
Maintenance and Serviceability

1 Introduction

1.1. Vehicle market in 2014

In 2014, 5,562,888 new vehicles were sold in Japan, an increase of 187,375 from the 5,375,513 sold in 2013. This was a significant increase of 3.5% from the previous year.

A more detailed analysis reveals that the number of registered vehicles was 3,299,800, an increase of 27,576 (0.9%) from the previous year. Sales of mini-vehicles in 2014 significantly exceeded those of the previous year, even though 2013 sales had already set a new record high. Mini-vehicle sales in 2014 were 2,272,790, a record high for a calendar year. This represented a significant increase of 159,799 vehicles (7.6%) from the previous year.

Vehicle sales in Japan in 2014 were greatly influenced by two factors. One, the consumption tax was raised to 8% in April, creating last-minute demand for vehicles between January and March. Two, sales declined greatly after this as the public reacted to the consumption tax increase. The year-on-year downward trend in the number of registered vehicles continued from April 2014 until the end of the year. However, the last-minute demand up until March meant that registered vehicle sales in the 2014 calendar year actually exceeded that of the previous year. A huge amount of last-minute demand for mini-vehicles also occurred between January and March. Automakers increased production, but could not keep up with demand, causing delays in vehicle deliveries. As a result, sales of mini-vehicles continued to increase in comparison to the previous year up to June 2014, before declining from July on. As the total sales of mini-vehicles in Japan in 2013 was around 2,110,000, which was a new record, sales of mini-vehicles in Japan held steady at a high level in 2013 and 2014. Sales of new mini-vehicles exceeded 2 million in two consecutive years for only the third time in history. Although lower sales are expected to continue in 2015, it is likely that the number of new

mini-vehicle sales will once again be close to 2 million on an annual basis.

In terms of used vehicle sales, the number of registered vehicles was 3,751,533, a decrease of 141,297 (3.6%) from the previous year. Used mini-vehicle sales were 3,088,641, an increase of 86,450 (2.9%) from the previous year. This exceeded the previous record for sales of used mini-vehicles set in 2006.

The number of domestically produced hybrid vehicles (HVs and PHVs) sold in Japan in 2014 was 1,027,531, 10.3% higher than the previous year. It was also the first time that sales of HVs exceeded 1 million. The number of imported HVs was 5,444. The total number of HVs sold in Japan in 2014 was 1,048,163. Broken down according to vehicle type, sales were as follows: HVs = 1,016,766, PHVs = 16,209, EVs = 15,181, and FCVs = 7.

1.2. Vehicle ownership trends in 2014

At the end of December 2014, the number of vehicles owned in Japan was 81,009,554, the fifth consecutive increase from 2010. Compared to 2013, which was the first time in history that the number of vehicles exceeded the 80 million vehicle mark, this marked an increase of 598,115 vehicles (0.7%) and set a new record for the number of vehicles owned in Japan for the calendar year.

According to model type, the number of 4-wheeled registered vehicles was 47,462,834, a decline of 248,664 (0.5%) from the previous year.

Although this number was buoyed by new vehicle sales and represented a slowing in the overall downward trend in the number of vehicles owned, it was the ninth consecutive year-on-year decline.

The number of 4-wheeled mini-vehicles owned in Japan continued to remain strong thanks to sales of new mini-vehicles exceeding the 2 million vehicle mark for two years in a row. The number reached 29,885,495 in 2014, an increase of 820,715 (2.8%) from the previous year. This shows that the number of 4-wheeled mini-vehicles owned in Japan has further increased momentum and

the number will certainly exceed 30 million vehicles in 2015.

The number of inspected 2-wheeled vehicles owned in Japan also increased to 1,636,922, which was 20,941 (1.3%) more than the previous year. The number of 2-wheeled mini-vehicles owned in Japan is 2,007,927, an increase of 4,225 (0.2%) from the previous year.

The number of mini-vehicles that are owned in Japan as a percentage of the total number of registered and 4-wheeled mini-vehicles rose by 0.8% from the previous year and is now at 38.6%, which is the highest in history.

According to a study by the Automobile Inspection & Registration Information Association (AIRIA), the average age of registered passenger vehicles at the end of March 2014 was 8.13 years. This is 0.06 years longer than the previous year and also means that the average vehicle age has continued to grow for the past 22 years in a row. This is the highest average vehicle age in history and a new record has been set for the past 20 consecutive years. The average vehicle age has increased by 1.55 years compared to 10 years ago in 2004. This result is clearly affected by the fact that vehicles are now being used for longer periods of time.

The decrease in the number of vehicles owned in Japan over the one-year period from April 2013 to March 2014 is regarded as the number of vehicles that were scrapped in a one-year period. If these vehicles are then examined to determine the average number of years of usage (the average number of years from when the vehicle was registered as a new vehicle in Japan until it was registered as being scrapped: equivalent to the average life span of a human being), this comes to 12.64 years. That is an increase of 0.06 years compared to the previous year (12.58 years) and is the second consecutive year that the average number of years of usage has increased. This result is probably due to the fact that the proportion of vehicles aged 12 years and over within the total number of vehicles that were scrapped has increased in comparison to the previous year (Fig. 1).

The average age of registered trucks at the end of March 2014 was 10.93 years. This increased by 0.20 years compared to the previous year (10.73 years) and is now the highest in history after increasing for the past 21 years in a row. This indicates that trucks are now also being used for longer periods of time.

