

# Special Purpose Vehicles

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## 1 Introduction

According to data compiled by the Japan Automobile Dealers Association (JADA), the number of truck registrations recovered greatly in 2012. For example, the number of large truck registrations increased by 130.3% from 2011 to 69,232 units and the number of small truck registrations increased by 122.8% to 227,326 units. Although the Great East Japan Earthquake, tsunami, and Fukushima Daiichi nuclear disaster in March 2011 greatly affected the Japanese automotive industry, there were signs of steady but definite recovery in 2012.

Key points related to the production and sale of special purpose vehicle sales in 2012 include substantial increases for construction vehicles such as dump trucks, concrete mixing transport trucks, and truck-mounted cranes, but lower increases for trailers, vans, sanitation vehicles (i.e., garbage trucks, cesspool emptiers, and the like) compared to large trucks.

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

The economic downturn caused by the global financial crisis bottomed out in 2009, leading to gradual market recovery from 2010. Although manufacturer optimism was soon extinguished by the earthquake and events that followed, the situation recovered in the following two years and a large 130.3% increase in large truck registrations was recorded in 2012 compared to 2011.

In particular, there were substantial increases in registrations of construction vehicles required to build infrastructure for disaster reconstruction and truck-mounted cranes capable of loading and offloading goods without

the need for on-site equipment.

Fig. 1 shows the 2012 production results of special purpose vehicles per vehicle type. Compared to 2011, van production increased by 7,783 units to 55,119 units (an increase of 116.4%). This increase is lower than that for other vehicle types. The overall dump truck category increased greatly by 158.1% to 28,544 units. Broken down by type, production of large dump trucks rose by 173.8% to 4,713 units, medium dump trucks rose by 160.0% to 12,202 units, and small dump trucks rose by 155.3% to 10,575 units. Excluding mini-vehicles, the total production of dump trucks increased greatly, reflecting the fact that full-scale earthquake restoration efforts were under way in 2012. Production of tailgate lifters increased by 119.8% to 23,644, a lower rate of increase than that of

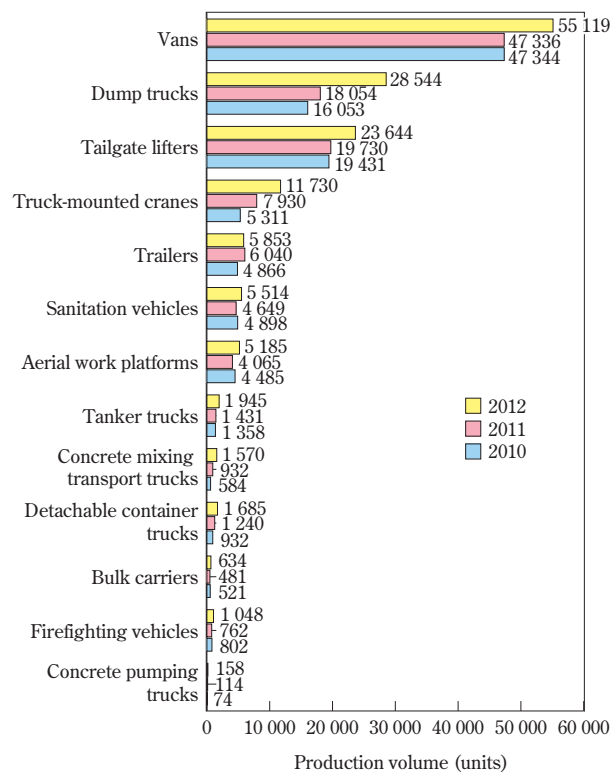


Fig. 1 Production results of special purpose vehicles per product type.

