Jan 10, 2022

Josh Neff, Chief
Medium & Heavy-Duty Vehicle Defect Division
Office of Defects Investigation

ref: NEF-106ns
DP21-004

On December 10, 2021, we (Great Dane LLC) received DP21-004, a request for information regarding side underride guards, their availability, and our assessment thereof. The attached information is in response to the inquiry:

To clarify our responses, we have relied upon this additional Definition:

Side Underride Guards: An assembly or device, incorporated into the subject vehicles that is intended to mitigate the results of automotive crashes into the subject trailers. This does not include devices that are strictly intended for protection of Vulnerable Users, such as bicyclists or pedestrians.

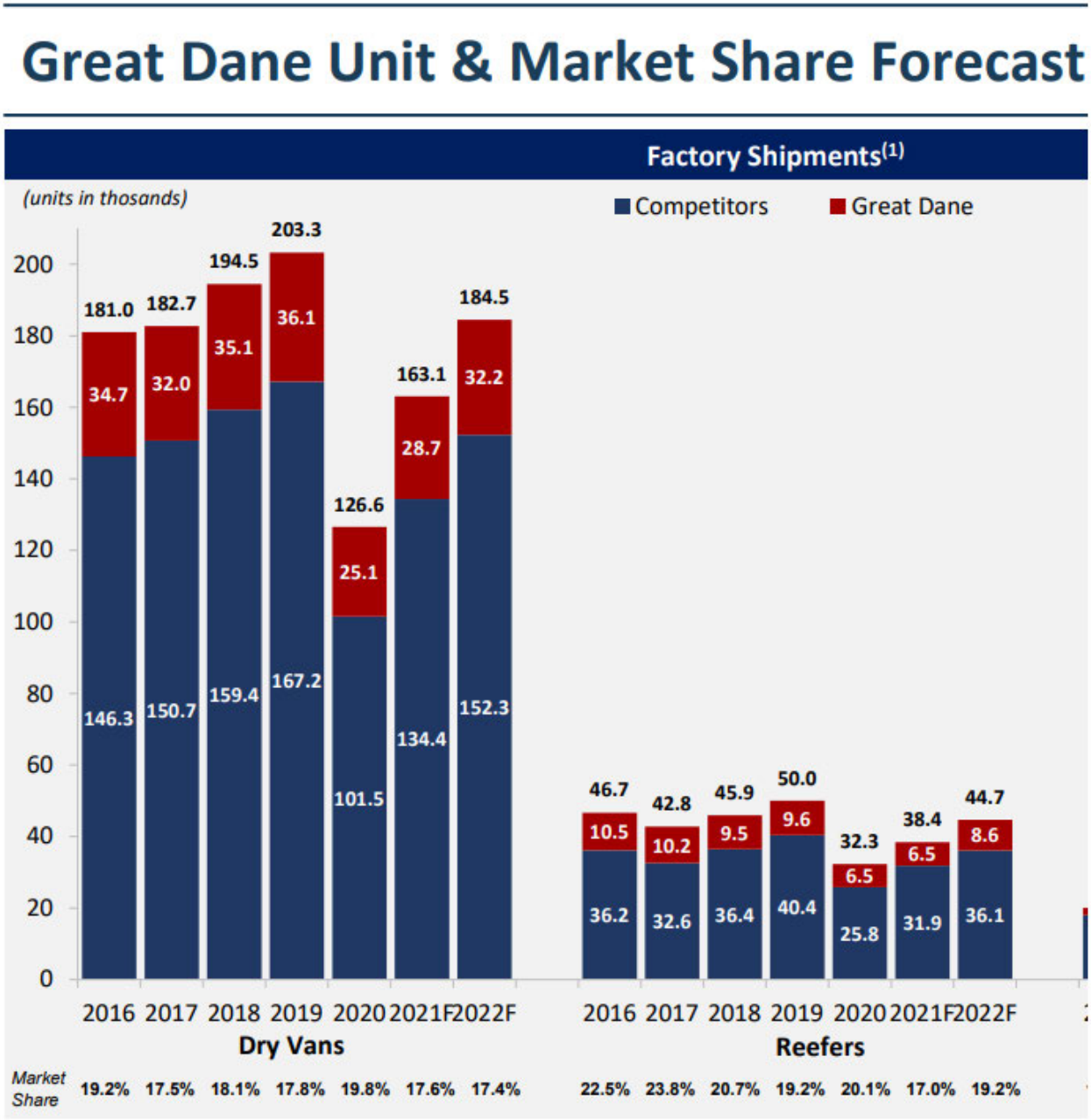
1. **State by Model Year the number of subject vehicles Great Dane has manufactured for sale or lease in the United States since 2006. Include by model year the number of subject vehicles which were manufactured by Great Dane with side underride guards as original equipment.**

