

SPECIAL PURPOSE VEHICLES

1 Introduction

According to data compiled by the Japan Automobile Dealers Association (JADA), the number of heavy- and medium-duty truck registrations in 2017 increased to 95,207 units, 101.1% of the level in 2016 and the eighth successive year-on-year increase since registrations bottomed out in 2009. Possible reasons for this increase include rising demand for logistics and construction trucks as the economy recovers, such as for recovery work after the Great East Japan Earthquake and projects related to the 2020 Tokyo Summer Olympics. However, the year-on-year increase in the number of registrations is starting to become smaller. This trend is echoed in the registrations of light-duty trucks, which increased to 255,836, only 100.5% of the level in 2016.

In contrast, overall production of special purpose vehicles in 2017 increased to 105.3% of the level in 2016, clearly higher than the 101.1% figure for heavy- and medium-duty truck registrations in the same period. In terms of production figures alone, this shows that the special purpose vehicle market was buoyant in 2017.

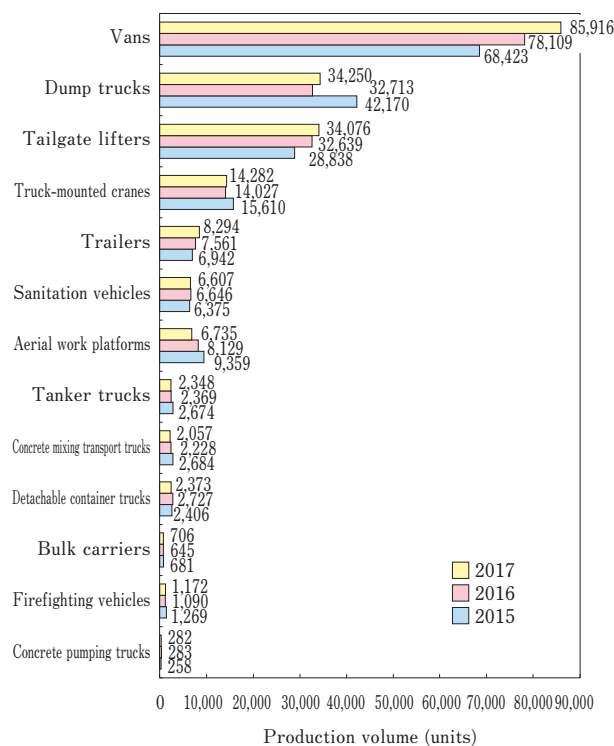
This article describes the main special vehicle trends based on data compiled by the Japan Auto-Body Industries Association (JABIA), the Japan Construction Equipment Manufacturers Association (CEMA), and the Automobile Inspection and Registration Information Association (AIRIA).

2 Market Trends

In 2017, total production of the thirteen types of special purpose vehicles shown in Fig. 1 increased by 9,932 units to 199,098 (105.3% of 2016). This was the eighth consecutive year-on-year increase after the low point in 2009. Different categories of these vehicles saw different results. For example, although the production of aerial work platforms and detachable container trucks fell by at least 10% from 2016, this was offset by the production

of vans, trailers, bulk carriers, and firefighting vehicles, which all increased by around 10%.

Figure 1 shows the 2017 production results of special purpose vehicles per vehicle type. Compared to 2016, production of vans, which are the largest category of special purpose vehicles, increased by 7,807 units to 85,916 (110.0% of 2016). In contrast, production of aerial work platforms fell substantially by 1,394 units to 6,735 (82.9%), the second successive year that this category fell by more than 1,000 units. The production of seven types of special purpose vehicles increased compared with 2016. For the second year in a row, the largest percentage-based production increase was achieved by vans (110.0% of 2016), followed by trailers, which rose by 733 units to 8,294 (109.7%), and bulk carriers, which rose by



Source: JABIA

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

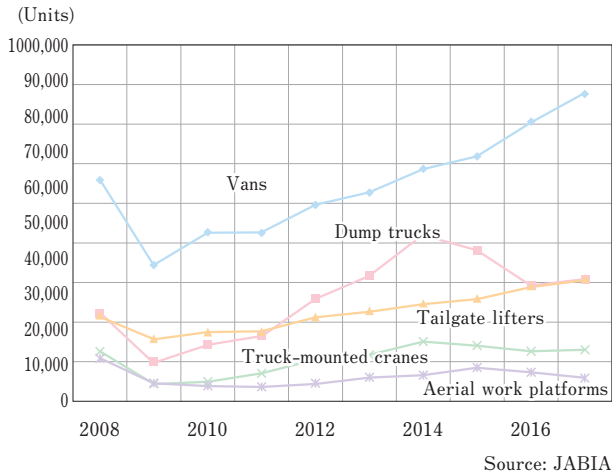


Fig. 2 Production trends of five typical special purpose vehicle types.

