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TELECOMMUNICATIONS INDUSTRY FOUNDATION

Effective Application of TIA-5053-A
How Additional Mount Classification Ratings Benefit the Industry

PLANNING ADVISORY NOTICE

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TIA-5053-A, Mounting System Classification has been recognized as the preeminent standard for classifying both new and existing mounts, as well as normalizing mount information from manufacturers. This normalizing of information has benefited end users and contractors through the ability to compare and select mounts based on an understanding of the maximum capacity. It should also be noted that the 5053-A Standard provides benefits for contractors by promoting effective communication on mounts and their installation which, when utilized by a competent contractor, can improve the quality, safety, and efficiency of an installation.

The benefits of the 5053-A Standard may extend beyond the normal use case of maximum capacity for any site-specific location, especially since new mounts will very seldom be utilized at their maximum capacity.

Take for example the scenario introduced with ANSI/TIA-222-I Section 16.5.1 regarding Application of Forces to Structural Models. A new requirement in the 222-I Standard involves checking the interaction between the mount connection and the structure to determine if local effects from the mount connection have a potential negative effect on the structure at the proposed mounting location. To date, most manufacturers publish their largest or highest mount classification, which is an effort to describe the maximum capacity of the product when subjected to the loading conditions set forth in TIA-5053-A. The mount reactions that stem from the classification loading parameters are generally much higher than what are actually encountered in site-specific loading conditions. The end user may never load one of these classified mounts to its maximum capacity and the site-specific wind and/or ice loading parameters are typically lower than what is considered in TIA-5053-A. This desire to convey the maximum capacity for the mount may lead to overly conservative mount to structure connection checks when the combination of equipment and environmental loadings are not close to the maximum values. This is where the information conveyed on a specific mount analysis through TIA 5053-A or ANSI/TIA-222-I will allow the manufacturer or third-party engineer to determine additional mount classification ratings for site-specific considerations. This site-specific rating of mounts at less than full design load will result in lower mount to structure reactions which can reflect more realistic outcomes. One of the considerations would be looking at recent C-Band deployments that were the same based on the end user design across thousands of sites and did not utilize anywhere near the maximum capacity of the majority of new mount designs.

This is similar to looking at towing something with a vehicle and looking at what is actually being towed versus how much can be towed. Let's assume we were planning a beach vacation and bringing a trailer with two jet skis but the only way to the destination required crossing an old bridge that has a weight limit of 15,000 lbs. (see Figure 1).

We have a 7,000 lb. vehicle with a 14,000 lb. towing capacity, and about 1,000 lbs. of other weight in the vehicle (people, clothing, food), resulting in a maximum capacity weight of 22,000 lbs. Does this mean we can't go on vacation or must make some modifications to how we are getting to the destination? Before we cancel plans or consider modifications to approaching the destination, let's stop and

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compare what the total weight of the vehicle is and what actually is being towed, not what the maximum theoretical weight is based on towing capacity. The two jet skis with a trailer weigh 3,000 lbs., so our total combined weight is 7,000 lbs. (vehicle) + 1,000 lbs. (weight in the vehicle) + 3,000 lbs. (jet skis) = 11,000 lbs. total, which is less than 75% of weight limit for the bridge. All is good and we can continue planning to drive because we considered condition-specific parameters not just the maximum capacity.

Figure 1: *AI Generated Photo Using Microsoft Designer*

Now let's work through an example for a mount: a manufacturer may publish a specific mount to have a rating of M1900R(3000)-4[6]. The mount itself can support 1900 lbs. of horizontal load at each mounting pipe combined with 135 psf (pounds per square foot) wind pressure on mount members and 950 lbs. of vertical load per mounting pipe which represents the extreme wind load case. For the extreme ice load case, the mount itself can support 750 lbs. of horizontal load at each mounting pipe combined with 15 psf wind pressure and 2.8" radial ice thickness on mount members and 3,000 lbs. of vertical load per mounting pipe. Those forces exerted over the 4 mounting pipe locations and mount members result in substantial total forces that are often multiple times higher than what the site-specific requirements may call for.

If the manufacturer were to publish mount reaction data at multiple (lower) classification values, the closest value for the site requirements may be selected which will yield mount reactions that are more in line with reality. Better yet, if manufacturers can produce a classification chart for their products, interpolation by the A&E utilizing the data is possible looking at the end user's use requirements.

For example, the mount rated at M1900R(3000)-4[6] may also carry classifications of M1700R(2600)-4[6], M1100R(1400)-4[6], M700R(600)-4[6], etc. So long as the manufacturer also publishes the corresponding mount reaction data with these subsequent classifications, the engineer performing the mount to structure interaction check will have data that more accurately represents the requirements of the site.

Table 1 and Figure 2 show examples of reactions for the lower leg bracket of a sector frame. At the maximum mount rating, the reaction into the structure's tower leg (X) is 15.3 kip (1,000 pounds of force). However, if the site engineer knows only an M1100 mount is needed for the site, the mount may be de-rated and a value of 8.5 kip used for the reaction into the tower leg.

Table 1: Example Mount Reaction Data

5053 Rating		Lower Leg Bracket					
Wind	Ice	X [kip]	Y [kip]	Z [kip]	Mx [kip-ft]	My [kip-ft]	Mz [kip-ft]
1900	3000	15.3	5.1	3.3	1.4	1.7	0.7
1700	2600	13.6	4.7	2.9	1.3	1.6	0.7
1500	2200	11.9	4.3	2.6	1.2	1.5	0.6
1300	1800	10.2	3.9	2.2	1.1	1.3	0.5
1100	1400	8.5	3.5	1.9	1.0	1.2	0.5
900	1000	6.8	3.1	1.5	0.8	1.1	0.4
700	600	5.3	2.7	1.2	0.7	0.9	0.3
500	200	4.4	2.3	1.0	0.6	0.8	0.2

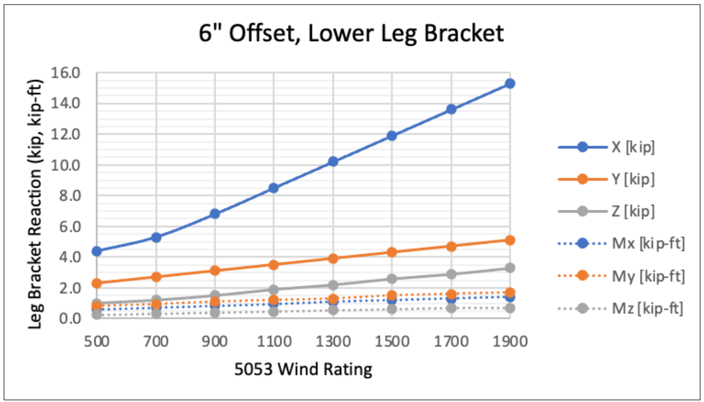

Figure 2: *Example Mount Reaction Data*

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These examples were intended to highlight site-specific or condition-specific scenarios where it was important to consider not only maximum capacity but also actual intended capacity.

TIA-5053-A has afforded stakeholders in the telecommunications industry the ability to consider site-specific conditions due to its effect of normalizing mount information.

Considering actual intended capacities provide potential benefits in two ways; first, by providing financial savings to structure owners and end users. More importantly, by improving the quality, safety, and efficiency of an installation.

DISCLAIMER: *This Planning Advisory Notice (PAN) does not modify, update, or provide analysis of TIA-5053-A. This PAN is an informative notice meant to provide information so that readers have enhanced thought and care in their activities, and to also generate feedback for t he authors to consider.*

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