



July 2017

DEFENSE TRANSPORTATION

DOD Has Taken Actions to Address Hazardous Material Transportation Issues but It Is Too Soon to Evaluate the Effectiveness of These Efforts

Accessible Version

GAO Highlights

Highlights of [GAO-17-498](#), a report to congressional committees

Why GAO Did This Study

Commercial carriers transport over 3 billion tons of HAZMAT in commerce in the United States each year, transporting an estimated 1 million HAZMAT shipments per day. DOD relies heavily on commercial carriers to transport HAZMAT, using them to transport about 90 percent of the department's HAZMAT shipments. DOD uses the TPS program to transport certain sensitive materials including ammunition and classified materials that follow more stringent safety and security standards.

House Report 113-446 accompanying a bill for the National Defense Authorization Act for Fiscal Year 2015 directed DOD to report on the root causes of improper documentation and packaging of HAZMAT; the extent to which TPS is used for materials that could be transported using less costly means; and any needed corrective actions and a plan, with milestones, to address them. The House report also included a provision for GAO to review DOD's report. DOD issued its report in September 2015.

This report examines the extent to which DOD (1) identified the root causes of improper documentation and packaging of HAZMAT shipments and any corrective actions taken since the report's issuance and (2) reported on the department's use of TPS carriers to transport shipments that could have been safely and securely transported using less costly alternatives.

GAO examined DOD's HAZMAT data and found the data it examined sufficiently reliable for the purposes of the review.

DOD reviewed a draft of this report and did not have any comments.

View [GAO-17-498](#). For more information, contact Cary Russell at (202) 512-5431 or russellc@gao.gov.

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What GAO Found

The Department of Defense (DOD) has addressed the committee direction to identify the root causes regarding the improper documentation and packaging of hazardous materials (HAZMAT) shipments and any needed corrective actions, but it is too soon to evaluate the effectiveness of these efforts. In its September 2015 report, DOD identified:

- contract- and documentation-related issues and human error as the root causes,
- several corrective actions—such as improved reporting—that aligned with these root causes, and
- milestones and DOD stakeholders to implement the corrective actions.

In addition to aligning with the DOD-identified root causes, the corrective actions also align with the root causes of improper documentation and packaging that GAO identified in its May 2014 report. However, it is too early to determine the efficacy of these corrective actions. According to DOD officials, most of the corrective actions were to begin in late fiscal year 2016, and the key performance measures for assessing those and the remaining actions will not be fully completed until late fiscal year 2017.

DOD has addressed the committee direction to report on the extent to which the department had used Transportation Protective Services (TPS) for HAZMAT shipments that could have been safely and securely transported using less costly alternatives, but did not include in its September 2015 report detail on the assumptions or limitations made underpinning its analysis. In its analysis, conducted specifically to address the committee direction, DOD concluded that it had used TPS infrequently when not required between June 1, 2013, and July 31, 2014. Specifically, DOD reported it used TPS to transport 518 of 31,373 HAZMAT shipments that it could have transported using less costly alternatives. This resulted in a total unnecessary cost of approximately \$126,000, according to DOD. While GAO found DOD did not include detail on the assumptions or limitations underpinning its analysis, GAO concurs with the report's general conclusion that DOD had infrequently used TPS unnecessarily to transport HAZMAT during the period studied and that the additional cost associated with these shipments was relatively small. Further, as part of its plan of action, DOD has identified corrective actions to preclude future unnecessary use of TPS, which, if properly implemented, should help ensure that in the future DOD uses TPS only when necessary.

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Abbreviations

DOD	Department of Defense
HAZMAT	Hazardous Materials
TPS	Transportation Protective Services
TRANSCOM	U.S. Transportation Command

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July 21, 2017

The Honorable John McCain
Chairman
The Honorable Jack Reed
Ranking Member
Committee on Armed Services
United States Senate

The Honorable Mac Thornberry
Chairman
The Honorable Adam Smith
Ranking Member
Committee on Armed Services
House of Representatives

Commercial carriers transport over 3 billion tons of hazardous materials (HAZMAT) in commerce in the United States each year, transporting an estimated 1 million HAZMAT shipments per day.¹ The Department of Defense (DOD) relies heavily on commercial carriers to transport HAZMAT, using them to transport about 90 percent of the department's HAZMAT shipments. In fiscal year 2016 DOD transported approximately 313,354 HAZMAT shipments.² These shipments range from materials associated with everyday use (e.g., chlorine, fire extinguishers, and lithium batteries) to sensitive materials considered to pose a risk to

