

Special Purpose Vehicles

1 Introduction

According to data compiled by the Japan Automobile Dealers Association (JADA), the number of truck registrations increased in 2014. For example, the number of large truck registrations increased by 120.8% from 2013 to 88,113 units and the number of small truck registrations increased by 107.2% to 252,828 units. This was the fifth consecutive year-on-year increase in large truck registrations since 2009.

Although production of special purpose vehicles increased in 2014 compared to 2013, the increase was not as much as the 120.8% increase in registered large truck sales. However, following on from 2013, production of construction vehicles greatly increased to meet demand for infrastructure building.

This article describes the main special vehicle trends based on data compiled by the Japan Auto-Body Industries Association (JABIA), the Japan Construction Equipment Manufacturers Association (CEMA), and the Automobile Inspection and Registration Information Association (AIRIA).

2 Market Trends

Production of special purpose vehicles in 2014 increased for the fifth consecutive year after reaching a low point in 2009. The largest increases in special purpose vehicle production were recorded by dump trucks, detachable container trucks, concrete pumping trucks, truck-mounted cranes, and concrete mixing transport trucks, which rose by at least 125%.

Figure 1 shows the 2014 production results of special purpose vehicles per vehicle type. Compared to 2013, van production increased by 6,691 units to 64,959 units (115.5%). The overall dump truck category increased by 11,060 units to 46,411 units (131.3%). The production of almost every type of dump truck rose: large dump trucks by 151.7% to 10,913 units, medium dump trucks

by 121.2% to 17,348 units, and small dump trucks by 140.5% to 16,997 units. The only exception was mini-vehicle dump trucks, which fell 1,137 units (65.4% of 2013). The second largest production increase was achieved by detachable container trucks, which rose by 129.3% to 1,979 units, followed by concrete pumping trucks (309 units, 127.2%), truck-mounted cranes (16,848 units, 126.7%), and concrete mixing transport trucks (2,632 units, 126.5%). As shown by these results, production of construction vehicles rose across the board. In fact, the production of all thirteen categories of special purpose vehicles increased in 2014. In addition to construction vehicles, the production of tailgate lifters rose by 108.8% to 27,306 units, sanitation vehicles by 107.5% to 5,891 units, bulk carriers by 105.2% to 714 units, and

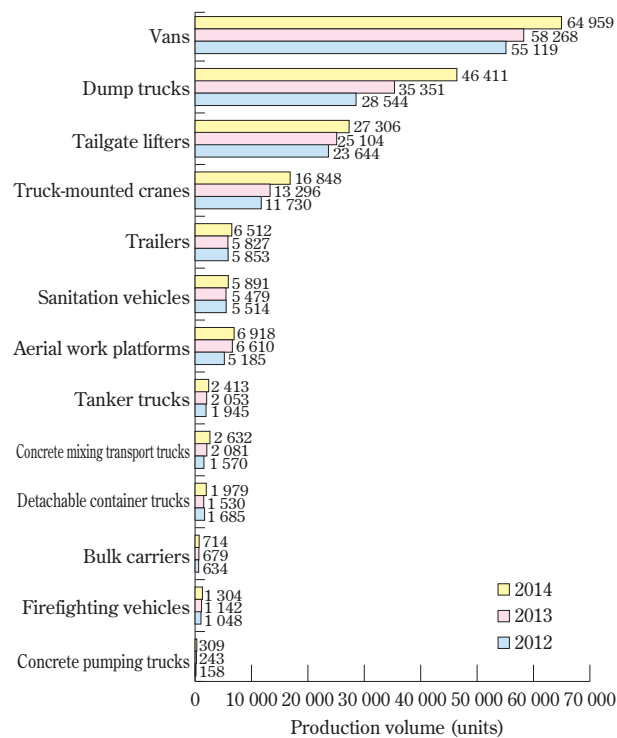


Fig. 1 Production results of special purpose vehicles per product type

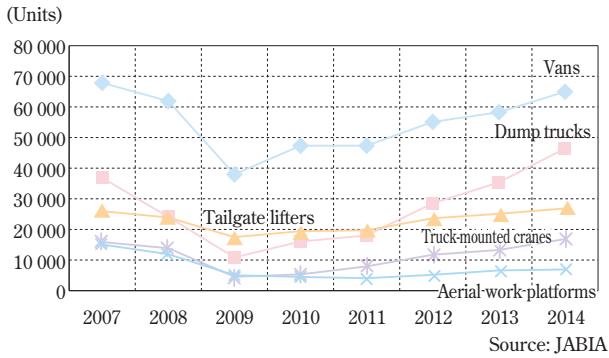


Fig. 2 Production trends of five typical special purpose product types

aerial work platforms by 104.7% to 6,918 units. Overall, production of the thirteen types of vehicles shown in Fig. 1 increased for the fifth consecutive year by 116.8% to 184,196 units.

