

PETITION FOR DEFECT INVESTIGATION AND RULEMAKING (49 CFR Part 552)

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Electronic copy submitted to NHTSA/ODI via email on **November 18, 2025, 7:42 PM** (for reference).

Revised on November 21, 2025 — Sections 6(B) and 6(C)

Electronic copy submitted to NHTSA/ODI via email on **November 21, 2025, 3:37 PM** (for reference).

Subject: *Wheel Separation Incidents from Lug-Nut Loosening on Heavy-Duty Commercial Vehicles (GVWR > 25,000 lbs.)*

Petitioner:

Date: November 21, 2025

Bhupinder Dhadha

Multi-disciplinary safety researcher and innovator

Founder & CEO, Lug Nut Lock LLC (*engineering background cited for context only*)

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To:

Office of Defects Investigation (ODI) and Rulemaking
National Highway Traffic Safety Administration (NHTSA)
U.S. Department of Transportation
1200 New Jersey Avenue SE
Washington, DC 20590

SECTION 1 — Petition Appendix Submission

To Whom It May Concern:

Enclosed is an appendix summarizing documented wheel-separation crashes attributed to lug-nut loosening—a long-recognized **mechanical failure mode**—on heavy-duty vehicles. Between **February 1 and October 3, 2025**, nineteen (**19**) such incidents were confirmed across North America, resulting in **at least ten fatalities** and numerous severe or permanently disabling injuries. (*See Appendix A – Wheel-Off Accident Summary, 2025 Cases.*) An average of **one death per month** from a known and preventable failure mechanism reflects unacceptable neglect of public safety and underscores the absence of **an effective design-based federal mitigation standard**. NTSB reports indicate that **approximately 750 to 1,050 wheel-separation accidents occur annually** in the United States.

In only four recent months—June, July, August, and September 2025— Commercial Vehicle Safety Alliance (CVSA) roadside inspections identified **2,440 vehicles** with **2,824 wheels** exhibiting loose or missing fasteners under violation code §393.205(c) (“Wheel fastener loose and/or missing”). A total of **255 vehicles** were **placed out of service (OOS)** due to the severity of the hazard. **These findings confirm** that wheel-fastener loosening **remains an active, unmitigated, design-level safety defect** across the commercial-vehicle fleet. (*See Appendix B – Attachment A.*)

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This appendix supports a **petition for defect investigation and rulemaking** under 49 CFR Part 552, demonstrating that the hazard formally recognized by the National Transportation Safety Board (NTSB) on **October 23, 1992**—through Safety Recommendations **H-92 through H-101** has **persisted for more than three decades** and continues to endanger the safety of all road users.

Additionally, the Petitioner submits this request **not only based on national data**, but also from **direct personal experience as a roadway user who narrowly avoided a wheel-separation incident in live traffic**. This near-miss demonstrates that the hazard is not theoretical or isolated; it is a **real and immediate public-safety threat** affecting every motorist, pedestrian, and road-sharing traveler. The Petitioner therefore raises this matter as **both a technical safety issue** and a **pressing public-risk concern requiring regulatory attention**.

In light of this enduring and well-documented safety risk, the Petitioner respectfully urges the National Highway Traffic Safety Administration (NHTSA) to initiate a **formal defect investigation and rulemaking** to evaluate the need for a **design-based federal safety standard** that ensures lasting wheel-fastener retention on heavy-duty commercial vehicles operating on U.S. highways.

Sincerely,

Bhupinder Dhadha

Multi-Disciplinary Safety Researcher and Innovator

Founder & CEO, Lug Nut Lock LLC (engineering background cited for context only)

SECTION 2 — BACKGROUND & URGENCY – WHEEL-OFF HAZARD SUMMARY

Crash investigations and historical records confirm that this hazard is **not new**. On **October 23, 1992**, the **National Transportation Safety Board (NTSB)** issued **Safety Recommendations H-92-98 through H-92-101**, formally warning federal and industry stakeholders—including **NHTSA, FMCSA, TIA, TTMA, SAE, and NWRA**—of the recurring dangers of wheel separations and calling for coordinated corrective action. Yet more than **three decades** later, **the same preventable design defect persists unchanged**. Since that first warning, an estimated **396 deaths** and **over 10,000 serious injuries** have occurred—**averaging one death every month** from a fully recognized and fully avoidable hazard. (*See Appendix B – Attachment G.*)

The **trend remains unbroken**. From **January 1, 2023, to October 3, 2025**, at least **44 verified wheel-separation crashes** were documented across North America, resulting in **19 fatalities** and numerous life-altering injuries. Each fatality represents a failure **not of maintenance, but of policy**—a **continued refusal** to correct a long-recognized **design-level hazard**. *How long will regulators wait before addressing a defect that continues to endanger every pedestrian, motorist, and passenger month after month?* (*See Appendix B – Attachment F.*)

Despite the seriousness of this problem, **no federal agency—including NHTSA, FMCSA, or even NTSB—has ever created a national reporting system** or maintained comprehensive data on wheel-separation crashes caused by lug-nut loosening. As a result, **no official federal count exists** for the total number of U.S. accidents, injuries, or fatalities attributable to this well-recognized mechanical failure mode. This **absence of federal tracking** has **allowed the hazard to remain**

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unmeasured, unmonitored, and unmitigated, despite its **documented recurrence** across all commercial-vehicle sectors. (*See FOIA responses from FMCSA and NHTSA.*)

By comparison, **Ontario, Canada** enforces fines of up to **\$50,000 per wheel-off** under a strict, **design-based safety law**. Yet the **National Highway Traffic Safety Administration (NHTSA)**—whose mission is to “**save lives, prevent injuries, and reduce vehicle-related crashes**”—still has **no design-based federal standard requiring redundant mechanical safeguards** to prevent these known and recurring failures.

SECTION 3 — PROBLEM DEFINITION – PRIMARY CAUSES OF WHEEL SEPARATIONS

Crash investigations consistently identify **two primary causes** of wheel separations on heavy-duty commercial vehicles:

1. Hub and Bearing Failures (~5%) – These incidents are relatively rare and have been largely mitigated through engineering improvements, including Meritor’s **Temper-Loc spindle nut (2015)** and enhanced hub-bearing design standards.

2. Lug-Nut Loosening (~95%) – The dominant and unresolved cause of wheel separations. Despite decades of procedural guidance, **no redundant mechanical locking systems** are currently required to prevent real-world operating stresses such as *thermal cycling, vibration, dynamic vehicle loads, embedment relaxation, and joint fatigue*—all of which routinely **cause post-installation preload loss** and progressive loosening **once the vehicle is in service**.

Independent engineering analyses, roadside inspections, and crash investigations consistently confirm **fifteen recurring failure factors** contributing to lug-nut loosening and subsequent wheel separations. (*See Appendix B – Attachment B: Fifteen Common Failure Factors.*)

SECTION 4 — WHY CURRENT MEASURES FAIL – R.I.S.T. PROTOCOL LIMITS

The Tire Industry Association’s **R.I.S.T. protocol**—*Remove debris, Inspect, Snug, Torque*—is an effective procedural standard for ensuring proper installation **only under controlled shop conditions**. However, **once a vehicle is in service**, R.I.S.T. provides **no mechanical safeguard against preload loss** caused by real-world stresses such as *thermal cycling, vibration, dynamic loads, embedment relaxation, and joint fatigue*. **Field evidence now exposes a critical and long-overlooked flaw: R.I.S.T. governs how a wheel is installed, not how it behaves under the severe operational forces that actually cause wheel separations.** As a result, vehicles remain **exposed to post-installation preload loss** even when **the initial torque was correct**.

