



U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**

ODI RESUME

Investigation: DP 15-006

Prompted by: Owner Letter

Date Opened: 09/28/2015

Investigator: Nate Seymour

Approver: Otto Matheke

Subject: Ride Quality

Date Closed: 04/08/2016

Reviewer: Bruce York-B

MANUFACTURER & PRODUCT INFORMATION

Manufacturer: Volvo Trucks North America

Products: 2013 - 2016 Volvo 780

Population: 62,016

Problem Description: The truck cab may sway contributing to driver/co-driver fatigue and/or loss of vehicle control.

FAILURE REPORT SUMMARY

	ODI	Manufacturer	Total
Complaints:	6	45	45**
Crashes/Fires:	0	0	0
Injury Incidents:	1	0	1
Number of Injuries:	1	0	1
Fatality Incidents:	0	0	0
Other*:	0	301	301

***Description of Other:** Warranty Claims for Loss of control (0), cab sway (9) and cab misalignment (292)

**** Total eliminates duplicates received by ODI and manufacturer.**

ACTION / SUMMARY INFORMATION

Action: This DP is closed.

Summary:

The Office of Defects Investigation (ODI) opened this Defect Petition (DP) assessment in response to a defect petition received from owners of a 2015 Volvo VNL 780 tractor. Prior to submitting the letter the owners had submitted two Vehicle Owner Questionnaires (VOQ). Their concerns included: cab sway, cab alignment, and loss of control. The petitioners further allege that due to a failure of the suspension system caused by cab misalignment one of them sustained a back injury while seated at the work station in the sleeper berth while traveling.

The office received a total of six (6) complaints (1 via telephone) related to ride quality on 2013 -2016 Volvo VNL vehicles. Two (2) of the complaints were filed by the petitioners. Of the five (5) unique complaints, three (3) were received during the course of this evaluation. During this evaluation, the Owner/Operators Independent Drivers Association (OOIDA) published an article in their magazine, Land Line, prompting the additional two reports. One owner reported owning three Volvo trucks, all of which had a tendency to sway and lean, yet he preferred the ride over other manufacturers peer vehicles.

ODI sent an Information Request (IR) letter to Volvo asking about the three concerns identified in the petition. The response indicated Volvo's cab air ride design has been in use since 2005. When evaluating each of the three concerns raised by the petitioners, ODI found that the complaint and warranty data did not establish existence of a defect trend for cab sway or loss of control. There were no reported injuries or loss of control events and less than 0.02% of the population had a cab sway concern. The majority of claims and complaints received involved cab alignment. The 2015 MY did stand out from the other MYs with over 1% of the 2015 population reporting cab

alignment issues. This may indicate there is a defect in the design or production of the cab mounting, however there was no indication it created a safety risk.

ODI test drove the petitioners' vehicle, employing an investigator with significant experience driving similar vehicles. This test drive revealed a degree of cab sway that appeared to exceed that of peer vehicles. Nonetheless, the ODI driver did not experience any difficulty controlling the vehicle.

For additional details see the attached Evaluation Report.

This defect petition is denied. The agency has not identified an actionable trend or unreasonable risk to motor vehicle safety. Should new information become available the agency will take whatever further action is appropriate.

The ODI reports cited above can be reviewed at:

<http://www-odi.nhtsa.dot.gov/owners/SearchNHTSAID> under the following complaint identification numbers: 10747593, 10715844, 10701592, 10781242, and 10822454

Nate Seymour
Safety Defects Engineer

NEF-140ns
DP15-006

Greg Magno
Chief, Defects Assessment Division

BASIS:

Mr. Albert Cusson and Nancy Younger-Cusson petitioned the National Highway Traffic Safety Administration (NHTSA) by letter dated August 7, 2015, requesting that a defect investigation be conducted concerning motor vehicle safety in 2015 Volvo VNL 780 vehicles. While Mr. Albert Cusson and Nancy Younger-Cusson's letter did not comply precisely with the requirements for a petition to initiate a defect investigation found in 49 C.F.R. § 552.4, the Agency is treating it as a petition in accordance with the regulation. The facts described in this report are based on the investigator's conversations with Albert Cusson and Nancy Younger-Cusson as well as the letter they submitted.

