

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 2018 decreased to 91,049 units, 95.6% of the level in 2017. This nearly five percent drop in registrations was the first after eight years of growth since registrations bottomed out in 2009. Although demand for logistics increased as the economy recovered from the low point in 2009, a period that included recovery work after the Great East Japan Earthquake and projects related to the 2020 Tokyo Summer Olympics, it has been suggested that this sudden decrease might be influenced by recent issues such as worker shortages and a drop in the number of young truck drivers due to changes in the driving license system. In contrast, registrations of light-duty trucks in 2018 increased to 258,521 units, 101% of the level in 2017 and the second consecutive slight year-on-year increase.

According to data compiled by the Japan Auto-Body Industries Association Inc. (JABIA), production of special purpose vehicles in 2018 failed to reach the same level as the previous year, falling to 99.3% of the level in 2017. However, this was higher than the change in the number of heavy- and medium-duty truck registrations in 2017 (95.6%).

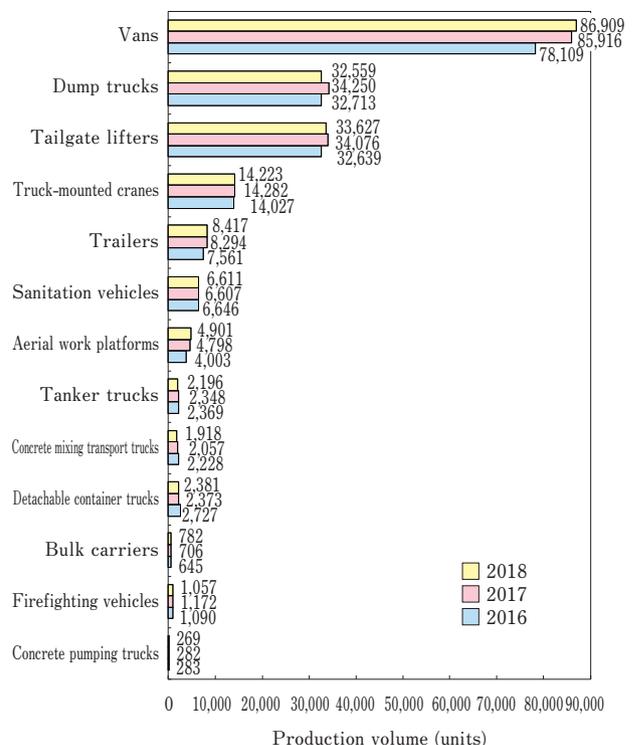
This article describes the main special vehicle trends based on data compiled by JABIA and the Automobile Inspection and Registration Information Association (AIRIA).

2 Market Trends

In 2018, total production of the thirteen types of special purpose vehicles shown in Fig. 1 decreased by 1,311 units to 195,829 (99.3% of 2017). This was the first drop after eight consecutive year-on-year increases since the low point in 2009 caused by the global financial crisis. Although none of the decreases exceeded 10%, more than

half (seven out of the thirteen types) saw a drop in production, underlining the stagnant growth in the market.

Figure 1 shows the 2018 production results of special purpose vehicles per vehicle type. Compared to 2017, production of vans, which are the largest category of special purpose vehicles, increased by 993 units to 86,909 (101.2% of 2017). The production of six types of special purpose vehicles increased from 2017. However, excluding bulk carriers, which achieved the highest rate of growth with production increasing to 782 units (110.8% of 2017), increases in production remained in the 0 to 2% range. After bulk carriers, production of aerial work platforms increased to 4,901 units (102.1% of 2017), trailers increased to 8,417 units (101.5%), vans to 86,909 units (101.2%), detachable container trucks to 2,381 units