Moreover, the **re-torque step**, typically performed within 50–100 miles, occurs **long before** the wheel assembly experiences **full brake-heat cycles or in-service** dynamic loading, rendering the **procedure ineffective as a long-term safeguard**. Field analysis confirms **up to a 99% functional failure rate** because torque is verified only under **ambient or partial-load conditions**—never after the **high-temperature and high-load cycles** that cause the most severe changes in joint tension.

A single example illustrates the magnitude of this oversight:

A fully loaded **80,000-lb tractor-trailer** descending a **6% grade for approximately five miles**—with limited engine braking—can raise all ten brake-drums temperatures to **+300°F to +800°F**

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(commonly $\sim +560^{\circ}\text{F}$). These temperatures cause significant expansion and contraction of studs, nuts, and wheels, **permanently altering joint geometry** and rapidly **erasing the assumed preload** established during installation.

A wheel installed or torqued in cold or moderate ambient conditions experiences **its first true thermal expansion only in service**. By the time these brake-heat cycles occur, **the R.I.S.T.** procedure's assumed clamp-load accuracy **no longer exists**. Torque values **degrade quickly** due to **thermal relaxation and preload decay**—often invisibly—until catastrophic separation occurs.

Key Finding:

R.I.S.T. alone cannot ensure wheel-end safety. Without a **redundant mechanical locking system**, **R.I.S.T.** offers only a *procedural appearance of safety*, not a **physical safeguard** capable of preventing **wheel loss under real-world** heavy-vehicle operating conditions.

SECTION 5 — Engineering Gap – Absence of Redundant Locking in Wheel Assemblies

In all **safety-critical bolted joints**, the use of **redundant locking mechanisms** is a **standard** engineering practice designed to **prevent self-loosening** and joint failure under dynamic service conditions. These safeguards generally fall into three primary categories:

1. **Friction Locking** – *e.g.*, lock washers, prevailing-torque nuts
2. **Mechanical Locking** – *e.g.*, cotter pins, tab washers, wire locks
3. **Permanent Locking** – *e.g.*, adhesives, rivets, welding

Across aircraft, rail, and industrial systems, **redundancy is universal**: each safety-critical joint must maintain clamping force despite thermal cycling, vibration, shock, load cycling, or material relaxation.

By **contrast**, heavy-duty truck, trailer, and bus **wheel assemblies** incorporate **no redundant safety measures**. They rely solely on frictional torque preload of wheel studs and nuts—a **single, non-redundant failure point** inherently vulnerable to **thermal cycling, vibration and road shock, dynamic vehicle loads, joint settlement, and embedment relaxation and fatigue**.

These **forces are normal and unavoidable** in commercial-vehicle operation, **making preload decay** inevitable even when **installation torque is correct**.

When wheel separations occur, manufacturers frequently cite “maintenance error” or “environmental conditions.” In **reality**, the absence of a **secondary mechanical locking mechanism** represents a **systemic design deficiency**, not a maintenance lapse. *A friction-only joint cannot maintain reliable clamp load under real-world braking heat, vibration, and dynamic axle loading. (See Appendix B – Attachment D.)*

SECTION 6(A) — REQUESTED ACTION

Wheel separations have **persisted for more than three decades**, demonstrating a **systemic regulatory and engineering failure** that continues to endanger pedestrians, motorists, passengers, and all other road users. **Despite the NTSB's 1992 safety recommendations** and

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decades of field evidence, there remains **no federal design standard requiring redundant mechanical locking systems** for wheel fasteners on heavy commercial vehicles.

To fulfill its statutory mission to **save lives, prevent injuries, and reduce motor-vehicle crashes**, the National Highway Traffic Safety Administration (NHTSA) must take immediate corrective action. The Petitioner respectfully requests that NHTSA:

1. **Open a formal defect investigation and rulemaking proceeding** into wheel-fastening practices on heavy-duty vehicles (GVWR > 25,000 lbs.) and/or vehicles utilizing the **10-285.75 mm bolt circle**, as these platforms share identical wheel-end architecture and the same inherent loosening-related failure mode. The **focus of this investigation** should be the absence of **mechanical locking** redundancy and its role in **recurring wheel-separation events**.
2. **Quantify the national scope of the hazard** by analyzing crash databases, FMCSA inspection records, and manufacturer defect reports to determine the prevalence of lug-nut loosening as a primary failure mode.
3. **Establish a design-based federal safety standard** requiring redundant mechanical wheel-fastener locking systems for all applicable vehicles to ensure permanent wheel-retention integrity under real-world operating conditions.

SECTION 6(B) — DEFECT INVESTIGATION AND RECALL REQUEST (49 CFR §552.4(d))

Pursuant to 49 CFR §552.4(d), the Petitioner formally requests that NHTSA initiate a defect investigation to determine whether the absence of a redundant mechanical wheel-fastener locking mechanism constitutes a safety-related defect in motor vehicles and motor-vehicle equipment.

The Petitioner further requests that NHTSA exercise its authority under 49 U.S.C. §§30118–30120 to order **the recall of all affected vehicles** utilizing the **10-285.75 mm bolt circle**, and/or any associated wheel-end components, including hubs, axles, studs, and fastener systems used on heavy-duty commercial vehicles.

This **request is supported** by extensive **evidence of fatalities, injuries, property damage, and recurring wheel-separation events attributable to lug-nut loosening**—an established and long-recognized failure mode that presents an unreasonable and ongoing threat to motor-vehicle safety.

SECTION 6(C) — RULEMAKING REQUEST FOR MANDATORY REDUNDANT WHEEL-FASTENER LOCKING (49 U.S.C. §30111; 49 CFR §552.8)

Under 49 U.S.C. §30111 and consistent with the procedures outlined in 49 CFR §552.8, the Petitioner respectfully requests that NHTSA **initiate a rulemaking proceeding** to establish and **mandate a Federal Motor Vehicle Safety Standard (FMVSS)** requiring redundant mechanical wheel-fastener locking systems for all heavy-duty commercial vehicles with a GVWR greater than 25,000 pounds. The Petitioner further requests that NHTSA evaluate whether this requirement should extend to platforms utilizing the **10-285.75 mm bolt circle**, which shares identical wheel-end architecture and the **same inherent loosening-related failure mode**.

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A **mandatory, design-based standard** is necessary to ensure **permanent wheel-retention integrity** and to eliminate the well-documented public-safety hazard posed by lug-nut loosening **under real-world operating conditions**. These actions are essential to closing the three-decade-old regulatory gap first identified by the NTSB in 1992. Prompt action will restore public confidence, protect all road users, and permanently eliminate a preventable and long-recognized mechanical hazard on U.S. highways.

SECTION 7 — PROPOSED SOLUTION (AVAILABLE FOR TECHNICAL EVALUATION)

In the interest of public safety, the Petitioner provides—for **technical evaluation only**—an example of an available, field-tested redundant mechanical wheel-fastener locking system: **U.S. Patent No. 10,344,504 (Miracle Lug Nut Lock)**. *(See Appendix B – Attachment E.)* This design is submitted solely to demonstrate engineering feasibility. It is not a commercial endorsement; it simply shows that **practical, production-ready mechanical locking technologies already exist**, are **compatible with standard wheel-hub assemblies**, and can be objectively evaluated under federal safety criteria.

The system complements the Tire Industry Association's (TIA) **R.I.S.T. protocol** by adding a **permanent mechanical safeguard** that prevents **post-installation preload loss**—the underlying mechanism behind nearly all lug-nut loosening events. If **preload loss is prevented**, fasteners cannot loosen; therefore, **wheel separations become a 100% preventable mechanical failure mode**. This reflects a fundamental engineering truth: **a joint that maintains clamping force cannot separate**. The Petitioner developed the referenced design with this principle as its **core mission**, ensuring **sustained clamp force** through thermal cycling, vibration, dynamic axle loading, embedment relaxation, and joint settlement.