According to a study by the Light Motor Vehicle Inspection Organization, the current average age of pas-

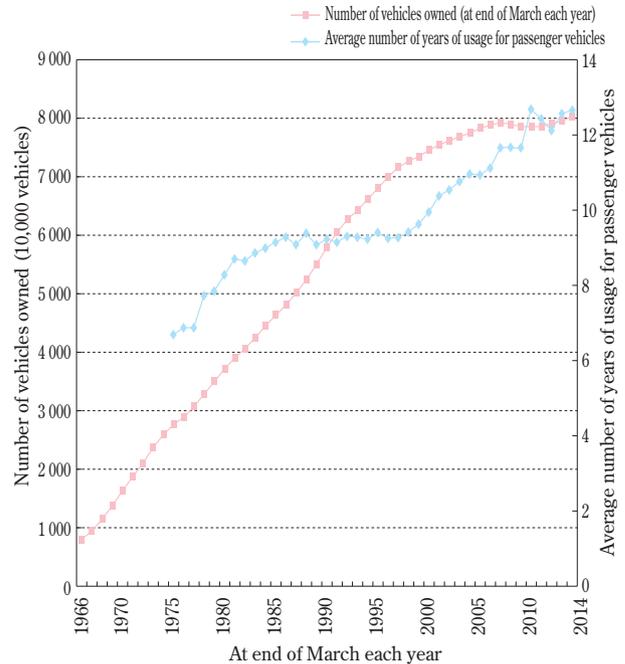


Fig. 1 Trends for number of vehicles owned and average number of years of usage (average vehicle age) for passenger vehicles

senger mini-vehicles is 7.80 years (as of the end of December 2014). This is 0.02 years longer than the average age recorded in 2013 (7.77 years). This organization first started recording this data for mini-vehicles in 2005 and the average age that year was 6.13 years. This means that the average age of mini-vehicles has increased for the past 9 years in a row by a total of 1.67 years or approximately 27.2%.

The average age of mini-vehicle trucks at the end of December 2014 was 11.78 years. This is 0.22 years longer than the average age recorded in 2013 (11.56 years). This data for mini-vehicles was first recorded in 2005 and the average age that year was 9.33 years. This means that the average age of mini-vehicle trucks has increased for the past 9 years in a row by a total of 2.45 years or approximately 26.3%.

The average number of years of usage of passenger mini-vehicles was 13.58 years at the end of December 2013. In 2014 this had increased by 0.25 years to 13.83 years. The average number of years of usage in 2005 was 11.49 years. Therefore, in comparison, the average number of years of usage has increased by 2.34 years. The same trend is seen in the average number of years of usage of mini-vehicle trucks. In 2013 it was 14.95 years, but this had increased by 0.42 years to 15.37 years by 2014. This represents a total increase of 2.59 years

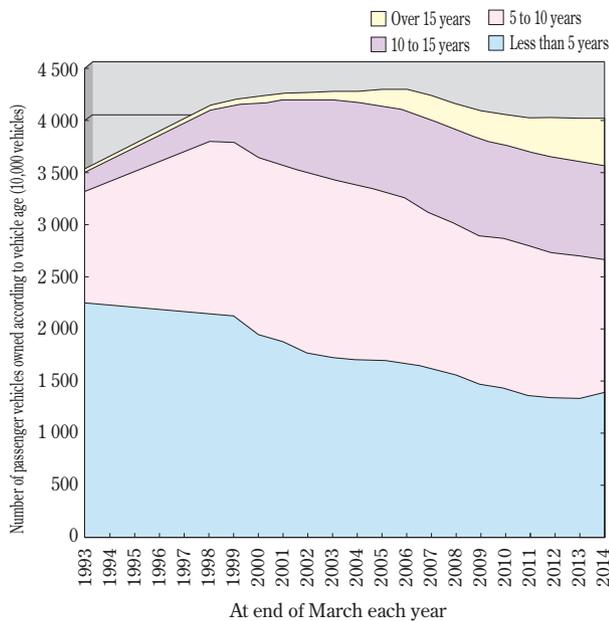


Fig. 2 Trends in vehicle age breakdown amongst total number of passenger vehicles owned

compared to the average number of years of usage recorded in 2005 of 12.78 years.

The total number of registered passenger vehicles owned in Japan at the end of March 2014 was 39,821,043 vehicles. This number has continued to be below 40 million since 1997. This was a decrease of 188,307 vehicles or 0.5% from the previous year (2013). The number of older vehicles within the total number of vehicles owned in Japan and the proportion of the total number that these older vehicles occupy have both continued to increase. The number of vehicles with an age of 10 years or more was 13,465,347, an increase of 195,542 (1.5%) compared to the previous year. These older vehicles accounted for 33.8% of the total number of registered passenger vehicles, an increase of 0.6% (Fig. 2).

The total number of HVs and PHVs owned in Japan at the end of March 2014 was 3,843,378, an increase of 974,276 (34.0%) compared to the previous year. The number of EVs owned in Japan was 39,168, an increase of 13,832 (54.6%) compared to the previous year. Clearly, both HVs and EVs are showing rapid growth in popularity and ownership.

2 Recent Trends in Vehicle Maintenance Industry

The Japan Automobile Service Promotion Association (JASPA) conducted its 2014 survey of the vehicle repair

and maintenance industry at the end of June 2014. The targets of the survey were vehicle repair and maintenance businesses defined by the Road Transport Vehicle Act. The survey was sent to approximately 20% of the 92,135 businesses according to category and size, and valid responses were received from approximately 10% or 9,108 of all the workplaces.