¹ "HAZMAT" is any substance or material that the Secretary of Transportation has determined is capable of posing an unreasonable risk to health, safety, or property when transported in commerce. The Secretary of Transportation designates HAZMAT under the Hazardous Materials Transportation Act and its implementing regulations. See 49 U.S.C. § 5103; 49 C.F.R. § 172.101. As used in the Hazardous Materials Transportation Act, "commerce" refers to trade or transportation in the jurisdiction of the United States between a place in a state and a place outside that state; that affects trade or transportation between a place in a state and a place outside that state; or on a U.S. registered aircraft. See 49 U.S.C. § 5102(1). Implementing regulations issued by the Department of Transportation further define the term to include trade or transportation in the jurisdiction of the United States within a single state. See 49 C.F.R. § 171.8. Under the Hazardous Materials Regulations, transportation of HAZMAT in commerce begins when the carrier takes physical possession of the HAZMAT for the purpose of transporting it and continues until the package is delivered to the indicated destination. See 49 C.F.R. § 171.1(c).

² A "shipment" may comprise several deliveries or orders and can be transported using one or consecutive modes of transportation (e.g., by rail and then by air).

national security (e.g., ammunition and explosives, nuclear weapons-related components and toxins). HAZMAT at both ends of this spectrum can pose a significant threat to transportation workers, emergency responders, and the general public if the HAZMAT shipment is not properly documented and packaged for transportation. Improper documentation and packaging can also delay the transport of needed supplies to military units, potentially creating a backlog of material.

We have previously reported on issues regarding the improper documentation and packaging of HAZMAT and DOD's evaluation of the safety and performance information for the U.S. Transportation Command's (TRANSCOM) Transportation Protective Services (TPS) commercial carriers. TPS commercial carriers transport certain types of sensitive materials, including ammunition and classified materials, and are to follow additional procedures and meet more stringent safety and security standards than other commercial carriers. For example, DOD regulations require that TPS commercial carriers handling certain security-sensitive shipments have two drivers with security clearances in trucks transporting those shipments.³ In 2014, we found that over 25 percent of DOD's HAZMAT shipments were delayed at aerial ports because of improper documentation and packaging.⁴ We recommended that DOD take actions to improve the documentation and packaging of HAZMAT, eliminate instances in which DOD installations deny "secure-hold" for TPS HAZMAT shipments, and examine the limitations on Department of Transportation data used to select commercial carriers of HAZMAT.⁵ DOD concurred with these recommendations and, in November 2014, improved reporting regarding HAZMAT transportation and established a "secure-hold denial" category in the Defense Transportation Tracking System for tracking the unauthorized parking of

³ See Department of Defense, Defense Transportation Regulation 4500.9-R, pt. II, ch. 205, *Transportation Protective Service (TPS)*, para. O.2 (Oct. 28, 2016).

⁴ GAO, *Defense Transportation: DOD Needs to Take Actions to Improve the Transportation of Hazardous Material Shipments*, [GAO-14-375](#) (Washington, D.C.: May 1, 2014).

⁵ A "secure-hold" area is a location designated for the temporary parking of commercial motor carrier vehicles transporting DOD-owned ammunition and explosives, and other security-sensitive material. According to the Defense Transportation Regulation, DOD installations are to assist commercial motor carriers transporting DOD shipments of arms, ammunition, and explosives by providing secure-hold areas in the interest of public safety and national security or by routing the shipments to the nearest location that has a secure-hold area. A "denial" refers to the situation in which carriers transporting DOD security-sensitive materials are not provided access to secure-hold areas within DOD installations.

security-sensitive shipments. In 2015, we recommended that DOD establish and use an approach for reviewing available Department of Transportation safety violation data and develop guidance on analyzing DOD incident trends and fully investigating HAZMAT incidents.⁶ DOD did not concur with our two recommendations on reviewing Department of Transportation violation data but concurred with the other two recommendations, and in November 2016 implemented the latter by issuing guidance including responsibilities related to the analysis of incident trends and the investigation of incidents involving DOD munitions.⁷

The House Armed Services Committee's report accompanying a bill for the National Defense Authorization Act for Fiscal Year 2015 directed DOD to report on the root causes of improper documentation and packaging of HAZMAT throughout DOD's transportation system; the extent to which TPS is used for materials that could be safely and securely transported using less costly means; and any needed corrective actions and a plan, with milestones, to implement them.⁸ The Committee's report also included a provision for us to review DOD's report. DOD issued its report in September 2015.⁹ We reviewed DOD's report and determined the extent to which DOD had (1) identified the root causes of improper documentation and packaging of HAZMAT shipments throughout the DOD transportation system and any corrective actions taken since the report's issuance to address those root causes, and (2) reported on the department's use of TPS carriers to transport shipments that could have been safely and securely transported using less costly alternatives.

