



U.S.
Department of
Transportation
**Pipeline and
Hazardous Materials
Safety
Administration**

1200 New Jersey Avenue,
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Safety Advisory Notice¹ – Special Permits DOT-SP 14951, DOT-SP-16524, DOT-SP 16346, DOT-SP 20418, DOT-SP 20425, and DOT-SP 16560

Summary

On March 3, 2020, the Pipeline and Hazardous Materials Safety Administration (PHMSA) conducted an Investigative Hearing (Hearing) in response to incidents and roll-over crashes associated with operations using packagings authorized under special permits DOT-SP 14951 and DOT-SP-16524. These special permits authorize the manufacture, mark, sale and use of non-DOT specification fully wrapped fiber reinforced composite gas cylinders (COPV). These COPVs are used for transportation of compressed natural gas (CNG) and other hazardous materials. Special permits DOT-SP 16346, DOT-SP 20418, DOT-SP 20425, and DOT-SP 16560 authorize similar relief and share similar concerns.

Based on the information presented at the Hearing and the subsequent evaluation, PHMSA publishes the recommendations outlined below to provide additional options to facilitate the safe transportation of CNG under the terms of these special permits. We have concluded:

- The design of the COPVs which contained the CNG performed in a manner which met or exceeded the design qualification and testing requirements of the special permits.
- The frame designs which are used to hold the cylinders met or exceeded the design requirements of the special permit. In the one instance where a crash resulted in separation of the COPVs from the frame assembly, it was calculated the impact loading was 3.75 times higher than the loading required under the special permits.
- The trailers have a high center of gravity which results in handling characteristics that lead to a higher rollover crash rate when compared to most commonly transported trailers.
- Specialized training can inform the drivers about the operational characteristics of these trailers and how to appropriately respond in certain situations.
- A common factor in all crashes was driver error.

¹ *This document contains guidance provided to help the regulated community understand how to comply with regulations, but its contents are not substantive rules themselves and do not create legally enforceable rights, assign duties, or impose new obligations not otherwise contained in the existing regulations and standards. However, an operator who is able to demonstrate compliance with the content of this document is likely to be able to demonstrate compliance with the relevant regulations. If a different course of action is taken by a regulated entity, that entity must be able to demonstrate that its conduct is in accordance with the regulations.*

Background

The Hearing took place on March 3, 2020 at the Department of Transportation's Headquarters in Washington, DC. In addition to PHMSA, FMCSA, and NHTSA, several major operators as well as other stakeholders attended the hearing. The hearing focused on the high center of gravity of the systems and trailers manufactured under the previously mentioned special permits. The vehicles using cylinders manufactured under these special permits are configured as a series of large cylinders mounted within a framework positioned either perpendicular or horizontal to the ground. Both configurations possess high centers of gravity which lead to a heightened/greater possibility of rollover. The greater likelihood for rollover, combined with the nature of CNG, the material most commonly transported, magnifies the safety risk inherent to operations conducted using these vehicles. As a result of this hearing, government, motor carriers, offerors and manufacturers of these units verbally agreed to work together to enhance existing practices to minimize the risk(s) of rollovers.

In 2005, the Federal Motor Carrier Safety Administration (FMCSA) commissioned a study to address the rollover concerns experienced by the hazardous materials cargo tank industry. That study helped FMCSA identify a series of factors that will result in a reduction of rollovers. Results of the 2005 FMCSA study, as well as information gathered at the March 2020 hearing, indicated that a combination of Driver Training, Electronic Stability Aids, Vehicle Design and the understanding of Highway Design are all contributing factors to consider in preventing rollovers.

FMCSA further concluded that the most contributable factors that minimized rollovers were Driver Training and the use of Electronic Stability Aids. Some of the findings of the study concluded that:

- *“Drivers need to realize the diverse situations that can lead to rollover so they can exercise proper care to prevent those situations from developing.*
- *Drivers and carriers alike must understand both the benefits and the limits of electronic stability aids.*
- *And carriers and manufacturers should appreciate the stability improvements to be gained from even a small reduction in the height of a cargo tank vehicle.”*

The current rollover issues associated with the vehicle manufactured under the specified special permits are no different than those addressed in the 2005 study. The main difference is vehicle configuration, however, the concept to address remains the same. Therefore, we are issuing the following recommendations to provide additional guidance and awareness of the actions to take to minimize the risk and impact of rollover issues.

Options for Enhanced Safety

Due to the design of the commercial motor vehicles (CMV) manufactured with cylinders authorized under the terms of the specified special permits, in addition to baseline requirements, we offer the following suggestions for optional safety enhancements for entities offering CNG to

motor carriers and motor carriers operating vehicles manufactured with cylinders authorized under the specified special permits:

- Under existing requirements, all CMV carriers transporting CNG trailers routinely verify their CMV drivers are trained in the handling characteristics and operation of these vehicle types as required by § 177.817. We encourage CMV drivers to understand the dynamics of the CNG trailers they are transporting and that center of gravity, load and road characteristics all contribute to potential rollover;
- We suggest that all carriers consider using CMVs equipped with electronic roll stability in accordance with Federal Motor Vehicle Safety Standard (FMVSS) No. 136, Electronic Stability Control Systems for Heavy Vehicles;
- We suggest that all carriers consider using CMVs equipped with appropriate electronic monitoring systems to record vehicle and driver actions in the event of crash or another unexpected event. This information can be used to enhance training for drivers of these vehicles;
- We encourage all CMV drivers to consider following designated routes to ensure familiarity with the characteristics of the roads on which they are driving; and
- We urge all CMV carriers to consider, in conjunction with the specialized training for drivers of these CNG vehicle configurations, using the FMCSA Cargo Tank Truck Rollover Prevention Video to train drivers for rollover prevention. This can be found at: <https://www.fmcsa.dot.gov/rolloverprevention>

By implementing these optional measures, operators may yield additional safety benefits when transporting CNG in motor vehicles containing cylinders authorized under the terms of these special permits.

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for Hazardous Materials Safety