Figure 2 shows the production trends for five typical products (vans, dump trucks, tailgate lifters, truck-mounted cranes, and aerial work platforms) with annual production in 2014 of more than 10,000 units over the past eight years. Excluding aerial work platforms, production of these five vehicle types hit bottom in 2009 before recovering. From 2009 to 2014, van production increased by 171.0%. Other particularly noticeable increases in production in the same period include dump trucks, which rose by 427.6%, truck-mounted cranes (369.1%), and tailgate lifters (156.2%). The production of dump trucks (126.0%), truck-mounted cranes (106.1%), and tailgate lifters (105.2%) has recovered to the levels in 2007, before the global financial crisis. Furthermore, overall production of these five vehicle types including aerial work platforms has recovered from the low point of 2011 to 100.5% of 2007.

Figure 3 shows the trends for the average number of years in service from initial registration. Although the service age of each of these seven vehicle types has been increasing since 2004, the service age of standard and small dump trucks fell slightly from 2013 to 12.94 (from 13.08) and 13.30 (from 13.35) years, respectively. This is probably because the increase in dump truck production over the last few years has reduced the proportion of dump trucks with longer service lives.

However, the overall service life trends for these seven vehicle types shows no signs of becoming shorter. It is likely that the clearly separated dual trend between construction vehicles and other logistics-related vehicles

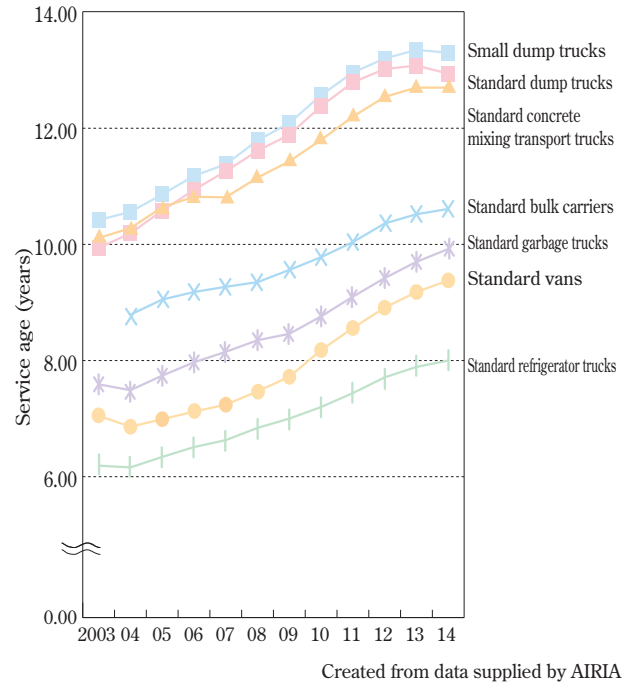
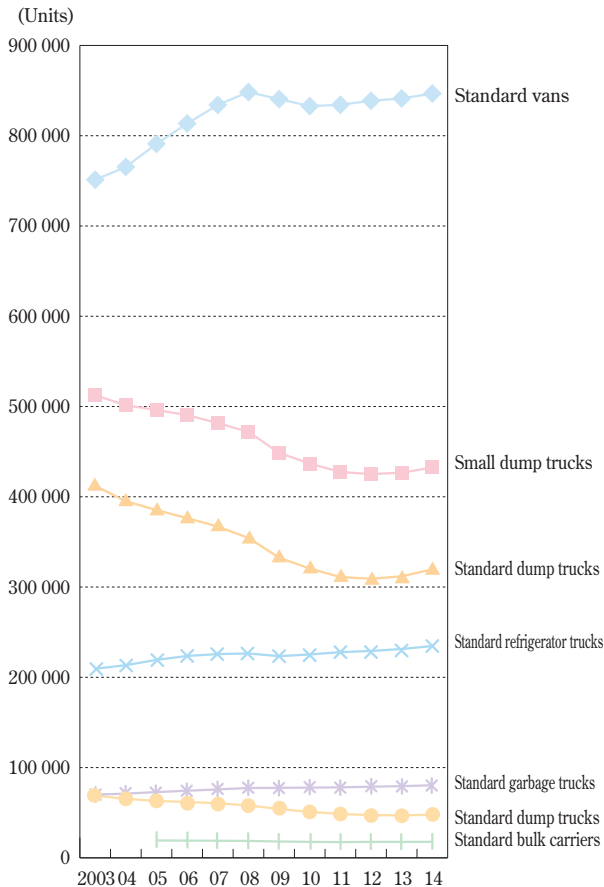