61 units to 706 (109.5%). The production of firefighting vehicles, dump trucks, tailgate lifters, and truck-mounted cranes also increased. In contrast, the production of six types of special purpose vehicles decreased, including detachable container trucks, which fell by 354 units to 2,373 (87.0%), concrete mixing transport trucks, which fell by 171 units to 2,057 (92.3%), and tanker trucks, which fell by 21 units to 2,348 (99.1%).

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 2017 of more than 10,000 units over the past ten years. Van production has increased every year since hitting bottom in 2009, with production in 2016 reaching 226.2% of the level in 2009. Similarly, tailgate lifter production in 2017 reached 195.0% of the level in 2009. Production of both of these vehicle categories has increased for eight consecutive years. Production of dump trucks finally began to rise again in 2017 after reaching a peak in 2014 and falling back. Although construction vehicle production has fallen noticeably, this increase in the production of dump trucks suggests that older vehicles from 2008 and earlier are being replaced in significant numbers.

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 increased after 2005, the service age of light-duty dump trucks has continued to fall since 2014, from 13.35 years in 2013 to 12.24 years in 2017. This trend is also reflected in the service age of standard dump trucks, which has also decreased for four consecutive years since 2014,

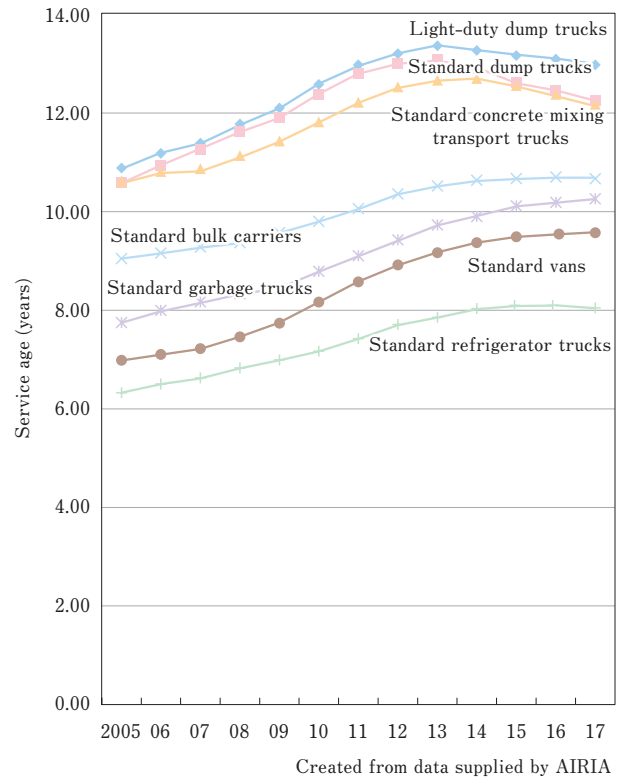


Fig. 3 Average service age from initial registration.

from 13.08 years in 2013 to 12.44 years in 2016, and 12.24 years in 2017. This is probably because the increase in dump truck production over the last few years has increased the proportion of dump trucks with shorter service lives, while reducing the high proportion of dump trucks with longer service lives registered before the global financial crisis. However, as the number of registered dump trucks declines, the fall in the average service age of this vehicle category is not likely to continue for much longer and will probably start to increase again. In contrast, the service age of garbage trucks and vans has continued to increase. Vehicles in these categories are now being used at least two years longer than was the case in 2005. One possible reason for this increase is the development and adoption of more durable engines and frames.

The service age of construction vehicles including concrete mixing transport trucks remains around two years longer than other logistics-related vehicles, which is affected by the distances driven and lengths of time that these vehicles are in operation, and it is likely that this clearly separated dual trend will continue in the future.