Source: JABIA

Fig. 1 Production Results of Special Purpose Vehicles per Product Type

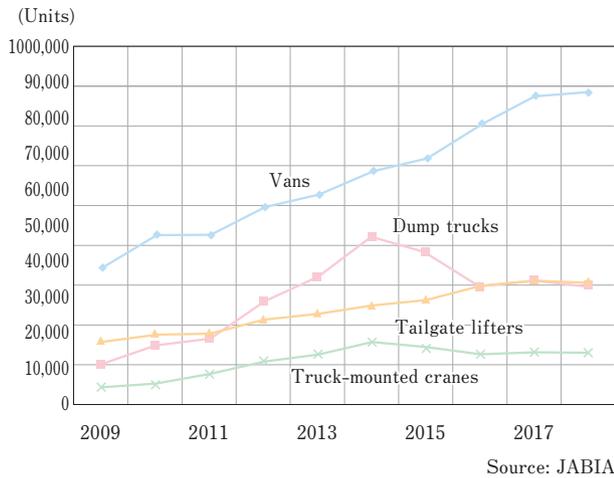


Fig. 2 Production Trends of Four Typical Special Purpose Vehicle Types

(100.3%), and sanitation vehicles to 6,611 units (100.1%). In contrast, the production of seven types of special purpose vehicles decreased compared to 2017. Firefighting vehicles fell by 115 units to 1,057 units (90.2% of 2017), tanker trucks to 2,196 units (93.5%), concrete mixing transport trucks to 1,918 units (93.2%), dump trucks to 32,559 units (95.1%), concrete pumping trucks to 269 units (95.4%), tailgate lifters to 33,627 units (98.7%), and truck-mounted cranes to 14,223 units (99.6%).

Figure 2 shows the production trends for four typical products (vans, dump trucks, tailgate lifters, and truck-mounted cranes) with annual production of more than 10,000 units over the past ten years. Production of all of these four types of vehicles increased year-on-year from the low point of 2009 to 2017. However, only vans saw higher in production in 2018, increasing by 993 units to 101.2% of the level in 2017. Production of each of the other three types fell. Despite this situation, demand for these vehicles remains robust, with production between 200% and 300% higher than the low point of 2009 in the wake of the global financial crisis.

Figure 3 shows the trends for the average number of years in service from initial registration. From 2006 to between 2013 and 2016, the service age of six out of seven of these vehicle types (excluding standard garbage trucks) rose. However, more recently, this increase has ceased and the average service age has begun to fall. This is probably because the increase in production over the last few years has increased the proportion of vehicles with shorter service lives, while reducing the high proportion of vehicles with longer service lives registered before the global financial crisis. However, as the

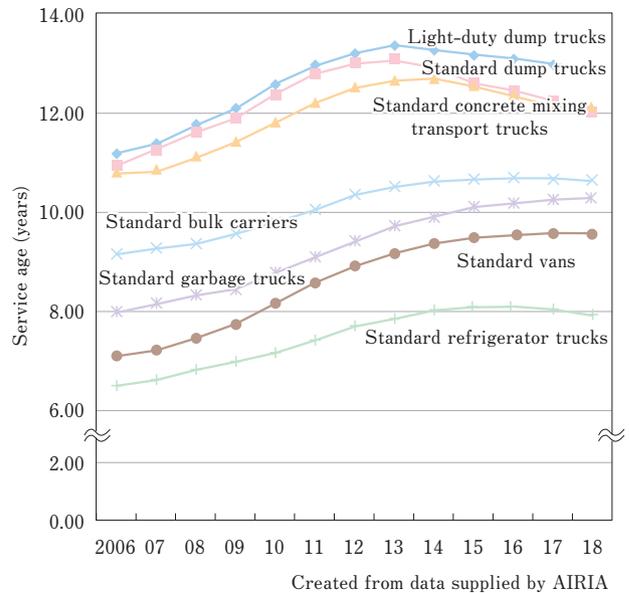


Fig. 3 Average Service Age from Initial Registration

rate of vehicles undergoing inspections and maintenance improves and the number of registered vehicles declines, the fall in the average service age is not likely to continue for much longer and will probably remain constant. Against this trend, the service age of garbage trucks has continued to increase. Vehicles in this category are now being used at least two years longer than was the case in 2006. Possible reasons for this increase include the development and adoption of more durable engines and frames, as well as improvements in the rate of vehicles undergoing inspections and maintenance.