Model Year	Dry Vans	Refrigerated	Total Vans	Total Vans with Side
2006	34,865	11,230	46,095	0
2007	40,852	11,427	52,279	0
2008	30,968	8,435	39,402	0
2009	15,686	6,914	22,600	0
2010	6,530	5,699	12,229	0
2011	11,012	7,280	18,292	0
2012	25,434	7,572	33,006	0
2013	29,938	8,485	38,423	0
2014	27,640	8,629	36,269	0
2015	30,978	9,296	40,274	0
2016	35,101	9,500	44,601	0
2017	32,975	10,421	43,396	0
2018	30,835	8,576	39,411	0
2019	31,823	8,677	40,500	0
2020	34,267	8,709	42,976	0
2021	25,205	6,036	31,241	0
2022	30,679	6,856	37,535	0

Notes:
1) Model Year 2022 includes trailers scheduled to be built as of December 16, 2022
2) Shipment data from JD Edwards used for MY 2006-2011; Build data from Power BI used for MY 2012-2023
3) For Model Years 2006-2011, trailers sold into US estimated based on percentage of US sales for MY 2012-2023

2. State the current or estimated number of Great Dane subject vehicles still in service for all model years. Based on Great Dane's experience in the used and new trailer markets, we generally anticipate that a dry freight van will have a 15 year useful life, and a refrigerated trailer will have a 10 year useful life. Overlaying those estimates with the data presented in #1, Great Dane estimates there are close 400,000 Great Dane Dry Vans and 85,000 Great Dane Refrigerated Vans currently in service.

3. Please report Great Dane current percent of the subject vehicle market share.



Market share data based on ACT data.

4. Provide a brief summary of any and all reports, claims, or other notices received by Great Dane, or of which Great Dane is otherwise aware, which relate to, or may relate to, the alleged defect in the subject vehicles or vehicles equipped with side underride guards.

With regards to Subject Vehicles (Model Year 2006 to present) manufactured by Great Dane, there are two incidents that Great Dane is aware of:

NATALIE BOONE, DENISE COBBS, and RAPHAEL LATSON, individually and on behalf of WILLIE LATSON	1ST JUDICIAL DISTRICT DOCKET NO. 601-872
VERSUS	DIVISION "A"
GREAT DANE LLC, FEDEX FREIGHT, INC., PROTECTIVE INSURANCE COMPANY, and MARIO DUMAS	PARISH OF CADDO STATE OF LOUISIANA

An automobile pulled out of a blind driveway into the roadway and struck the passing trailer in the landing gear area. The car was then struck by the battery box and subframe that was installed under the trailer, in the by area. The matter was settled by the parties.

Secondly,

In early 2016, we received a demand letter arising from a side underride accident in which a motorcyclist was killed in California in November of 2014. The motorcyclist was first struck by another motorist, lost control, ended up off of his motorcycle and was run over by the trailer of a tractor trailer combination. This matter was settled by the parties prior to any lawsuit being filed.

5. Does Great Dane currently offer side underride guards as standard or optional equipment? If yes, is it a Great Dane design or from another supplier? If from another supplier, identify the supplier and provide their contact information.

No. Indeed, at this time, Great Dane is not aware of a side underride guard system that is technologically feasible to function as a guard without compromising the operational status of the trailer.

6. Produce copies of all installation, service, warranty, and other documents that relate to, or may relate to, the subject component in the subject vehicles.

Great Dane has never installed a side underride guard on a trailer that was put into service. In 2017, Great Dane purchased an AngelWing device for the purpose of determining possible compatibility of the AngelWing device with a Great Dane trailer. Please find attached an installation manual provided by Airflow Deflector to Great Dane in connection with Great Dane's installation and compatibility testing of the AngelWing device. This attachment is labeled "Response #6 …."

7. Provide a brief summary of all assessments, analyses, tests, test results, studies, surveys, simulations, investigations, inquiries and/or evaluations that relate to , or may relate to, the subject component that have been conducted, are being conducted, are planned, or are being planned by, or for, Great Dane.