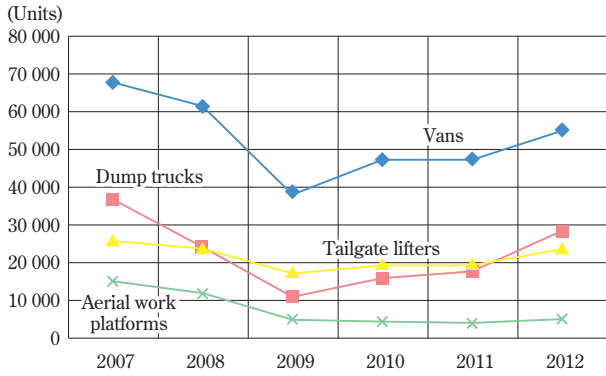


Fig. 2 Production trends of four typical special purpose product types.

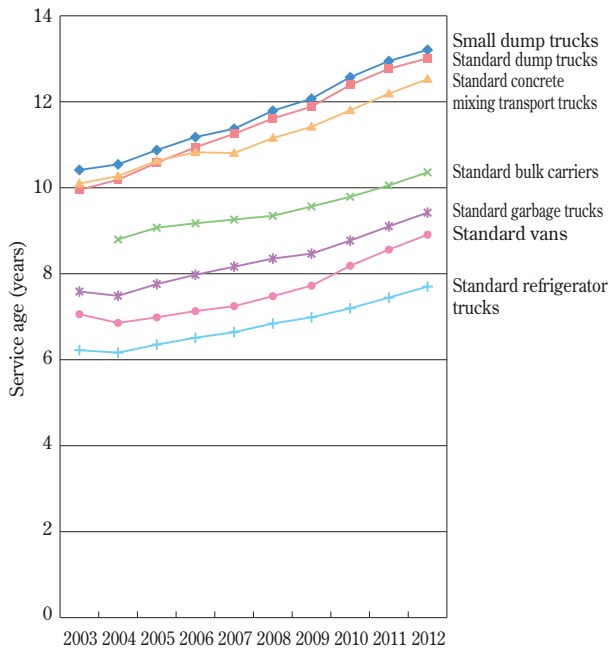


Fig. 3 Average service age from initial registration.

large trucks, and a similar trend to vans. One prominent result in the figures for other vehicle types was the decrease in trailer production compared to 2011. Overall, production of the thirteen types of vehicles shown in Fig. 1 increased by 126.5% to 142,629 units.

Fig. 2 shows the production trends for four typical products (vans, dump trucks, tailgate lifters, and aerial work platforms) over the past six years. Excluding aerial work platforms, production of these four items hit bottom in 2009 before recovering. In particular, van production increased by 145.1% from 2009 and 2012 and dump trucks increased by 263.0% in the same time frame. However, production has yet to recover to the levels in 2007, before the global financial crisis.

Fig. 3 shows the trends for the average number of years in service from initial registration. This graph

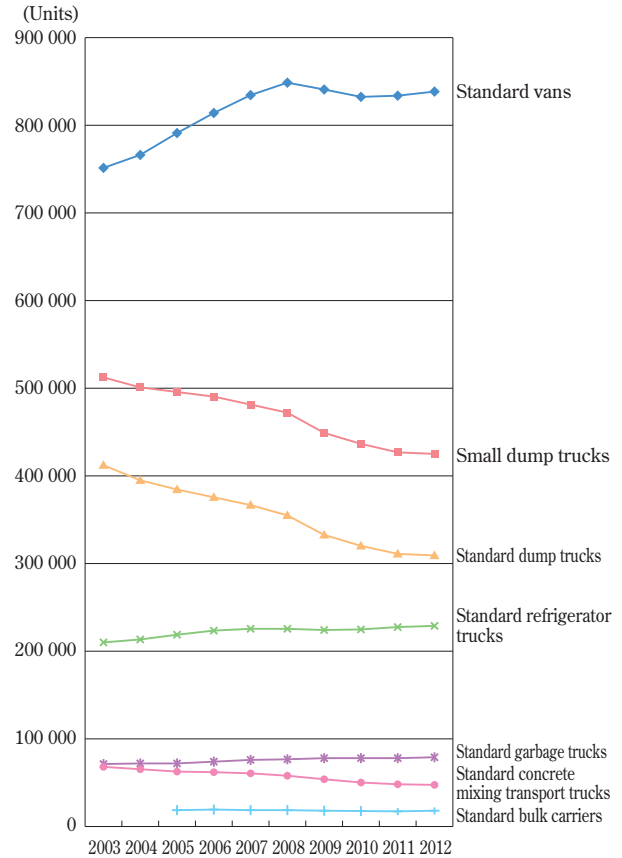


Fig. 4 Trends for overall number of special purpose vehicles in Japan.

