A Cautionary Tale

by Rick Astley

Three or four times a year, my wife Anne and I drive to visit our son and his family who have lived, for the past 11 years, just north of Albany, NY. That means we have made the journey many times, using the same route and now know the road well, so well in fact that I can tell you the exact distance: it's 572 miles.

Last Christmas, we were prepared for a bad journey. Every winter the I-90 from Buffalo to Syracuse is subject to lake effect snows which can make driving very hazardous; we have even been affected by it in October. The weather forecast for our chosen travel day in December 2012, however, was particularly bad and so I took the precaution of having the tires rotated and checked the day before leaving. This is a free service provided for the life of the tires by the shop from which I bought them. I won't name the establishment for fear of reprisals, but it is a local franchised general service shop that carries the name of one of the major tire companies.

As I said, rotation and balancing is free, so I was surprised when picking up the vehicle, a 2004 Ford Explorer with about 65,000 miles covered, to be presented with a bill for $125. They explained that a rear lug-stud had broken when they were refitting the wheels and the charge was for the cost of parts and labor for its replacement. I argued that they must have over-tightened it but, they insisted, the cause was rust. Of course, it turned out that they'd trashed the offending stud and I could not see it for myself.

The next day we set off for up-state New York and, for a change (and sadly), the forecast was spot on. The I-90 was covered in ice and snow and its median and shoulders were littered with vehicles that had spun out. Things got better once we were around Utica and past Lake Ontario and we were naturally relieved when we were on our last leg, which is the I-87 north from NY to Montreal. My son's home is just a mile from the highway ramp but at mile 570 from our home, with just 2-miles to go to my son's, the rear of the car began to wander. The pavement was dry and I remarked to Anne how undulating its surface must be to cause the car to do that. We were slowing down anyway to exit the highway and evening rush-hour traffic forced us to drive at about 25 mph for the last mile. As I pulled into the driveway and braked to a stop, there was a kind of thump, which I thought little of.

My son always insists that we relax while he brings in the bags from the car. However, he brought in more than bags this time. He'd seen something shining in the lit driveway close to the rear of my car and picked it up. It was a lug-nut with part of a stud still screwed to it. Upon inspecting the wheel, I was alarmed to see that it was only one of two studs that had broken.

Found in the driveway

What happened? Educated guess work, including that from people better qualified than I, is that one stud broke and that's when I felt the car begin to wander as the affected rear wheel began to wobble a little. That put strain onto the remaining 4 studs and one of those broke as I came to a stop in the driveway only 2 miles later. The scary part is, what would have happened next if, instead of being at the end of our journey, this had happened much earlier on? Failure would have been progressive, with the entire load now on only 3 studs, each of which would probably break in rapid succession with the loss of a wheel as the end result. And what then? The consequences don't bare thinking about.

Our journey home was delayed because we had to find a service shop open the day after Christmas to replace the studs, making me poorer again by $160. The same rear wheel now had 3 new studs, one changed at home and two in New York, but that meant it still had 2 suspect ones. During the return journey, I was therefore especially attentive to every movement and noise from the car. On returning home, I bought 20 new studs and changed every one on the car, an arduous, but I thought necessary undertaking, even though I parted with yet more money, about $50. I have also now sold the vehicle.

I'll never prove that the tire shop over tightened the lug nuts, with possible risk to our lives, but I'm certain that the one that was found in my son's driveway didn't fail because it was part eaten through with rust; any corrosion being very superficial and confined to the outside surface. I do know that my story isn't unique. Having discussed it with others in the club, I have heard similar, but thankfully, less distressing stories.

The broken end of the stud

The problems of over-tight lug nuts that others reported to me were fortunately not so life threatening. Their problems were to do with the near impossibility of removing the nuts when they needed to change a wheel while on the road. Whether it's your regular car or your British sports car with bolt-on wheels, I can only advise that if a service shop has occasion to remove and replace your wheels, you back the wheel nuts off and re-torque them yourself as soon as possible afterward. The ½" wheel nuts on the Explorer should be torqued to 100 ft-lb, and the $^{7}/_{16}$" wheel-nuts for most MG bolt-on wheels require 60 to 62.5 ft-lbs. If, as is the case with the Explorer, the provided tool kit for changing a wheel on the road includes a pathetic 6" long wrench, then undoing a wheel nut tightened to specification requires that a 200-lb person bounce on the end of it to loosen it. If it's over-tightened, then you may never release it with the provided tool

Has irreparable damage already been done if the wheels-nuts are over-tightened? It's hard to say because it depends on the individual lug-nut and the degree of over-tightening. However, my experience seems to indicate that it may have been the initial over-tightening plus the added stress that subsequent long distance driving puts on the studs that caused the failures and that had I torqued them back to specification before I left, they may not have succumbed. Who knows, but at least we're here to tell the tale.

More on, "A Cautionary Tale" and Making Sure Your Nuts are on the Correct Side

by Rick Astley

I had quite a response to the article published in July's Can -Am Connection titled A Cautionary Tale concerning over -tightened lug nuts.