For objective one, we identified the root causes that DOD reported in September 2015 for HAZMAT shipments being delayed because of improper documentation and packaging and compared those root causes with the associated plan of action and milestones that DOD described in

⁶ GAO, *Defense Transportation: DOD Needs to Improve the Evaluation of Safety and Performance Information for Carriers Transporting Security-Sensitive Materials*, [GAO-16-82](#) (Washington, D.C.: Dec. 10, 2015).

⁷ See Department of Defense Directive 6055.09E, *Explosives Safety Management (ESM)*, para. 2.10 (Nov. 18, 2016).

⁸ H.R. Rep. No. 113-446, at 116 (2014).

⁹ See Department of Defense, *Report on the Department of Defense's Transportation of Hazardous Materials* (Sept. 29, 2015).

its report.¹⁰ We also compared the DOD-identified root causes with the elements directed in the House report and provisions in the *Defense Transportation Regulation*, which among other things requires that DOD transportation officers ensure that carriers have documentation to properly label HAZMAT and ensure that HAZMAT is properly marked, packaged, and labeled in accordance with applicable regulations for each mode of transportation.¹¹ We interviewed officials from the offices with the primary responsibility identified in DOD's report for the development and implementation of DOD's plan of action and milestones to discuss their approach for identifying the root causes of HAZMAT shipments being delayed because of improper documentation and packaging. In addition, we visited three of DOD's five major domestic aerial ports of embarkation/debarkation on the East Coast to discuss the status of the implementation of DOD's corrective actions with officials that process delayed HAZMAT cargo and to get their perspectives on whether these corrective actions had addressed the DOD-identified root causes of improper documentation and packaging of HAZMAT shipments.¹² We also assessed aerial ports data from October 1, 2013, through March 9, 2017, and determined that the data were sufficiently reliable for the purpose of our review by reviewing relevant DOD documentation on shipments to the aerial ports; performing standard electronic data reliability testing, such as looking for outliers or missing data; and interviewing aerial ports officials about their methodology.

¹⁰ See Department of Defense, *Report on the Department of Defense's Transportation of Hazardous Materials* (Sept. 29, 2015).

¹¹ See Department of Defense, *Report on the Department of Defense's Transportation of Hazardous Materials* (Sept. 29, 2015). See Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, *Plan of Action and Milestones* (Dec. 15, 2016). See H.R. Rep. No. 113-446, at 116 (2014). The Defense Transportation Regulation (DTR) establishes that transportation officers are to ensure that shippers (both DOD and commercial carriers) have shipping papers to properly label and package HAZMAT in accordance with applicable regulations for each mode of transportation. Furthermore, the Defense Transportation Regulation includes requirements related to training, inspection, and HAZMAT shipping paper documentation, marking, packaging, and labeling. See generally Department of Defense, *Defense Transportation Regulation 4500.9-R*, pt. II, ch. 204, *Hazardous Material* (Apr. 11, 2016).

¹² The five major continental United States domestic military aerial ports are Joint Base Charleston, Dover Air Force Base, Naval Station Norfolk, Travis Air Force Base, and Joint Base McGuire-Dix-Lakehurst. In addition, we received total HAZMAT shipments and HAZMAT delayed shipment data from October 1, 2013 through March 9, 2017, from all five of the major domestic aerial ports. We selected these locations because they provided a cross-section of the various modes of transportation and HAZMAT classes. We also selected these locations because they provided us with information on the various central locations through which DOD transports these materials.