was prepared from registration data provided by AIRIA. The original registration data includes the number of registered vehicles at the end of March 2012 for each registration year between 1994 and 2001, and as collected data prior to 1993 (i.e., vehicles in service for more than 20 years). The average service age was extrapolated from these figures. According to the graph, the service age of each of these seven vehicle types is increasing. In the nine years between 2003 and 2012, the service age of standard dump trucks increased by the largest amount (3.08 years), followed by small dump trucks (2.78 years), and standard concrete mixing transport trucks (2.43 years). This data demonstrates the weakened state of the construction-related economy in Japan. Comparing the service age of construction-related vehicles such as dump trucks and concrete mixing transport trucks with other types of logistics vehicles indicates the continuation of a clearly separated dual trend.

However, the rate of increase in service age of standard dump trucks and small dump trucks has peaked. From January to March 2012, registrations increased by 220% compared to 2012, a trend which is likely to con-

**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	1.3%	0.3%	0.0%
4-ton trucks (GVW: less than 8 tons)	5.3%	1.0%	0.0%
GVW: 8 tons to less than 16 tons	18.6%	10.4%	0.0%
GVW: 20 tons	7.4%	5.6%	0.0%
GVW: 22 tons	35.3%	22.9%	2.1%
GVW: 25 tons	68.9%	35.9%	7.3%

Source: JABIA

tinue in the following years.

Fig. 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 751,262 in 2003 to 848,358 in 2008, it has hardly increased since then, probably because the market is almost at saturation point. Small dump trucks decreased from 512,548 in 2003 to 425,169 in 2012, an overall decline of 17.0%, or an annual rate of  $-1.9\%$ . Standard dump trucks decreased substantially from 412,037 in 2003 to 309,184 in 2012, an overall decline of 24.8%, or an annual rate of  $-2.8\%$ . However, the number of small dump trucks and standard dump trucks only decreased by approximately 0.5% in 2012, indicating that the rate of decline has bottomed out. Standard refrigerator trucks increased from 209,411 in 2003 to 229,185 in 2012, an overall increase of 9.4%, or an annual rate of 1%. Standard garbage trucks increased from 70,042 in 2003 to 78,802 in 2012, an overall increase of 12.5%, or an annual rate of 1.4%. Standard concrete mixing transport trucks decreased by 31.3% from 68,897 in 2003 to 47,354 in 2012. Standard bulk carriers also decreased from 19,218 in 2005 to 17,703 in 2012, an overall decline of 7.9%, or an annual rate of  $-1.3\%$ . These figures show that the numbers of construction vehicles such as dump trucks and concrete mixing transport trucks have decreased greatly in the last nine years. It will be important to monitor future trends for the overall number of vehicles as demand increases in the future.

### 3 Special Purpose Construction Vehicles

#### 3.1. Dump trucks

Dump truck production in 2012 increased by 158.1% from 2011 to 28,544 units. According to vehicle class, large dump trucks increased by 2,001 units to 4,713 units (173.8%), medium dump trucks increased to 4,578 units to 12,202 units (160.0%), and small dump trucks increased

by 3,768 units to 10,575 units (155.3%). Although the increase in medium and small dump truck production boosted the overall total, the rate of increase in large dump truck production was particularly significant. Production of each dump truck variant also increased. Medium-sized large-capacity dump trucks recorded the largest rate of increase (285.1%) because this type is probably in demand for transporting earthquake rubble.

