

# **TRAILER SAFETY INDUSTRY COALITION**

December 20, 2004

**To: All Manufacturers of Trailers Under 26,000 lbs. GVWR and Suppliers of Wheels, Wheel Assemblies, and Components**

**From: Jack Klepinger and Bruce Hopkins, Co-Chairs, Trailer Safety Industry Coalition**

**Re: Recommended Industry Practices for Wheel Mounting and Application**

Dear Industry Colleagues:

The trailer industry has noted an increase in recent years in warranty claims for wheel separation incidents. These incidents involve both aluminum and steel wheels on a variety of trailer types. The Trailer Safety Industry Coalition (TSIC) has determined this is an important issue, potentially affecting customer satisfaction, manufacturer's liability, and the industry's image and reputation. The federal government, specifically, the U.S. DOT's National Highway Traffic Safety Administration (NHTSA), has launched on-going investigations into these incidents.

In a cooperative response, leaders of the trailer industry and its trade groups, the National Association of Trailer Manufacturers (NATM), the Recreation Vehicle Industry Association (RVIA), the National Marine Manufacturers Association (NMMA), the National Truck Equipment Association (NTEA), and major wheel, axle, and trailer manufacturers have come together to form a coalition, the "TSIC." TSIC's purpose is to conduct the industry's own investigation into wheel-attachment technology and wheel-separation issues affecting trailers under 26,000 lbs. GVWR and to interact proactively with NHTSA. TSIC's long-term goal is the development of a series of recommended actions, communicating these throughout the industry, to eliminate or significantly reduce incidents of torque loss and wheel separation.

The enclosed list of "recommended practices" represents the product of TSIC's initial efforts. Aimed at vendors of components for the wheel assembly and at manufacturers of trailers and their transporters and dealers, they are recommended guidelines for the assembly of the fastening systems for aluminum and steel wheels. Developed by TSIC's Technical Committee, approved by TSIC, and tweaked following meetings with NHTSA, they present the state of knowledge when published. Early next year (2005), TSIC plans to initiate a testing program to learn more about the forces of clamping and

torque and the effects of paint, lubricants, and varying road conditions on those forces, short term and long term.

Because NHTSA preliminarily has identified such elements as inadequate torque, improper torquing, excessive paint, and poorly engineered wheel assembly systems as potential contributing factors in wheel separations, TSIC has made as its immediate priority the preparation of its consensus-based "recommended practices" to address these suspected problem areas. TSIC strongly recommends that, whether supplier, trailer manufacturer, or dealer, you, as your own immediate priority, should compare your processes and practices with these lists of "do's" and "don'ts" and institute appropriate corrections to conform to these guidelines. If you have questions about this activity, please contact the TSIC (Jack Klepinger (Wells Cargo) and Bruce Hopkins (RVIA), co-chairs) or one of your industry associations, such as NATM, RVIA, NMMA, or NTEA for additional input. If there are technical questions, we will direct you to an appropriate source for assistance.

If you are a trailer manufacturer, these "recommended practices," particularly as they relate to torque and paint, should be communicated directly and clearly to your plant staff and upstream to your transporters and dealers and downstream to your component manufacturers and distributors. NHTSA staff has stated that NHTSA intends to pursue any company about whom it receives even one consumer report of a wheel separation.

These "recommended practices" are available on the following websites: [www.natm.com](http://www.natm.com), [www.rvia.org](http://www.rvia.org), [www.nmma.org](http://www.nmma.org), or [www.ntea.com](http://www.ntea.com). If you would like to participate on the voluntary Trailer Safety Industry Coalition, please contact NATM, RVIA, NMMA or NTEA.

## **TRAILER SAFETY INDUSTRY COALITION RECOMMENDED PRACTICES: WHEEL MOUNTING AND APPLICATION FOR TRAILER USE**

The following "recommended practices"\* have been prepared as guidelines by a technical committee composed of representatives from the National Association of Trailer Manufacturers, (NATM), the Recreation Vehicle Industry Association (RVIA), the National Marine Manufacturers Association (NMMA), the National Truck Equipment Association (NTEA), and a range of steel wheel, aluminum wheel, axle and trailer manufacturers. The Trailer Safety Industry Coalition (TSIC) has tasked this Technical Committee to conduct an investigation into the engineering of the fastening systems for road wheels on trailers and to develop a "recommended practices" document for the assembly of the fastening systems. The Technical Committee provides the guidelines below to communicate these recommended practices for wheel fastening systems. By promoting observation of these practices, the Technical Committee expects to reduce the rate of claims for torque loss on wheel fasteners and the number of wheel separation incidents within the trailer industry.

### **I. Component Guidelines**

1. Surfaces of contact on an aluminum wheel (the nut seat and the mounting surface) must be free of paint, contamination and damage. Smooth, clean surfaces provide the most uniform clamping pressure and best retain torque.
2. Surfaces of contact on a steel wheel (the nut seat and the mounting surface) must be free of excessive paint, contamination and damage. Smooth, clean surfaces provide the most uniform clamping pressure and best retain torque.
3. Surfaces of contact on the axle (the flat hub surface and the threaded studs) must be free of excessive paint, oils, grease, contamination and physical damage.
4. Lug nut geometry must match that of the wheel nut seat. The threads and nut seat must be free of paint, oils, grease and other contamination.
5. Stud length must be sufficient that, after mounting the wheel to the hub, the lug nut is engaged to a depth at least equivalent to the diameter of the stud. For example, a lug nut threaded on a ½ inch diameter stud should thread on for a depth of at least ½ inch.