Fig. 3 Average service age from initial registration

will continue in the future. Despite this, it is hoped that the fact that the average service life of typical construction-related vehicles such as dump trucks and concrete mixing transport trucks is no longer rising indicates that 2013 and 2014 marks the peak of this trend.

The graph in Fig. 3 was prepared from registration data provided by AIRIA. The original registration data includes the number of registered vehicles at the end of March 2014 for each registration year between 1996 and 2013, and as collected data prior to 1995 (i.e., vehicles in service for more than 20 years). The average service age was extrapolated from these figures.

Figure 4 shows the overall number of each of these vehicle types in Japan at the end of March each year. Although the number of standard vans increased from 2003 to 2008, it has hardly increased since then. The number has increased slightly from the low point of 832,809 recorded in 2010 to 846,731 in 2014. Small dump trucks decreased by 87,379 between 2003 and 2012. Since then, the number has increased slightly for two consecutive years, from 425,169 in 2012, to 426,675 in 2013 and 432,484 in 2014. Standard dump trucks decreased by 102,853 between 2003 and 2012. Since then, the number has continued to increase slightly, from 309,184 in 2012, to 311,878 in 2013, and 319,610 in 2014. Standard refrigerator trucks and standard garbage trucks have



Created from data supplied by AIRIA

Fig. 4 Trends for overall number of special purpose vehicles in Japan

increased by about 1% each year. Standard concrete mixing transport trucks decreased by an annual rate of 3.5% from 2003 to 2012. However, this figure increased slightly by 1.3% in 2014 from 2013 to 47,736. Although standard bulk carriers decreased by an annual rate of 1.3% from 2005 to 2012, numbers only increased slightly by 0.8% in 2014 to 17,776. The numbers of construction related vehicles such as dump trucks and concrete mixing transport trucks decreased sharply up to 2011. The increase in these vehicles in 2014 is probably due to greater demand for special purpose construction vehicles for projects related to the 2020 Tokyo Summer Olympics and the like.

3 Special Purpose Construction Vehicles

3.1. Dump trucks

Dump truck production in 2014 increased by 131.3% from 2013 to 46,411 units. According to vehicle class, large dump trucks increased by 3,719 units to 10,913 units (151.7%), medium dump trucks increased by 3,031

Table 1 Production proportions of non-earth and sand dump trucks, and dump trucks with SUS or aluminum bodies

Vehicle type	Non-earth and sand	SUS	Aluminum
2-ton trucks	0.6%	0.2%	0.0%
4-ton trucks (GVW: less than 8 tons)	4.0%	0.6%	0.0%
GVW: more than 8 tons (6 to 8 tons)	11.1%	4.8%	0.0%
GVW: 20 tons	2.4%	2.2%	0.1%
GVW: 22 tons	24.9%	16.1%	1.2%
GVW: 25 tons	81.8%	33.3%	3.8%

Source: JABIA

units to 17,348 units (121.2%), and small dump trucks increased by 4,899 units to 16,997 units (140.5%). Although the production of large, medium, and small dump trucks all increased, the rate of increase was lower than in 2013 for large dump trucks (152.6%). In contrast, the rate of increase for both medium and small dump trucks rose.