The design also offers practical advantages, including **seamless integration with existing wheel-end architectures**, tolerance for **real-world brake-heat expansion**, continuous locking engagement, and full compatibility with current maintenance practices—allowing fleets to adopt a design-based safeguard **without costly retrofitting or operational disruption**.

Given the long-standing and well-documented hazards associated with lug-nut loosening, the Petitioner respectfully urges NHTSA, FMCSA, NTSB, and CVSA to conduct a **formal engineering review**—through defect investigation, safety-research programs, or **rulemaking**—to determine whether redundant mechanical wheel-fastener locking systems should be adopted nationwide as a **design-based safety requirement**. The Petitioner stands ready to support federal agencies, OEMs, and fleet operators in any laboratory testing, durability studies, field trials, or agency-supervised evaluations required to validate performance, reliability, and long-term safety.

SECTION 8 — CONCLUSION

For more than thirty years, wheel-separation incidents have remained a recognized yet unremedied safety defect within the heavy-vehicle sector. The continued occurrence of these events—resulting in thousands of crashes, hundreds of fatalities, and significant public-risk exposure—demonstrates that existing procedural and maintenance-based measures are insufficient to protect road users. The persistence of this hazard, despite longstanding NTSB warnings and recommendations, establishes a clear record of **regulatory gap** and **unresolved engineering vulnerability** in current wheel-fastener retention practices.

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Redundant mechanical locking systems—now available, proven, and field-validated—offer a design-based corrective measure capable of eliminating the underlying failure mode. Their adoption would align federal standards with established engineering principles used across other safety-critical industries and would meaningfully reduce the national incidence of wheel-off events.

For these reasons, the Petitioner respectfully requests that the **National Highway Traffic Safety Administration (NHTSA)** initiate both a **formal defect investigation** and a **rulemaking proceeding** to evaluate and establish a federal design standard requiring redundant mechanical wheel-fastener locking systems on heavy-duty commercial vehicles. Taking regulatory action would close a long-standing safety gap, fulfill NHTSA's statutory obligations under **49 U.S.C. §§ 30101 and 30111** to reduce motor-vehicle crashes and protect the public, and ensure that preventable wheel-separation incidents are permanently eliminated.

Sincerely,

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Founder & CEO, Lug Nut Lock LLC (engineering background cited for context only)

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Attachments and Document Page Index (49 CFR Part 552)

Main Petition Document - Defect Investigation and Rulemaking - 6 pages **(1-7)**

Appendix A - Wheel-Off Accident Summary (2025 Cases) - 1 page **(8)**

Appendix B+ - Supporting Technical Attachments:

Attachment A - FMCSA/CVSA Inspection Records - 1 page **(9)**

Attachment B - Fifteen Common Failure Factors - 1 page **(10)**

Attachment C - R.I.S.T. Protocol Limits & Thermal Preload Loss - 1 page **(11)**

Attachment D - Bolt-Locking Methods & Failure Mechanisms - 1 page **(12)**

Attachment E - Technical Details — U.S. Patent 10,344,504 - 5 pages **(13-17)**

Attachment F - Incident & Fatality Data (2023-2025) - 2 pages **(18-19)**

Attachment G - NTSB 1992 Wheel-Off Safety Recommendations - 6 pages **(19-24)**

Attachment H - FOIA Responses (FMCSA & NHTSA) - 2 pages **(25-26)**

Total: 26 pages

📌 Appendix A: Wheel-Off Accident Summary (2025 Cases)

Between **February 1 and October 3, 2025**, **nineteen** documented **wheel-off crashes** linked to lug-nut loosening on heavy trucks, trailers, and buses occurred across North America, causing **at least ten fatalities** and **numerous serious injuries** to motorists and pedestrians. This equates to **an average of one fatality every month** from a **known and preventable defect**—a continuing and unacceptable lapse in public-safety oversight that demands immediate regulatory intervention.

Time Period	Wheel-Off Crashes (Confirmed)	Fatalities	Serious / Lifetime Injuries	Estimated National Impact
Feb–Oct 2025 (8 mo.)	19	10 🚨	200–300	—
1992–2025 (33 yrs)	—	~395–595	~10,000–13,000	Based on NTSB + FMCSA data extrapolation

Notable 2025 Wheel-Off Crashes

1. Oct 3 – Harris Co., TX – Semi lost wheel; struck road crew – 1 fatality 🚨 – ABC13.
2. Sep 23 – Niagara, ON (QEW) – Truck wheel hit vehicle – 1 fatality 🚨 – CityNews / Global.
3. Sep 17 – PA Turnpike – Tire detached; 2 injured – WBNG.
4. Sep 17 – NJ Turnpike – Wheel-off; 1 fatality 🚨 – NJ1015.
5. Sep 17 – Lindon, UT – Dump-truck wheel crossed median; multiple injuries – ABC4.
6. Sep 16 – Whitpain Twp, PA – Pickup tire crushed SUV roof; 2 injured – 6ABC.
7. Sep 2 – Lone Tree, CO – Tire crossed median; driver killed 🚨 – 9News.
8. Aug 19 – Prince George’s Co., MD – Tire hit car; driver killed 🚨 – WTOP.
9. Aug 11 – Pomona, CA (SR-60) – Big-rig tire struck sedan; driver killed 🚨 – LA Times.
10. Jul 9 – Oklahoma City, OK – Semi wheel hit apartment – KOCO.
11. Jul 3 – Peach Co., GA – Loose semi tire killed woman 🚨 – AJC / WGXA.
12. May 18 – LaPorte Co., IN – Trailer wheel hit parked cars – WNDU.
13. May 11 – Atlanta, GA (I-285) – Semi tire pierced SUV windshield – 11Alive.
14. May 5 – Atlanta, GA – Truck tire crossed median – 11Alive.
15. Apr 18 – Alamo, CA (I-680) – Wheel hit pickup; driver died 🚨 – Danville News.
16. Mar 20 – Oklahoma (I-35) – Tire hit Jeep; driver killed 🚨 – KOCO.
17. Feb 19 – Columbia, SC (I-77) – Wheel-off; SCDOT worker killed 🚨 – The State.
18. Feb 19 – I-80, IA – Trailer tire struck car – KWQC.
19. Feb 7 – I-80 near Walcott, IA – Semi lost wheel set; serious injuries – KWQC.

Even under routine maintenance following the **TIA’s R.I.S.T. protocol**, **wheel separations continue** nationwide, demonstrating a **persistent design-level hazard**. These 2025 cases underscore the urgent need for **redundant mechanical locking systems** to prevent lug-nut loosening on heavy vehicles.

Prepared by:

Bhupinder Dhabda

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Independent Researcher in Road & Highway Safety

Submitted as **Appendix A** to NHTSA ODI Defect Investigation and Rulemaking Petition (49 CFR Part 552)

FMCSA / CVSA Inspection Records – Lug-Nut Loosening (49 CFR §393.205(c))

Data Source: FMCSA's Motor Carrier Management Information System (MCMIS) data snapshot as of 6/6/2025, 7/4/2025, 7/25/2025, 8/29/2025 and 10/31/2025, including current year-to-date information for CY 2025.

The data presented above are accurate as of this date but are subject to updates as new or additional information may be reported to MCMIS following the snapshot date.