This graph was prepared from registration data provided by AIRIA. The original registration data includes

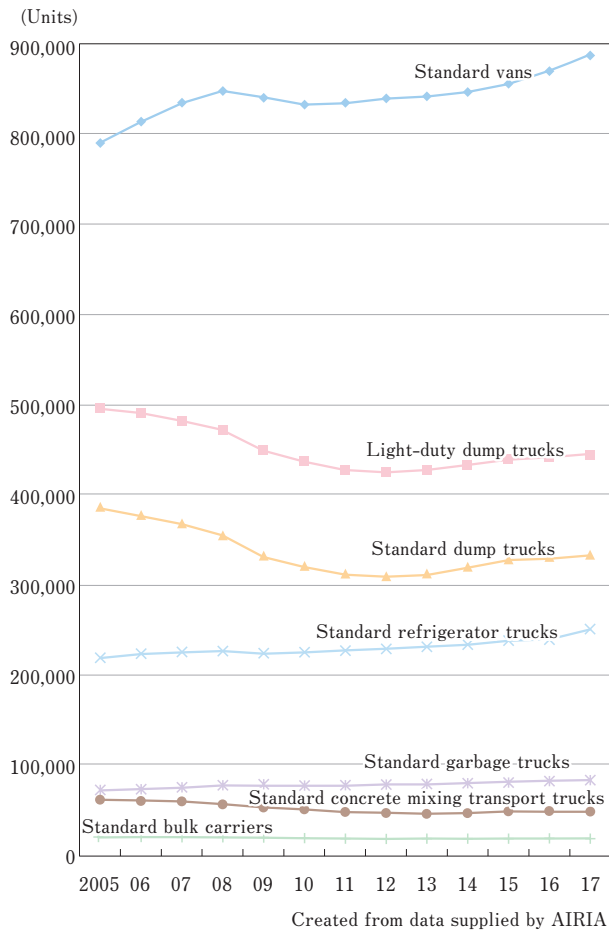


Fig. 4 Overall number of special purpose vehicles in Japan.

the number of registered vehicles at the end of March 2016 for each registration year between 1997 and 2016, and as collected data prior to 1996 (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 up to 2008, it has hardly increased since then. The number bottomed out at 832,809 due to the effects of the global financial crisis and has since increased slightly to 886,911 in 2017. Pulling out of a continuous steady decline, the numbers of both light-duty and standard dump trucks have increased between 2012 and 2017. The numbers of standard refrigerator trucks and standard garbage trucks have increased each year since 2005, reaching 114.1% and 115.1% of the number in 2005, respectively. The numbers of construction vehicles such as dump trucks and concrete mixing transport trucks decreased sharply up to 2011. The increase in these vehicles after

bottoming out in 2012 and 2013 may be attributed to greater demand for special purpose construction vehicles for projects related to earthquake recovery, the 2020 Tokyo Summer Olympics, and the like.

3 Special Purpose Construction Vehicles

3.1. Dump trucks

Dump truck production in 2017 increased to 34,250 units (104.7% of 2016). According to vehicle class, heavy-duty dump trucks decreased by 333 units to 5,350 (94.1%), medium-duty dump trucks increased by 2,049 units to 15,863 (114.8%), and light-duty dump trucks decreased by 258 units to 12,120 (97.9%). Overall dump truck production started to fall between 2015 and 2016 after increasing for five consecutive years up to 2014. Despite further decreases in heavy- and light-duty dump trucks in 2017, this was offset by higher production of medium-duty dump trucks. As a result, overall production of dump trucks increased compared to 2016. However, the increase in medium-duty dump truck production was driven by last minute demand for vehicles to meet new emissions standards, and is unlikely to be a sustainable trend. According to each class, the proportion of heavy-duty dump trucks fell from 17.4% to 15.6% between 2016 and 2017, the proportion of medium-duty dump trucks rose from 42.2% to 46.3%, and the proportion of light-duty dump trucks declined from 37.8% to 35.4%. As these figures show, the proportion of heavy-duty dump trucks is continuing to fall.