Table 1 shows the proportions of dump trucks produced in 2014 for transporting material other than earth or sand (i.e., non-earth and sand dump trucks). For example, the proportion of 4-ton vehicles was 4.0% in 2014, the proportion of trucks with a gross vehicle weight (GVW) of 20 tons was 2.4%, and the proportion of trucks with a GVW of 22 tons was 24.9%. The proportion of 4-ton and 20-ton GVW non-earth and sand dump trucks has been falling since production reached a low point in 2009 (14.2% and 11.9%, respectively) in the wake of the Great East Japan earthquake. These figures indicate that the proportion of dump trucks produced for transporting earth or sand has continued to increase since these trucks are used to build infrastructure as part of earthquake recovery work. Stainless steel (SUS) is used as a long-life corrosion-resistant body material for dump trucks. In the SUS body category, the proportions of each truck category, including trucks with a GVW of 25 tons, which reached irregular levels in 2013, returned to normal in 2013 (GVW of 20 tons: 2.2%, GVW of 22 tons: 16.1%, GVW of 25 tons: 33.3%).

According to fuel, most dump trucks were equipped with diesel engines. Only 1 compressed natural gas (CNG) or liquefied petroleum gas (LPG) powered 2-ton dump truck was produced. Three gasoline-powered dump trucks and 4 hybrid dump trucks were also produced in the same GVW category. However, there was no production in the 4-ton category.

3.2. Concrete mixing transport trucks

Production of concrete mixing transport trucks in 2014 increased by 126.5% from 2013 to 2,632 units. However,

the increase in 2013 and 2014 has gradually declined compared to the results for 2011 and 2012 that saw increases in excess of 150%. According to class, large concrete mixing transport trucks increased by 130.0% to 2,290 units, medium concrete mixing transport trucks increased by 107.8% to 275 units, and small concrete mixing transport trucks increased by 103.1% to 67 units. Although the average service age since initial registration of concrete mixing transport trucks increased by 2.69 years from 10.11 years in 2003 to 12.70 years in 2012, it remained virtually unchanged in 2014 (12.70 years) compared to 2013. In addition, although the overall number of concrete mixing transport trucks declined by 31.6% from 68,897 in 2003 to 47,104 in 2013, it increased to 47,736 in 2014.

4 Fixed Capacity Special Purpose Vehicles

4.1. Tanker trucks

Production of tanker trucks in 2014 increased by 117.5% from 2013 to 2,413 units. According to class, production of large tanker trucks increased by 101.4% to 449 units, medium tanker trucks by 123.2% to 1,668 units, and small tanker trucks by 114.3% to 280 units. Production of tanker trucks has doubled since the low point of 2009, and has bounced back to exceed the 2,351 units produced in 2006. Large (18.6%) and medium (69.1%) tanker trucks accounted for roughly 90% of production, a proportion that did not change from 2013.

A detailed analysis shows that oil tanker trucks increased by 239 units from 2013 to 1,477 units, an increase of 119.3%. Of these, the number of large oil tanker trucks increased by 14 units to 325 units (104.5% of 2013) and the number of medium oil tanker trucks increased by 206 units to 1,027 units, an increase of 125.1%, contributing to the overall increase in tanker truck production. The number of water spraying or water supply trucks increased by 126 units to 845 units, an increase of 117.5%.

According to use, the proportion of oil tanker trucks was 61.2% in 2014, virtually unchanged from its usual figure.

4.2. Bulk carriers

Production of bulk carriers in 2014 increased by 105.2% from 2013 to 714 units. According to class, large bulk carriers accounted for approximately 95% of this total, a proportion that remained unchanged. The proportion of bulk cement carriers increased from 41.4% in 2011 to 53.2% in 2012, 60.5% in 2013, and 63.7% in 2014. In

contrast, the proportion of bulk foodstuff carriers continued to decrease, from 41.6% in 2011, 36.8% in 2012, 31.7% in 2013, and 27.3% in 2014. This was because bulk cement carrier production increased by 110.7% from 2013, whereas bulk feedstuff carrier production fell to 90.7% of the level achieved in 2013.

The overall number of standard bulk carriers fell each year from 19,218 in 2005, reaching 17,393 in 2011. However, this declining trend has slowed and actually rose slightly in 2014 by 100.8% to 17,776.