Data Date	Violation Code	Violation Description	# of Inspections	# of Violations	# of OOS Violations
6/6/2025	393.205(c)	Wheel fastener loose and/or missing	66,336	76,286	12,467
7/4/2025	393.205(c)	Same as above	66,750	76,751	12,536
7/25/2025	393.205(c)	Same as above	67,128	77,207	12,608
8/29/2025	393.205(c)	Same as above	67,637	77,781	12,722
10/13/2025	393.205(C)	Same as above	68,776	79,110	12,906
4 Months Total	393.205(C)	Same as above	2440	2824	439

CVSA Inspection & Violation Evaluations (June–August 2025)

Month	# of Inspections	# of Total Wheels (Wheel fastener loose and/or missing)	Vehicles Placed OOS
4 Months Total	2440	2824	439

Recently, in just 4 months—**June, July, August and September 2025**—CVSA roadside inspections identified **2,440** vehicles with **2,824 wheels** exhibiting loose or missing fasteners under violation code §393.205(c) (“Wheel fastener loose and/or missing”). **A total of 439** vehicles were placed out of service (**OOS**) due to the severity of the safety risk. These findings confirm that wheel-fastener loosening remains an **active and unresolved safety defect** across the commercial vehicle fleet.

Analysis & Conclusion

Torque-based maintenance ensures accurate installation but provides no enduring protection against real-world stresses—thermal cycling, vibration, dynamic vehicle loads, and joint fatigue—that **cause post-installation preload loss**. Inspection records confirm that **maintenance-only measures** have repeatedly failed to prevent wheel-separation **violations** and **out-of-service** orders.

Only an **engineered design-based safeguard**, redundant **mechanical lug-nut locking system** can preserve **clamp-preload**, prevent nut rotation, and eliminate failure modes **beyond the control of friction-based designs**.

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Submitted as **Appendix B+ Attachment A:** to NHTSA ODI Defect Investigation and Rulemaking Petition (49 CFR Part 552)

Fifteen Factors Contributing to Wheel Lug Nut Loosening

Over **three decades of crash investigations** and field analyses have identified most common **fifteen recurring failure factors** underlying wheel separations—**persistent, repeatable patterns documented across fleets.**

1.  Standard lug nuts lack mechanical locking mechanism.
2.  Preload loss from thermal cycling (/ ). (see Appendix B + Attachment C)
3.   Vibration-induced self-loosening.
4.  Dynamic Vehicle Loads.
5.  Joint fatigue & micro-slip reduce clamp force.

The Tire Industry Association's (TIA) R.I.S.T. protocol ensures proper installation but offers **no sustained protection against** these five principal **post-installation failure factors**.

6. Over-torquing or under-torquing damages studs / threads.
7. Painted rims create "soft joints."
8. Unbalanced wheels add oscillation.
9. Corroded or worn threads weaken joints.
10. Uneven tightening introduces residual stress.

11. Lack of inspection / re-torque.
12. Hub-seal oil contamination reduces thread friction, allowing nut loosening.
13. Suspension or drivetrain vibration.

14. Salt, water, and debris accelerate corrosion and loosening.
15. Rough roads and heavy loads amplify vibration.

Proposed Solution (Available for Evaluation)

In the interest of public safety, this petition requests NHTSA's technical review of a **field-tested mechanical wheel-fastener locking concept** (U.S. Patent No. 10,344,504) (see Appendix B – Attachment E). The design complements the Tire Industry Association's (TIA) R.I.S.T. protocol by **providing a permanent, design-based safeguard against post-installation preload loss** and **directly addresses all fifteen documented failure factors** identified through **field investigations**.

Key Performance Advantages Include:

- ✓ **Seamless Integration:** Fits standard hubs—**no modification required.**
- ✓ **Comprehensive Protection:** fail-safe **preload retention** under all operating conditions.
- ✓ **Design-Based Safety:** Closes the **procedural gaps** current methods cannot.

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Submitted as: Appendix B + Attachment B — Fifteen Common Failure Factors to NHTSA ODI Defect Investigation
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R.I.S.T. Procedure and Loss of Preload from Thermal Cycling 🔥 / ❄️

Technical Discussion of Fastener Behavior & R.I.S.T. Protocol Limits

The TIA's **R.I.S.T. protocol**—Remove debris, Inspect, Snug, Torque—is an effective procedural standard that ensures installation accuracy and minimizes human error under controlled conditions. However, once the **vehicle is in service**, R.I.S.T. provides **no mechanical safeguard against preload loss** resulting from post-installation stresses such as thermal cycling 🔥 / ❄️, vibration 🌀, or dynamic loads 📉.

Table C-1 below compares the R.I.S.T. procedure with the residual risks that remain unaddressed under in-service temperature variation and material expansion/contraction.

R.I.S.T. Controls & Benefits	Residual Risks Unaddressed by R.I.S.T. Under Thermal Cycling
R – Remove Debris – Ensures clean contact surfaces between hub, wheel, and nut, minimizing friction variation and seating errors.	Does not prevent thermal relaxation or loss of preload after installation; debris removal cannot mitigate expansion / contraction effects once in service.
I – Inspect Components – Identifies damaged studs, nuts, or wheel holes before assembly, reducing immediate installation failures.	Inspection cannot predict differential thermal expansion among steel, aluminum, or composite materials that alter clamping force during operation.
S – Snug the Fasteners – Promotes uniform seating and even load distribution, reducing initial stress concentrations.	Even seating at ambient temperature cannot prevent non-uniform stress redistribution as hubs and brake assemblies heat and cool.
T – Torque to Specifications – Achieves target preload under ambient conditions, standardizing installation torque values.	Torque values measured cold do not remain constant as assemblies heat (nominally +560°F). or cool below freezing; preload loss may exceed 30% .
Overall Benefit → Provides consistent installation and compliance with TIA / FMVSS guidelines at assembly.	System Limitation → R.I.S.T. is static and process-based ; it offers no mechanical redundancy against vibration 🌀, embedment, or thermally-induced torque decay 🔥📉.
—	Recommended Countermeasure → Incorporate redundant mechanical locking devices (e.g., secondary lug-nut locks 🛡️ or retention clips) to maintain joint integrity under all thermal 🔥 / ❄️, vibration 🌀 and 📉 Dynamic loading conditions.

As shown in Table C-1, the **R.I.S.T. protocol** ensures installation accuracy but **remains static and process-based—not a physical safeguard**—and provides **no protection against preload loss or joint-tension reduction** resulting from **post-installation stresses** such as thermal cycling, vibration, or dynamic loading. Ensuring lasting fastener reliability therefore requires a **mechanical locking mechanism** capable of maintaining **clamp load under real-world service conditions**.

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Submitted as **Appendix B+ Attachment A:** to NHTSA ODI Defect Investigation and Rulemaking Petition (49 CFR Part 552)

Appendix B+ Attachment D: Bolt Locking Methods and Failure Mechanisms

Securing bolted joints is essential to the safety, reliability, and structural integrity of vehicles and equipment. Over time, dynamic forces such as vibration, shock, and thermal cycling can cause fasteners to lose preload and separate—leading to wheel separation, component failure, or catastrophic mechanical loss.

1. Purpose of Bolt Locking

Bolt locking systems preserve the clamping force applied during installation, ensuring the joint remains secure. **Effective mechanisms:**

- Maintain clamping force and stability
- Reduce maintenance and extend service life
- Prevent loosening and fatigue cracks
- Mitigate runaway wheel separations in high-vibration environments.

2. Common Failure Mechanisms:

Vibration Loosening – micro-rotations back off nuts

- Thermal Cycling – expansion/contraction reduces preload
- Embedment – surface settling relaxes joint
- Corrosion – alters friction and torque
- Improper Torque – under/over-tightening accelerates fatigue.