Table 1 shows the proportions of dump trucks produced in 2017 for transporting material other than earth or sand (i.e., non-earth and sand dump trucks). In 2017, the proportion of heavy-duty non-earth and sand dump trucks with a gross vehicle weight (GVW) in excess of 8 tons continued to increase. This trend reflects a decline in engineering work requiring the use of earth and sand dump trucks, and the increasing production of non-earth and sand dump trucks for carrying away industrial waste, rubble, and the like. Stainless steel (SUS) is used as a long-life corrosion-resistant body material for dump trucks. The proportion of SUS dump trucks is also rising in accordance with the increase in non-earth and sand dump trucks (GVW of 22 tons: 28.3%, GVW of 25 tons: 49.4%). The proportion of dump trucks with aluminum bodies is decreasing due to issues related to durability.

In addition, although most of these dump trucks were powered by diesel engines, six hybrid, and two com-

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

Vehicle model	Non-earth and sand	SUS	Aluminum
2-ton trucks	1.5%	0.7%	0.0%
4-ton trucks (GVW: less than 8 tons)	7.7%	2.8%	0.0%
GVW: more than 8 tons (6 to 8 tons)	26.5%	9.2%	0.0%
GVW: 20 tons	23.3%	4.8%	0.1%
GVW: 22 tons	46.1%	28.3%	0.6%
GVW: 25 tons	90.2%	49.4%	4.5%

Source: JABIA

pressed natural gas (CNG) or liquefied petroleum gas (LPG) powered 2-ton dump trucks were produced in 2017. However, none were produced in the 4-ton or heavier categories.

3.2. Concrete mixing transport trucks

Production of concrete mixing transport trucks in 2017 fell sharply to 2,057 units (92.3% of 2016). Although the production of concrete mixing transport trucks increased gradually between the low point of 2010 and 2015, production fell again in 2016 and 2017. Production of all classes of concrete mixing transport trucks decreased. The heavy-duty class fell to 1,435 units (97.5% of 2016), the medium-duty class fell to 451 units (89.8%), and the light-duty class fell to 171 units (67.3%). Although the proportion of light-duty concrete mixing transport trucks fell, there were no major changes in the proportions of the medium- and heavy-duty classes. Although the average service age since initial registration of concrete mixing transport trucks increased from 10.64 to 12.70 years between 2005 and 2014, it has fallen since then, reaching 12.18 years in 2017. In addition, although the overall number of concrete mixing transport trucks in use fell greatly up to 2013, this number has been stable since then.

4 Fixed Capacity Special Purpose Vehicles

4.1. Tanker trucks

Production of tanker trucks in 2017 was 2,348 units (99.1% of 2016). According to class, production of heavy-duty tanker trucks increased to 479 units (102.8%), medium-duty tanker trucks decreased to 1,557 units (94.9%), and light-duty tanker trucks increased to 307 units (119.5%). Although production in 2017 was virtually the same as in 2016, it still represents 198.5% of the figure produced at the low point of 2009 (1,183 units). In addition, although the proportion of production per size class (heavy-, medium-, and light-duty) remained approximately 2:7:1, the proportion of medium-duty tanker trucks fell,

while the proportion of light-duty tanker trucks rose.

According to use, the production of oil tanker trucks fell by 193 units in 2017 (87.0% of 2016). The main causes of this decline were the integration and consolidation of oil distributors, and the closure of regional gas stations. The production of water spraying or water supply trucks increased significantly by 969 units in 2017 (125.2% of 2016).

According to use, this significant increase in water spraying or water supply truck production boosted the proportion of this category to 41.3% of the total number of tanker trucks, while the proportion of oil tanker trucks fell to 55.2%.

4.2. Bulk carriers

Production of bulk carriers in 2017 increased to 706 units (109.5% of 2016). According to class, heavy-duty bulk carriers accounted for approximately 98.6% of this total, demonstrating the growing prevalence of heavy-duty vehicles in this segment. According to use, production of bulk cement carriers rose by 11 units from 311 in 2016 to 322 in 2017. Production of bulk feedstuff carriers also increased, by 49 units from 253 to 302. The recent increase in bulk cement carrier production means that production of this category of bulk carrier is now almost equal to that of bulk cement carriers, which have been the mainstream type of bulk carrier in the past. Mirroring the drop in concrete mixing transport truck production, this trend highlights the decrease in public works projects and greater demand for feedstuff.

