

**Approved by General Counsel**

TR-14 Meeting Report

Date(s): 03/29/2016 - 03/30/2016

Location: Las Vegas, NV

Approved: 06/15/2016



**TR-14 Structural Standards for Communication and Small Wind  
Turbine Support Structures Engineering Committee**  
(<http://www.tiaonline.org/all-standards/committees/tr-14>)

**MEETING REPORT**

Date: March 29, 2016  
Time: 8:30-17:00  
Location: Golden Nugget Hotel  
129 E. Fremont Street  
Las Vegas, NV, 89101

Meeting Room: Pebble Beach I&II

Chair: John Erichsen, PE, SE  
Vice Chair: Mark Malouf, PE  
Secretary: Bryan Lanier, PE, SE  
TIA staff: Stephanie Montgomery, VP  
TIA staff: Franklin Flint, CTO

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**1. Administrative/General Business**

**1.1 Call to Order**

**1.2 Attendance (Call Quorum, Introductions, Roster)**

- Introduction of Chairman, Vice-Chairman, Secretary, Steering Committee and TIA staff



- Attendance Taken for Quorum (One company, one vote – section 5.2.2 ECOP)
  - Quorum met
- Meeting [Roster](#)
- Distribution and Numbering of Documents
  - TR-14 email reflector address: [14@tiacomm.org](mailto:14@tiacomm.org)
  - TR-14 FTP site: <http://ftp.tiaonline.org/TR-14/>

### **1.3 Meeting Agenda Review and Approval**

- Meeting Agenda March 29, 2016
  - First Motion: Scott Kisting
  - Second Motion: Jim Kyriacopoulos
  - Objections/Discussion - NONE
  - Approved

### **1.4 Meeting Report Review and Approval**

- Meeting Report October 2, 2015
  - First Motion: Scott Kisting
  - Second Motion: Albert Schmidt
  - Objections/Discussion - NONE
  - Approved

### **1.5 TIA Intellectual Property Rights (Early Disclosure Policy)**

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### **1.6 Chair's Report and General Items**

### **1.7 TIA Report and General Items**

## 2. Old Business

- Re-affirmation of ANSI/TIA-222-G
  - Motion to open a reaffirmation industry ballot for TIA-222-G and approve for publication
  - First Motion: Mark Malouf
  - Second Motion: Dave Hawkins
  - Objections/Discussion: None
  - Approved
- Re-affirmation of ANSI/TIA-222-G-1
  - Motion to open a reaffirmation industry ballot for TIA-222-G-1 and approve for publication
  - First Motion: Mark Malouf
  - Second Motion: Dave Hawkins
  - Objections/Discussion: None
  - Approved
- Re-affirmation of ANSI/TIA-1019-A
  - Motion to open a reaffirmation industry ballot for TIA-1019-A and approve for publication
  - First Motion: Mark Malouf
  - Second Motion: Dave Hawkins
  - Objections/Discussion: None
  - Approved
- Approval to open an industry 45 day ballot for ANSI/TIA-322
  - First Motion: Mark Malouf
  - Second Motion: Dave Hawkins
  - Objections/Discussion: None
  - Approved
- Dissolution of Task Group 4
  - First Motion: Mark Malouf
  - Second Motion: Dave Hawkins
  - Objections/Discussion: None
  - Approved
- Dissolution of Task Group 5
  - First Motion: Mark Malouf
  - Second Motion: Dave Hawkins
  - Objections/Discussion: None
  - Approved

### 3. New Business

#### 3.1 Government Relations / Educational Videos

#### 3.2 Task Group 7 – ANSI/TIA-322

- James Ruedlinger approved as a Task Group Leader
- Should be released fall of 2016

#### 3.3 Task Group 6 – IBC Liaison

- Spiro Soukis approved as Task Group Leader
- Additional support and involvement is needed and invited for this Task Group

#### 3.4 Task Group 3 – ANSI/TIA-222-H

- Overview / Goals / Progress
  - Report / commentary by Mark Malouf
  - Incorporate ASCE7 design wind, ice and seismic loads, along with updated load factors
  - Incorporate steel and concrete standards per AISC 360-10 and ACI318-14
  - Incorporate base plates and wind turbine structures from Addendum 3 and 4 of TIA-222-G
  - New annexes on topography, new tower construction and post modification inspections
  - Incorporation of fatigue as a design check where appropriate
  - Completion in time for reference in 2018 IBC. This means final draft of sections complete in July 2015, release for ballot in December 2016 and release for publication in May 2017
  - Over 70 change proposals received per date
  - 7 of 17 Sections have been reviewed by the steering committee and / or are ready for ballot
  - 8 of 18 Annexes have been reviewed by the steering committee and / or are ready for ballot
  - Approximately 50% of revision work has been complete
  - Main work left to be completed:
    - Update to ASCE7-16
    - Update to ASCE7-16 seismic and completion of updated seismic standards
    - Climbing facilities section
    - SWT inclusion of ASCE AFL fatigue criteria
- AASHTO Comparisons with TIA-222-G
  - Report / commentary by Dave Brinker