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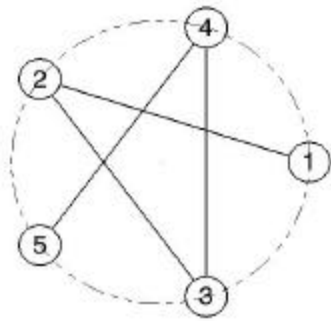
\* These recommended practices represent the state of knowledge when published and may be amended as additional information becomes available.

## **II. Assembly Guidelines**

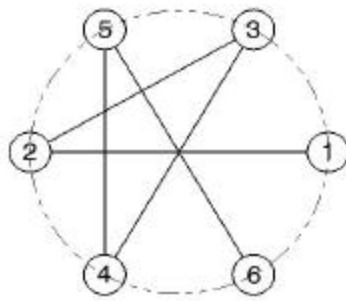
Assembly of the wheel onto the hub is a critical, safety-related process. The proper method of assembly and the consistency of the torque applied to wheel fasteners are important factors in ensuring reliability of the fastening system and retention of the wheel to the trailer. The trailer manufacturer, distributor/dealer, and end user must consistently follow proper torquing technique in order to ensure the hub and wheel are properly seated and use caution to prevent anything from interfering with the flat, full designed mating contact of wheel mounting surface and hub. Excess paint, oil, and grease must be removed from the fastener contact surfaces (the mounting surfaces, studs, and lugs) or not applied at all. Adherence to the recommended "do's" and "don'ts" set out below will minimize the likelihood of fastener torque-loss and wheel-separation.

### **DO'S:**

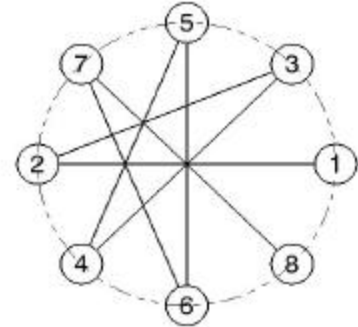
- Obtain confirmation from each component manufacturer that its component/s is/are appropriate for the application, meets the appropriate component guidelines and is/are compatible with the other components in the wheel system
- Develop and distribute a list or manual of proper assembly and torquing procedures consistent with these guidelines and specific technical information provided by component manufacturers
- Train appropriate personnel (factory and field) in proper assembly and torquing procedures
- Insist on consistent, strict adherence to these assembling and torquing procedures
- Conduct and document regular audits or checks to verify compliance with assembly and torquing procedures
- Investigate and correct any obstruction at the center bore of a wheel, resulting from a poor fit between the ornamental cap and the wheel
- Remove all oil and grease from threaded fasteners (studs and lugs)
- Mask or shield (cover) all fastener contact surfaces (mounting surfaces and studs) before painting axles, whether for improved cosmetics or for corrosion protection
- Only use an impact wrench with torque stick as a tool initially to lightly secure the wheel, applying a criss-cross or star pattern (see diagram below)



5 LUG BOLT  
PATTERN



6 LUG BOLT  
PATTERN



8 LUG BOLT  
PATTERN

- Use a calibrated torque wrench to complete the torque fastening process, applying the same criss-cross or star pattern
- Retorque periodically during the trailer's initial towing and thereafter in accordance with the component suppliers' recommendations
- Maintain records of the maintenance and torque checks performed by transporters, noting any loss of torque or any corrective measures taken
- Investigate any customer claim involving wheel loss

#### **DON'TS:**

- **DON'T** deviate from the component manufacturers' recommendations regarding compatible components without a competent engineering review
- **DON'T** substitute any component for the components the suppliers have specified without a competent engineering review
- **DON'T** deviate from the component suppliers' fastener torque specifications, where provided, without a competent engineering review
- **DON'T** use adhesive products to maintain fastener tension
- **DON'T** use lubricants or oils on threaded fasteners (studs or lugs) to make applying the torque easier unless assembly specifications require it
- **DON'T** apply any additional paint on fastener contact surfaces (mounting surfaces/hub faces or studs)

### **III. Important Note and Disclaimer**

The design, manufacture, assembly, and maintenance of running gear, wheels, and fastener hardware must be performed under controlled conditions and as part of a system of quality control practices. This system works best when there is constant communication and flow of information between and among component manufacturers, their distributors, trailer manufacturers, transporters, dealers, and end users.

The Trailer Safety Industry Coalition (TSIC) has produced these "recommended practices" as voluntary guidelines to clarify and assist in the proper selection, preparation, assembly, and maintenance of components for steel and aluminum wheel assemblies. These Guidelines do not purport to state that any particular type of component or product should be used in any specific application or that any particular practice, procedure, or methods will not achieve as good or better results, depending upon the particular circumstances involved. The user of these Guidelines, whether manufacturer, distributor, or assembler of these products, has the responsibility to select the proper components for the application intended, perform appropriate process controls, and exercise sound management oversight within its respective operations. The TSIC and its respective members expressly disclaim any responsibility for any specific result relating to the use of these Guidelines, for any errors or omissions contained therein, and for any liability for any loss or damage arising out of their use. Those using the Guidelines agree, as a condition of their use, to release the TSIC and its respective members from any and all liability, claims, losses, or damages of any kind or nature arising out of or relating in any way to their use.

The TSIC expressly reserves the right, in its sole discretion, to update, revise, amend, and otherwise modify these Guidelines from time to time as it sees fit and to do so without furnishing specific notice, or the revised edition itself, to prior recipients of the Guidelines.