The values that were reported, such as the sales volume, were those from the accounting period closest to the time of the survey at the end of June 2014 (e.g., from the 2013 fiscal year). According to this survey, the total maintenance sales were 5 trillion 516.9 billion yen. The increase amounted to 95.2 billion yen (1.8%), the second consecutive year-on-year rise.

JASPA presumes this increase in total maintenance sales for the past two years was caused by higher consumer spending due to the gradual recovery of the economy thanks to the new economic policies of the Japanese government (Abenomics) to help pull the country out of prolonged deflation, and the last-minute demand before the consumption tax hike in FY 2014.

For the purpose of the 2014 vehicle repair and maintenance industry survey, the target vehicle repair and maintenance businesses were classified as follows: full-time vehicle maintenance shops (workplaces other than at vehicle dealers where maintenance sales account for over 50% of total sales), maintenance shops run as an additional business (workplaces where sales from other businesses, such as vehicle sales, parts and accessory sales, insurance sales, or gasoline sales, account for over 50% of total sales), maintenance shops at vehicle dealers (workplaces at companies that have signed an exclusive distributor agreement with an automaker or a domestic exclusive retailer), and private owner-run maintenance shops (mainly workplaces that perform maintenance work on vehicles that are privately owned).

The values for data, such as sales figures, number of vehicles brought in for service, and number of mechanics, were calculated by the people who conducted the survey from an analysis of the survey results.

2.1. Maintenance facilities and maintenance personnel

2.1.1. Outline of maintenance facilities

The number of businesses in the vehicle repair and maintenance industry was 73,695 at the time of the survey on June 30, 2014, an increase of 522 (0.7%) compared to the previous year. This was the first time in three

Table 1 Maintenance sales volume, composition ratio, and rate of change compared to previous year according to type of business and work content

(Sales volume units: hundred million yen)

Business type \ Work content		Vehicle inspection (<i>shaken</i>) maintenance			Regular inspection and maintenance				Collision repair	Other maintenance	Total	Number of shops and composition ratio	Number of mechanics and composition ratio
		2 years	1 year	Subtotal	1 year	6 months	3 months	Total					
Full-time	Sales volume	6 332	3 313	9 645	377	105	231	713	4 361	6 249	20 968	57 043	166 902
	Change in sales volume compared to previous year	357	1	358	32	3	7	42	-130	376	646	95	-595
	Composition ratio	30.2%	15.8%	46.0%	1.8%	0.5%	1.1%	3.4%	20.8%	29.8%	100.0%	61.9%	48.7%
	Ratio of increase or decrease compared to previous year	106.0%	100.0%	103.9%	109.3%	102.9%	103.1%	106.3%	97.1%	106.4%	103.2%	100.2%	99.6%
Additional business	Sales volume	2 393	662	3 055	157	33	39	229	1 350	1 921	6 555	15 181	48 985
	Change in sales volume compared to previous year	60	71	131	9	1	7	17	-38	19	129	-113	-1 370
	Composition ratio	36.5%	10.1%	46.6%	2.4%	0.5%	0.6%	3.5%	20.6%	29.3%	100.0%	16.5%	14.3%
	Ratio of increase or decrease compared to previous year	102.6%	112.0%	104.5%	106.1%	103.1%	121.9%	108.0%	97.3%	101.0%	102.0%	99.3%	97.3%
Full-time + additional business	Sales volume	8 725	3 975	12 700	534	138	270	942	5 711	8 170	27 523	72 224	215 887
	Change in sales volume compared to previous year	417	72	489	41	4	14	59	-168	395	775	-18	-1 965
	Composition ratio	31.7%	14.4%	46.1%	1.9%	0.5%	1.0%	3.4%	20.7%	29.7%	100.0%	78.4%	63.0%
	Ratio of increase or decrease compared to previous year	105.0%	101.8%	104.0%	108.3%	103.0%	105.5%	106.7%	97.1%	105.1%	102.9%	100.0%	99.1%
Dealer	Sales volume	6 752	1 335	8 087	1 738	227	126	2 091	6 022	8 995	25 195	16 179	109 930
	Change in sales volume compared to previous year	-202	356	154	181	1	51	233	-254	-43	90	146	719
	Composition ratio	26.8%	5.3%	32.1%	6.9%	0.9%	0.5%	8.3%	23.9%	35.7%	100.0%	17.6%	32.1%
	Ratio of increase or decrease compared to previous year	97.1%	136.4%	101.9%	111.6%	100.4%	168.0%	112.5%	96.0%	99.5%	100.4%	100.9%	100.7%
Private owner-run	Sales volume	688	207	895	100	21	45	166	570	820	2 451	3 732	16 669
	Change in sales volume compared to previous year	10	47	57	-19	1	-4	-22	-16	68	87	74	522
	Composition ratio	28.1%	8.4%	36.5%	4.1%	0.9%	1.8%	6.8%	23.3%	33.5%	100.0%	4.1%	4.9%
	Ratio of increase or decrease compared to previous year	101.5%	129.4%	106.8%	84.0%	105.0%	91.8%	88.3%	97.3%	109.0%	103.7%	102.0%	103.2%
Total	Sales volume	16 165	5 517	21 682	2 372	386	441	3 199	12 303	17 985	55 169	92 135	342 486
	Change in sales volume compared to previous year	225	475	700	203	6	61	270	-438	420	952	202	-724
	Composition ratio	29.3%	10.0%	39.3%	4.3%	0.7%	0.8%	5.8%	22.3%	32.6%	100.0%	100.0%	100.0%
	Ratio of increase or decrease compared to previous year	101.4%	109.4%	103.3%	109.4%	101.6%	116.1%	109.2%	96.6%	102.4%	101.8%	100.2%	99.8%

years that the number of these businesses had increased.