- Idea is to ensure monopole drag coefficients and pole axial / flexural strengths to largely coincide with AASHTO specifications.
- Specifically, drag coefficients for poles with attachments (coax, step bolts, etc.) would remain largely the same for all cross sections except for 16 sided, which might slightly increase.
- Second set of drag coefficients, which are to be used if there are not attachments (coax, step bolts, etc.) would also be published.
- Existing specifications in ANSI/TIA-222-G would continue to be used in place of AASHTO specifications.
- No limitations on multi-sided sections, based on round sections, as is followed in AASHTO, would be followed.
- D/t limits would be revised from 400 to 300.
- Use AASHTO 1.5(t) as default bend radius for strength derivation.
- Fabrication Considerations for Rev. H
  - AISC manufacturer certification for Risk Category 3 or 4 structures.
  - Various additional requirements with respect to UT inspection.
  - Additional galvanization requirements / definitions.
  - Specific welding qualifications and procedures to be added.
- Foundation considerations for Rev. H
  - Reference ACI318 specific passages, like is done with AISC Steel Manual for super structure.
  - Various directions to consider for mat and pier design.
  - Reinforcement ratios / detailing
  - Anchor bolt development and rebar development in compression
  - Expansive soil
- Ad Hoc 3.13 – Mounts
  - Report / commentary by Michelle Kang
  - Analysis of existing mounts will be noted in Section 15.8
  - Expectation is the mount being used is to be analyzed with each changed condition, much the way the tower is analyzed with each changed condition. Other existing mounts on the superstructure that are not experiencing a changed condition are not to be analyzed.
  - Specific criteria are given for changed conditions requiring a structural analysis of the mount.
  - Modeling methods and application of design loads provided.
  - Annex P was originally proposed as the location for the mount classification system. Proposed change is to release as a technical document by TIA and not specifically include in Revision H.
  - Mounts do not have to be classified to be in conformance, just an aid to help the owner purchase the mount needed and for rating of future loads.
- Ad Hoc 3.14 – Monopole Reinforcing
  - Report / commentary by Dave Hawkins
  - Recently formed group that is developing standards to design and analyze monopole reinforcement

- Reviewing topics of stress distribution / compatibility, stability, second order effects, system type, connections, anchorage and inspection
- Goal is to codify some approaches for monopole reinforcement design, similar to Addendum 3, but to make informative
- Ad Hoc 3.12 – Seismic
  - Report / commentary by Bryan Lanier
  - Significant changes include removal of base seismic to wind shear comparisons,  $S_s \leq 1.0$  considerations, horizontal and vertical irregularities and required use of methods
  - Inclusion will be overstrength and redundancy factors, elimination of seismic considerations based on  $S_{ds}$ , and foundation detailing requirements
  - Rayleigh Method will be included as an option to determine Natural Frequency
  - Classify structures as moderate to high seismic risk, as opposed to Seismic Design Category, per ASCE7, which will indicate detailing requirements
- Ad Hoc 3.1 – Loading
  - Report / commentary by Madison Batt
  - Clarification on load factor of guyed anchors
  - Exposure Site Specific to be added in conjunction with exposures used in TIA-222-G
  - Ice thickness determination corrected by removing the 2.0 factor to take into account MRI of 500 year vs. 50 year
  - Clarification of  $K_a$  factor
  - Structure Class will be renamed Risk Category for consistency with ASCE7. Risk Category definitions will be redefined. Importance factors to be corrected / updated as needed.
  - Clarification of definition of transmission line grouping
  - Introduction of protected zones with respect to wind loading for poles
  - Introduction of optional derivation of gust effect factor per ASCE7
  - Include topographic factors per SEAW RSM-03
  - Introduction of Rooftop Wind Speed-up Factor
  - Introduction of Ground Elevation Factor, which takes into account air density at sea levels vs. higher elevations
  - Update to Directionality Factor ( $K_d$ ) to consider multiple rad centers of equipment vs. single carrier towers and stealth structures
- Ad Hoc 3.2 – Analysis
  - Report / commentary by Peter Chojnacki
  - Update to 2<sup>nd</sup> Order Effects in global analysis
  - Inclusion of imperfections vs. notional loads or modeled imperfections to correctly account for global stability
  - Discussion of inclusion of stiffness reductions with respect to global analysis and stability due to partial yielding or residual stresses