The petitioners allege that a defect exists involving the design and assembly of the sleeper cab air suspension system which under certain circumstances, lead to excessive cab sway, cab misalignment/bottoming out, and/or loss of vehicle control. The petitioners claim that excessive cab sway causes them to experience fatigue beyond what is normally expected in the operation of a commercial motor vehicle. They state the constant swaying physically tires them and prevents them from getting good rest when utilizing the vehicle in team driving operations. The petitioners further allege that due to a failure of the suspension system caused by cab misalignment one of them sustained a spinal injury while seated at the work station in the sleeper berth during transit. They also expressed a concern that the advanced technologies for crash avoidance would be falsely triggered by the cab sway.

DESCRIPTION OF SYSTEM: The cab suspension system installed on the petitioners' truck is an air ride configuration. The design has been used by Volvo since 2005 and consists of two (2) air bags, two (2) shock absorbers, an air leveling valve, and a torsion bar and block located at the rear of the sleeper cab. Two (2) mounting brackets are located at the front of the cab. Volvo uses shock absorbers that are mounted on an angle. Other OEMs such as Freightliner, Peterbilt and Kenworth were observed to use shock absorbers mounted in the vertical configuration. The front brackets are mounted such that the anchoring bolt and bushings are parallel to the frame. Again, this is unique when compared to Freightliner, Peterbilt and Kenworth.

The air bags are intended to support the load of the cab/sleeper. They are controlled by a single leveling valve. As more weight (occupants and personal gear) is added to the cab/sleeper more air is added to the air bags to support the additional load. When the load is reduced, air is exhausted from the air bags, maintaining the predetermined ride height of the cab/sleeper. The torsion bar and block are used to allow cab/sleeper movement, but maintain correct placement on the frame.