The total number of workplaces (number of certified maintenance shops) also increased for the second year in a row. The number of shops increased by 202 from the previous year and now stands at 92,135, breaking the record from last year (Table 1).

When the number of workplaces was examined according to the types of business, full-time vehicle maintenance shops accounted for the majority at 57,043 (61.9% of the total workplaces). This represented an increase of 95 (0.2%) from the previous year. Maintenance shops that were run as an additional business accounted for 15,181 (16.5%). This was a decrease of 113 (0.7%) from the previous year.

The number of maintenance shops at vehicle dealers was 16,179 (17.6%), an increase of 146 (0.9%) from the previous year. The number of dealer-based maintenance shops has increased for two years in a row thanks to the strong results from new car sales. The number of private owner-run maintenance shops was 3,732 (4.1%). This number increased by 74 (2.0%) from the previous year.

The number of designated workshops (i.e., private shops permitted to carry out the Japanese *shaken* vehicle inspection procedure) is increasing consistently and is setting a new record every year. In the 2014 survey the number of such workshops reached 29,642, an increase of 149 (0.5%) from the previous year. The number of workplaces that have obtained this designation (i.e., the designation acquisition ratio) is 32.2% of the total number of workplaces (Table 2).

If the designation acquisition ratio is examined according to the different types of businesses, 13,371 out of the total number of full-time vehicle maintenance shops (57,043) have obtained the designation, which is a new record. This is an increase of 55 (0.4%) from the previous year and represents a designation acquisition ratio of 23.4%. This number has been increasing very slowly but steadily and the total number of full-time vehicle maintenance shops that have obtained this designation has increased by 2,033 (17.9%) over the past 10 years since 2004.

In the case of maintenance shops that were run as an additional business, 4,560 out of the total of 15,181 have

Table 2 Number of vehicle maintenance-related personnel

Scale of business	A1 (2 to 3 people)	A2 (4 to 10 people)	B (11 to 20 people)	C (21 to 30 people)	D (31 people or more)	Total	Change compared to previous year	Rate compared to previous year
Number of shops	51 648	36 297	3 610	438	142	92 135	202	100.2 %
Number of shops that obtained designation		26 576	2 643	320	103	29 642	149	100.5 %
Acquisition ratio		73.2 %	73.2 %	73.1 %	72.5 %	32.2 %		
Total number of personnel	176 663	281 942	65 472	13 828	7 227	545 132	- 4 770	99.1 %
Number of female personnel within that total	30 186	36 013	5 371	884	402	72 856		
Total number of maintenance personnel	123 294	211 783	49 418	10 640	5 950	401 085	749	100.2 %
Number of female maintenance personnel within that total	9 308	6 269	696	129	69	16 471		
Number of Class 1 auto mechanics	1 373	5 350	1 571	187	105	8 586	1 054	114.0 %
Number of female mechanics within that total	0	54	13	2		69		
Number of Class 2 auto mechanics	80 233	154 505	35 534	6 874	3 804	280 950	- 590	99.8 %
Number of female mechanics within that total	1 377	1 679	289	39	9	3 393		
Number of Class 3 auto mechanics	20 045	25 884	4 961	1 329	731	52 950	- 1 188	97.8 %
Number of female mechanics within that total	4 473	1 533	45	9	3	6 063		
Total number of mechanics	101 651	185 739	42 066	8 390	4 640	342 486	- 724	99.8 %
Number of female mechanics within that total	5 850	3 266	347	50	12	9 525		

Survey in June 2014 : The number of women was also surveyed.

Table 3 Number of businesses according to number of employees

	2 to 5 people	6 to 10 people	11 to 15 people	16 to 20 people	21 to 30 people	31 to 50 people	51 to 100 people	101 to 300 people	More than 300 people	Private company total	Public offices	Overall total
June 2006	39 187	13 685	4 189	2 547	2 667	1 641	1 905	2 608	2 150	70 579	438	71 017
June 2014	40 270	15 904	5 152	2 674	2 187	1 728	1 714	2 166	1 471	73 266	429	73 695
Change	1 083	2 219	963	127	- 480	87	- 191	- 442	- 679	2 687	- 9	2 678

obtained the designation. This is a decrease of 15 (0.3%) from the previous year and represents a designation acquisition ratio of 30.0%. It also represents a decrease of 30 (0.8%) from 2004.

There were a total of 16,179 maintenance shops at vehicle dealers, and of these, 10,464 have obtained the designation. This is an increase of 79 (0.8%) from the previous year and represents a designation acquisition ratio of 64.7%. It also represents a decrease of 691 (6.2%) from 2004.

In the case of private owner-run maintenance shops, 1,247 out of the total of 3,732 have obtained the designation. This is an increase of 30 (2.5%) from the previous year and represents a designation acquisition ratio of 33.4%. It also represents an increase of 20 (1.6%) from 2004.

Table 2 compares the scale of the maintenance shops based on the number of vehicle maintenance personnel employed.

