PAN – TIA-5053-A

A revision to the Mounting System Classification standard, TIA-5053-A, was published on 4/19/2023. This PAN will provide an overview of the critical updates to the Standard since its original release in late 2019. One of the main goals of the 5053 update committee was to reorganize and reformat the standard to give a better user experience. During the development process, the 5053 update committee identified four distinct user scenarios of this standard, and wanted to tailor the standard to uniquely satisfy each:

1. A carrier wanting to mandate a minimum classification for their network.
2. An engineering company trying to determine what classification is needed for a given site.
3. A manufacturer wanting to design something to meet a specific classification.
4. A contractor desiring consistency of documentation, allowing them to plan work more effectively.

The committee specifically did not want to modify the core principles of classification ratings, and they remain the same for this new revision, due to the wide-spread adoption of these ratings. Table 2-1 was added to serve as a quick reference for the definition of the classification identification structure:

Table 2-1: Mount Classification Identification

Example: M800R(1450)-4[6]

M800R(1450)-4[6]	Used at the beginning of each mount identification
M**800**R(1450)-4[6]	The maximum factored horizontal force, F, considered for design under extreme wind condition at each mounting pipe location
M800**R**(1450)-4[6]	Mount classification category
M800R**(1450)**-4[6]	Maximum factored vertical force, F_{zi}, considered for design under extreme ice condition at each mounting pipe location
M800R(1450)**-4**[6]	Quantity of mount pipes, n, considered for the application of design forces[1]
M800R(1450)-4**[6]**	Allowable vertical centerline offset, e, the maximum distance, in inches, F and F_{zi} may be from the mount elevation.

The objective and scope were updated to represent the intent of this standard more accurately and clarify what classifying a mount in accordance with the Standard will allow a user to do as well as what it should and should not be used for. This will allow for more effective procurement requirements and can be relied on to allow for a mount to be selected based upon its rating and the site location and loading information.

The streamlined layout separated the examples from the main body of the text and moved them into an Annex. This gives the user a straightforward view of the Standard itself and provides consistent formatting from section to section. In addition, the process for classifying a mount is now in a more direct step by step layout to further clarify the intent. This is based on feedback from manufacturers that perform the structural analysis on these mounts allowing them to clearly communicate the mounts' capabilities. The examples outlined in the Annex now run through three distinct scenarios:

1. Determination of the individual mount pipe capacity based on a given mount rating.
2. The required mount rating based on known site-specific criteria.
3. Procurement of a mount using the Request for Mount worksheet.

All of these allow A&E firms selecting mounts to utilize the manufacturers ratings that are based on the analysis requirements to select a mount with a proper rating for the site-specific location and loading.

Category A and L mounts were moved to an Annex, while the main body of the standard focuses the messaging on category R mounts. This move allows the user to quickly access the most applicable information needed for classifying the most common mounts.

SI unit conversions were removed from this standard, due to primary usage of US customary units in the regions covered by this standard. Removal of SI unit conversions adds to the overall clarity and readability of the document.

"Engineer of Record" (EOR) was defined and is used in place of “Qualified Engineer” throughout the document, adding clarify to the responsibilities of the work covered by this standard.

Limitations

The value for Maximum Factored ice thickness at the mounting elevation, t_{iz}, was increased to 2.8” from 2.75” to align with the current version of TIA-222.

Specific limitations for unbalanced and severely unbalanced loading are introduced in this version of the standard. Section 2.3.1 now places a limit on when the classification no longer applies for unbalanced loading conditions. New Figures 5 and 6 outline the calculations for the user to see if the loading falls within the specified unbalance ratio, or if the situation is severely unbalanced.

Design Forces

Some clarification and a slight change to the application of loading for mounts was done to section 5.1. Design wind force is now to be considered in two different load cases. One at the centerline of the mount pipe, and the other at 10% and 90% of the mount pipe. This ensures that mounts perform when antenna loads are imparted at locations that more accurately represent the load path from typical appurtenance connection brackets.