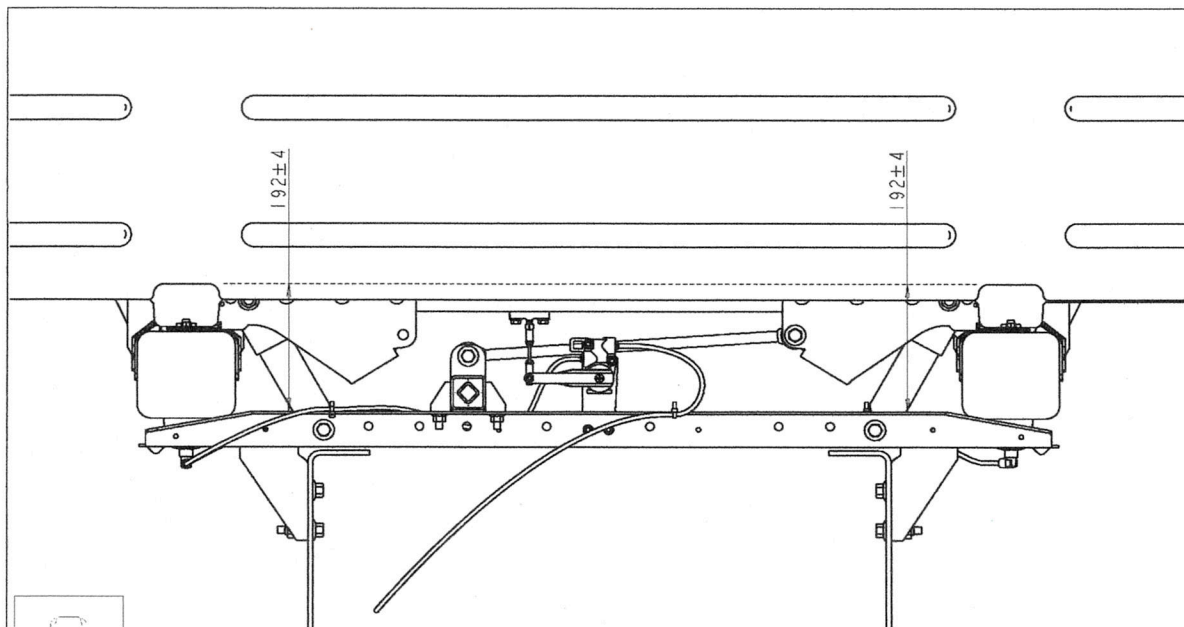


Figure 1 - Air Suspension Sleepers

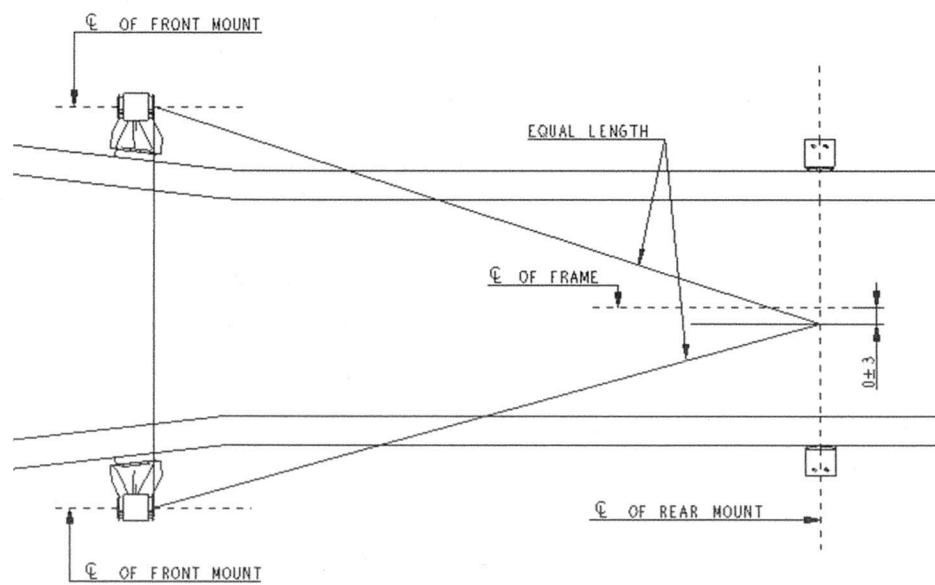


Figure 2 - Front Mounting Brackets

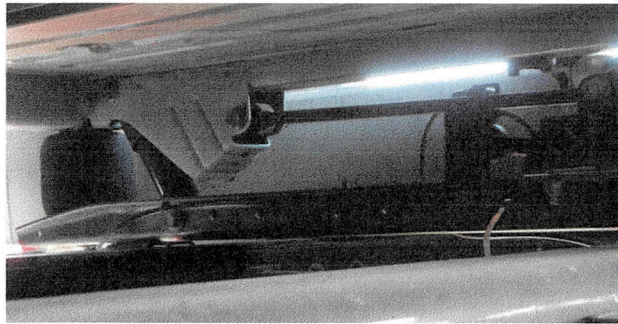


Figure 3 – Volvo Rear of Sleeper

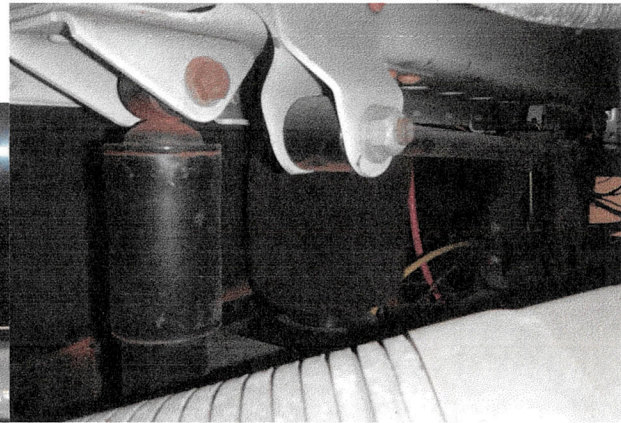


Figure 4 – Freightliner Rear of Sleeper

OWNER REPORTS:

The Office of Defects Investigation has confirmed a total of six (6) complaints related to the ride quality of 2013 -2016 Volvo VNL vehicles. Attempts were made to confirm an additional two (2) VOQ submissions, but were unsuccessful. Two (2) of the complaints were filed by the petitioners. Of the five (5) unique complaints, three (3) were received during the course of this evaluation after the Owner/Operators Independent Drivers Association (OOIDA) published an article in their magazine, Land Line, about the evaluation.

One of the reports received during the evaluation was from a couple driving team, similar to the petitioners. They have over 50 years of driving experience and have owned three (3) Volvo VNL trucks (MY 2008, 2010, & 2015). All have exhibited the swaying condition. When asked why they continued to buy Volvos, they stated: fuel mileage, aerodynamics, spaciousness of the cab/sleeper, availability of work station (table) in the sleeper, uptime of the vehicle, and ride quality. When asked to explain what they meant by ride quality they said it was smoother and less jerky than all other trucks and rode more like a pickup truck. When asked if they felt the swaying was an unreasonable risk to safety, they believe it is manageable, but might require you to slow down at times.

A second report received during the evaluation was from a first time Volvo owner, similar to the petitioners. This individual had 45 years of driving experience in various makes and models. However, since becoming an owner operator in 1995 he exclusively bought Kenworth. This was the first Volvo he purchased. It had a different ride, which he believed required a lot more input to control the vehicle.

The subject vehicle population (2013-2016 VNL with sleeper), as manufactured without scrappage, is 62,016.

ANALYSIS: The petitioners, Mr. Albert Cusson and Nancy Younger-Cusson, identified three concerns in their conversations with the ODI investigator: (1) cab sway; (2) cab alignment/bottoming out; and (3) loss of control due to false trigger of advanced safety

equipment. ODI considered all three and questioned Volvo about each in an Information Request (IR) letter dated October 13, 2015. Volvo responded on October 28, 2015.

ODI also conducted a test drive of the petitioners' vehicle on August 26, 2015. The ODI investigator was an experienced over the road (OTR) truck driver. The test drive originated in Warrenton, VA, and concluded in Hunlock, PA. The investigator drove approximately 250 miles from Warrenton, VA, to Grantville, PA, and then rode as Albert Cusson drove another 60 miles to Hunlock, PA. The route was primarily interstate highways with the exception of state roads to access pickup and delivery locations. The investigator noted that the petitioners' truck did have a slight sway. When observing other trucks traveling alongside it, the petitioners' truck did appear to sway more than others according to the subjective assessment of the investigator.

The road surface was generally smooth. Elevation changes typical of Interstate 81 in VA, WV, MD, and PA were encountered. At times there did appear to be a moderate cross wind and this coincided with the times of greatest sway. The investigator also noted that the sway could be induced by "oversteering" the vehicle. Volvo has instructed drivers to hold the steering wheel steady and minimally steer as required. This is a deviation from how some drivers allow the steering wheel to flow with the feel of the road, i.e.: oversteering.

In Grantville, PA the ODI investigator coordinated with the Pennsylvania State Police (PSP) to weigh the petitioners' truck both bobtail and coupled to the loaded trailer. PSP uses individual wheel scales, however due to uneven surfaces, PSP only considers across axle weights for enforcement purposes. The weights observed were as follows:

Loaded	Left Side	Right Side	Total
Front	6500	5900	12,400
Rear Front	7750	7250	15,000
Rear Rear	7700	6700	14,400
Total			41,800

Table 1: Petitioners' Truck coupled to loaded step-deck trailer with driver in seat