3. Comparative Locking Methods:

Type	Typical Devices	Mechanism	Advantages	Limitations
Friction-Based	Split lock washers, Nylon nuts, serrated flange nuts	Increased thread friction	Low cost, reusable	Limited under vibration/heat
Mechanical	Tab washers, cotter pins, wire locking, double-nut	Physical stop prevents rotation	Reliable under severe vibration	Slightly complex install
Permanent	Welding, thread-locking adhesives	Chemical/physical bonding	Tamper-resistant, no loosening	Non-reversible service limits

4. Engineering Gap and Recommended Approach

In all safety-critical joints, redundancy is standard—**aircraft, rail**, and industrial systems **use mechanical locks** to prevent **self-loosening**. Heavy vehicles **wheel assemblies use none**. Resulting failures are often attributed to maintenance error or environmental factors, yet the **true cause stems** from a **fundamental design gap**—the **absence of a secondary mechanical lock** that **physically prevents nut rotation and eliminates failure modes** that **friction alone cannot control**.

Prepared by:

Bhupinder Dhadha

Multi-Disciplinary Safety Researcher and Innovator & Independent Researcher in Road & Highway Safety.

Submitted as **Appendix B+ Attachment A:** to NHTSA ODI Defect Investigation and Rulemaking Petition (49 CFR Part 552)

The
United
States
of
America



UNITED STATES PATENT

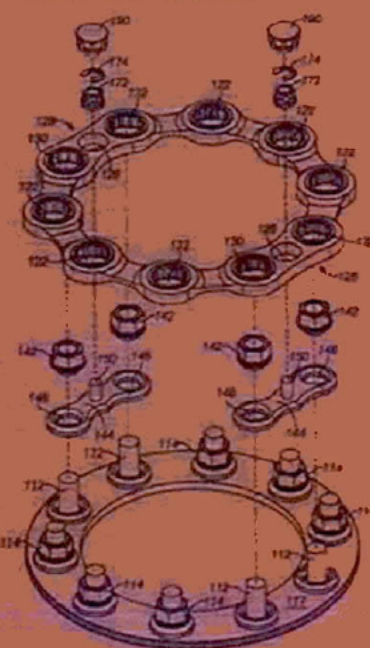
Granted on July 9, 2019

Bhupinder Dhadda

INVENTOR

10,344,504

LUG NUT LOCKING SYSTEMS



Lug nut locking systems, including systems for securing lug nuts on a wheel of a motor vehicle comprising a frame with ratcheting apertures. In some embodiments, the device has a pair of supports that fit over the wheel's lug bolts and underneath the frame. In other embodiments, the device comprises uniquely configured securing caps that fit over the lug bolts. In still other embodiments, the device comprises a plurality of protective covers that fit over the securing caps.

The Director of the United States Patent and Trademark Office has received an application for a patent for a new and useful invention. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law. Therefore this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America for the term of this patent, subject to the payment of maintenance fees as provided by law.

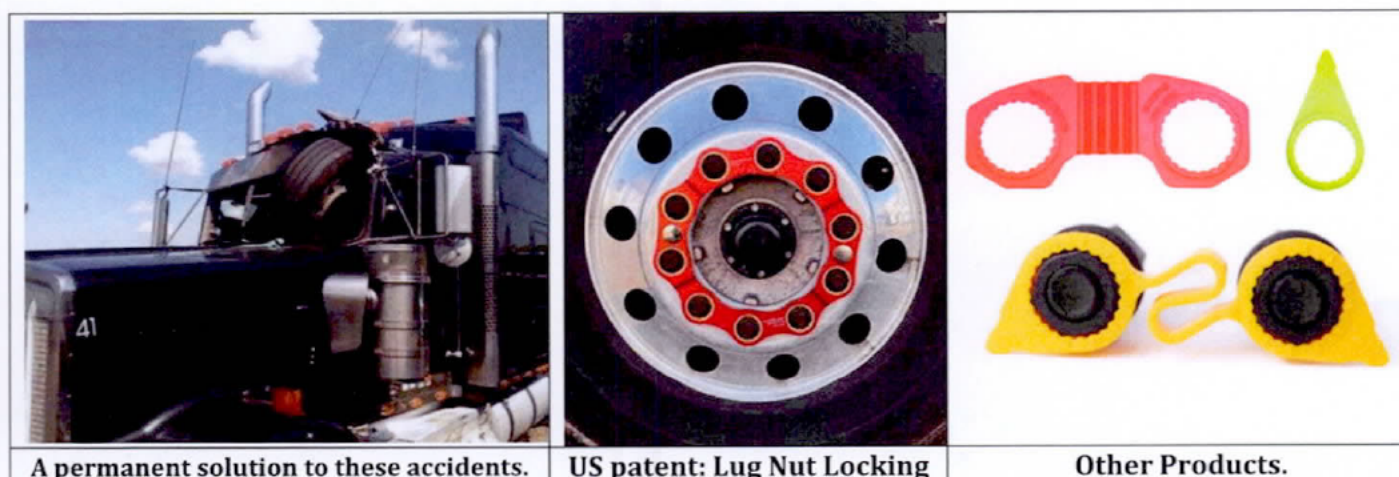
Director of the United States Patent and Trademark Office



Comparison of U.S. Patent No. 10,344,504 (Lug Nut Lock) vs. Alternative Products

Reverse Torque Retention Test (150 lbs. ft): Laboratory testing confirmed the **redundant lug-nut locking system's** ability to maintain secure clamp-load under reverse-torque loads representative of real-world loosening forces. Withstood a **150 lbs. Ft reverse load**—the point where standard friction-based fasteners typically rotate or lose preload— The results verify **stable mechanical restraint and true redundancy**, ensuring continuous wheel-fastener security even when frictional resistance is diminished by thermal cycling, vibration, or embedment relaxation. (for **Lab Test report** See Appendix B+ **Attachment E:** page 5)

Our Product — U.S. Patent No. 10,344,504	Other Products on the Market
1. Eliminates the problem at its source by preventing lug-nut loosening from the outset.	1. Merely indicate or hint that a problem exists, without preventing it.
2. Specifically engineered to stop loosening before it begins.	2. Ineffective in stopping lug-nut loosening once in service.
3. Withstands up to 150 lbs. of reverse torque , maintaining secure clamp load.	3. Lacks torque-holding capacity to resist reverse rotation or preload loss.
4. Requires no daily driver inspection—the system is self-securing once installed.	4. Requires constant manual inspection to confirm continued function.
5. Permanently affixed to the wheel assembly; cannot be removed, detached, or stolen without the driver's awareness.	5. Temporarily attached; susceptible to accidental loss, removal, or theft.
6. Prevents vehicle damage from progressive loosening, reducing maintenance and shop visits.	6. Loose-wheel indication often comes after damage has already occurred, necessitating repairs.
7. Constructed from high-strength steel and aluminum for durability and longevity.	7. Commonly made of plastic, which degrades under heat, vibration, and load.
8. Available with anti-theft locking nuts for enhanced wheel and rim protection.	8. Do not prevent theft or unauthorized wheel removal.



A permanent solution to these accidents.

US patent: Lug Nut Locking

Other Products.

Contact for Technical Brief or Demonstration:

Bhupinder Dhadda

Founder & CEO, Lug Nut Lock LLC

Submitted as: Appendix B + **Attachment E:** - Patent Technical Details (U.S. 10,344,504 vs. alternatives)

Appendix B+ Attachment E: Reverse Torque Retention Test (150 lbs. Ft.) (Page 5 of 5)

METALTEST, INC.
1205 5th Avenue South
Kent, Washington 98032
Phone (253) 813-5970

1/14/2025

Alpha Truck Services
18618 94th Ave Ct E
Puyallup, WA 98375

LAB: 221344
PO: LWRF
MATL: Cast Aluminum
SPEC: Customer Requirement
TEST METHOD: ASTM E18-24
Customer Requirement

Contact: B Dhadda

SIZE:

TEST REPORT

Page 2 of 2

Identification

Sample:	1
Qty:	1 Lug Nut Lock

The lug nut lock part was torque tested to various loads.
The lug nut lock sustained 175 Ft/Lb torque load without failing

The lug nut lock hardness is 59.1 HR15TW

The lug nut lock does not appear to be heat treated.