- Great Dane has been analyzing the feasibility of a side underride device for many years. That work has included, among other things, informal discussions and brainstorming sessions within the Engineering department as well as other departments within the company.
- Great Dane has examined several patented devices (no production versions are available as far as we can tell) from other trailer manufacturers, including Wabash and Vanguard to assess potential viability.
- In 2017, Great Dane conducted installation and durability simulation testing on an aftermarket guard, the AngelWing. That testing revealed that the AngelWing device was not compatible for use on a Great Dane trailer. A copy of Great Dane's test report is attached to these responses labeled, "Response #7 …".
- Since at least 2018, Great Dane has been actively engaged in developing its own side underride guard system that it hopes will prevent passenger compartment intrusion under both crash-test and real-world conditions while not compromising the trailer's structural or operational capabilities. Great Dane has applied for a U.S. patent relating to certain of this work.[1] Design work and testing are still underway. In September 2021, Great Dane conducted crash tests of its then-current side underride design. At least one of the tests was unsuccessful. Great Dane's work is ongoing, but to date, it has not identified a feasible side underride guard design that would prevent passenger compartment intrusion under crash-test and real-world conditions while not compromising the trailer's structural or operational capabilities. Great Dane's work in this area is continuing.
- Great Dane also participated in a TTMA process that was intended to develop a Recommended Practice relating to side underride guards. TTMA endeavored to provide industry-wide guidelines for the performance and installation of a side underride, and design considerations for practicable side underride guard implementations. That work has not yet been successful for a number of reasons.

8. Angelwing is one aftermarket manufacturer of side underride guards. Please assess the compatibility of this product with Great Dane trailers. See the following link for additional information: http://www.angelwingskirts.com/

a. Effect, if any, this guard will have on the structural integrity of Great Dane trailers;

b. The approximate weight adding this side underride guard will add to Great Dane trailers;

c. The approximate reduction in cargo carrying capacity adding this side underride guard will have on Great Dane trailers;

d. Effect, if any, this guard will have on the durability and service life of Great Dane trailers;

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[1] *See* https://appft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PG01&s1=20210309176&OS=20210309176&RS=20210309176 (last visited January 13, 2022).

e. The approximate cost, including materials and labor for installation of these guards both on new production and in-service Great Dane units;
f. Effect, if any, this guard will have on the maneuverability and operating environment compatibility of Great Dane trailers;
g. Your assessment of the effectiveness this side guard would have preventing injury and death of other roadway users when installed on Great Dane trailers; and,
i. Your assessment of any additional concerns, issues, or benefits this side underride guard may have.

a. As discussed in its response to Question 6, above, Great Dane previously purchased, installed, and conducted durability simulation testing on an AngelWing aftermarket guard. Great Dane's test results are attached as "Response #7 ….". In short, Great Dane determined that due to premature fatigue failures on the AngelWing's components and the accelerated damage to the trailer roof structure (as compared to similar trailers) the AngelWing device is not compatible for use on Great Dane trailers.
b. 800 lbs
c. The approximate reduction in cargo carrying capacity caused by adding this an AngelWing device would vary. On a trailer that is loaded to its maximum weight, the load would need to be reduced by at least 800 lbs. On a fully loaded trailer that uses palletized or bulk loads, this reduction could be even more, if an entire pallet or unitized load is removed. Trailers that are not loaded to the maximum weight may not have reduced carrying capacity – for that load – but would be heavier each trip with the additional weight of the device.
d. See response to a) and attached report.
e. Our best estimate of the approximate cost for installing this device on new production trailers is $3,200 per trailer ($3,000 in parts and approximately 4 man-hours). For installation as an aftermarket part on as in-service Great Dane unit, the cost would be approximately $4,200 per trailer ($3,000 parts and 15 man-hours). The new production cost estimate is for limited utilization. Additional costs would be incurred if an Angelwing device became standard, because this component cannot be installed on Great Dane's mainline production operation and would need to be installed in a service bay. If all trailers were to be equipped, there would need to be additions made to plant manufacturing space and storage space for the devices.
f. The addition of a rigid guard system, such as an AngelWing would significantly impair the maneuverability and operation of the vehicle in situations that include ramps at loading docks and high centering scenarios such as railroad crossings. Installation of the device also may restrict the use of current systems that are mounted under trailers such as walk ramps, spare tires, cargo boxes, and fuel tanks.
g. The installation of an AngelWing device is unlikely to prevent injury and death of other roadway users for at least three independent reasons. *First*, as detailed above, Great Dane's durability simulation testing revealed that the AngelWing is incompatible with a Great Dane trailer and would cause accelerated damage to the structural integrity of the trailer. This would be a significant safety hazard to all roadway users. *Second*, because of the rigidity of the AngelWing device, it is likely to sustain damage at loading docks and in various high centering scenarios; this damage is likely to vitiate any functional utility that the device might otherwise have had. *Third*, because of interstate highway weight restrictions, the addition of an AngelWing device would reduce the cargo capacity of

