TIA-TSB-5053

Mount Classification System... What You Need to Know

The TIA-TSB-5053 Bulletin on Mounting System Classification is a comprehensive document. This PAN delves into the different uses for this Bulletin and the benefits it provides to all stakeholders in the telecommunications industry. TIA-TSB-5053 was initiated by a team of people assembled in February of 2014 at a meeting in Champaign, Illinois at the request of some of the industry's carriers, which included four of the major mount manufacturers: CommScope, Rohn, Sabre and Valmont.

TIA-TSB-5053 was created out of necessity due to difficultly when comparing antenna mounts' loading from one manufacturer to another, and concerns that mounts were not being utilized as originally designed. While most of the mounts deployed in the field prior to the deployment of LTE were designed primarily for wind (horizontal) loads, new antenna and radio designs, along with associated additional loads during iced conditions, have significantly increased the dead (vertical) loads on the mounts. It was also necessary to better define maintenance loading. For these reasons, optimum performance of the mount was not achieved because of the arbitrary, often asymmetric, locations of equipment versus how the mount was designed for loading placement. In addition, there was a need to standardize data collection and documentation procedures. Finally, it is critical for our industry to have the ability to forecast more effectively the cost impact of future network upgrades and the need to modify mounts to support these upgrades.

The mount classification system provides assurance that the installed mount complies with industry design specifications. In the past, engineers often specified a new mount with the caveat of "or equivalent", but were not involved in the purchasing process, and there was no means to ensure equivalency for the purchaser. Many mounts installed in the field were fabricated with available parts and the strength of these parts do not meet the "equivalent" mount as specified by the engineer. Under the new procedure specified in TIA-TSB-5053, a comprehensive documentation package is required to accompany newly classified mounts which will also be physically tagged during install for easy identification in the field.

FAILED MOUNT

The mount classification system is also a means to drive consistency between the manufacturers in their conveyance of mount design loading and allow purchasers to easily understand the capacity of the mounts they are buying.

In addition, TIA-TSB-5053 will provide cost savings to mount purchasers through documentation requirements and potential elimination of future mount analysis, when the future loading is within the parameters of the defined classification.

Definitions

The following definitions are provided in TIA-TSB-5053:

Mounting System: a combination of members and components designed to support antennas and associated appurtenances (also referred to as a mount).

Integral Mounting System: a mounting system consisting of multiple sectors or other similar mount arrangements intended to be assembled at a given elevation as an integral structural system.

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IMPROPER CANTILEVER

INCORRECT LEG SIZE FOR MOUNT

OVERLOAD

Maintenance Load: a live load that may occur during maintenance operations.

Mount Category: a letter designation used as part of the mount classification methodology of this technical bulletin that defines the intended application and corresponding strength requirements for a mount.

Mount Classification: a series of designations that define the intended application of a mount and the maximum loads that may be supported by the mount.

Please refer to the TSB-5053 for additional definitions.

Scope

The mount classification system, when properly utilized, will provide a standard identification number for each mount, which will inherently detail the vertical, horizontal, and transverse loads that can be applied to each mount pipe location for extreme wind, extreme ice, and maintenance conditions. The mount will also be classified by category based on its intended use. Category 'R' mounts are the sturdiest and are intended to support loading with similar projected wind areas on the side and front of each mount pipe such as antennas with RRUs, or other similar equipment mounted behind them. Category 'A' mounts are intended to support loading configurations where the front projected area is greater than the side projected area, and Category 'L' mounts are intended to support loading for optional services with no limitations on down time.

There are three ways in which the mount classification system can be used:

1. It can and should be used by manufacturers to classify their mounts. This will allow for clarity in the purchasing process and present added value to the purchaser over time.

2. It should be used by an engineer to verify that future loading changes to the mount are within the mount's classification parameters.

3. An engineer can use this Bulletin to classify an existing mount. When properly managed and supervised this can provide value to the owner of the mount for future deployments.

When evaluating the use of the Bulletin for new mounts, the purchaser should consider the advantage of selecting the appropriate mount classification based on use and location. This is where the cost savings to the carrier will be the most apparent. Because the classification will allow for a load comparison for future additions, the need for a mount analysis each time there is a loading change will potentially be eliminated. It will also provide more transparency amongst purchasers

when evaluating mounts between manufacturers to determine if the two mounts are truly "equivalent".

Maintenance loading is also considered as a part of the TIA-TSB-5053. It is important to note that an OSHA specified man-rating is not considered. There are too many permeations of mounts to ensure true man-rating, however by providing a maintenance load for the mount it will now be more effective for contractors to understand what the mount was designed and intended for. As a result, they will be able to create a rigging plan in compliance with ANSI/ASSE A10.48 and, if necessary, have a qualified engineer review the plan to ensure compliance with ANSI/TIA 322. All involved in the process are seeking to support the competent person on-site creating a fall protection plan that will address the needs for a safe work environment. It is also critical to note that the engineer or manufacturer will more clearly convey the design of the mount to the contractor, allowing for increased efficiency during the planning phase of mount installation and the reduction of installation fault issues due to improper installs.

Before proceeding with any mount classification, one must verify that the site-specific criteria for the mount does not fall outside of the limitations listed in TIA-TSB-5053 Section 2.3. These limitations were created to make mount classification practical while being inclusive of as many situations as possible. There are several limitations that may exclude the use of mount classification including mount elevation, site structure class, exposure and topographic categories, ice thickness, wind speed, and loading symmetry. It is important to note that while a site may not meet the limitations that are defined in Section 2.3, it is still possible to evaluate the mount for classification.

For a new or existing mount classification, the mount is modeled using the procedures and load combinations specified in TIA-TSB-5053, and the maximum design loads at each mount pipe location are determined. These loads are noted as 'F' and 'Fzi', and from these loads nominal forces for horizontal, transverse, and vertical loading can be determined.

When an engineer is checking a classified mount to verify that the final loading configuration meets the existing mount classification, the procedure is done in reverse. The 'F' and 'Fzi' values will already be provided based on the given mount classification and the engineer must determine if the actual forces from the final loading configuration will exceed these values. In order to do so, the engineer must calculate the six separate factored loads (normal, transverse, and vertical for extreme wind and extreme ice conditions), multiply them by the values specified in TIA-TSB-5053, and select the maximum value in 50 lb increments as the 'F' and 'Fzi' values.

FAILED HARDWARE

TIE BACK

In conclusion, we believe that it is an exciting time in our industry. TIA's release of new standards or Technical Bulletin's demonstrates that our industry is seeking to have the tools necessary to address the deployment of networks of today while working towards a solution that will support the network needs of the future.

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FAILED MOUNT

MOUNT OVERLOAD

Table: Mount Classification Identification, Example Mount M1000R(1550)-4[6]

M1000R(1550)-4[6]	Used at the beginning of each mount identification.
M**1000**R(1550)-4[6]	The maximum factored horizontal force, F, considered for design under extreme wind condition at each mounting pipe location.
M1000**R**(1550)-4[6]	Classification category.
M1000R**(1550)**-4[6]	Maximum factored vertical force, Fzi, considered for design under extreme ice condition at each mounting pipe location.
M1000R(1550)**-4**[6]	The mount is designed for four mounting pipe locations.[1]
M1000R(1550)-4**[6]**	The centerline of the maximum horizontal concentrated force, F, may be offset vertically from the mount centerline by up to 6 inches.

Notes: [1]If the mount were intended to be assembled as an integral structural system in a triangular configuration, the mount would be designed for three mounting pipe locations per sector for a total of nine mounting pipe locations for the mounting system. ■