Table 1 shows the proportions of various categories of dump truck production. According to the target load, the proportion of dump trucks produced in 2012 for transporting material other than earth or sand (i.e., non-earth and sand dump trucks) in various gross vehicle weight (GVW) categories is as follows. The proportion of trucks with a GVW of 20 tons used for transporting material other than earth or sand was 7.4% (down from 10.7% in 2011), compared to 35.3% of trucks with a GVW of 22 tons (down from 43.5% in 2011), and 68.9% of trucks with a GVW of 25 tons (down from 76.5% in 2011). Therefore, the proportion of non-earth and sand dump trucks fell in each GVW category, indicating that dump trucks produced for transporting earth or sand increased, probably because these trucks are being used to build infrastructure in regions hit by the earthquake. Stainless steel (SUS) was the most common form of long-life corrosion-resistant body type for non-earth and sand dump trucks. However, the proportions in each GVW category hardly changed.

The proportion of SUS bodies in each GVW category was as follows: trucks with a GVW of 20 tons = 5.6%, trucks with a GVW of 22 tons = 22.9%, and trucks with a GVW of 25 tons = 35.9%. As the size of the dump truck increased, the proportion of non-earth and sand dump trucks also rose.

According to fuel, most dump trucks were equipped with diesel engines. Only 4 CNG or LPG-powered 2-ton dump trucks were produced in the whole year. Six gas-

oline-powered dump trucks and 5 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 2012 increased by 168.5% from 2011 to 1,570 units, the second consecutive year of growth in excess of 150%. According to class, large concrete mixing transport trucks increased by 178.1% to 1,275 units, medium concrete mixing transport trucks increased by 147.3% to 221 units, and small concrete mixing transport trucks increased by 113.8% to 74 units. The trend for large concrete mixing transport trucks is particularly noticeable, increasing 315.1% since 2010. The average service age since initial registration of concrete mixing transport trucks has increased by 2.43 years from 10.11 years in 2003 to 12.54 years in 2012. The overall number of concrete mixing transport trucks has also declined by 31.3% from 68,897 in 2003 to 47,354 in 2012. However, the rate of decline has dropped in recent years.

## 4 Fixed Capacity Special Purpose Vehicles

### 4.1. Tanker trucks

Production of tanker trucks in 2012 increased by 135.9% from 2011 to 1,945 units. According to class, large tanker trucks increased by 129.2% to 509 units, medium tanker trucks increased by 138.1% to 1,221 units, and small tanker trucks increased by 138.8% to 211 units. The production of tanker trucks increased greatly in 2012 despite only a small increase in 2011. This is particularly noteworthy since the number of filling stations and oil tanker trucks has declined in recent years. Large (26.2%) and medium (62.8%) tanker trucks accounted for roughly 90% of this category, a proportion that did not change.

A detailed analysis shows that large oil tanker trucks increased by 119 units from 2011 to 360 units, a rise of 149.4%. In addition, medium oil tanker trucks increased by 228 units from 2011 to 771 units, a rise of 142.0%, underlining the contribution of oil tanker trucks to the overall increase in this category.

According to use, the proportion of oil tanker trucks increased from 60.0% in 2011 to 62.5% in 2012.

### 4.2. Bulk carriers

Production of bulk carriers in 2012 increased by 131.8% from 2011 to 634 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 greatly from 41.4% in 2011 to 53.2% in 2012. In contrast, the proportion of bulk foodstuff carriers decreased from 41.6% in 2011 to 36.8% in 2012. This was because the rate of increase in bulk cement carrier production (169.3% compared to 2011) was much higher than the rate of increase in bulk feedstuff carrier production (116.5%). As with concrete mixing transport trucks, these results underlined the signs of recovery in concrete demand.

Although the overall number of standard bulk carriers fell by 9.5% from 19,218 units in 2005 to 17,393 units in 2011, the number of standard bulk carriers increased by 101.8% in 2012 compared to 2011.