For objective two, we reviewed the methodology that DOD presented in its September 2015 report and the data and analysis that DOD used to support its conclusions on the use of TPS. We analyzed the methodology and the supporting data and analysis within the context of the methodological standards identified in our prior work.¹³ We selected those standards that were most relevant to assessing the methodology underpinning a defense study, in particular those related to identifying any assumptions used and any limitations. We also applied principles from our *Standards for Internal Control in the Federal Government*, which calls, among other things, for any data obtained to be processed into quality information.¹⁴ For both objectives, we interviewed senior officials from the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics; TRANSCOM headquarters and its military service components, and the Defense Logistics Agency.¹⁵

We conducted this performance audit from April 2016 to July 2017 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

¹³ GAO, *Defense Transportation: Study Limitations Raise Questions about the Adequacy and Completeness of the Mobility Capabilities Study and Report*, [GAO-06-938](#) (Sept. 20, 2006). To develop these standards, we reviewed research literature and DOD guidance and identified frequently occurring, generally accepted research standards that are relevant for defense studies that define a quality or sound and complete study. We determined that these standards are still current and relevant for the purposes of assessing DOD's report.

¹⁴ GAO, *Standards for Internal Control in the Federal Government*, [GAO-14-704G](#) (September 2014).

¹⁵ The U.S. Transportation Command (TRANSCOM) is the functional combatant command charged with providing transportation services (other than service-unique or theater-assigned assets) to DOD's combatant commands, military services, and defense organizations. In this role, TRANSCOM is responsible for providing common-user and commercial air, land, and sea transportation, terminal management, and aerial refueling to support the global deployment, employment, and sustainment and redeployment of U.S. forces. TRANSCOM is also responsible for procuring commercial transportation services. See Department of Defense Directive 5158.04, *United States Transportation Command (USTRANSCOM)*, para. 4.6.9 (July 27, 2007) (incorporating change Sept. 11, 2007). TRANSCOM also serves as the DOD Distribution Process Owner, responsible for overseeing the overall effectiveness, efficiency, and alignment of DOD-wide distribution activities. See *id.* para. 4.6.15.

DOD Has Addressed the Direction to Identify Root Causes and Corrective Actions, but It Is Too Soon to Evaluate the Effectiveness of These Efforts

In its September 2015 report, DOD addressed the committee direction to identify root causes regarding the improper documentation and packaging of HAZMAT shipments and any needed corrective actions, but it is too soon to determine the effectiveness of the department's efforts.¹⁶ DOD identified the root causes of the improper documentation and packaging of HAZMAT shipments and developed a plan of action with milestones to address them. In its September 2015 report, DOD used an approach involving stakeholders from throughout DOD's transportation system. According to officials, the Office of the Deputy Assistant Secretary of Defense for Supply Chain Integration coordinated the stakeholders' efforts. According to its officials, the office established a working group comprising stakeholder representatives from the Office of the Deputy Assistant Secretary of Defense for Supply Chain Integration, the Defense Logistics Agency, TRANSCOM, the Air Mobility Command, the Army's Surface Deployment Distribution Command, and the Government Services Administration. As part of this working group, these stakeholders analyzed HAZMAT transportation data from, among other DOD transportation sources, the Global Air Transportation Execution System, the Defense Logistics Agency, and the Web Supply Discrepancy Reports, according to officials.¹⁷

¹⁶ We did not independently assess DOD's identification of root causes and proposed corrective actions.

¹⁷ Global Air Transportation Execution System is the aerial port operations and management information system designed to support automated cargo and passenger processing. DOD uses the Global Air Transportation Execution System at 19 aerial ports and 139 active remote and deployed sites worldwide to document the transport of shipments. The system also, among other things, supports the processing of those shipments, reports in-transit tracking data, and tracks the data necessary for billing to the Air Mobility Command's financial-management directorate. The Supply Discrepancy Report is a tool used to report shipping or packaging discrepancies attributable to the responsibility of the shipper, (including U.S. government sources and contractors/manufacturers/vendors) and to provide appropriate responses and resolution, including financial action when appropriate. The purpose of the Supply Discrepancy Report submission is to determine the cause of such discrepancies, effect corrective action, and prevent recurrence.

As a result of this approach, DOD identified in its report contract- and documentation-related issues and human error as root causes of improper documentation and packaging of HAZMAT. For example, air HAZMAT shipment documentation and packaging discrepancies resulted from HAZMAT shipments arriving at an aerial port without certain required documentation for air transportation. Specifically, according to the report, missing documentation included confirmation of air clearance, the Advance Transportation Control and Movement Document, and Shipper's Declaration of Dangerous Goods.¹⁸ In addition, DOD noted in its report that contract- and process-related issues contribute to HAZMAT shipments arriving at an aerial port not documented or packaged correctly for air transportation. According to the report, for many shipments delivered directly from the vendors, contracts did not clearly specify for vendors when they must prepare HAZMAT for air shipment, to include preparing required documentation, requesting air clearance, and packaging in accordance with the applicable rules for that mode of transportation. In addition, some contracts did not instruct vendors to use the Defense Logistics Agency's Vendor Shipping Module website, which could have assisted them in requesting air clearance, submitting advance transportation movement and control data, and printing military shipment labels.¹⁹