each trailer. That would lead directly to an increased number of tractor-trailers on the road. These additional tractor-trailers would mean greater chances for accidents.

For additional details please see attached report on Angelwing installation and testing at Great Dane R&D Lab.

9. Safetyskirt is one aftermarket manufacturer of side underride guards. Please assess the compatibility of this product with Great Dane trailers. See the following link for additional information: https://www.trailerguards.com/
a. Effect, if any, this guard will have on the structural integrity of Great Dane trailers;
b. The approximate weight adding this side underride guard will add to Great Dane trailers;
c. The approximate reduction in cargo carrying capacity adding this side underride guard will have on Great Dane trailers;
d. Effect, if any, this guard will have on the durability and service life of Great Dane trailers;
e. The approximate cost, including materials and labor for installation of these guards both on new production and in-service Great Dane units;
f. Effect, if any, this guard will have on the maneuverability and operating environment compatibility of Great Dane trailers;
g. Your assessment of the effectiveness this side guard would have preventing injury and death of other roadway users when installed on Great Dane trailers; and,
i. Your assessment of any additional concerns, issues, or benefits this side underride guard may have.

Great Dane has not evaluated the Safetyskirt in any hands-on testing. The current version of the Safetyskirt appears to incorporate an AngelWing device, as well as other structural mounting apparatuses which do not appear to be compatible with the structural design of Great Dane trailers. Based on engineering judgment, Great Dane believes the Safetyskirt would be similarly incompatible with Great Dane's current trailer design. Further answering, Great Dane incorporates by reference herein its answers to No. 8 above.

10. Furnish Great Dane's assessment of the following in today's transportation system:
a. The feasibility of side underride guards;
b. The industry financial cost of side underride guards;
c. The effectiveness side underride guards may have preventing traffic crash injuries and fatalities;
d. The potential changes in the US transportation system side underride guards may require; and,
e. The reports included with this inquiry.

a. Currently, there are no technologically feasible side underride guard designs that would be compatible with a Great Dane trailer as OEM equipment. Moreover, no such guards are available in the aftermarket. Great Dane is continuing work in this area.
b. There would be significant industry costs to widespread use of side underride guards. In addition to the parts and labor costs associated with side underride guards (which for the AngelWing are discussed above – other model guards are likely to differ slightly), overall trailer weight would also increase. This weight will result in higher overall fuel costs to

operate the trailer. Moreover, because of interstate weight restrictions, each trailer could haul less cargo, which would lead directly to an increased number of tractor-trailers on the road. These additional tractor-trailers would mean greater chances for accidents. Side guards also are likely to increase maintenance, inspection, and replacement costs over the life of the trailer are not yet available.

c. A properly designed and maintained guard may be effective in preventing traffic crash injuries and fatalities under the proper set of crash circumstances. At this time, Great Dane cannot conceive and has not conceived of a guard assembly that would be technologically feasible and would have a net positive effect on overall safety.
d. Requiring side underride guards on trailers could cause a whole host of unintended side effects. These may include:
    - High centering could cause rerouting of loads;
    - Problems accessing current loading docks, many of which would need to be redesigned to accommodate side guards;
    - A significant increase in the number of trailers on the road as a result of the reduced cargo capacity for each affected trailer; alternatively, laws would need to be changed to accommodate increased trailer weights. Of course, this would affect fuel efficiency and interaction with myriad environmental laws
    - A significant increase in the number of trailers on the road may lead to an increase in total accidents;
    - Current US trailer designs do not seem to permit any currently available retrofit side guard solutions, so any change in federal law would require a substantial grace period and would still likely lead to considerable industrial and economic waste if current trailers are destroyed

Hopefully this information will prove to be helpful in NHTSA's evaluation of side underride protection devices, their effectiveness, their availability, and necessity.

GREAT DANE LLC



Daniel E. Carter
Director, Product Safety & Compliance