### 4.3. Vans

Van production in 2012 increased by 116.4% from 2011 to 55,119 units. Although this increase contrasts favorably with the static trend from last year, it still lags below the overall 130% increase in large trucks. According to class, large vans increased by 109.8% from 2011 to 13,598 units, medium vans increased by 114.7% to 17,838, small vans increased by 122.1% to 22,479 units, and mini-vehicle vans increased by 125.5% to 1,204 units. These results indicate that production increased as the size of the van decreased. According to use, production of ordinary goods vans increased by 113.2% from 2011 to 13,565 units, side-opening vans increased by 112.3% to 19,171 units, and refrigerator and freezer vans increased by 119.0% to 19,237 units. According to proportion of type, ordinary goods vans accounted for 24.6% of production, compared to 34.8% for side-opening vans and 34.9% for refrigerator and freezer vans. According to body material, steel accounted for 1,153 units (2.1%), aluminum for 48,394 units (87.8%), and fiber reinforced plastic (FRP) for 5,572 units (10.1%). There were no major changes in these proportions.

One noteworthy trend was the 128.6% increase in small aluminum freezer vans to 4,563 units compared with 2011. The production trend of bottle transportation vans, which only make up approximately 5% of the overall van total, is also increasing greatly, from 1,359 units in 2010 to 1,702 units in 2011 (an increase of 125.2%) and 2,571 units in 2012 (an increase of 151.1%).

The overall number of standard vans increased from 751,262 units in 2003 to 848,358 units in 2008, but has remained flat since then.

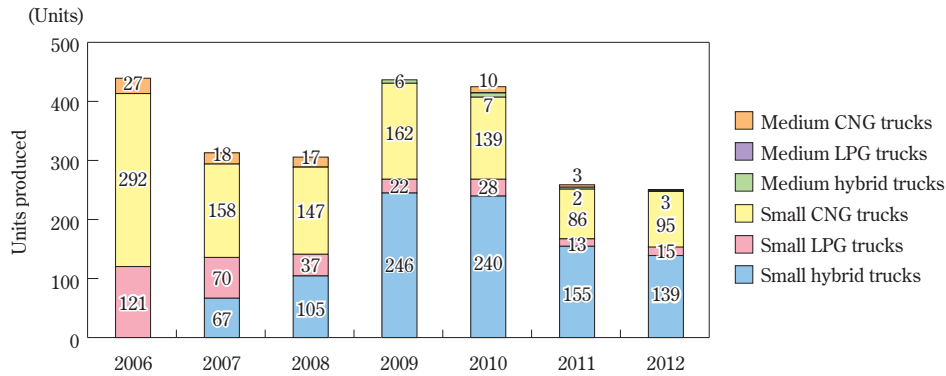


Fig. 5 Production volumes of CNG and LPG garbage trucks.

## 5 Other Special Purpose Vehicles

### 5.1. Sanitation vehicles

The category of sanitation vehicles covers garbage trucks, large capacity garbage dump trucks, cesspool emptiers (also known as vacuum trucks), cleaning trucks and road sweepers (i.e., dewatering trucks and trucks that clean by spraying water or using suction), and other vehicles. Production of these vehicles in 2012 increased by 118.6% from 2011 to 5,514 units, reversing the downward trend of a year earlier. According to proportion of type, production of garbage trucks increased by 128.9% from 2011 to 3,689 units and accounted for 66.9% of sanitation vehicle production. Cesspool emptiers also increased by 116.4% to 958 units and accounted for 17.4% of sanitation vehicle production.

The overall number of standard garbage trucks increased by 8,760 units from 70,042 units in 2003 to 78,802 units in 2012. The average service age from initial registration increased by 1.83 years from 7.59 years in 2003 to 9.42 years in 2012.

Fig. 5 shows the production status of CNG and LPG garbage trucks, which have grown in popularity as environmental awareness has increased. Although small CNG and LPG-powered garbage trucks increased slightly by 107.8% from 2011 to 110 units, this is still only 62.1% of the level in 2010. Production of small and medium hybrid garbage trucks designed to reduce both fuel consumption and emissions was 142 units, continuing the large decrease recorded in 2011. Despite signs of slight recovery in overall garbage truck production, the relative high price of low-polluting environmentally friendly garbage trucks seems to be having an impact.