Mount Assembly Documentation

Three additional items were added to the mount assembly documentation section for clarification both to the contractor and engineer:

- Consideration of climbing facility and safety climb (if applicable)
- Vertical/Horizontal loading symmetry tolerances
- Guidance on acceptable limits of Severely Unbalanced Loading

For clarification on how to consider the climbing facility and safety climb (if applicable) in the design process, refer to the TIF White Paper “Appurtenance Installation Impact to Climbing Facilities and Antenna Supporting Structures”.

Additionally, Section 6 was updated to differentiate between two categories of data:

- Distributed public documentation.
- Documentation that manufacturers maintain.

The intent here is to shed some light on what information is required to be public data for specifiers, contractors and engineers to use and what data is needed to be kept on the backend for in-depth product support.

Procurement Guidelines

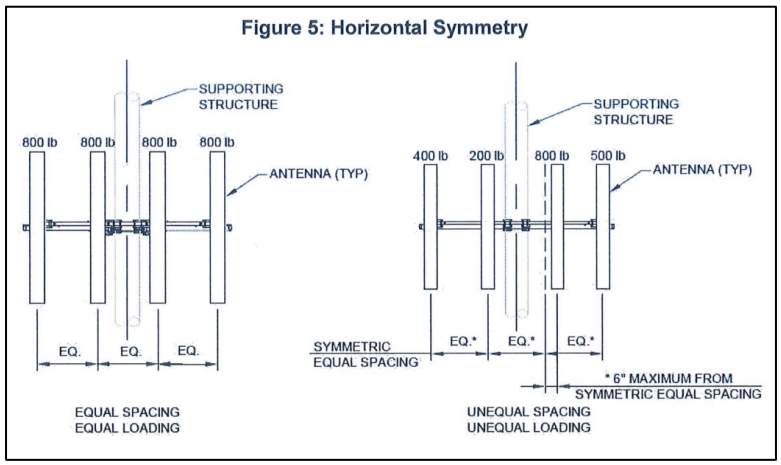
An all-new section 7.0 was also created to give new normative procurement guidelines to assist industry folks who procure mounts on a regular basis. It walks the user through the scope of mount procurement and the four main steps:

1. Define the project scope
    a. Identify the overall aspects of the request (is this a regional request, single site, etc.)
2. Determine the required classification
    a. Follow the 5-step process as outlined to determine the minimum required classification
3. Define the site configuration
    a. Provide data regarding qty of sectors, type of mount, any known structure information (pole diameter and thickness, tower leg size, etc)
4. Product proposal from the supplier
    a. Manufacturer supplies product information in accordance with Section 6.1

Figures

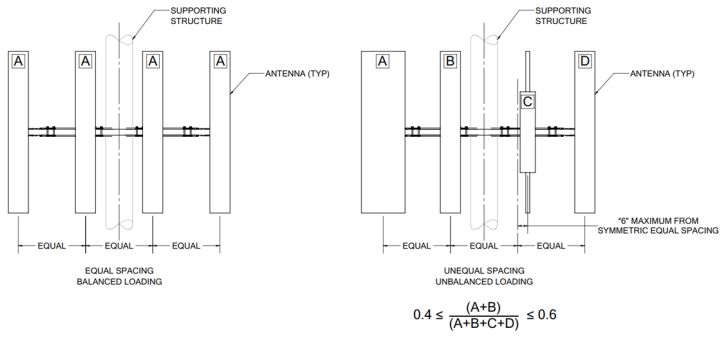
The following updates were made to the included Figures:

- Figures 1-4: No changes.
- Figure 5: Replaced with updated image, better clarifying the unbalanced loading by changing the relative sizes of the antennas. “Equal Loading” and “Unequal Loading” were changed to “Balanced Loading” and “Unbalanced Loading”, respectively. Additional verbiage was added to the note giving the requirements for Balanced and Unbalanced Loading as described in Section 2.3.1.
    - Old Figure 5:



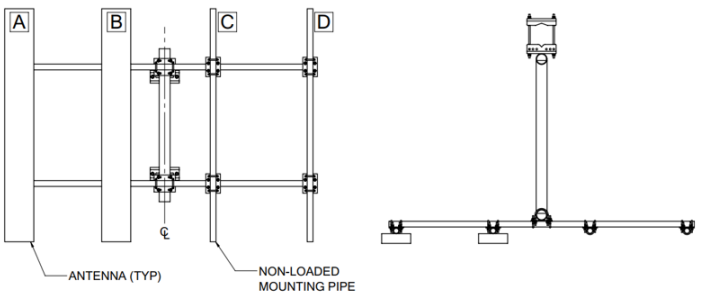
    - New Figure 5:

Figure 5: Balanced and Unbalanced Loading



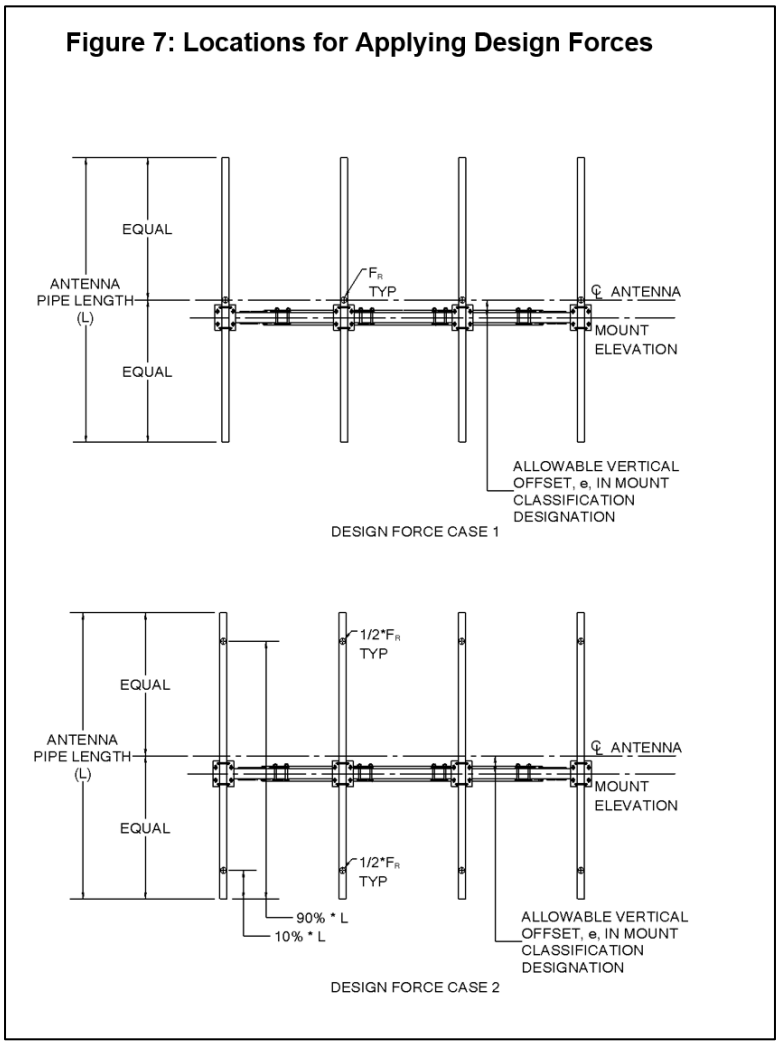
- Figure 6: Details the requirements for Severely Unbalanced Loading as described in Section 2.3.1.
    - Figure 6:

Figure 6: Severely Unbalanced Loading



$$\frac{(A+B)}{(A+B+C+D)} < 0.4 \text{ or } 0.6 < \frac{(A+B)}{(A+B+C+D)}$$

- Figure 7: Locations for applying design forcesas described in Section 5.1.



In conclusion, the authors are very excited about the updates and how the TIA-5053 can be used to procure mounts but also allow for more effective communication between the structure owners, end users, contactors and engineers. It is our firm belief that when each role and their associated responsibility is supported through consistent information that the work quality is improved and the overall safety impacted in a positive way.