

# Lock Nut Protector Disc

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**Abstract:-** This Document is for the presentation of a new Safety feature of the automotive industry for better safety of the wheels and lock nuts to provide a safer journey. This Project will help mainly those who do not service & maintain their vehicle regularly. Now the vehicle can go without servicing for some extra kilometers in an emergency case. This document is created in Microsoft Word 2010.

**Key Words:** Automobile Safety Features, Wheel Safety for vehicles, Lock Nut Protector, Lock Nut safety feature, Latest Features in Automotive industry.

## 1. INTRODUCTION

Lock Nut is a nut which locks the wheel on the stub axle by the threads in the nut, the nuts are tighten at a required torque, after a certain period of time these nuts require servicing in which they need to be tighten at the same torque again as the vehicle create lots of vibrations which can loosen them slowly. Many people do not service/maintain their vehicles for a long period of time, e.g. Buses, Rickshaws etc. Due to poor servicing and rash driving the vehicle can create a lot of vibrations in the chassis which can be transferred to the wheels also. The vibrations in the wheel can unscrew the Lock Nut and due to the loosening of the Lock Nut the wheel can be easily dismounted and also there are chances of the wheel getting separated from the vehicle and this situation can turn into a major accident.

### 1.1 Accidents due to loose Lug Nuts

A number of accidents are caused and occur more often than people think as a loose lug nut/lock nut can separate the wheel from the vehicle and cause a major accident to the vehicle from which the wheel is separated as well as to the other vehicles and also to the pedestrians.

## 2. Reference Articles for Accidents

<sup>1</sup>This article is referred from [www.injurylawyernj.com](http://www.injurylawyernj.com).

Earlier this spring, on Route 17 in Ramsey, New Jersey, a wheel fell off a 2009 Lexus and bounced into the path of a bus carrying 50 passengers. The wheel crashed through the windshield of the bus, seriously injuring at least one passenger. While this may seem at first glance to be a freak accident, these sorts of events do appear to occur with some regularity. Just months ago, a woman was killed and her child critically injured when a wheel flew off of a boat trailer traveling on Interstate 690 near Syracuse, New York.

Similarly, several years ago, a woman was lucky to escape injury when a wheel fell off of a Chevrolet traveling on Route 17 near Paramus, New Jersey and smashed into her windshield.

<sup>2</sup>This article is referred from [www.meaforensic.com](http://www.meaforensic.com).

When a wheel separation occurs on a highway, the separated wheel is hardly slowed down. The approach speed between the now bouncing projectile and oncoming vehicles can easily exceed 100 mph. *Figure 1* shows damage to an SUV that was hit head on by a pair of escaped heavy truck wheels.



Figure 1. Front-end damage from head-on impact with separated dual heavy truck wheels.

**Fig -1:** Accident due to wheel separation.

The most common reason for a wheel to separate is failure of the fasteners, where wheel nuts fall off and/or wheel studs break and release one or two wheels from the vehicle. These failures generally occur 175 to 3000 miles and one to fifteen weeks after a wheel was taken off and put back on during some service, such as a tire installation. *Figure 2* shows a wheel stud and the hole of the wheel that it was in. The stud threads left an imprint in the aluminum wheel and there is aluminum embedded in the stud threads. The stud is not broken.



**Fig -2:** Wheel stud.



**Fig -2.1:** Wheel hole damage after 21 days of installation.

Figure 3 shows a badly corroded wheel which was separated because the rust deposits were not cleaned off properly before re-installation of the wheel. There are ample warnings for wheel installers to clean wheel surfaces before re-installing a wheel to prevent corrosion and dirt from imperiling the clamping force. Cleaning the wheel interfaces is normally done with a wire brush just before installation. This mistake can be dangerous as the rust can easily reach the nuts and the studs, and they can be easily loosened due to the rust deposits and the wheel can be separated.



**Fig -3:** Badly corroded disc wheel.

Figure 4 shows the condition of a SUV whose left rear wheel got separated due to loose lock nuts/lug nuts, all of the five nuts were missing as the wheel came off and caused a major accident as the driver lost control over the SUV and it rolled due to lost control. Such accidents can occur due to loose fasteners or loose lug nuts/lock nuts which can unscrew automatically due to vibrations coming from the engine or the road shocks due to rash driving.

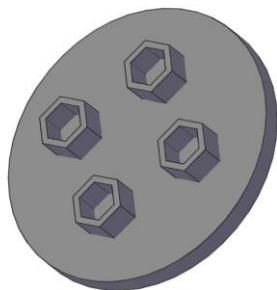


Figure 4. Eyewitnesses observed the left rear wheel separate from this SUV before it lost control and rolled. All five nuts were missing from the wheel studs of the left rear wheel.

**Fig -4:** Wheel separated from a SUV

### 3. SOLUTION

A new and better design is created by me, which will be completely made up of rubber or silicon for better grip and better dissipation of vibration which will result into better protection of the Lock Nut, namely "Lock Nut Protector Disc". The image of the disc is given below, *Figure 5*. The hexagonal tube like structure will perfectly fit into the nuts and will cover them and lock them as the tubes will be the part of the disc and will be connected very rigidly, the disc will be perfectly hard, not too soft & not too hard so it will automatically lock the nuts in their place. This particular design is created for the Disc wheels as they have space for the protector disc unlike the alloy wheels. A special design can be created for the alloy wheels as they have a different structure.



### 3.1 MATERIAL

Rubber or silicon will be the best suitable material for this disc as rubber can easily help in reducing the impact of vibrations on the nuts and it also provides a better grip due to

friction on the surface. It can also be molded into any shape and size easily.

### 3.2 EXTRA PROTECTION

An extra Metal sheet (Designer metal sheet for better look) can be added to give extra strength to the disc in case of failure, if a metal disc is added to the top layer of the Disc then the twisting of the disc can be avoided and this will make it more strong and it will rigidly protect the nuts and itself from the vibrations and road shock due to which it can be useful for a longer run and the nuts will be protected so you can be reliable without worrying about the servicing in any emergency situation.

### 4. LEGAL ACTION

In case of such accidents of wheel separation if someone's property is damaged or any person is injured in the accident then the person can file a case against the driver or owner of the car which can bring the owner of the car in trouble for not maintaining the car properly. This can happen to anyone and anytime, even it's not your fault. Just because of some loose lock nuts someone can get killed or injured and then the driver or the owner would suffer, so it's better to take some precautions which can avoid such kind of incidents.

### 5. LITERATURE REVIEW

All the information provided by [www.meaforensic.com](http://www.meaforensic.com) shows that a loose lug nut/lock nut can cause really dangerous situations and maybe the pedestrians as well as the driver and co passengers can be injured.

### 6. CONCLUSION

All of the accidents mentioned above in the reference articles can be avoided if the Lock nut protector disc is used. Even if the stud is worn off the nuts can be locked in their place as the disc holds all of the nuts rigidly. If the nuts are not tightened then at least while putting on the disc the mechanic can notice the loose lock nuts and tighten them.

### ACKNOWLEDGEMENT

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