At the time of this survey in June 2014, the number of private companies was 73,266 after subtracting the

number of public offices. However, at the time of the June 2006 survey 8 years ago, the number of private companies was 70,579 after subtracting the number of public offices. Table 3 shows this comparison based on the number of employees.

2.1.2. Outline of mechanics and maintenance personnel

At the time of the 2014 survey, the number of maintenance-related personnel was 545,132, a decrease of 4,770 (0.9%) from the previous year.

When these changes in the numbers of maintenance-related personnel are examined by business type, the full-time vehicle maintenance businesses employed 260,315 people, an increase of 479 (0.2%) from the previous year. This was the second year in a row that this number increased. Vehicle maintenance businesses that are run as an additional business employed 86,221 people, 971 (1.1%) less than the previous year. However, the number of maintenance-related personnel at maintenance shops at vehicle dealers increased to 156,082 people, 1,671 (1.1%) more than the previous year. In the case

of private owner-run maintenance shops, the number of maintenance-related personnel decreased significantly to 42,514 people, 5,949 (12.3%) less than the previous year.

The number of maintenance personnel (shop workers) was 401,085, 749 (0.2%) more than the previous year, and the number of mechanics was 342,486 people, 724 (0.2%) more than the previous year.

The number of personnel who obtained the Class 1 vehicle mechanic qualification was 8,586 people, an increase of 1,054 (14.0%) from the previous year. The number of personnel who obtained the Class 2 vehicle mechanic qualification was 280,950, a decrease of 590 (0.2%). The number of personnel with Class 3 vehicle mechanic qualification was 52,950 a decrease of 1,188 (2.2%) (Tables 1 and 2).

The average age of maintenance personnel has continued to rise consistently, but a decline was recorded for the first time in the history of this survey in 2010. The average age increased once again in 2011 and increased again by 0.3 years to 43.8 years in 2014.

According to the School Basic Survey of the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT), the number of students admitted to the vehicle maintenance departments of vocational schools that train mechanics in FY 2014 was 9,193 out of the total student capacity for those departments (12,617). JASPA conducts a registration test to help people obtain the qualifications to be a mechanic. The number of people taking this test reached its peak in FY 2003 at 72,623, but since then the number has continued to decrease and in FY 2013 the number had dropped 40% to 43,863.

The existence of qualified vehicle mechanics is essential for Japan's vehicle-based society so that consumers can continue to use vehicles easily. In the coming years, the electronic controls of various devices and functions related to safety, environmental-friendliness, and passenger comfort, will continue to become more advanced. Consequently, there will be a great need to train and educate mechanics with high-level maintenance skills that will be able to handle the newest vehicle technologies. In addition, the vehicle maintenance industry will need to develop and disseminate highly versatile scanning tools that will be able to be used on a wide variety of vehicle models. Another urgent issue that needs to be solved is the construction and maintenance of a system that provides the technical information necessary to perform maintenance on vehicles that continue to advance

and evolve.

In 1991, the Japanese vehicle industry established the Japan Automobile Education Foundation (JAEF). For over the past 20 years, JAEF has provide automotive technology educational materials, such as tools, measuring instruments, and engines for dismantling and assembly, to industrial high schools and other vocational schools teaching vehicle mechanics courses. The JAEF also dispatches experts in vehicle technology and other fields to act as lecturers who provide support and guidance as well as training sessions for the teachers at these schools.

In April 2014, fifteen different vehicle-related organizations, such as JASPA, the Japan Automobile Dealers Association (JADA), the Japan Automobile Manufacturers Association (JAMA), and JAEF, obtained the cooperation of the Japanese Ministry of Land, Infrastructure, Transport and Tourism (MLIT) to establish a council to promote the recruitment and training of vehicle maintenance personnel. In addition, local liaison committees were established in each transportation bureau unit. These committees then visited high schools to give presentations and provide information about becoming mechanics in an effort to recruit new human resources into the field of vehicle maintenance.

2.2. Demand for vehicle maintenance

2.2.1. Trends in total maintenance sales volume

The total maintenance sales volume in the 2014 survey (results from the 2013 fiscal year) was 5 trillion 516.9 billion yen. Table 1 compares the maintenance sales volume generated by full-time vehicle maintenance businesses, those run as an additional business, those at dealers, and those that are private owner-run businesses. It also compares the sales volume according to the content of the work that was performed, such as *shaken* vehicle inspection and maintenance, regular inspection and maintenance, collision repairs, and other maintenance (extraordinary maintenance due to a breakdown or malfunction, simple maintenance such as oil changes, voluntary inspection and maintenance requested by the vehicle's owner, re-inspection of a vehicle that has been issued a limited vehicle inspection certificate, customization services, and the like).

When the total vehicle maintenance sales are examined by business type, the maintenance sales at full-time vehicle maintenance businesses accounted for 2 trillion 96.8 billion yen, an increase of 64.6 billion yen (3.2%) com-

pared to the previous year. Broken down according to the different kinds of maintenance work, *shaken* vehicle inspection and maintenance sales amounted to 964.5 billion yen (46.0% of the total maintenance sales at these businesses), an increase of 3.9% compared to the previous year. Regular inspection and maintenance sales amounted to 71.3 billion yen (3.4%), an increase of 6.3%. Collision repairs amounted to 436.1 billion yen (20.8%), a decrease of 2.9%. Finally, other maintenance sales amounted to 624.9 billion yen (29.8%), an increase of 6.4%.

