

# The Truth About Nuts & Bolts

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There have been a lot of articles, books and seminars that cover the nuts and bolts of this or that. Well, this might come as a shock to many of you, but this is actually an article *about* nuts and bolts and their use. Throughout my many years of working and consulting in shops, I have seen many technicians reusing nuts and bolts that, in many cases, should have been discarded in favor of having new ones installed. Over the years, the recommendation was to replace all of the hardware on replaced suspension parts for safety and liability issues, but you might be surprised as to the position of what the OEMs say about the replacement of nuts, bolts and clips on multiple areas of the vehicle. Up until about five years ago, there was very little repair information available for collision repair technicians as to what hardware needed to be replaced. In the last five years, OEMs have made available their repair procedure manuals online either for free or “pay per view.” In the past few years, Alldata and OEM Information Providers have added an all-new collision repair information service to their mechanical services. If you have recently looked at an OEM or the Alldata web site and chose a vehicle to look at, you might have been surprised at some of the procedures that are there.

Let's take a look at some manufacturers' required procedures.

The following are some examples from Ford, Audi, GM and Toyota:

**Body support fasteners:** New fasteners must be installed for each body support fastener that has been removed or loosened. These manufacturers do not allow reused body support mounting fasteners.

**Lubrication:** Body support fasteners should not be lubricated prior to installation. This changes the friction factors of the bolts allowing unwanted over-tightening.

**Bumpers:** The front bumper cover-to-front bumper bolts must be replaced with new bolts. *NOTE:* Anytime the rear bumper nuts are removed, discard and install new rear bumper nuts.

**Suspension:** Fasteners are critical parts because they affect performance of the vehicle. Failure of suspension hardware can result in major service expense or, more importantly, a loss of control during operation. A new part with the same part number must be installed if suspension fastener replacement becomes necessary. Do not use a replacement part of lesser quality or substitute design. Torque values must be used as specified during reassembly to make sure of correct retention of these parts. Remove and discard the wheel-end nut. Discard the tie-rod nut. Discard the upper ball joint nut.

**Outer body:** Assuming clips do not fail during removal, new replacements should be used during reinstallation of components. New attachment clips must be installed whenever the pickup box is removed. All eight-foot beds will have eight attachment clips. All other beds will have six attachment clips. Install new attachment clips before reinstalling the pickup box.

One of the reasons for replacement of hardware is corrosion. Contact corrosion may occur if unsuitable connecting elements (bolts, nuts, washers and so on) are used. For this reason, only connecting elements with a special surface coating are installed (Dacromet). These elements are distinguished by their greenish hue. Furthermore, all rubber, plastic and adhesive materials used are non-conductive. If there is any doubt about the reusability of parts, always install new replacement parts. When repairing an Audi, only use genuine Audi replacement parts. They are tested and aluminum-compatible. Damage via contact corrosion is not covered by warranty!

It is interesting how each manufacturer notes what can be reused and what cannot be reused along with what bolts or nuts need to be coated for corrosion protection; usually this is for steel to aluminum contact to prevent galvanic corrosion. This special coating will be covered later in this article.

Fasteners fail for many reasons; fatigue cracks and loosening are the more common reasons. Fatigue is a stress failure caused by cyclic stress. Such stresses are often caused by the loss of “preload.” Preload is produced by the bolt torque specified at the initial installation. This means that loose bolts may not only fall out, but can crack due to flexing of the parts they

are supposed to secure. Another issue is the use of zinc-coated bolts, which can be inappropriate as the zinc coating acts as a lubricant. As stated earlier, lubricants make it too easy to exceed the specified torque when preloading. The excessive preload places increased stress and tensile overload on the bolt that may accelerate failure.

In some cases, torqued bolts that have been checked regularly during service may still become loose. This may be because the bolts were secured with a liq-

uid thread-retaining compound. This compound makes the torque check results false, as no loss of preload torque or looseness would show. Vehicle manufacturers will usually require a "dry" or non-lubricated torque value. If a locking compound or lubricant is used, then there will be a "wet" torque value. The use of zinc-coated bolts or liquid thread retaining compound is inappropriate in any location where bolt torque, preload and condition are to be maintained to ensure proper torque, unless otherwise specified

in the repair procedure.

For example, you would never add a lubricant to a lug nut and stud for a wheel assembly. Doing this could cause the lug nuts to loosen, resulting in a disastrous outcome.

Engineers specify nut and bolt grade, installation and maintenance during the design phases of vehicle manufacture. Replacement of these nuts and bolts should all be in accordance with these engineering specifications and standards as recommended by the OEM. Re-torquing and examination must be maintained as per these engineering standards and the manufacturer's scheduled maintenance requirements. Any bolts found to be loose or showing signs of fatigue must be taken out of service immediately and replaced. Some manufacturers recommend that applicable bolts be replaced when torque specifications cannot be maintained or a defective bolt is identified. Due to these standards, there is a good practice that you can follow.

As per the OEM engineers:

- Always check OEM (Alldata) torque procedures and recommendations.
- Replace hardware when required by the OEM or when supplied with replacement parts.
- Replace nuts anytime they are loosened or removed.
- Replace nylon locking and crush nuts anytime they are loosened or removed.
- Replace any hardware that utilized locking compound. (e.g. airbag, seat and steering column hardware)
- Replaced any non-adjustment related suspension bolt or nut following loosening or removal.
- Replace bumper reinforcement (steel or aluminum) nuts and/or bolts.
- Do not reuse any bolt or nut that attaches steel to aluminum. Fasteners that secure dissimilar metals use specialized anti-corrosive coating such as Dacromet, which are proprietary water-based coating dispersions containing metal oxides, metallic zinc and aluminum flakes that form a metallic silver gray coating. Dacromet coated bolts are often seen on bumper reinforcements and suspension

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parts when aluminum parts are attached to steel parts. For more information on the benefits and capabilities of Dacromet, check out their website at [www.dacromet.com](http://www.dacromet.com).

We hope this article has cleared up some of the issues regarding reusing hardware and fasteners. When in doubt, it would behoove you to just replace the hardware in question. By doing so, you protect the customer, reduce comebacks and limit your liability. When replacing suspension, steering and airbag hardware, it is important to not only replace the fasteners with new ones, but also follow the manufacturer's installation and pre-load (torquing) procedure. If you get nothing else from this article, know that you put your business and your customers at risk when you choose to re-use hardware that requires new replacement by the vehicle manufacturer.

*Feel free to contact us at any time if you have any questions that I could help with.*



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