Although the overall number of standard bulk carriers has risen and fallen virtually year-by-year over the last ten years, the number has remained virtually stable at around 18,000 units.

4.3. Vans

The increase in logistical demand due to economic recovery pushed the production of vans up by 7,807 units in 2017 to 85,916 units (110.0% of 2016). Annual van production has continued to increase since 2009 (37,984 units), more than doubling between then and 2017. Production of each class of van increased compared to 2016. Production of heavy-duty vans increased by to 24,435 units (112.7% of 2016), medium-duty vans to 29,494 units (113.7%), light-duty vans to 30,418 units (104.5%), and mini-vehicle vans to 1,569 units (112.8%). The proportion of heavy- and medium-duty vans increased from 60.9% in 2016 to 62.7% in 2017, reflecting the growing use of vans for bulk shipments. According to use, production of ordi-

nary goods vans increased to 20,622 units (105.9% of 2016), side-opening vans increased to 34,516 units (113.2%), and refrigerator and freezer vans increased to 25,797 units (112.1%). According to proportion of type, ordinary goods vans accounted for 24.0% of production, side-opening vans accounted for 40.2% of production, and refrigerator and freezer vans accounted for 30.0% of production. As a result, the proportion of side-opening, refrigerator, and freezer vans increased from 2016. According to body material, steel accounted for 1,299 units (a proportion of 1.5%), aluminum for 76,162 units (88.6%), and fiber reinforced plastic (FRP) for 8,455 units (9.8%). The proportion of van bodies manufactured from aluminum or FRP is continuing to grow.

The overall number of standard vans has increased for seven consecutive years from 832,809 units in 2010 to 886,911 in 2017.

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 2017 decreased slightly to 6,607 units (99.4% of 2016). According to type, production of garbage trucks increased slightly to 4,883 units (100.3% of 2016), which accounted for 73.9% of all sanitation vehicle production. However, production of cesspool emptiers, the next most prevalent type of sanitation vehicle (proportion: 13.9%) fell by 26 units to 921 (97.3% of 2016).

The overall number of standard garbage trucks has increased for thirteen consecutive years, virtually unaffected by the state of the economy, rising by 10,969 units from 72,856 in 2005 to 83,825 in 2017. Furthermore, the average service age from initial registration has continued to increase from 7.74 years in 2005 to 10.24 in 2017.

Figure 5 shows the production status of hybrid, CNG and LPG garbage trucks, which have grown in popularity as environmental awareness has increased. In 2017, these trucks were produced only in the light-duty category. However, production fell to 143 units, 65.0% of the level in 2016. Production has stagnated over time since 2009 and 2010, when purchasing incentives were available. Furthermore, the proportion of low-polluting environmentally friendly garbage truck production has fallen

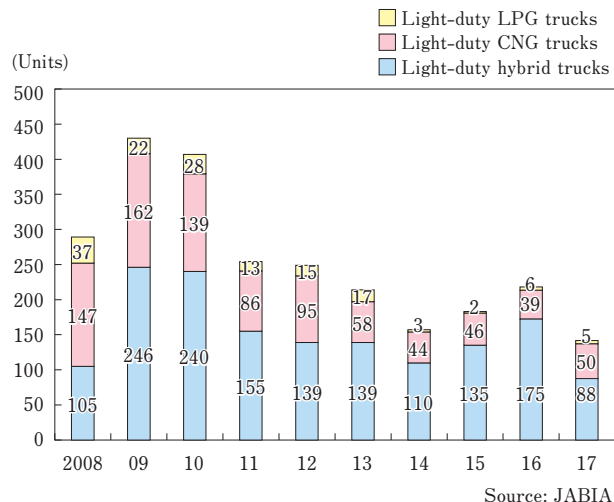


Fig. 5 Production volumes of hybrid and CNG garbage trucks.

to 2.9% of the whole, indicating that this type of truck has failed to find mainstream acceptance. Since the production of low-polluting environmentally friendly garbage trucks increased when purchasing incentives were available, this decline may be partly attributable to the price of these trucks.

