.2 A statement indicating which adjustment factors from the NDS are included in the derivation of the tabulated allowable load for wood compression members and steel to wood connections.

6.2.3.3 The following statement: "When using the basic load combinations in accordance with IBC Section 1605.3.1 (or UBC Section 1612.3.1), the tabulated allowable loads for the continuous rod tie-down assembly shall not be increased for wind or earthquake loading. When using the alternate basic load combinations in IBC

Section 1605.3.2 (or UBC Section 1612.3.2) that include wind or earthquake loads, the tabulated allowable loads for the continuous rod tie-down assembly shall not be increased by 33 1/3 percent, nor shall the alternative basic load combinations be reduced by a factor of 0.75."

6.2.3.4 The following statement: The components covered by this report are evaluated with respect to their performance characteristics to each other and the identified structural members. Uses of any components other than those identified within this report are not covered by this report. (Optional) Proprietary Hold-down connectors: Hold-down and structural capacities shall be as set forth in a current ICC-ES evaluation report.

6.2.3.5 High strength threaded rod: A statement that the report holder shall have mill certificates and mechanical property reports be available for local building official inspection upon request that clearly shows conformance to the appropriate specification and the batch or heat lot used in the field.

6.3 Prescriptive Applications of Tie-down Assemblies According to the IRC (Optional): For tie-down assemblies complying with Section 3.4.7 of this criteria, the evaluation report shall include the following information:

6.3.1 Tie-down component dimensions, and required components, including type, size, for attaching the tie-down components to the structural member.

6.3.2 An allowable tension load of the tie-down assembly, which shall not be less than that required by IRC Table R602.10.6, depending on the application.

6.3.3 A figure, drawn to scale, showing the complete tie-down assembly, including details on the concrete spread footing, anchorage to the concrete footing, and attachment of the tie-down components to the boundary members of the alternate braced-wall panel. The figure shall have sufficient detail and information such that the building official may use the evaluation report to verify compliance with Section R602.10.6 of the IRC and waive the requirement of submission of construction documents and other data according to Section R106.1 of the IRC.

6.4 Conditions of Use: The evaluation report shall include the following Conditions of Use:

6.4.1 Chemically treated preservative or fire treated wood: The use of continuous rod tie-down assemblies in contact with chemically treated preservative wood is subject to the approval of the building official, since the effects of corrosion of metal in contact with chemically treated wood on the structural performance of the components are outside the scope of this report.

6.4.2 Duration of Load Increase: No further duration of load increase for wind or earthquake loading shall be allowed.

6.4.3 Drawings and Design Details: Drawings and design details verifying compliance with this report shall be submitted to the building official for approval. The drawings and calculations shall be prepared by a registered design professional when required by the statutes of the jurisdiction in which the project is to be constructed.