4.3. Vans

Van production in 2013 increased by 105.7% from 2012 to 58,268 units. Production rose even more quickly in 2014, increasing by 111.5% to 64,959. According to class, production of large vans increased by 118.8% compared to 2013 to 15,714 units, medium vans by 117.4% to 21,541, and small vans by 104.1% to 26,373 units. However, the production of mini-vehicle vans fell to 97.7% of the level in 2013 to 1,358 units. These figures show that the production of large and medium vans increased substantially. According to use, production of ordinary goods vans increased by 110.2% from 2013 to 16,955 units, side-opening vans by 124.6% to 23,419 units, and refrigerator and freezer vans by 104.7% to 21,233 units. According to proportion of type, ordinary goods vans accounted for 26.1% of production, compared to 36.1% for side-opening vans and 32.7% for refrigerator and freezer vans. According to body material, steel accounted for 1,196 units (1.8%), aluminum for 57,401 units (88.4%), and fiber reinforced plastic (FRP) for 6,362 units (9.8%). There were no major changes in these proportions.

The overall number of standard vans increased from 751,262 units in 2003 to 848,358 units in 2008. This number then fell to a low of 832,809 units in 2010, before increasing for the fourth consecutive year to 846,731 units in 2014.

5 Other Special Purpose Vehicles

5.1. Sanitation vehicles

The category of sanitation vehicles includes garbage trucks, large capacity garbage dump trucks, cesspool emptiers (also known as vacuum trucks), as well as cleaning trucks and road sweepers (i.e., dewatering trucks and trucks that clean by spraying water or using suction). Production of these vehicles in 2014 increased by 107.5% from 2013 to 5,891 units. According to proportion of type, production of garbage trucks increased by

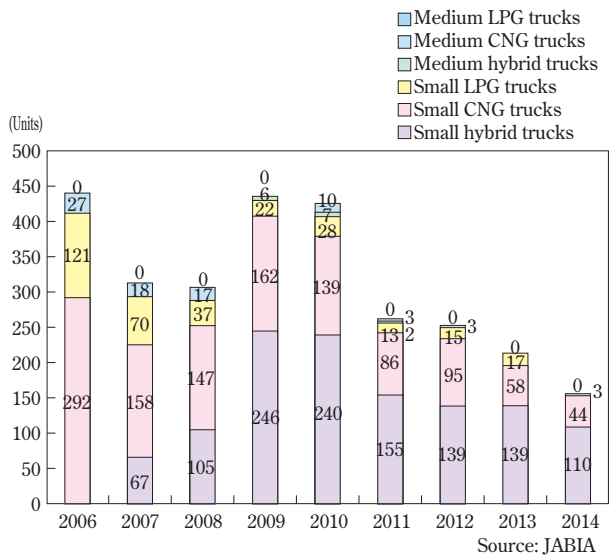


Fig. 5 Production volumes of CNG and LPG garbage trucks



Fig. 6 Dual system garbage truck capable of using hybrid vehicle drive motor or engine

110.2% from 2013 to 4,216 units and accounted for 71.6% of sanitation vehicle production. However, production of cesspool emptiers, the next most prevalent type of sanitation vehicle (15.4%) fell by 75 units to 907, 92.4% of the level in 2013.

The overall number of standard garbage trucks has increased by 10,302 units from 70,042 units in 2003 to 80,344 units in 2014. However, the average service age from initial registration has increased by 2.33 years from 7.59 years in 2003 to 9.92 years in 2014.

Figure 5 shows the production status of CNG and LPG garbage trucks, which have grown in popularity as environmental awareness has increased. Annual production of small and medium CNG and LPG-powered garbage trucks decreased greatly to 47 units, 62.7% of the level in 2013. Furthermore, production of small hybrid garbage trucks designed to reduce both fuel consumption and emissions was 110 units, 79.1% of the level in 2013. Overall production of low-polluting environmentally

friendly hybrid, CNG, and LPG garbage trucks fell from 440 units in 2006 to 157 units in 2013. For the second consecutive year, no medium hybrid, CNG, or LPG garbage trucks were produced. Although the production of hybrid garbage trucks has continued to decrease, a new type of hybrid garbage truck was launched in 2014 (Fig. 6), which allows the driver to switch between drive systems depending on the type and location of garbage collection work. For example, the vehicle can be powered by a conventional engine for garbage collection during the day and electric power using the hybrid battery and drive motor at night or inside another facility. The production trend of this type of low-pollution garbage trucks will require close monitoring in the future.