Bobtail	Left Side	Right Side	Total
Front	6650	6050	12,700
Rear Front	2700	2300	5,000
Rear Rear	2550	2250	4,800
Total			22,500

Table 2: Petitioners' Truck bobtail with driver in seat

Difference L-R	Loaded	Bobtail
Front	600lb (4.8%)	600lb (4.7%)
Rear Front	500lb (3.3%)	400lb (0.8%)
Rear Rear	1,000lb (6.9%)	300lb (6.3%)

Table 3: Petitioners' Truck : Left to Right side weight difference

Slight differences are expected between the left and right side of the truck due to the slope of the parking surface where the truck was weighed. However, one would expect that the percentage would remain consistent between loaded and bobtail. We see that on the front axle, which is a spring ride, it is very close: 4.8% loaded vs. 4.7% bobtail. The rearmost drive axle is also very close at 6.9% loaded and 6.3% bobtail. However the forward drive axle is significantly different

with 3.3% loaded and only 0.8% bobtail. There are many factors that would need to be further investigated to understand this difference. Assuming cargo placement and fifth wheel location were appropriate for the load, an analysis of the drive axle air suspension system may reveal an issue which contributes to cab sway in the petitioners' truck. This may be similar to one of the unconfirmed VOQs which reported sway caused by failed axle suspension air bags.

Volvo reported a total of forty-five (45) complaints and field reports on 2013-2016 VNL sleep models for all three conditions. Thirty of those reports were on 2015 MY vehicles. Similarly, of the 301 total warranty claims filed on 2013-2016 VNL sleeper models, 225 warranty claims were filed on the 2015 MY vehicles. This equates to a 0.07% complaint and 0.49% overall warranty rate on the 2013-2016 MY vehicles.

ODI further analyzed the claims and determined there were zero (0) claims for loss of control. The petitioners stated they lost control of their vehicle; however, during the incident petitioners described they were able to safely recover control of the vehicle prior to any crash. Petitioners did not file a Police Accident Report (PAR) related to the incident and the vehicle was not towed. Therefore, ODI does not recognize this as a loss of control event.

Petitioners did not provide any basis for their claims that the cab sway could falsely trigger the vehicle's advanced safety systems or provide an example of any incidence where this occurred. When specifically asked if sway could falsely trigger the advanced safety features of the vehicle, Volvo responded:

The alleged defect does not adversely affect vehicle control. Volvo has not received any warranty claims, customer complaints, field reports, vehicle crash reports, property damage claims, or personal injury claims. Furthermore, the advanced safety systems are controlled by inputs from the chassis and not the cab; therefore, the systems are not affected.

ODI does not have any evidence contrary to Volvo's claim that there are no known claims, complaints, or reports. While ODI notes that the chassis is not independent of the cab, and therefore forces from the cab will be transmitted to the chassis, ODI does not have, and petitioners have not provided, any information to suggest that cab sway impacts the vehicle's advanced safety systems.

Volvo did receive two (2) complaints and nine (9) warranty claims for cab sway. This equates to 0.01% of the total population. When considering just the 2015 MY, the rate was 0.02%. Reviewing all warranty claims indicated the majority of claims were resolved when the cab shocks were replaced. For these reasons, ODI is unable to identify a defect involving cab sway in the vehicle at this time.

The final concern raised by the petitioners was cab misalignment/bottoming out. They stated that the cab has come out of alignment multiple times and it can then bottom out, forcefully striking the frame. Volvo reported forty-three (43) complaints and field reports and 292 warranty claims for cab misalignment. When sorted by MY, the 2015 MY stood out, with twenty-nine (29) complaints and field reports and 222 warranty claims. This equates to a 0.47%

warranty rate on the subject vehicles and a 1.24% warranty rate specifically for the 2015 MY. This significant shift indicated to ODI that there is a defect with the cab mounting components beginning in or about the 2015 MY; however a safety risk has not been identified because none of the complaints, field reports, or warranty claims received by Volvo report injuries.