Appendix B+ Attachment E
US Patent Lock System & FMCSA Correspondence (Page 4 of 5)

U.S. Department
of Transportation

1200 New Jersey Avenue, SE
Washington, DC 20590

**Federal Motor Carrier
Safety Administration**

OCT 23 2013

Refer to: MC-PSV

Mr. Bhupinder Dhadda

Puyallup, WA

Dear Mr. Dhadda:

Thank you for your letter to the Federal Motor Carrier Safety Administration (FMCSA) Chief Safety Officer Jack Van Steenburg regarding a product that you have developed called, "Miracle Lock," that is designed to be used on commercial trucks and trailers to prevent lug nuts that hold a tire to the vehicle from becoming loose. Your letter was forwarded to the Office of Policy for response.

The FMCSA is the agency in the Department of Transportation (DOT) responsible for safety regulations concerning motor carrier operations. Our regulations include certain requirements for motor carrier safety management controls, driver qualifications, and commercial motor vehicle (CMV) equipment necessary for safe operations.

We appreciate having the opportunity to learn about your device. However, FMCSA does not review or approve devices for use on CMVs. FMCSA's safety regulations allow the use of additional equipment or accessories that are not specifically required by our safety regulations, provided such devices do not decrease safety. Therefore, motor carriers may use your device if it does not decrease the operational safety the vehicle.

I hope this information is helpful. Please feel free to contact Luke Loy at (202) 366-0676 or via e-mail at luke.loy@dot.gov if you have further questions.

Sincerely,

Larry W. Minor
Associate Administrator for Policy

Wheel-Off Incidents (2023 – 2025)

Prepared by: Bhupinder Dhadha, Founder & CEO, Lug Nut Lock LLC

Submitted in Support of: NHTSA Defect Investigation Petition under 49 CFR Part 552

(All incident dates verified from independent local and national news sources. Chronology: newest → oldest.)

Summary of Findings

A systematic review of verified U.S. and Canadian crash archives (Jan 1, 2023 – Oct 4, 2025) identified at least **44 documented wheel-off or runaway-tire incidents**, resulting in **19+ confirmed fatalities** 🚬 and **numerous serious injuries**. Nearly all cases trace directly to **wheel-fastener loosening** on heavy trucks, trailers, or buses.

Category	Count	% of Total	Notes
🛠 Fastener / Assembly Failures	44	≈100%	All linked to lug-nut loosening or wheel separation
🚬 Fatalities (confirmed)	≈19	—	Across U.S. & Canada (2023–2025)

Verified Incidents (Chronological Summary)

- Sep 23, 2025 – Niagara, ON – 🛠 Detached truck tire hit vehicle; 1 fatality 🚬 – source: local news.
- Sep 17, 2025 – PA Turnpike – 🛠 Tractor-trailer lost tire; 2 injured – source: local news.
- Sep 17, 2025 – NJ Turnpike – 🛠 Trailer wheel-off; chain-reaction crash; 1 fatality 🚬 – Sour: local news.
- Sep 17, 2025 – Lindon, UT – 🛠 Dump truck tire bounced median; multiple injuries – source: local news.
- Sep 16, 2025 – Whitpain Twp, PA – 🛠 Pickup tire crushed SUV roof; 2 serious injuries – source: local news.
- Sep 2, 2025 – Lone Tree, CO – 🛠 Tire crossed median; driver killed 🚬 – source: local news.
- Aug 19, 2025 – Prince George's Co, MD – 🛠 Tire hit SUV on Beltway; 1 fatality 🚬 – source: local news.
- Aug 11, 2025 – Pomona, CA – 🛠 Big-rig tire struck sedan; 1 fatality 🚬 – source: local news.
- Jul 9, 2025 – Oklahoma City, OK – 🛠 Semi lost wheel; hit apartment building – source: local news.
- Jul 3, 2025 – Peach Co, GA – 🛠 Loose tire struck car; 1 fatality 🚬 – source: local news.
- May 18, 2025 – LaPorte Co, IN – 🛠 Trailer wheel separated; property damage – source: local news.
- May 11, 2025 – Atlanta, GA – 🛠 Semi tire hit windshield; injuries – source: local news.
- May 5, 2025 – Atlanta, GA – 🛠 Truck tire bounced median; 1 injury – source: local news.
- Apr 28, 2025 – Renfrew Co, ON – 🛠 Loose wheel on Hwy 17; driver charged – source: local news.
- Apr 18, 2025 – Alamo, CA – 🛠 Wheel hopped median; driver killed 🚬 – source: local news.
- Mar 20, 2025 – Oklahoma, I-35 – 🛠 Trailer tire hit Jeep; driver killed 🚬 – source: local news.
- Feb 19, 2025 – Columbia, SC – 🛠 18-wheeler struck DOT crew; worker killed 🚬 – source: local news.
- Feb 19, 2025 – I-80, IA – 🛠 Trailer wheels detached; serious injury – source: local news.
- Feb 7, 2025 – I-80, Walcott, IA – 🛠 wheels off semi; severe injuries – source: local news.
- Dec 1, 2024 – BC – 🛠 Loose tire crash; fine called 'insult' – source: local news.
- Nov 28, 2024 – BC – 🛠 Truck wheel hit SUV; injuries – source: local news.

22. 📁 Appendix B + Attachment F: (Page: 2 of 2)

- 23. Sep 23, 2024 – Niagara, ON – 🚚 Detached truck wheel; 1 fatality 🚬 – source: local news.
- 24. Aug 25, 2024 – Denver, CO – 🚚 Wheel crossed median; 1 fatality 🚬 – source: local news.
- 25. Jul 19, 2024 – Oakland, CA – 🚚 Flying wheel hit SUV; injuries – source: local news.
- 26. May 6, 2024 – Ontario, QEW – 🚚 Detached wheel; 2 injured – source: local news.
- 27. Apr 11, 2024 – Atlanta, GA – 🚚 Tire struck car; 1 fatality 🚬 – source: local news.
- 28. Mar 5, 2024 – Utah, I-15 – 🚚 Dump truck wheel loose; minor injuries – source: local news.
- 29. Feb 18, 2024 – Illinois, I-80 – 🚚 Flying wheel hit windshield; 2 injured – source: local news.
- 30. Jan 23, 2024 – PA Turnpike – 🚚 Wheel separated from semi – source: local news.
- 31. Dec 13, 2023 – Montgomery, AL – 🚚 Tire came off trailer; driver injured – source: local news.
- 32. Nov 8, 2023 – Durham, ON – 🚚 Truck wheel came off; 2 cars damaged – source: local news.
- 33. Oct 12, 2023 – Nashville, TN – 🚚 Wheel hit police cruiser; officer injured – source: local news.
- 34. Sep 14, 2023 – Syracuse, NY – 🚚 Flying tire hit van; 1 fatality 🚬 – source: local news.
- 35. Aug 17, 2023 – Lake Co, IN – 🚚 Wheel fell off semi; 5 injured – source: local news.
- 36. Jul 16, 2023 – KY/OH border – 🚚 Truck tire came off; 1 killed 🚬 – source: local news.
- 37. Jun 12, 2023 – Miami Co, OH – 🚚 Semi tires came off; 2 killed 🚬 – source: local news.
- 38. Apr 30, 2023 – Missouri, I-70 – 🚚 Loose tire caused multi-car crash; injuries – source: local news.
- 39. Apr 11, 2023 – Atlanta, GA – 🚚 Semi tire hit SUV; injury – source: local news.
- 40. Mar 19, 2023 – Edmonton, AB – 🚚 Loose truck wheel hit sedan – source: local news.
- 41. Feb 25, 2023 – London, ON – 🚚 Loose wheel hit SUV; 2 injured – source: local news.
- 42. Feb 10, 2023 – Dallas, TX – 🚚 Trailer tire came off; 1 fatality 🚬 – source: local news.
- 43. Jan 17, 2023 – Ohio – 🚚 Truck driver killed 🚬 by loose tire – source: local news.
- 44. Jan 5, 2023 – Toronto, ON – 🚚 Wheel flew into oncoming lanes – source: local news.