The service age of construction vehicles including light-duty and standard dump trucks and 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 the number of registered vehicles at the end of March 2018 for each registration year between 1999 and 2018, and as collected data prior to 1998 (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. Despite small decreases depending on the year, the total number of each vehicle type has continued to increase

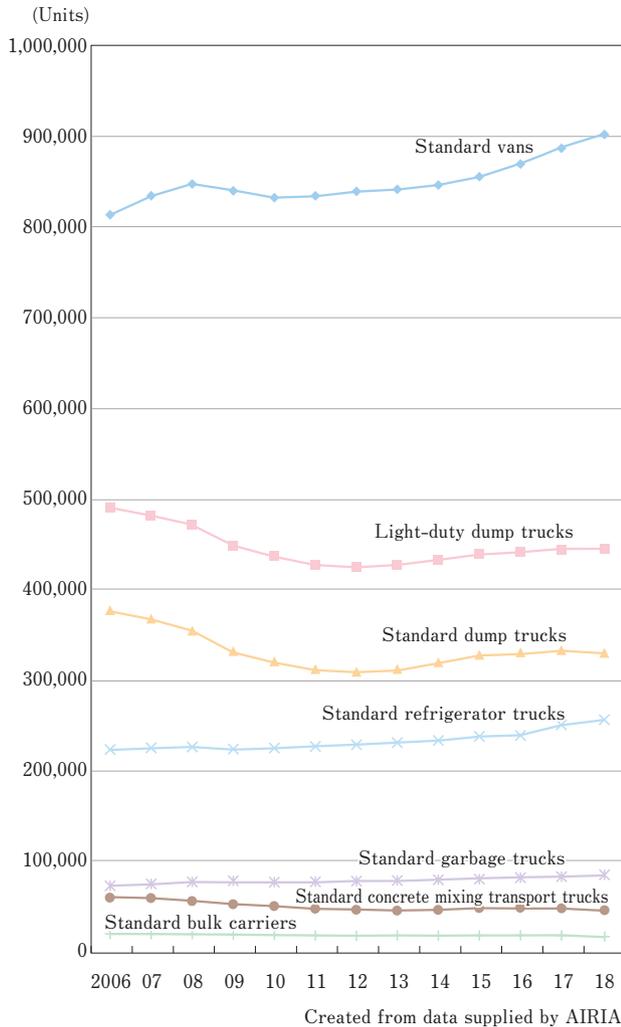


Fig. 4 Overall Numbers of Special Purpose Vehicles in Japan

slightly. In 2018, the total number of logistics-related vehicles such as standard vans, standard refrigerator trucks, and standard garbage trucks increased to 110% of the number in 2006, the highest level since that time. In contrast, the total numbers of small and standard dump trucks, standard concrete mixing transport trucks, and standard bulk carriers, which are all affected by the demand for construction, have still not recovered to the level in 2006, creating another clearly separated dual trend. It is thought that the drop in the total number and registrations of these vehicles has been directly affected by the fall in demand for construction in the wake of the global financial crisis in 2009 and 2010.

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

Table 1 Production Proportions 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%	0.5%	0.0%
4-ton trucks (GVW: less than 8 tons)	8.6%	1.9%	0.0%
GVW: more than 8 tons (6 to 8 tons)	37.5%	4.7%	0.0%
GVW: 20 tons	25.0%	5.2%	0.1%
GVW: 22 tons	40.8%	26.3%	1.4%
GVW: 25 tons	87.7%	33.0%	8.8%

Source: JABIA

for projects related to earthquake recovery, the 2020 Tokyo Summer Olympics, infrastructure projects, and the like.