One petitioner claims an injury was sustained when the cab bottomed out. ODI understands that the petitioner was seated at the work station (table) in the sleeper berth while the vehicle was in transit. Petitioners did not provide, in their petition or during their meeting with the investigator, enough details about the event for ODI to determine whether the injury was related to the alleged defect. Volvo has not designated this as a seating position. The seating area for the work station does not provide back support for a seated individual and is not equipped with seatbelts. Volvo does not intend for it to be used while the vehicle is in transit.



Figure 5: Volvo work station

While ODI believes that it may be foreseeable that vehicle occupants may use the work station during transit, ODI does not believe that the alleged defect creates an unreasonable risk to motor vehicle safety. Volvo reported three (3) complaints and three (3) field reports for the cab bottoming out. One of the field reports described an incident in which a mounting bolt had punctured the air bag, which caused the failure. Volvo did not report any warranty claims related to bottoming out. Volvo also received three (3) reports of the cab hitting or striking the vehicle's aerodynamic flaring. Volvo has not received any reports of injury related to bottoming out.

It is ODI's contention—based on currently available information—that the incidence in the petition is isolated and is not related to a larger defect trend. There are several factors that could cause the sleeper cab to bottom out including traveling on a rough road surface, an incidence of heavy swaying, or an incident such as the one described in the field report. Furthermore, if the vehicle had a defect that caused the cab to bottom out ODI would expect to see more complaints, warranty claims, and field reports regarding the issue.

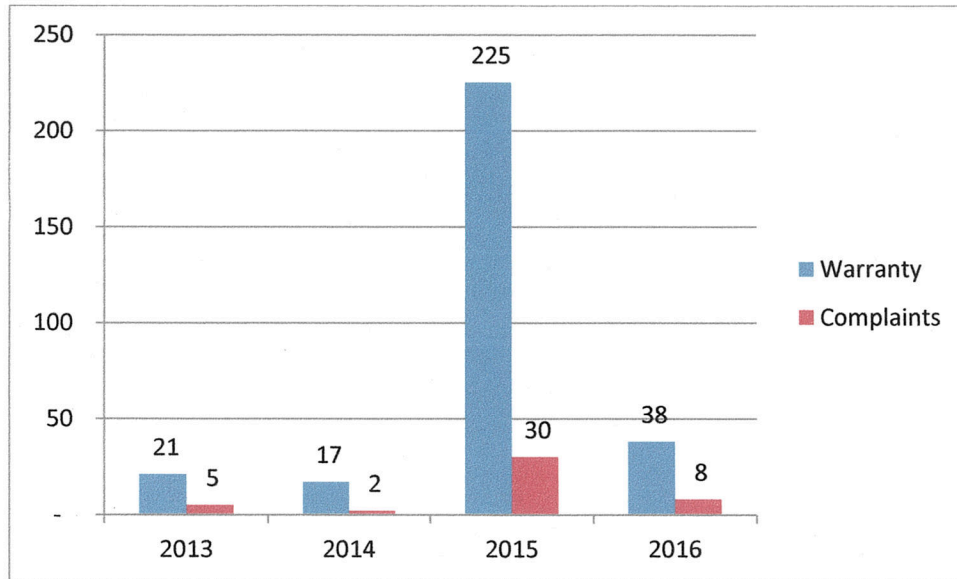


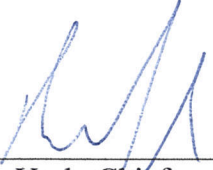
Figure 5 - Number of Volvo Reports by Vehicle Model Year

ODI searched its data base for similar recalls and investigations. No similar recalls for ride quality were found. And, no previous investigations have been launch to assess the alleged defect.

CONCLUSION: Based on the available information and previous agency experience, ODI does not believe that an investigation is likely to result in a determination that the alleged defect is an unreasonable risk to highway safety.

RECOMMENDATION: Deny the petition.

CONCUR:


 Bruce York, Chief
 Medium & Heavy Duty Vehicles
 Division

Date