Maintenance sales at vehicle maintenance businesses that are run as an additional business amounted to a total of 655.5 billion yen, an increase of 12.9 billion yen (2.0%) compared to the previous year. Broken down according to the different kinds of maintenance work, *shaken* vehicle inspection and maintenance sales amounted to 305.5 billion yen (46.6% of the total maintenance sales at these businesses), an increase of 4.5% compared to the previous year. Regular inspection and maintenance sales amounted to 22.9 billion yen (3.5% of the total), an increase of 8.0%. Collision repairs amounted to 135 billion yen (20.6%), a decrease of 2.7%. Finally, other maintenance sales amounted to 192.1 billion yen (29.3%), an increase of 1.0%.

In the case of vehicle maintenance sales at maintenance shops at vehicle dealers, the total amounted to 2 trillion 519.5 billion yen. This was an increase of 9 billion yen (0.4%) compared to the previous year. Broken down according to the different kinds of maintenance work, *shaken* vehicle inspection and maintenance sales amounted to 808.7 billion yen (32.1% of the total maintenance sales at dealers), an increase of 1.9% compared to the previous year. Regular inspection and maintenance sales amounted to 209.1 billion yen (8.3%), an increase of 12.5%. Collision repairs amounted to 602.2 billion yen (23.9%), a decrease of 4.0%. Finally, other maintenance sales amounted to 899.5 billion yen (35.7%), a decrease of 0.5%.

Total vehicle maintenance sales at private owner-run vehicle maintenance businesses was 245.1 billion yen, an increase of 8.7 billion yen (3.7%) compared to the previous year. Broken down according to the different kinds of maintenance work, *shaken* vehicle inspection and maintenance sales amounted to 89.5 billion yen (36.5% of the total maintenance sales at these businesses), an increase of 6.8% compared to the previous year. Regular inspection and maintenance sales amounted to 16.6 billion yen (6.8%), a decrease of 11.7%. Collision repairs amounted to

57 billion yen, (23.3%), a decrease of 2.7%. Finally, other maintenance sales amounted to 82 billion yen (33.5%), an increase of 9.0%.

2.2.2. Average number of vehicles serviced according to type of business and work content

The average number of vehicles brought in for maintenance service per shop during the year was 1,586, an increase of 27 (1.7%) from the previous year. Broken down according to the content of the work that was performed, the average number of vehicles brought in for *shaken* vehicle inspection and maintenance service per shop was 359, an increase of 5 (1.4%), and 22.6% of the total number of vehicles brought in (1,586). The average number brought in for regular inspection and maintenance per shop was 220, an increase of 19 (9.2%), and 13.9% of the total number brought in. The average number of vehicles brought in for collision repairs per shop was 101, a decrease of 1 (1.0%), and 6.4% of the total number brought in. The average number of vehicles brought in for other maintenance per shop was 907, an increase of 4 (0.5%), and 57.2% of the total number brought in.

Looking at the average number of vehicles brought in for maintenance per shop during the year according to the type of business, the average number of vehicles brought into full-time vehicle maintenance businesses was 812, an increase of 22 (2.8%) from the previous year. The average number of vehicles brought into maintenance shops run as an additional business was 1,169 per shop, an increase of 24 (2.1%). The average number of vehicles brought into maintenance shops at dealers was 4,748 per shop, an increase of 48 (1.7%).

Furthermore, looking at the content of the maintenance work according to the type of business, the average number of vehicles brought into full-time vehicle maintenance businesses for *shaken* vehicle inspection and maintenance during the year was 279 per shop, an increase of 8 (3.0%) from the previous year and 34.4% of all the vehicles brought into those shops for maintenance. In the same category, the average number of vehicles brought into maintenance shops run as an additional business was 329 per shop, a decrease of 8 (2.1%), and 28.2% of the total number of vehicles brought into those shops for maintenance. In contrast, the average number of vehicles brought into maintenance shops at dealers for *shaken* vehicle inspection and maintenance was 670, an increase of 5 (0.8%), and 14.1% of all the vehicles brought into those shops for maintenance.

Next, the average number of vehicles brought into full-time vehicle maintenance businesses for regular inspection and maintenance during the year was 75 vehicles per shop. This was an increase of 4 (5.8%) from the previous year and accounted for 9.2% of all the vehicles brought into those shops for maintenance. In the same category, the average number of vehicles brought into maintenance shops run as an additional business was 96 vehicles per shop, an increase of 6 (6.7%) from the previous year, and 78.2% of the vehicles brought into those shops for maintenance. The average number of vehicles brought into maintenance shops at dealers was 852 vehicles per shop, an increase of 83 (10.7%), and 17.9% of the vehicles brought into those shops for maintenance.

The average number of vehicles brought in for collision repairs during the year was 69 vehicles per shop at the full-time vehicle maintenance businesses, a decrease of 2 (1.8%) from the previous year, and 8.5% of all the vehicles brought in for maintenance service. In the same category, the average number of vehicles brought into maintenance shops run as an additional business was 72 vehicles per shop, a decrease of 4 (5.1%), and 6.2% of all the vehicles brought in for maintenance service. The average number of vehicles brought into maintenance shops at dealers was 238 per shop, an increase of 2 (1.0%) from the previous year, and 5.0% of all the vehicles brought in for maintenance service.