3 Special Purpose Construction Vehicles

3.1. Dump Trucks

Dump truck production in 2018 decreased to 32,559 units (95.1% of 2017). According to vehicle class, heavy-duty dump trucks decreased by 295 units to 5,055 (94.5%) and medium-duty dump trucks decreased by 2,176 units to 13,687 (86.3%). In contrast, light-duty dump trucks increased by 775 units to 12,895 (106.4%). After exceeding 40,000 units in 2014 (46,411) and 2015 (42,170), dump truck production has subsequently fallen, reaching 32,559 units in 2018. However, this is still three times higher than the 10,853 units produced during the global financial crisis, and highlight the struggles of dump truck manufacturers to adjust production levels. The substantial decrease in medium-duty truck dump truck production probably reflects the effects of last minute demand in recent years for vehicles meeting new emissions standards. Furthermore, similar last minute demand for trucks that meet the emissions standards that come into effect in September 2019 may be driving the increase in light-duty dump truck production. According to each class, the proportion of heavy-duty dump trucks fell from 15.6% to 15.5% between 2017 and 2018, the proportion of medium-duty dump trucks also fell from 46.3% to 42.0%, and the proportion of light-duty dump trucks rose from 35.4% to 39.6%. As these figures show, the proportion of light-duty trucks is continuing to increase.

Table 1 shows the proportions of dump trucks produced in 2018 for transporting material other than earth or sand (i.e., non-earth and sand dump trucks). In 2018, the proportion of non-earth and sand dump trucks with a gross vehicle weight (GVW) of 1 and 4 tons was low, with most of these vehicles used for transporting earth

and sand. However, the proportion of heavy-duty dump non-earth and sand dump trucks with a GVW in excess of 8 tons was high. Of these, the proportion of non-earth and sand dump trucks with a GVW of 20 tons (i.e., the so-called 10-ton earth and sand dump trucks) was only 25.0%. In contrast, the proportion of non-earth and sand dump trucks with a GVW of 25 tons was 87.7%. These trucks are used to transport comparatively heavy loads, such as industrial waste, debris, wood chips, and recycling materials. As a result, a relatively high proportion of these trucks have heavy-duty bodies manufactured from corrosion-resistant long-life stainless steel (SUS). The proportion of SUS-bodied dump trucks also rises in accordance with the proportion of non-earth and sand dump trucks (GVW of 22 tons: 26.3%, GVW of 25 tons: 33.0%). The proportion of aluminum-bodied dump trucks with a GVW of 25 tons is only 8.8%, somewhat lower than the proportion of SUS-bodied dump trucks. Aluminum tends to be used to reduce body weight and increase the carrying capacity of the truck.

In addition, although most of these dump trucks were powered by diesel engines, one compressed natural gas (CNG) and two hybrid 2-ton dump trucks were produced in 2018. However, none were produced in the 4-ton or heavier categories.

3.2. Concrete Mixing Transport Trucks

Production of concrete mixing transport trucks in 2018 fell sharply to 1,918 units (93.2% of 2017). Although the production of concrete mixing transport trucks increased between the low point of 2010 and 2015, production fell again in 2016. Production of all classes of concrete mixing transport trucks decreased. The heavy-duty class fell to 1,391 units (96.9% of 2017), the medium-duty class fell to 371 units (82.3%), and the light-duty class fell to 156 units (91.2%). Additionally, the proportion of light- and medium-duty concrete mixing transport trucks fell, and the proportion of heavy-duty trucks rose. Although the average service age since initial registration of concrete mixing transport trucks increased from 10.82 to 12.70 years between 2006 and 2014, it has fallen since then, reaching 12.11 years in 2017. Furthermore, although the overall number of concrete mixing transport trucks in use fell greatly up to 2013, this number has not experienced major increases or decreases since then.

4 Fixed Capacity Special Purpose Vehicles

4.1. Tanker Trucks

Production of tanker trucks in 2018 fell substantially to 2,196 units (93.5% of 2017). According to class, although production of heavy-duty tanker trucks increased to 538 units (112.3%), medium-duty tanker trucks decreased to 1,399 units (89.9%) and light-duty tanker trucks decreased to 226 units (73.6%). In addition, although the proportion of production per size class (heavy-, medium-, and light-duty) remained approximately 2.7:1, virtually unchanged from 2017, the proportion of medium- and light-duty tanker trucks fell, while the proportion of heavy-duty tanker trucks rose.

According to use, the production of oil tanker trucks fell by 102 units in 2018 (92.1% of 2017), the second successive year-on-year decrease of more than 100 units. 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 decreased significantly to 892 units in 2018 (92.1% of 2017). In contrast, the production of tanker trucks for transporting poisonous materials or foodstuffs increased to 68 units (117.2% of 2017).