Prepared by:

Bhupinder Dhadha

Multi-Disciplinary Safety Researcher and Innovator & Independent Researcher in Road & Highway Safety.

Submitted as **Appendix B+ Attachment F:** to NHTSA ODI Defect Investigation and Rulemaking Petition (49 CFR Part 552)

Log H-568



National Transportation Safety Board

Washington, D. C. 20594

Safety Recommendation

Date: October 23, 1992

In Reply Refer To: H-92-98 through -101

To the attached mailing
list

Throughout its 25-year history, the Safety Board has conducted in-depth investigations of hundreds of highway accidents involving commercial vehicles over 10,000 pounds. Prior to the fall of 1991, Safety Board investigators cited a wheel failure as the causal factor in only one fatal case.

Beginning in fall 1991, the Safety Board investigated a spate of five truck-wheel runoff accidents in which a total of seven people died. In the 3-week period alone between October 14 and November 4, 1991, three fatal heavy truck-wheel separation accidents occurred, including an accident in which the front left wheel broke off of a two-axle cargo van truck and careened into the path of an oncoming schoolbus carrying 46 fourth-graders and their chaperones. The 365-pound wheel slammed through the bus windshield, killing two children and a chaperone.

The seemingly high incidence of similar fatal accidents aroused public and Congressional concerns about the potential magnitude of the wheel separation problem. The Safety Board therefore initiated a 6-month special investigation in November 1991 in order to determine the magnitude of the wheel separation problem, the types and causes of failures, and the adequacy of current truck wheel inspection and maintenance guidance and procedures.¹

¹For detailed information, read Special Investigation Report--"Medium/Heavy Truck Wheel Separations" (NTSB/SIR-92/04)

Because the Safety Board had investigated only six fatal accidents that had resulted from wheel separations, we recognized that we did not have a sufficient database with which to perform a comprehensive analysis. To compile the data needed for this special investigation, the Safety Board researched numerous sources and worked with several transportation agencies, including the Federal Highway Administration's Office of Motor Carriers (OMC) and the National Highway Traffic Safety Administration (NHTSA). Study group members also surveyed the six States that maintain separate accident data on wheel defects and interviewed truck carriers, manufacturers, engineers, and mechanics.

The Safety Board found that no one data source was sufficient by itself to enable us to determine the leading causes of wheel separations. However, we believe that the databases examined showed similar patterns and, in combination, enabled us to identify the most probable causes of wheel separation. The Safety Board believes that the most common causes of truck-wheel separations are the loss or breakage of wheel fasteners and wheel bearing failure. Both result mainly from improper maintenance.

Wheel failures involving broken studs, lugs, or loose nuts most frequently result from the improper tightening of the nuts or failure to retighten the nuts after the initial seating of the fasteners. The Safety Board identified undertightening as the causal factor in its 1991 investigations of fatal accidents near Warrior, Alabama, and Marion, North Carolina. The OMC violation data and maintenance records provided by one of the nation's largest carriers support the Safety Board's findings that undertightening of fasteners results in most wheel separations. The carrier's maintenance records showed that 65 percent of the wheel separations that the company's fleet experienced resulted from undertightening and 20 percent resulted from overtightening. In addition, the OMC's MCSAP data shows that in commercial vehicle inspections conducted by the States, 40 percent of all wheel violations issued were for loose or missing nuts or studs. Stud hole elongation, which results when fasteners are loose during wheel use, was the third leading violation.

The Safety Board also interviewed representatives from several wheel manufacturers who stated that when company metallurgists had analyzed failed studs, they determined the failures had been caused by fatigue that most likely resulted from the improper tightening of wheel nuts by various service facilities.

During the course of this special investigation, the Safety Board found that wheel failures resulting from seized bearings also stemmed primarily from improper maintenance. In trucks requiring grease, the Board determined that bearing seizure usually resulted from lack of lubrication. In several cases, overloading a vehicle and installing the axle nut using either too much or too little torque resulted in bearing failure. The Safety Board identified bearing failure as the causal factor in both the Miami, Florida, and Greensboro, North Carolina, fatal accident investigations.

Wheel bearing manufacturers indicated to the Safety Board that improper adjustment is the most frequent cause of bearing failure/wheel separation. The industry uses different types of wheel bearing adjustment components, and adjustment procedures also differ. Use of the correct procedure for the components involved is essential.

Manufacturers and carriers indicated to the Safety Board that fewer wheel separations result from bearing failures now that most bearings on large truck wheels are lubricated with oil instead of grease; the oil is visible and also leaks. Still, most single-unit trucks (similar to those investigated by the Safety Board) are built with grease bearings on the front wheel. While seal material and grease have been

improved, such vehicles still require periodic maintenance and monitoring. During routine maintenance inspections, determining whether a greased bearing is dry is difficult without disassembling the hub. Carriers indicated that if an oil seal leaks, a visible spray pattern is usually easy to detect and corrections are made. In addition, for oil-lubrication bearings, checking oil levels in the hub's viewing glass is easier. However, some engineers warned that the tendency to place covers on wheels eliminates the opportunity to frequently check oil level, as well as the nut torque and rust streaks, and should therefore be discouraged.

Wheel separations due to bearing problems do not generally appear to involve the design or manufacture of the bearings. Since the 1970's, only two manufacturers' campaigns have involved more than 100 vehicles with bearing problems, and both of these occurred in the late 1970s. Lubricants, such as synthetic grease, are improving, and oil lubrication of bearings has apparently helped reduce the incidence of dry bearings. Some large carriers are re-evaluating greased bearings as advances are made in these areas. It is evident that improvements to reduce the incidence of failures must come in the maintenance and operation area.

The Safety Board found that numerous sources identified the failure to follow proper maintenance practices as the primary cause of improper tightening of wheel fasteners and bearing failure. The OMC surveyed 16 carriers who performed their own wheel maintenance and found that 9 admitted to not following manufacturers' procedures.

To determine what guidance was available to installers and maintenance personnel, the Safety Board looked at the manuals of several truck, wheel, and bearing manufacturers. Included in our review was the National Wheel & Rim Association's manual,² which contains safety information, operating procedures, and wheel and rim maintenance information for 12 of the nation's leading wheel manufacturers. The manuals all identified deficiencies and practices that could affect fasteners and bearings. However, the maintenance manuals were not uniform in content and presentation.

The Safety Board also determined from examining the manuals and from conducting interviews with manufacturers and motor carriers that the recommended inspection frequency for fasteners and bearings varied greatly among them. The Board found that industry has not adopted standard guidelines for replacing broken wheel studs. Few manufacturers call for bearings to be checked other than when the wheel is pulled. Wheels will be pulled less frequently in the future because most carriers are specifying outboard-mounted brake drums, which do not require that the wheel be pulled to change the brakes.