Other maintenance accounted for the largest portion of vehicles brought in for maintenance or service. The average number of vehicles brought into full-time vehicle maintenance businesses for other maintenance was 388 per shop, an increase of 11 (2.9%) from the previous year, and 47.8% of all the vehicles brought into those shops for maintenance during the year. In the same category, the average number of vehicles brought into maintenance shops run as an additional business for other maintenance was 671 per shop, an increase of 30 (4.6%), and 57.4% of all the vehicles brought into those shops for maintenance. In contrast, the average number of vehicles brought into maintenance shops at dealers for other maintenance was 2,987 per shop, a decrease of 42 (1.4%), and 62.9% of all the vehicles brought into those shops for maintenance.

2.2.3. Trends in *shaken* vehicle inspection and regular inspection and maintenance fees according to type of business

Two-year vehicle inspections account for over three-

quarters of the *shaken* vehicle inspection sales volume. Comparing the unit prices of the 2-year vehicle inspection fees at the different types of businesses, the unit price at the full-time vehicle maintenance businesses was 51,883 yen, an increase of 640 yen (1.3%) over the previous year. The unit price at the maintenance shops run as an additional business was 56,298 yen, an increase of 3,105 yen (5.8%). In contrast, the unit price at the maintenance shops at dealers was 69,492 yen, a decrease of 1,790 yen (2.5%).

The price difference for the 2-year *shaken* vehicle inspection fees at full-time vehicle maintenance businesses and maintenance shops at dealers shrunk from 22,201 yen in FY 2012 to 20,089 yen in FY 2013. This price difference continued to shrink further and was 17,659 yen in FY 2014.

One-year vehicle inspections account for approximately three-quarters of the regular inspection and maintenance sales volume. Comparing the average unit prices of the 1-year regular inspections at the different types of businesses, the average unit price at the full-time vehicle maintenance businesses was 20,035 yen according to the FY 2012 survey and 20,953 yen according to the FY 2013 survey, an increase of 918 yen (4.6%). Furthermore, the average unit price according to the FY 2014 survey was 21,150 yen, an increase of 197 yen or 0.9% compared to the previous year. The average unit price of a one-year vehicle inspection at the maintenance shops run as an additional business was 16,266 yen according to the FY 2012 survey. The average unit price rose to 18,087 yen according to the FY 2013 survey, an increase of 1,821 yen (11.2%). In the FY 2014 survey the average unit price was 18,214 yen, a further rise of 127 yen (0.7%) from the previous year. The average unit price of a one-year vehicle inspection at the maintenance shops at dealers was 18,208 yen according to the FY 2012 survey. This average unit price fell to 17,117 yen according to the FY 2013 survey, a decrease of 1,091 yen (6.0%). However, in the FY 2014 survey the average unit price was 17,181 yen, an increase of 64 yen (0.4%) from the previous year.

2.3. Maintenance technical information and promotion of ICT usage

JASPA began operating the FAINES internet-based subscription service for providing vehicle maintenance technical information in 1998. At the end of FY 2014 the number of FAINES subscribers had reached 32,137 busi-

nesses, an increase of 1,115 (3.6%) from the previous year. The number of new subscribers increased in 2014 by over 1,000 businesses, but this was not as many as the previous year when a special campaign was carried out to promote new subscriptions.

The average number of times that FAINES was used per month increased from approximately 450,000 times in 2011, to about 500,000 times in 2012, to approximately 700,000 times in 2013, and then to about 850,000 times every month in 2014. The number of times that it is used a month per business also increased from 24 times a month in 2011, to 25 times a month in 2012, to 30 times per month in 2013, and then fell to 28 times a month in 2014.

The types of information that FAINES provides and the data stored in its system are as follows: (1) maintenance manual information: 1,205 pieces of data, 528 vehicle models (last year: 1,101 pieces of data and 488 models), (2) vehicle maintenance standard work points table: 4,983 pieces of data from the 1995 version to the 2014 version (last year: 4,886 pieces of data), (3) examples of breakdown repairs and maintenance advice: 5,327 pieces of data (last year: 4,885 pieces of data), (4) vehicle data (sampling data) from registered vehicles equipped with OBD, mainly vehicles compatible with J-OBD II: 209 pieces of data (last year: 195 pieces of data), (5) technical information: 1,535 pieces of data (last year: 1,531 pieces of data), (6) service data for Japanese and imported vehicles: (main specification values and inspection standard values for vehicles, engines, and chasses) 2,774 pieces of data (last year: 2,672 pieces of data), (7) guidelines for timing belt changes: 76 pieces of data (last year: 76 pieces of data), (8) new technologies for vehicle maintenance: 601 pieces of data (last year: 572 pieces of data), (9) fuel injection system troubleshooting manual: 338 pieces of data (last year: 338 pieces of data), (10) list of applicable tire rims (updated to the latest version in conjunction with publication of new service data): 1 piece of data (last year: 1 piece of data), (11) illustrated manual for chassis number and power unit model stamping positions, and the like: 184 pieces of data (last year: 184 pieces of data).

In June 2006, the Japanese government started a system that denies renewals of *shaken* inspections for vehicles that have unpaid illegal parking fees. In August 2006, JASPA began operating an illegal parking fee delinquent vehicle information inquiry system that allows vehicle maintenance personnel to confirm the illegal

parking fee payment status of a vehicle that has been brought in for a *shaken* vehicle inspection. By the end of 2014, some 36,065 maintenance shops had registered to use this system and during that same year there were 1,578,678 queries entered into the system. The system is used constantly and every month there are hundreds of thousands of inquiries. In fact, from the start of operations until March 2015 there have been a total of 12,667,149 queries entered into the system.