The proportion of production in terms of use remained virtually unchanged from 2017, with oil tanker trucks making up 54.4% of the total, and water spraying or water supply trucks making up 40.6%.

4.2. Bulk Carriers

Production of bulk carriers in 2018 increased to 782 units (110.8% of 2017). According to class, heavy-duty bulk carriers accounted for approximately 98.0% of this total, demonstrating the dominance of heavy-duty vehicles in this segment. According to use, production of bulk cement carriers rose by 86 units from 322 in 2017 to 408 in 2018. However, the production of bulk feedstuff carriers decreased by 2 units from 302 to 300. Despite this decrease, demand for bulk feedstuff carriers remains robust. The substantial increase in bulk cement carrier production (126.7% of 2017) might be attributed to rising demand from infrastructure and private construction projects.

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. Furthermore, the average service

age has remained at around 10.5 years without major increases or decreases.

4.3. Vans

The increase in logistical demand due to economic recovery pushed the production of vans up by 993 units in 2018 to 86,909 units (101.2% of 2017). Annual van production has continued to increase since 2009 (37,984 units). Although the increase in 2018 was small, production now stands at 228.8% of the level in 2009. According to class, production of large vans decreased to 22,967 units (94.0% of 2017) and production of medium vans decreased to 27,862 (94.5%). However, the production of small vans increased to 33,771 units (111.0%) and that of mini-vehicle vans to 2,309 units (147.2%). These figures show contrasting trends for heavy- and medium-duty vans compared with light-duty and mini-vehicle vans. This increase in light-duty and mini-vehicle van production means that the proportion of heavy- and medium-duty van production fell from 62.7% in 2017 to 58.5% in 2018. According to use, production of ordinary goods vans continued to increase, rising to 22,061 units (107.0% of 2017). However, the production of temperature-controlled vehicles fell, with refrigerator and freezer vans decreasing to 25,703 units (99.6%) and simple refrigerator vans decreasing to 1,796 units (87.6%). One particular trend was the ten-fold increase in walk-through truck production, which increased from 28 units in 2017 to 271 units in 2018. This is probably due to the increase in demand for delivery trucks as more goods are transported to private houses. According to proportion of type, ordinary goods vans accounted for 25.4% of production, compared to 39.4% for side-opening vans and 29.6% for refrigerator and freezer vans. These three types of vans accounted for nearly 95% of production. According to body material, steel accounted for 1,209 units (a proportion of 1.4%), aluminum for 76,285 units (87.8%), and fiber reinforced plastic (FRP) for 9,415 units (10.8%). The proportion of van bodies manufactured from aluminum or FRP is continuing to grow.

The total number of standard vans in use has increased for eight consecutive years from 832,809 units in 2010 to 902,081 in 2018.

The average service age of standard vans and standard refrigerator and freezer vans was 9.56 and 7.92 years, between two and four years shorter than that of special purpose construction vehicles, reflecting the long distances driven by these vehicles.

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 2018 increased slightly to 6,611 units (100.1% of 2017). According to type, production of garbage trucks increased slightly to 4,931 units (101.0% of 2017), which accounted for 74.6% of all sanitation vehicle production. Production of cesspool emptiers, the next most prevalent type of sanitation vehicle (proportion: 13.9%) remained unchanged at 921 units.

The overall number of standard garbage trucks in use has continued to increase year-by-year, virtually unaffected by the state of the economy, rising from 74,361 units in 2006 to 84,904 units in 2018. Production in 2018 was 114.2% of the level in 2006. Furthermore, the average service age from initial registration has continued to increase from 7.97 years in 2006 to 10.29 years in 2018.

Hybrid, CNG, and liquid petroleum (LPG) garbage trucks, which have grown in popularity as environmental awareness has increased, were only produced in the light-duty category in 2018. However, production fell to 106 units, 74.1% of the level in 2017. 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 to 1.6% 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 2018 was 2,381 units, virtually unchanged from 2017 (100.3%). According to class, production of heavy-duty detachable container trucks increased substantially to 519 units (112.8% of 2017) and medium-duty detachable container trucks increased slightly to 1,486 units (100.8%). In contrast, production of light-duty detachable container trucks decreased to 370 units (85.8%). According to the proportion of each class, heavy-duty detachable container trucks accounted for 21.8% of the total, medium-duty de-

tachable container trucks accounted for 62.4%, and light-duty detachable container trucks accounted for 15.5%. The proportion of larger detachable container trucks is increasing.