Further addressing the committee direction, DOD in its September 2015 report included a plan of action and milestones to address the root causes identified and specified over 40 corrective actions. Our analysis found that these corrective actions generally align with the root causes that DOD identified.²⁰ Examples follow of corrective actions intended to

¹⁸ All export OCONUS shipments entering the Defense Transportation System must be precleared using an Advanced Transportation Control and Movement Document(s) (ATCMDs) through the sponsoring shipper service. The Defense Transportation Regulation requires that when transporting HAZMAT by air, the shipper must complete a Shipper's Declaration for Dangerous Goods. Policies, procedures, and responsibilities for transporting HAZMAT by military aircraft are identified in DOD guidance including Air Force Manual 24-204 (Interservice)/TM 38-250/NAVSUP PUB 505/ MCO P4030.19J/DLAI 4145.3, *Preparing Hazardous Materials for Military Air Shipments* (Dec. 3, 2012) and the Defense Transportation Regulation. See generally Defense Transportation Regulation 4500.9-R, pt. II, ch. 204, *Hazardous Material* (Apr. 11, 2016).

¹⁹ Vendor Shipping Module is a web-enabled vehicle by which shippers notify the DOD transportation team experts that a shipment is ready for processing in the Defense Transportation System.

²⁰ When transporting HAZMAT, there is a complex framework of statutes and regulations prescribed by multiple civilian and military entities that must be considered and evaluated to ensure safe, secure, and efficient transport.

reduce the percentage of HAZMAT shipments with missing, incomplete, or inaccurate documentation arriving at aerial ports and to improve the reporting of HAZMAT shipment documentation and packaging discrepancies:

- reducing the percentage of HAZMAT shipments from government shippers arriving at aerial ports with missing documentation by notifying shippers of the requirement to prepare HAZMAT for shipment to the final destination, to include preparing required documentation, requesting air clearance, and repacking in accordance with applicable rules;
- reducing the percentage of HAZMAT shipments arriving at aerial ports with incorrect or incomplete documentation by investigating and recommending alternatives for reducing human error in HAZMAT documentation; and
- improving the reporting of HAZMAT shipment documentation and packaging discrepancies by adding specific data elements for HAZMAT shipments in a web-based supply discrepancy reporting system, such as WebSDR—an automated process used to report shipping or packaging discrepancies and to provide appropriate responses and resolution.

During the course of our review, and according to DOD officials, we found that as of February 2017 DOD had modified and added new corrective actions based on feedback from the working group that developed the September 2015 report and had conducted further analysis of the documentation and packaging issues addressed there. According to DOD officials, the working group of stakeholders involved in this effort meets every quarter to elicit input from its members and update the plan of action and milestones as necessary to reflect actions taken in the field. For example, DOD officials reported that the plan of action and milestones has been updated in response to Joint Base McGuire-Dix-Lakehurst implementing the use of WebSDR in September 2016 and the Defense Logistics Agency implementing a contract provision in January 2017 to help ensure proper documentation and packaging of shipments arriving at aerial ports.

As DOD implements its corrective actions, it continues to face issues with improper documentation and packaging causing delayed cargo, according to DOD officials. According to the Global Air Transportation Execution System data that we reviewed for HAZMAT shipments at the five major aerial ports and according to DOD officials whom we interviewed during the course of our review, there continue to be a

number of HAZMAT shipments that were not documented and packaged properly. According to DOD officials, these documentation and packaging discrepancies can result in shipment delays that can be as short as a few hours or last several days, depending on the nature of the issue. Based on DOD's Global Air Transportation Execution System database and according to transportation officials, of the 62,703 total shipments of HAZMAT received from October 1, 2013, through March 9, 2017, 34,040 shipments or 54.2 percent were delayed. Of the 34,040 delayed shipments, 19,858 or 58.3 percent were delayed primarily because they were not in compliance with the *Defense Transportation Regulation* requirements for documentation and packaging, and 14,183 shipments or 41.6 percent were delayed for security-clearance-related reasons (i.e., for shipments supporting foreign assistance missions) that are out of the control of the shipper or DOD.²¹ Following are examples of HAZMAT shipments that we identified in 2016 during the course of our review that were delayed for documentation and packaging issues:

- Scissor lifts were delayed in transport to Bagram Air Base in Afghanistan because, according to DOD transportation officials, they arrived without shipping documentation, air certifications, and shoring (packaging).²² According to the *Defense Transportation Regulation*, the transportation officer must ensure that HAZMAT is properly marked, packaged, and labeled for air transportation. However, the shipping papers for the scissor lifts did not identify Bagram Air Base as the destination. In addition, there was ineffective coordination between the vendor, shipper, and contracting officer (who is located at Bagram Air Base), according to the DOD transportation officials.
- Cylinders filled with refrigerant gas were delayed because, according to DOD officials, the Shipper's Declaration for Dangerous Goods was missing or incomplete, and the cylinders were not properly packaged for shipment. According to the *Defense Transportation Regulation*, the

²¹ In our 2014 report, we reported on the Global Air Transportation Execution System's fiscal year 2009-2013 data. For this report, we reviewed data from October 1, 2013, through March 9, 2017, which includes the period from the end of the [GAO-14-375](#) report through the current fiscal year. These foreign assistance shipment delays do not affect supplies needed in support of the U.S. warfighter, according to DOD officials. See [GAO-14-375](#).

²² According to officials, "scissor lifts" are motorized vehicles that have a railed platform or an extended boom that can be raised vertically in order to gain access and perform work on areas that are difficult to reach. They are considered HAZMAT because they contain internal combustion engines, fuel, and batteries, according to officials.

transportation officer must ensure that HAZMAT is properly marked, packaged, and labeled for air transportation.

- A skid of lithium-ion batteries was delayed because, according to DOD officials, the Shipper's Declaration for Dangerous Goods was missing the correct gross weight. The *Defense Transportation Regulation* requires that when transporting HAZMAT by air, the shipper must accurately reflect the quantity of the material to be transported.

DOD officials noted that it is too early to evaluate the effectiveness of the corrective actions identified in the report's plan of action and milestones to mitigate delays in transporting HAZMAT. According to DOD officials, most of the corrective actions were to begin in late fiscal year 2016 and the key performance measures for assessing those and the remaining actions will not be completed until late fiscal year 2017. The officials added that it will take time to accumulate data and conduct subsequent analyses to determine the efficacy of actions that have already been taken or are currently in progress. We agree with DOD that it is too early to evaluate and determine the efficacy of the corrective actions. DOD officials also told us that they recognize that root causes are long-standing reasons for transportation delays, that several studies have documented the delayed cargo issues at aerial ports of embarkation, and that the issue of delayed cargo will never go away completely. However, the officials noted that the corrective actions will help the warfighter receive needed equipment without delay.²³ By continuing to identify and address the root causes for these transportation delays, the department will be able to continue to develop and implement corrective actions to mitigate delays of its HAZMAT shipments in support of the warfighter.

DOD Has Addressed the Direction to Report on the Unnecessary Use of Transportation Protective Services, but Lacked Detail on the

²³ In 2008, the Office of the Deputy Assistant Secretary of Defense for Transportation Policy commissioned a study to address DOD's unacceptable level of delayed HAZMAT shipments. According to the study's Final Project Report, the study's scope was to reduce the effect of these delays by first defining the scope of the problem, developing a consensus on root causes, and providing a data-centric solution to the problems. The 2008 report had several findings that identified causes for delays, including improper documentation and packaging of HAZMAT at an aerial port that we visited.

Assumptions or the Limitations Underpinning Its Analysis

In its September 2015 report, DOD addressed the committee direction to report on the extent to which it used TPS for HAZMAT shipments that could have been safely and securely transported using less costly alternatives, and identified two corrective actions. However, the report did not fully disclose the assumptions and limitations associated with its analysis.²⁴ In its report, DOD concluded that between June 1, 2013, and July 31, 2014, it had used TPS motor carriers to transport 518 of 31,373 HAZMAT shipments that could have been transported using less costly alternatives and that doing so had resulted in a total unnecessary cost of approximately \$126,000.²⁵ DOD reported that in the majority of these instances transportation officers had either made errors or conscious decisions that two drivers were necessary to meet tight time frame delivery requirements or, when transportation officers could not obtain complete cargo documentation to determine whether a TPS designation was needed, they had erred on the side of safety and opted to use the TPS carriers to transport the shipments. DOD reported that it had calculated the approximately \$126,000 in unnecessary costs by accounting for the “accessorial charges” for TPS carriers—the additional costs incurred for providing constant surveillance, dual-driver protection, protective security service, and satellite motor surveillance.²⁶ DOD concluded that it had infrequently used TPS carriers unnecessarily and that the additional costs incurred for doing so were relatively low.