### 5.2. Detachable container trucks

Production of detachable container trucks in 2012 in-

creased by 135.9% from 2011 to 1,685 units. According to class, large detachable container trucks increased by 129.5% to 570 units, medium detachable container trucks increased by 145.3% to 872 units, and small detachable container trucks increased by 122.6% to 239 units. Compared to 2010, production of large, medium, and small detachable container trucks has increased by 172.2%, 189.2%, and 181.1%, respectively. The growth in medium detachable container truck production is particularly noticeable. According to proportion of class, large detachable container trucks accounted for 37.8% of the total, medium detachable container trucks accounted for 51.8%, and small detachable container trucks accounted for 14.2%. There were no major changes in these proportions.

### 5.3. Aerial work platforms

The production of aerial work platforms in 2011 was 90.6% of the level in 2010. However, this figure recovered by 115.6% in 2012 to 5,185 units. However, as shown in Fig. 2, this figure is still substantially lower than in 2008 and 2009. 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 has increased greatly for two consecutive years, reaching 11,730 units in 2012, which is 147.9% higher than in 2011 and 220.9% higher than in 2010.

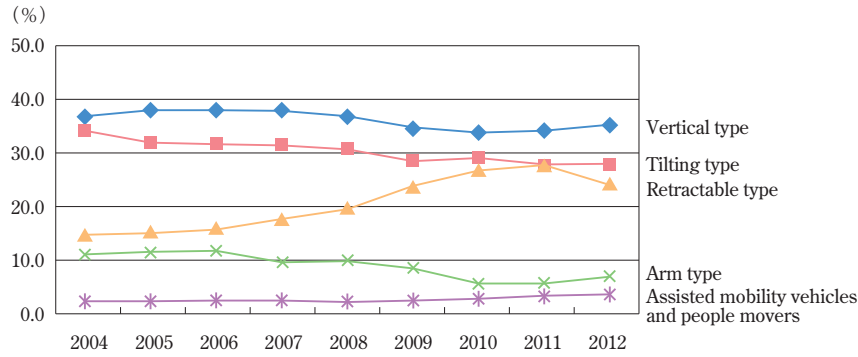


Fig. 6 Production proportion of tailgate lifters per type and use.

### 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 2012 increased by 119.8% from 2011 to 23,644 units. According to type and use, vertical tailgate lifters increased by 124.1% to 8,441 units, tilting tailgate lifters increased by 121.3% to 6,699 units, arm-type tailgate lifters increased by 145.2% to 1,713 units, and tailgate lifters for assisted mobility vehicles and people movers increased by 125.8% to 950 units. The growth of arm-type tailgate lifters was particularly noticeable. The increase in retractable tailgate lifters was low, which is probably related to the similarly slow growth in large van production since this type of lifter is most commonly used on large vans.

Fig. 6 shows the production proportion of tailgate lifters per type and use. Vertical lifters accounted for the largest proportion (35.7%), followed by tilting, and arm types. The trends for these types remain unchanged

from last year. Tailgate lifters for assisted mobility vehicles and people movers only account for 3 to 4% of overall production, but the proportion of this type is increasing.

### 5. 6. Trailers

Trailers are used to transport large volumes or heavy items. In 2012, production decreased to 5,853 units, 96.9% of the level in 2011.

According to type, production of low-bed trailers increased to 148 units (106.5% of 2011), flat-bed trailers increased to 1,237 units (112.1%), van-type trailers decreased to 1,533 units (92.8%), trailers for containers decreased to 1,724 units (73.7%), tanker trailers increased to 645 units (147.3%), dump trailers increased to 137 units (173.4%), vehicle carriers increased to 194 units (150.4%), and full trailers increased to 200 units (161.3%). The increase in dump and tanker trailers reflects the trends of the equivalent standalone vehicle types.