5.2. Detachable container trucks

Production of detachable container trucks in 2014 increased greatly from 2013 by 129.3% to 1,979 units. According to class, although large detachable container trucks decreased to 339 units (90.7% of 2013), medium detachable container trucks increased by 156.9% to 1,334 units, and small detachable container trucks increased by 104.7% to 244 units. According to the proportion of each class, large detachable container trucks accounted for 20.2% of the total, medium detachable container trucks accounted for 67.4%, and small detachable container trucks accounted for 12.3%. The production of medium detachable container trucks, which usually accounts for around 50% of the total, increased noticeably.

5.3. Aerial work platforms

The production of aerial work platforms in 2009 was 5,044 units, which was 42.3% of the level in the previous year. Production then fell to 4,065 units in 2011, before recovering to 5,185 units in 2012 (an increase of 127.6% from 2011) and 6,610 units in 2013 (an increase of 127.5% from 2012). Production in 2014 increased by 104.7% to 6,918 units. However, as shown in Fig. 2, this figure is still substantially lower than the production of 15,065 units achieved in 2007. Categories of aerial work platforms include truck-mounted and self-propelled types. Truck-mounted aerial work platforms are mainly used for electrical and communication system engineering work, whereas self-propelled aerial work platforms tend to be found on construction sites, inside buildings and so on.

5.4. Truck-mounted cranes

This category of vehicle mostly comprises a crane mounted behind the cab of a flat-bed truck and is used

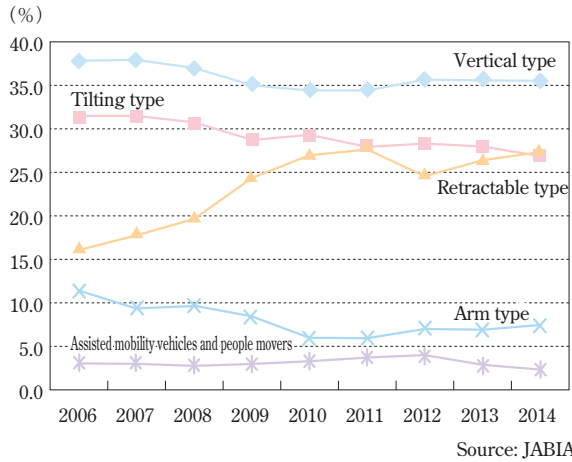


Fig. 7 Production proportion of tailgate lifters per type and use

for construction or building work, or for handling cargo. Production of truck-mounted cranes, which reached 13,964 units in 2008, fell to 4,565 units in 2009 (32.9% of the previous year). However, as shown in Fig. 2, the production of truck-mounted cranes has increased for five consecutive years, reaching 16,848 units in 2014, 126.7% higher than in 2013. Compared to 2009, production of truck-mounted cranes has increased by 369.1%, the largest rate of increase after concrete mixing transport trucks and dump trucks, and close to that achieved before the global financial crisis.

5.5. Tailgate lifters

Tailgate lifters are mounted to the back of flat-bed trucks or vans as a typical labor-saving device for handling cargo. Production of tailgate lifters in 2014

increased by 108.8% from 2013 to 27,306 units. According to type and use, vertical tailgate lifters increased by 108.5% to 9,702 units, tilting tailgate lifters increased by 105.0% to 7,375 units, retractable tailgate lifters increased by 113.1% to 7,517 units, and arm-type tailgate lifters increased by 115.2% to 2,046 units. However, tailgate lifters for assisted mobility vehicles and people movers decreased to 666 units, 92.8% of the level in 2013.

Figure 7 shows the production proportion of tailgate lifters per type and use. Vertical lifters accounted for the largest proportion (35.5%), followed by retractable (27.5%), and tilting types (27.0%). Production of retractable tailgate lifters, which was less than half that of tilting tailgate lifters in 2006, exceeded tilting tailgate lifters for the first time in 2014.

5.6. Trailers

Trailers are used to transport large volumes or heavy items. In 2014, production increased by 111.8% to 6,512 units. According to type, production of low-bed trailers decreased to 222 units (82.2% of 2013), flat-bed trailers increased to 1,688 units (124.6%), van-type trailers increased to 1,773 units (119.8%), trailers for containers decreased to 1,656 units (99.6%), tanker trailers increased to 488 units (100.4%), dump trailers increased to 252 units (137.7%), vehicle carriers also increased to 252 units (105.4%), and full trailers increased to 146 units (113.2%). Despite remaining relatively low, production of dump trailers has increased for four consecutive years, mirroring that of whole vehicles.