²⁴ Department of Defense, *Report on the Department of Defense’s Transportation of Hazardous Materials*, September 29, 2015 (Washington, D.C.) directed by H.R. Rep. No. 113-446, at 116 (2014).

²⁵ Department of Defense, *Report on the Department of Defense’s Transportation of Hazardous Materials*, September 29, 2015 (Washington, D.C.) directed by H.R. Rep. No. 113-446, at 116 (2014).

²⁶ “Accessorial charges” for TPS used in the DOD report are for: Constant Surveillance and Custody Service, which requires constant surveillance and custody of motor and air shipments by a qualified TSP representative; Dual Driver Protective Service, which consists of two drivers with security clearances to provide constant surveillance; Protective Security Service, which consists of continuous attendance and surveillance of a shipment by two qualified drivers; and Satellite Motor Surveillance Service, which provides vehicle location reports to the Defense Transportation Tracking System and for two-way communications devices to provide status changes and emergency notification.

DOD developed and conducted a one-time analysis to address the committee direction. According to DOD's Transportation Policy officials, DOD developed this analysis in order to respond to the congressional direction since the department lacked an established procedure to extract and match the tens of thousands of records of HAZMAT shipments transported by motor, rail, or air carriers using TPS each year and calculate the costs for doing so.²⁷ DOD's analysis included data for motor and air TPS HAZMAT shipments transported from June 1, 2013, through July 31, 2014, and data for rail HAZMAT shipments transported through TPS from January 1, 2014, through June 30, 2014. The Transportation Command's Surface Deployment and Distribution Command, which manages the TPS program for DOD, provided these data for DOD's analysis. Next, DOD used TPS guidance in the Defense Transportation Regulation as criteria to identify scenarios within the data set where DOD shipping activities may have ordered TPS for shipments when not required. An item's Controlled Item's Inventory Code located in the Federal Logistics Information System determines whether an item requires TPS. According to officials because the Surface Deployment and Distribution Command TPS data lack cost information, DOD matched the bill of lading records in the data system to shipment entries in DOD's Third Party Payment System to determine the cost of TPS shipments that could have been safely and securely transported using less costly means.²⁸ DOD was able to match most of the bill of lading records in the two systems. According to DOD, the shipments that they could not match were likely never invoiced by the transportation provider.

In reviewing DOD's September 2015 report, supporting documentation and interviewing agency officials, we identified assumptions and limitations that the report did not disclose in its findings and conclusions. Absent these disclosures, decision makers cannot be assured this report

²⁷ According to DOD officials, for TPS motor shipments, the Surface Deployment and Distribution Command reviews over 20,000 requests annually and provides guidance to shippers as required on sensitive and hazardous freight. Command officials verify that the correct level of TPS is associated with the commodity and if mistakes are found, the officials contact the shipper to adjust the TPS level as required. Command officials do not review air or rail TPS shipments or have access to cost data. Because of the manual nature of these actions, the command has not recently collected metrics on how many shipments reviewed did not require TPS.

²⁸ A "bill of lading" is a contract between the shipper and the transportation service provider to furnish transportation services according to the conditions printed on the bill of lading.

is conveying quality information. Generally accepted research standards and *Standards for Internal Control in the Federal Government* call, among other things, for a study methodology to explicitly identify any assumptions and limitations and for any data obtained to be processed into quality information.²⁹ Following are examples of assumptions and limitations the report did not include in its description of its analysis:

- **The number of shipments requiring TPS varied depending on the assumptions used:** For example, during our review we requested that Surface Deployment and Distribution Command officials provide TPS shipment data for the same time frame DOD used in the September 2015 report (June 1, 2013 through July 31, 2014). The data that they provided showed there were a potential of 1,097 TPS motor shipments that may not have required TPS, compared with the 518 TPS motor shipments referred to in the report.³⁰ Surface Deployment and Distribution Command officials said the difference between the two totals could be a result of how DOD applied certain Controlled Item Inventory Codes when it determined whether an item required TPS to create the data set of TPS shipments that was subsequently analyzed, and how they counted non-TPS shipments that were transported with TPS shipments.
- **DOD used inconsistent dates in its collection of shipment data in its analysis:** The DOD report shows that DOD analyzed HAZMAT shipment data from the Surface Deployment and Distribution Command for the period June 1, 2013, through July 31, 2014. We found, however, that this 13-month time frame included data for only motor and air TPS shipments. For rail TPS shipments, DOD used data from a 6-month time frame (January 1, 2014, through June 30, 2014). DOD officials explained that the time frames used for their analysis were driven by which data were available at the time of their request. We believe disclosing this limitation would have provided decision makers with important information about the reliability of the reported results.