- Discussion of modeling guy cables as either cable elements or non-linear elastic supports
- Ad Hoc 3.3 – Strength
  - Report / commentary by Ping Jiang
  - Various updates to sections for consistency with AISC 360-16
  - Design strengths for HSS and pipe shapes updated to reflect use of design thickness and increased resistance factors
  - Specific compressive strength method for single angle members is introduced
  - Update to minimum nominal design slip splice length for monopoles
  - Inclusion of Addendum 3 for baseplates included in Section 4
  - Commentary on u-bolted connections introduced
- Ad Hoc 3.4 – Sections 5 – 8
  - Report / commentary by Bryan Lanier
  - Introduction of various manufacturing tolerances that were not part of TIA-222-G, including updated carbon equivalents, minimum elongations and corrosion standards for various shapes
  - Fabrication of structures designed as Risk Category III and IV to be completed by fabricators certified per AISC 201-06
  - A1085 added as a prequalified steel for HSS
  - Commentary added that Section 6 is for tower structures, not other communication applications, like RF, shelters, etc.
  - Guy assemblies have additional factor to account for slippage. Language also added to ensure this section is for design / maintenance for guys used in structural applications, not safety cables
- Ad Hoc 3.5 – Foundations / Grounding
  - Report / commentary by Ken Gilbert
  - Updates to design strength of soil / rock / substructure
  - Site specific geotechnical investigation is required for Risk Category III / IV structures and only recommended for Risk Category I / II
  - Additional comments provided regarding exceptions that provide restraint (i.e. grade beams) for seismic considerations
  - Updates to grounding sections throughout
- Ad Hoc 3.6 – Markings & Climbing
  - Report / commentary by Scott Kisting
  - Additional criteria to be included regarding climbing facilities
- Ad Hoc 3.7 – Sections 13 & 14, Annex J, K, N & O
  - Report / commentary by Raphael Mohamed
  - Crest height and geotechnical references added to design plans
  - Additional commentary / recommendations on tolerances and measurements in the field, specifically with respect to solar distortion, wind speed limits and ice thickness limits
  - Two annexes for inspections, Annex N for new structures, Annex O for existing structures



- Significant new commentary / specifications for Annex N. Specifically, comments on IBC Chapter 17 - Special Inspections and pre / post construction requirements
- Additional commentary for Annex O, including pre / post construction requirements for existing towers
- Weld inspection in plant waived if AISC certified fabricator
- Increased frequency for stealth / flag poles
- New recommendations for Annex J on Maintenance and Condition Assessment
- Inclusion of Shunt Dynamometers as option for guy tension measurement for Annex K
- Ad Hoc 3.8 – Existing Structures
  - Report / commentary by Christopher Ply
  - Feasibility Structural Analysis renamed to Feasibility Structural Review. Definition changed significantly to reflect the intent is review of provided documentation, not full encompassing engineering analysis, including detailed structural calculations.
  - Definition for Registered Design Professional
  - Updated code for the evaluation of existing structures with respect to changed appurtenance conditions. Specific details are to be provided which codifies up to 10% increases in member usages (with maximum limiting usages being 110%), based on Revision H analysis of the structure before and after the changed condition. Use of previous revisions of the standard will not be permitted.
  - Inclusion of the allowance of comparison to original foundation design loads to current foundation loads for Rigorous Structural Analyses in specific circumstances is proposed
  - Significant commentary / revisions made to Section 15.7, Modification of Existing Structures, including comments on field verification, fabrication, installation and verification of installation
- Ad Hoc 3.9 – Installation & Procurement
  - Report / commentary by Tim Drumm
  - Additional commentary / specifications regarding procurement standards
- Ad Hoc 3.10 – Small Wind Turbine
  - Report / commentary by Ronnie Glover
  - ASCE AFL standard incorporated for consistency of designs across multiple codes
  - Additional fatigue updates / changes to current Addendum
  - Current discussions include how to deal with changed turbines / turbine replacement and inspection intervals
- Ad Hoc 3.11 – County Listing / ATC & USGS Website
  - Report / commentary by John Erichsen
  - <http://windspeed.atcouncil.org/>
  - <http://earthquake.usgs.gov/designmaps/us/application.php>



#### 4. New Topics

- Ernie Jones to be honored with a special award at the TIA-2016 event in Dallas (<http://www.tia2016.org/>)

#### 5. Upcoming Meeting

- Meeting in Boston, MA, June 19 – 20<sup>th</sup>
- Location: Courtyard Boston Downtown, 275 Tremont Street, Boston, MA 02116
- Reservation URL: [http://www.marriott.com/meeting-event-hotels/group-corporate-travel/groupCorp.mi?resLinkData=TIA%20TR-14%20%5eBOSDM%60TIATIAA%60209%60USD%60false%602%607/18/16%607/21/16%6006/27/2016&app=resvlink&stop\\_mobi=yes](http://www.marriott.com/meeting-event-hotels/group-corporate-travel/groupCorp.mi?resLinkData=TIA%20TR-14%20%5eBOSDM%60TIATIAA%60209%60USD%60false%602%607/18/16%607/21/16%6006/27/2016&app=resvlink&stop_mobi=yes)

#### 6. Adjournment

- First Motion: Jim Kyriacopoulos
- Second Motion: Scott Kisting
- Objections/discussion: None
- Approved

This meeting was conducted in accordance with the TIA Legal Guidelines and the engineering procedures



## TR-14 Structural Standards for Communication and Small Wind Turbine Support Structures Meeting Roster

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**NOTES:**

1.) A \* denotes an attendee that has manually entered their information into the system and may not be currently in the TIA membership database.