



Naval Safety Center

LESSONS LEARNED



LL 20-29

OFF-DUTY VEHICLE MAINTENANCE MISHAPS

Have you ever watched one of those car fixer-upper shows where the two hosts rebuild a classic car engine in an hour-long episode? All the old parts come off so easy, and everything fits just right on the first try (*note: they also wear all the required PPE, but we'll get to that in a bit*). If only the reality of do-it-yourself (DIY) auto maintenance happened in that same accident-free and time-accelerating setting. The unfortunate truth is, things just don't always go like they should. Those unplanned trips to the auto-parts store, the busted knuckles, stripped bolts, and the lost socket in the bowels of the engine compartment have become a right of passage for many of our warriors turned part-time home auto mechanics. For some, a seemingly routine project ended in serious injury and lost work time that could have been avoided with some ORM, PPE, and just plain slowing down and thinking things through.

We found more than 80 mishaps in the Navy and Marine Corps since FY 2017 that occurred while Sailors and Marines were working on their vehicles. We'll spare you the pie chart, but here are the top injuries and causes from our database: Coming in at number four, "dropping parts" accounted for 12 percent of the mishap causes, with "falling jacks and jack stands" third with 15 percent. "Knuckle busters" scored second with 20 percent of the mishaps and cuts led the way with 22 percent. The remainder of the injuries were "burns," "objects to the eyes," and "dropping hoods on heads and hands." Most of the injuries reported were preventable, but they happened nonetheless. Sailors and Marines — who likely use maintenance cards, apply ORM, and wear PPE while on duty — didn't remember, or think it necessary, to do the same while performing equally hazardous work in their garages. Please continue reading, and learn from our DIY "mechannots," and the misfortunes that landed them in this lesson learned.



- A Sailor was repairing a fog light on his car. He put the hood up, but he did not secure it properly (*as he soon learned the hard way*). As the Sailor let go to continue his work, the hood promptly fell on his hand, fracturing it and leading to one lost workday for surgery followed by 36 days on light duty. — *This song lyric from the movie Frozen comes to mind, "Let it go, let it go, can't hold it back anymore..." But first, make sure the hood prop rod is secure and your body parts are out of the way, then you can let it go.*
- A Sailor was jacking up his car to change the front right tire (*easy enough procedure, right?*). Well... at some point during the operation, the Sailor noticed the jack "might slip into a hole." According to the report, he "placed his hand into the hole to verify the jack wouldn't slip." While his hand was in the hole, (*and the reason you're reading about him here*), the jack slipped just like he thought it might, and it pinned his left hand. Trapped like an arctic fox, our Sailor refused to let the predicament get the best of him. With more available options than the fox (*well...at least one*), the Sailor used his free hand to retrieve his phone and dial 911. The local fire department arrived, removed the car / fox-trap, and rushed the Sailor to the emergency room where he was found to have nerve damage and lacerations on his left pinky and ring finger. — *Five months on light duty was likely more than ample time for our single-handed car jack stability tester to contemplate his methods. Make sure that the jack is on stable ground ladies and gentlemen, without sticking your hand under it.*
- In another car-jacking (*maintenance, not crime*) mishap, a Marine was working under his car while it was on jack stands (*you probably know where this story is going, but let's play it out*). As he worked under the car, it rolled forward and fell off the jacks, "dropping on Marine," the report states. Additional facts: the car was not on flat, level ground, and he didn't use wheel chocks. He received a fractured cheekbone, nerve damage, seven lost workdays, and 19 days on light duty. — *All for not using wheel chocks. Thankfully he wasn't working alone, so his buddy was there to save him. If your vehicle isn't already equipped with wheel chocks, buy a set. Their low cost is worth the savings in pain.*

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- *The DIY auto maintenance folks will know what's going to happen in this one just by the mention of these two words — spark plug.* Yep, the classic knuckle buster. A Sailor was at a friend's house helping him change the spark plugs in his car, and after successfully changing the first two plugs, the third time wasn't a charm. The Sailor placed the ratchet and socket on the spark plug and applied as much force as he could to break the spark plug free (*some time-critical risk management would have come in handy here*). As the Sailor pulled on the ratchet handle, the socket slipped off of the spark plug, and the Sailor's hand struck the engine. X-rays revealed a fractured left fifth metacarpal in two locations. This socket-slipping Sailor earned a month on light duty for his overzealous wrenching.

- A Sailor was "working on his vehicle with a soldering iron with no PPE," (*sigh*). When the Sailor went to retrieve another tool, he didn't realize the soldering iron was on the ground and plugged in. The report doesn't say how long the Sailor was gone retrieving the tool, but, *Dude, you were just soldering on your car!* When the Sailor returned, he stepped on the soldering iron with his bare feet (*double sigh*), and burned his right foot. — *Working in a garage environment in bare feet is just not a good idea as our fire-walking Sailor demonstrated. A burned foot and seven days on light duty probably weren't worth the "no shoes, no problem" policy in this Sailor's garage. Shoes are PPE too folks.*



- A Sailor was working on an autocross car in his driveway and overlooked a piece of metal pointing out from where the bumper was removed. As the Sailor walked around the front of the vehicle, he contacted the metal, causing a six-inch laceration along the side of his right calf. — *While our "autocross-cut" Sailor only earned one day on light duty and an unreported number of stitches, he'll likely be more careful when moving around partially disassembled cars in the future. Let's all learn from his pain also.*

Key takeaways / Lessons Learned

The Naval services have maintenance cards, PPE requirements, ORM, and safety measures to make sure we work properly and safely. The hazards that exist on the flight line or the motor pool don't disappear in your home garage or driveway, so don't leave your safety culture at work. Make it a part of your auto-mechanic toolbox at home too.

1. Don't take shortcuts with jacks or stands if you're going to work under a two-ton chunk of metal.

- A. Choose a level, stable surface that will support the weight of the vehicle. **Always** use chocks to keep the vehicle from rolling when using jacks or stands.
- B. Use the owner's manual for the proper location of lift and jack stand locations.
- C. Never use a jack to support a vehicle, they are for lifting and lowering only. Use a jack stand that is rated for the weight of your vehicle.

2. **PPE isn't just for on duty.** Turning a wrench is turning a wrench, no matter where you're doing it. Long sleeves, long pants, and (as demonstrated above) shoes should be on the list in addition to the traditional "eye-pro" and gloves.

3. **Plan for the inevitable.** That's another way of saying, "apply ORM." If you find yourself cranking hard on the wrench to loosen that nut or spark plug, take a minute, have a sip of lemonade, and plan for the knuckle buster. Try a heavier pair of gloves, or place padding where your knuckles are most likely to fly if, and when, that wrench lets go. If removing heavy parts, it might also be wise to not do it right above your face.

4. **Nuts and bolts (the bottom line).** On your next auto maintenance venture, take a minute to assess and mitigate any risks, protect yourself, and think it through. Happy wrenching!

This product is posted on the NAVSAFECEN CAC-enabled website <https://intelshare.intelink.gov/sites/nsc/Pages/default.aspx> and on the public website <https://navalsafetycenter.navy.mil/Safety-Promotions/Lessons Learned>.

And remember, let's be careful out there...