²⁹ See [GAO-06-938](#) and *GAO, Standards for Internal Control in the Federal Government, GAO-14-704G* (September 2014).

³⁰ The Surface deployment and Distribution Command was able to provide TPS HAZMAT shipments for the dates requested. The command identified shipments that may not have required tracking in the Defense Transportation Tracking System as shipments that may not have required TPS.

- **DOD omitted air and rail TPS HAZMAT shipments and their costs:** DOD omitted 10 HAZMAT shipments transported by rail and 4 HAZMAT shipments transported by air from the shipments analyzed in its report, which together total about \$4,525 in unnecessary costs. These 14 shipments were omitted because, in DOD's estimation, their number and their costs were low and therefore statistically insignificant.³¹ Given that DOD concluded that TPS was used only infrequently when not required, we find it inconsistent that the additional 14 rail and air TPS shipments and their costs were omitted from the report, and led to the report conveying incomplete results. We believe that, in accordance with our generally accepted research standards, DOD should have fully explained its rationale for such an omission in its discussion of its methodology.
- **DOD did not disclose the use of average cost estimates:** According to DOD, on 10 of the 518 invoices for TPS motor carrier shipments, DOD found the TPS charges exceeded the total amount paid to the carrier. Including those charges would significantly skew the results of the analysis, according to DOD. For those 10 invoices, DOD applied an average cost to estimate the amounts paid for TPS. DOD estimated average costs using three different methods: average TPS cost per shipment, average TPS cost per mile, and average TPS cost as a percentage of the total. DOD chose to use the average cost per mile as it produced the highest cost estimate for the 10 invoices according to the DOD documents. We believe that disclosing the use of TPS shipment cost averages in DOD's cost calculation for these 10 HAZMAT shipments would inform decision makers about the potential effect of this approach on the reported results.

DOD officials acknowledged that DOD's September 2015 report lacked details regarding the assumptions and limitations made in DOD's analysis. However, the officials noted that, because the number of improper TPS shipments is relatively low and the range of the potential cost of these shipments is also relatively low, these assumptions and limitations did not affect the department's general conclusion that DOD had infrequently used TPS unnecessarily to transport HAZMAT and that the additional cost incurred was relatively small. Reviewing the data DOD provided in support of its analysis, we have reasonable assurance that DOD was correct in its general conclusion that DOD had infrequently used TPS during the period studied and that the additional cost

³¹ DOD reported that 518 HAZMAT shipments did not require TPS (in accordance with *Defense Transportation Regulation* guidance).

associated with these shipments was relatively small. In addition, DOD identified corrective actions to preclude the future unnecessary use of TPS. Specifically, as part of its plan of action and milestones, DOD plans to publish advisories reiterating TPS usage criteria to transportation officers. An advisory in November 2015 advised transportation officers that they should request TPS for shipments only if required by the *Defense Transportation Regulation*. To monitor compliance with the customer advisories and the *Defense Transportation Regulation*, DOD plans to conduct spot checks of TPS HAZMAT shipment data every 2 years beginning in November 2017, according to DOD officials. According to the February 2017 DOD plan of action and milestones, DOD also plans to identify and evaluate policy options to ensure proper coding of HAZMAT items in the Federal Logistics Information System by September 30, 2018. We anticipate that these actions, if properly implemented, will help ensure that TPS is only used when necessary.

Agency Comments

We provided a draft of this report to DOD, and DOD responded that it would not be providing comments.

We are sending copies of this report to the appropriate congressional committees, the Secretary of Defense, the Director of the Defense Logistics Agency, the Commander of the U.S. Transportation Command, and other interested parties. In addition, the report is available at no charge on the GAO website at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-5431 or russellc@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in the appendix.



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Appendix: GAO Contact and Staff Acknowledgments

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Staff Acknowledgments

In addition to the contact named above: James A. Reynolds, Assistant Director; Colin Chambers; Pat Donahue; Alfonso Garcia; Alexandra Gonzalez; Mae Jones; Ruben Montes de Oca; and Michael Shaughnessy made key contributions to this report.

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