5.3. Aerial Work Platforms

Production of aerial work platforms in 2018 increased slightly to 4,901 units (102.1% of 2017). This number has increased year-by-year since 2009 (1,566 units), more than tripling in the period up to 2018. 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 for construction or building work, or for handling cargo. Production of truck-mounted cranes fell as far as 4,565 units in 2009 due to the slowdown in construction and building demand in the wake of the global financial crisis. Production then increased for five consecutive years, recovering to 16,848 units in 2014, before maintaining a stable level above 14,000 units between 2016 and 2018, and falling only slightly in 2018 to 14,223 units (99.6% of 2017).

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 decreased by 449 units in 2018 to 33,627 units (98.7% of 2017). According to type and use, production of vertical tailgate lifters increased to 10,841 units (105.5% of 2017), tilting tailgate lifters increased to 9,589 units (108.4%), retractable tailgate lifters decreased sharply to 10,717 units (85.6%), arm-type tailgate lifters decreased to 1,826 units (99.2%), and tailgate lifters for assisted mobility vehicles and people movers increased to 654 units (109.5%). In the future, production of tailgate lifters is likely to remain robust, reflecting the growing production of vans due to rising logistical demand, and the growing requirement for labor-saving devices to unload cargo as the number of female and elderly users increases.

Figure 5 shows the production proportion of tailgate

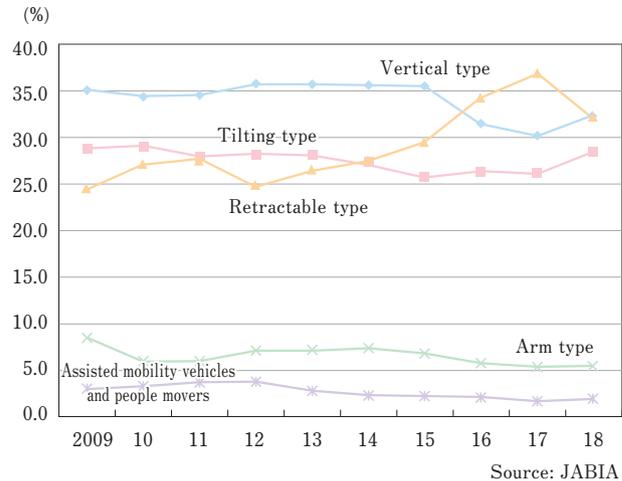


Fig. 5 Production Proportion of Tailgate Lifters per Type and Use

lifters per type and use. The proportion of retractable tailgate lifters, which increased to a record high of 36.7% in 2017, fell to 31.9% in 2018 due to the sluggish growth in production of temperature-controlled vehicles such as refrigerator and freezer vans. In contrast, the proportion of tilting and vertical lifters increased substantially to 28.5% and 32.2%, respectively. Production of assisted mobility vehicles and people movers increased to 654 units (109.5% of 2017), reflecting social needs. The production proportion of this vehicle type rose to 1.9%.

5.6. Trailers

Trailers are used to transport large volumes or heavy items. In 2018, production increased to 8,426 units (101.5% of 2017). According to type, production of low-bed trailers increased to 258 units (127.1% of 2017), flat-bed trailers increased to 1,983 units (111.1%), van-type trailers decreased to 2,603 units (95.3%), trailers for containers decreased to 2,438 units (97.0%), tanker trailers increased to 417 units (116.2%), dump trailers increased to 208 units (104.0%), car carrier trailers increased to 309 units (103.3%), and full trailers decreased to 178 units (94.2%). According to type, the proportion of van-type trailers and trailers for containers decreased, while the proportion of low- and flat-bed trailers increased. The increase in logistics volumes and number of large cargoes being transported indicates the presence of substantial underlying demand, suggesting that production will continue to rise in the future.