Harry Mac Lean annotated my picture of the broken stud, which I blamed on over -tightening, with arrows pointing to where he noted the thread is torn -up due to the lug -nut not being in proper contact with the wheel, which is the possible consequence of under-tightening. That thread damage could have occurred at any time during the life of the car and I was amiss in only discussing the perils of too much torque being applied during wheel installation. Of course, a loose wheel is equally dangerous. Harry, and others, also related stories concerning over and under -tire inflation by workshops; again something I should have warned against.

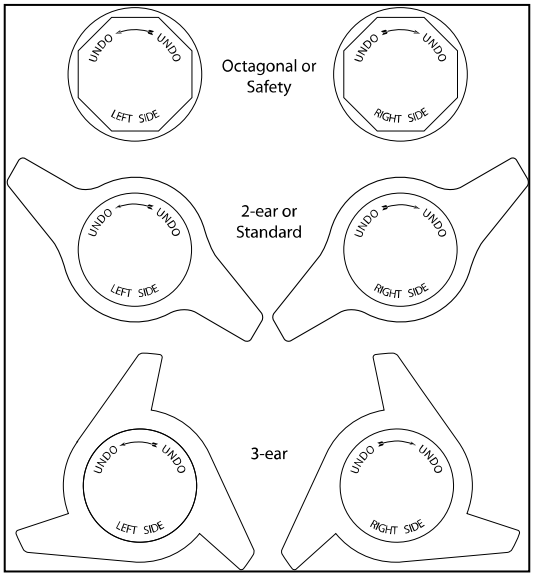
The broken end of the stud

On the other hand, several members told or wrote me that they had every confidence in their tire shop, telling me that they had observed a double -check or similar process in which a Goldilocks mechanic makes doubly sure that the wheel nuts and tires are, like the baby bear's porridge, 'just right', in torque and pressure; neither over nor under done.

In so far as MGs are concerned, July's article was only relevant to cars having steel or aluminum -alloy wheels retained with lug nuts. Those members having cars with spoked wheels will know that their wheels have single center -fixing, or so -called 'knockoff', nuts. Although I could not resist the schoolboy humor in the second line of this story's title, the side of the car onto which these nuts and hubs are attached, is a very serious matter as Lee Jacobsen relates:

" ….. that reminds me of an adventure when I first bought my 45 TC back in 1979. I was cruising down I-275 at around sixty when I felt a thump. I looked to the left, and there was my left rear wire wheel, keeping pace with my car! I leaned over far to the right to balance the car on three wheels, and slowly stopped on the side of the freeway, perplexed and relieved to be in one piece. A Michigan State trooper saw the whole thing, said the knockoff fell off the rear wheel, just jumped off the axle, cleared the rear fender, and rolled on for another quarter mile. He retrieved the wheel, and, since I did not have a jack, the trooper manually lifted the TC while I reattached the wheel, and secured the knockoff. At that point I knew why it had failed. The previous owner had installed the rear axle backwards! The knockoffs on the rear wheels were reversed and were becoming loose, rather than tight, each time I took off from a standstill. Needless to say, I thanked the officer profusely, and very slowly made my way back home. No wheels have fallen off my cars since then…"

Besides Lee's scary experience, I and at least two other members can report finding that a previous owner installed left and right hubs reversed, fortunately without loss of a wheel. We don't need to go deeply into Newtonian physics here, but as Lee says, every time the car moves from a standstill, there is a tendency for the knockoff (for the driven rear wheels) or hub (for the front wheels) to react in the opposite direction to the other to which it is screwed, and should that direction be one that undoes the nut, then it may eventually loosen to the point where the wheel falls off. The tendency is greater for eared wheel nuts that have a larger mass, much of which is further from the center than that for a 'safety' nut. It also seems logical that the rear wheels are more vulnerable because the un -driven front wheels only have to accelerate relatively lightweight hubs. So why doesn't hard braking cause the opposite effect? Mmm, good question, to which someone else out there can perhaps supply the answer. Whatever the physics, all wire wheel hubs and nuts are left or right sided, as the illustration shows. Note that the left side nuts attach with a standard right -hand thread, and those on the right side with a left -hand thread.



In my case, unlike the illustration, my original knockoffs were not marked 'Right Side' or 'Left Side' as most replacements seem to be. Mine simply had the word 'Undo' and the directional arrow. I did, however, notice that the arrows for the front and rear wheels on the same side pointed in different directions. On checking the correct knockoff direction, I found that it was the rear hubs that had been reversed.

As swapping them on my 1970 roadster required I purchase a $1\ ^{15}/_{16}"$ A/F wrench — an uncommon item in an amateur's toolbox — I'm guessing the hubs were incorrectly installed by a professional shop.

MG folklore says that if you tow your car, the gearbox's rear bearing will not receive the active lubrication it does when the engine, rather than the rear wheels, is doing the driving. If that persuades you to tow your MG backwards on a dolly behind your Winnebago, Steve Finch warns that the result might be that the knockoffs fall off, because in this situation, they are rotating the wrong way. That seems to me like a damned if you do, damned if you don't scenario.

Should you decide to check the orientation of your knockoffs, and find them wrong, remember, I have a $1\ ^{15}/_{16}"$. A/F socket wrench gathering dust.