5.2. Detachable container trucks

Production of detachable container trucks in 2017 decreased greatly to 2,373 units (87.0% of 2016). According to class, production of heavy-duty detachable container trucks decreased to 460 units (82.0%) and medium-duty detachable container trucks decreased to 1,474 units (84.2%). In contrast, production of light-duty detachable container trucks increased to 431 units (106.4%). Heavy-duty detachable container trucks accounted for 19.4% of production, medium-duty trucks for 62.1%, and light-duty trucks for 18.2%. The proportion of heavy- and medium-duty trucks is decreasing, while that of light-duty trucks is increasing.

5.3. Aerial work platforms

Although the production of aerial work platforms fell to 4,065 units in 2011, production increased robustly to 6,610 units in 2013 and 6,918 units in 2014, before coming close to 10,000 units in 2015 when production reached 9,359 units. However, production dropped sharply again in 2016 and 2017, falling to 6,735 units in 2017 (82.9% of 2016). In addition, as shown in Fig. 2, the 2017 production figure is only slightly higher than half the number produced in 2008 (11,911 units), indicating that production of this type of special purpose vehicle remains sluggish. Categories of aerial work platforms include truck-mount-

ed 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 for construction or building work, or for handling cargo. Production of truck-mounted cranes, which reached 13,864 units in 2008, fell as far as 4,565 units in 2009. Since then, the production of truck-mounted cranes increased for five consecutive years, recovering to 16,848 units in 2014, before falling back in 2015 and 2016. This trend started to reverse again in 2017, with production increasing to 14,282 units (101.8% of 2016)

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 2017 remained robust and increased substantially to 34,076 units (104.4% of 2016). According to type and use, vertical tailgate lifters increased to 10,277 units (100.4% of 2016), tilting tailgate lifters increased to 8,847 units (102.5%), retractable tailgate lifters increased sharply to 12,515 units (112.1%), arm-type tailgate lifters decreased to 1,840 units (97.3%), and tailgate lifters for assisted mobility vehicles and people movers decreased to 597 units (83.8%). The large overall increase in tailgate lifter production reflects the growing production of vans as economic recovery stimulates logistical demand, and the growing requirement for labor-saving devices to unload cargo as the number of female and elderly users increases.

Figure 6 shows the proportion of tailgate lifter production per type and use. Retractable tailgate lifters are now the mainstream type of tailgate lifter, and accounted for the largest proportion of production (36.7%). The produc-

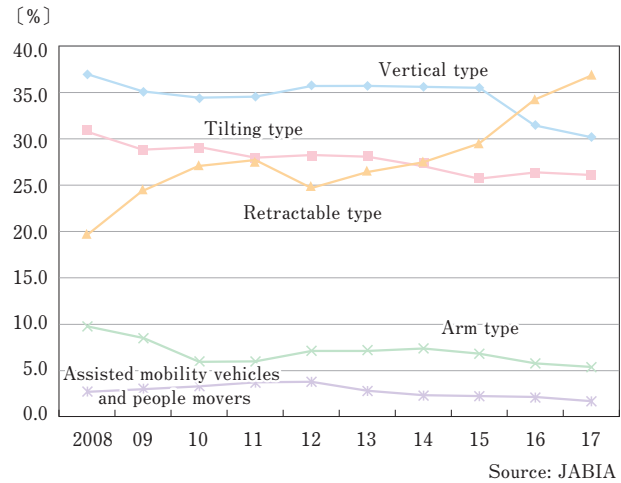


Fig. 6 Production proportion of tailgate lifters per type and use

tion of retractable tailgate lifters is likely to continue increasing for the foreseeable future as this type is most suitable for temperature-controlled vehicles such as refrigerator and freezer vans.

5.6. Trailers

Trailers are used to transport large volumes or heavy items. In 2017, production increased to 8,294 units (109.7% of 2016). According to type, production of low-bed trailers decreased to 203 units (78.7% of 2016), flat-bed trailers increased to 1,785 units (111.0%), van-type trailers increased to 2,731 units (111.7%), trailers for containers increased to 2,514 units (119.3%), tanker trailers increased to 359 units (103.8%), dump trailers decreased to 200 units (79.7%), car carrier trailers increased to 299 units (103.5%), and full trailers decreased to 189 units (82.9%). According to proportion of type, the number of van-type trailers and trailers for containers increased. Reflecting the increase in production of whole-vehicle vans, factors behind this trend include rising freight volumes and the growing use of road transportation to make bulk shipments.