Because wheel bearing failures apparently are the second major cause of truck wheel separations, an industry-wide practice for properly maintaining bearings is needed. The Maintenance Council of the ATA sponsored a Wheel End Assemblies Task Force, which developed a "Recommended Practice" for the installation of wheels and wheel bearings and for axle nut adjustment. This practice covers assembly of the bearings on the spindle and tightening of the wheel nuts(s) to

²"Wheel & Rim Manual," National Wheel & Rim Association, Form W-770, 1992 Issue, September 1991. The manual contains recommended procedures for Accuride, Alcoa, Budd, Dayton Walther, Erie, Firestone, Goodyear/Motor Wheel, Gunito, Kelsey-Hayes, Redco, and Webb.

obtain the proper bearing end play. It calls for bearing adjustment of smaller tolerances that should help reduce some problems associated with overly loose axle nuts. However, the Recommended Practice, which was distributed to ATA's membership for final approval by September 1992, does not address intervals for checking bearings or lubrication. The Safety Board believes that ATA should also develop guidelines on bearing inspection intervals.

In summary, the Safety Board believes that to reduce wheel separations due to improper tightening and bearing failure, the wheel and truck manufacturers need to develop a comprehensive service manual that addresses all of the above areas and the manual should be disseminated to all involved in heavy-truck maintenance. The manual needs to address those maintenance procedures that are often not observed by mechanics, as well as uniform procedures on matters where conflict currently exists. Once this manual is available, the industry should launch an intensive training effort through manufacturers, carriers, media, truck stops, and repair facilities to highlight the need to follow recommended practices for mounting wheels.

During the course of this special investigation, several wheel manufacturers provided the Safety Board with torque specification labels which they now provide with their products. The labels show such information as tightening sequence, proper installation procedures, recommended inspection frequency, and warnings about the impact of incorrect torque. During the technical review of this special investigation report that was conducted with government and industry representatives, the Truck Trailers Manufacturers Association informed the Safety Board that all their manufacturers were placing specification labels on trailers. Most of the participants at the technical review contended that labels were beneficial because mechanics may not always refer to manuals. The Safety Board agrees that labels provide a good quick reference to or reminder of the torque required, the sequence for tightening nuts, and the need to periodically retighten fasteners. The Safety Board believes that all manufacturers should consider providing labels to place on trucks near the wheels.

Therefore, the National Transportation Safety Board recommends that the American Trucking Associations, in cooperation with the National Wheel & Rim Association, the Motor Vehicle Manufacturers Association of the United States, Truck Trailer Manufacturers Association, and the Society of Automotive Engineers:

Develop and disseminate model guidelines for the inspection and maintenance of all types of medium/heavy truck wheels. (Class II, Priority Action) (H-92-98)

Develop uniform recommended practices that specify how often truck wheel bearings should be examined. (Class II, Priority Action) (H-92-99)

Promote an educational program on proper wheel tightening procedures through carriers, manufacturers, and government. (Class II, Priority Action) (H-92-100)

Encourage manufacturers to provide a label on trucks that indicates the recommended torque for wheel fasteners, proper tightening sequence, and recommended frequency for retorquing fasteners. (Class II, Priority Action) (H-92-101)

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "... to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any action taken as a result of its safety recommendations. Therefore, it would appreciate a response from you regarding action taken or contemplated with respect to the recommendations in this letter. Please refer to Safety Recommendations H-92-98 through -101 in your reply

Also the Safety Board issued Safety Recommendations H-92-102 to the Federal Highway Administration and H-92-103 to the Department of Transportation.

VOGT, Chairman, COUGHLIN, Vice Chairman, and LAUBER, HART, HAMMERSCHMIDT, Members, concurred in these recommendations.



By: Carl W. Vogt
Chairman

MAILING LIST

Mr. Thomas J. Donohue
President and CEO
American Trucking Associations, Inc.
2200 Mill Road
Alexandria, VA 22314

Mr. Max Rumbaugh, Jr.
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Mr. Bryan Lewis
Executive Vice President
National Wheel & Rim Association
5121 Vowden Road, Suite 303
Jacksonville, Florida 32216

Mr. Michael J. Stanton
Director of Federal Liaison
Motor Vehicle Manufacturers Association
1620 I Street, N.W.
Washington, D.C. 20006

Mr. Richard P. Bowling
President
Truck Trailer Manufacturers Association
1020 Princess Street
Alexandria, Virginia 22314



U.S. Department
of Transportation

National Highway
Traffic Safety
Administration

September 11, 2024

Bhupinder Dhadda
Alpha Services LLC
[REDACTED]

Via email to: [REDACTED]

Re: Freedom of Information Act (FOIA) Request NHTSA-240503-003

Dear Bhupinder Dhadda,

This responds to your May 3, 2024 FOIA request stating:

I want to know as per of your records about the vehicles that registered over GVWR 26000 Lbs. How many incidents are reported to NHTSA that happened due to lug nuts loosened and wheel & tire separated from the vehicle while driving on the public highways. Time period of incidents we requested is from 2013 to 2023 or/and whatever most records are available in your records.

On August 23, 2023 you submitted a FOIA request, NHTSA-230829-008, seeking the same information as this request. On February 27, 2024, we responded to that request advising you that NHTSA's authority does not extend to the oversight of commercial vehicles and that the agency does not have records responsive to your request. We also advised you that your request was referred to the Federal Motor Carrier Safety Administration (FMCSA), an operating mode of the Department of Transportation for processing and direct response to you. We provided contact information for FMCSA. As this request is identical to your previous request, we refer you to our February 27, 2024 response.

Pursuant to the provisions of 49 C.F.R. Part 7, there is no charge for this response.

Sincerely,
[REDACTED]

Shonda Humphrey
Attorney Advisor



U.S. Department
of Transportation

Federal Motor Carrier
Safety Administration

1200 New Jersey Ave., SE
Washington, DC 20590

November 10, 2025
FMCS-2024-03703

Bhupinder Dhadda
Alpha Services LLC

Puyallup, WA

Dear Bhupinder Dhadda:

This is in response to your request dated April 24, 2024, requesting records pertaining to "vehicles over GVWR 26000 Lbs, incidents are reported to FMCSA that happened due to Federal Motor Carrier Administration laws for Safety: (§ 393.205 Wheels) (c) Nuts or bolts shall not be missing or loose."

We have searched our databases and/or contacted the appropriate program offices regarding your request and have determined that the Federal Motor Carrier Safety Administration (FMCSA) does not the level of data you are seeking. You can review the data we have online pertaining to [Crash Statistics](#).

You have the right to appeal this determination. By filing an appeal, you preserve your rights under FOIA and give the agency a chance to review and reconsider your request and the agency's decision.

Your appeal must be mailed within 90 days from the date of this response, to:

Associate Administrator, Office of Administration
Federal Motor Carrier Safety Administration
1200 New Jersey Ave, S.E.
Washington, DC 20590

Please clearly mark both the envelope and your letter "Freedom of Information Act Appeal."

If you would like to discuss our response before filing an appeal to attempt to resolve your dispute without going through the appeals process, please contact the FMCSA FOIA Hotline at 202-366-2960 or by email at FOIA2@dot.gov .

You may also contact the FMCSA FOIA Public Liaison for assistance at:



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** See International Mail Manual at <http://pe.usps.com> for availability and limitations of coverage.

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EP14F October 2023
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S2324N504487-2

FROM:

FROM:

Bhupinder Dhadha
18618 94th Avenue Court East
Puyallup, WA 98375
253-906-8013 | bsd8013@gmail.com

TO:

Administrator (NHTSA)
National Highway Traffic Safety Administration
U.S. Department of Transportation
Docket Operations, West Building Ground Floor, Room W12-140
1200 New Jersey Avenue SE,
Washington, DC 20590

Attn: Petition for Defect Investigation and Rulemaking (49 CFR

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