As part of the environmental conservation measures being pursued by the vehicle maintenance industry, JASPA also operates an environmental budgeting system to help reduce the amount of CO₂ emissions that are associated with the vehicle maintenance industry. The maintenance businesses that register with the system input the amount of energy used in each registered shop, calculate the amount of CO₂ emissions, and then utilize this information to implement improvements in working environments and methods to reduce emissions. Some 2,623 vehicle maintenance businesses are cooperating with a survey of the amount of CO₂ emissions and are using this same system to carry out the survey and reduce emissions.

3 Inspection and Maintenance System Trends

3.1. Vehicle inspections

In 2014 the total number of *shaken* renewal inspections (sum of data from MLIT, the National Agency of Vehicle Inspection, and the Light Motor Vehicle Inspection Organization) was 31,923,685 cases, a reduction of 128,084 cases (0.4%) compared to 2013.

The total number of registered vehicles and mini-vehicles specified to receive maintenance was 22,861,228, a decrease of 11,961 vehicles (0.1%) compared to 2013. The specified maintenance rate rose by 0.2% from the previous year to 71.6%.

Closer analysis of the data for registered vehicles shows that the number of registered vehicles subjected to a *shaken* renewal inspection was 21,129,078, an increase of just 9,143 vehicles (0.0%) compared to 2013. The number of registered vehicles specified to receive maintenance was 15,801,876 and the specified maintenance rate increased by 0.3% to 74.8% from the previous year.

In 2014, the number of inspections conducted by the National Agency of Vehicle Inspection at inspection centers throughout Japan to assess compliance with the Jap-

Japanese Safety Regulations for Road Vehicles (total number of new inspections, *shaken* renewal inspections, structural change inspections, and re-inspections) was 6,998,091. This was a decrease of 137,312 inspections (1.9%) compared to 2013.

The number of on-street inspections was 118,993, a decrease of 5,961 (4.8%) compared to 2013.

The breakdown of the number of the different types of inspections indicates that there were 980,788 new inspections (including preliminary inspections), a decrease of 50,140 (4.9%) compared to 2013. The number of *shaken* renewal inspections was 5,259,264, a decrease of 51,057 (1.0%). The number of structural change inspections was 61,960, a decrease of 1,014 (1.6%).

There were 696,079 re-inspections in 2014, a decrease of 35,101 (4.8%) compared to 2013. This decrease in the number of re-inspections has continued for 9 years in a row since 2006.

This is the first time that the number of inspections conducted at the inspection centers of the National Agency of Vehicle Inspection fell below 7 million. The largest number of inspections recorded by this same agency was 8.79 million in 2005, which was just 3 years after the agency started operations. However, this number fell below 8 million in 2008 and it has fallen by a further 1 million over the past 6 years.

When the data for mini-vehicle inspections is examined, there were 10,862,545 *shaken* renewal inspections, an increase of 136,611 (1.3%) compared to 2013. The number of *shaken* renewal inspections for mini-vehicles first exceeded 10 million in 2010 and it has now exceeded this number for 5 years in a row.

The number of mini-vehicles specified to receive maintenance was 7,059,352 and the specified maintenance rate was 65.0%, an increase of 0.2% from the previous year.

The number of vehicles brought into the Japan Light Motor Vehicle Inspection Organization for a *shaken* renewal inspection was 3,803,193. This total consisted of 2,636,450 vehicles that were brought in by maintenance personnel and 1,166,743 vehicles that were brought in by the owner for vehicle inspection and maintenance.

3.2. Operation of advanced facilities and introduction of large multi-testers

The National Agency of Vehicle Inspection introduced a prototype large multi-tester at its Kanto Inspection Division in June 2013 and began trial operation. Heavy trucks are equipped with a speed limiting device (SLD)

to restrict the maximum speed and the agency began concrete initiatives to prevent the illegal modification of these devices. In 2014 the agency had introduced the large multi-tester at 4 of its facilities.

The main goals of these advanced inspection facilities that began full-fledged operations in April 2013 are as follows: (1) the elimination of vehicles with illegal modifications, such as unauthorized secondary modifications, (2) the prevention of unauthorized *shaken* vehicle inspections via the electronic collection and storage of vehicle inspection data, (3) placing greater emphasis on specific inspection points through statistical analysis of inspection results and then providing this statistical inspection information to the relevant parties, and (4) encouraging and promoting regular vehicle inspections and maintenance by providing inspection results to the vehicle owners. In addition, these advanced inspection facilities will be utilized, in cooperation with MLIT, to (1) identify vehicle defects that may lead to recalls and (2) enhance the guidance and supervision of specified maintenance facilities.

The guidelines and requirements for vehicle inspections that are stipulated by the National Agency of Vehicle Inspection are codified in the operational rules for inspections. These operational rules were amended for the 65th time (Rules No. 16, March 31, 2015) during FY 2014 to ensure consistency with the revisions that were made to the Japanese Safety Regulations for Road Vehicles and other regulations, and 24 items in the operational rules for inspections were revised. In particular, the newest technological trends, which include standards for vehicle stability control devices, were incorporated into the operational rules for inspections. This included the following: Agreements and rules concerning the braking systems of trucks and buses (UN Regulation No. 13), "Lane departure warning systems (UN Regulation No. 130), and Collision avoidance/mitigation emergency braking systems (UN Regulations No. 131).

During 2014, there were a total of 113 cases of undue claims made during vehicle inspections according to the reports from inspection stations across Japan. This was an increase of 26 cases compared to 2013. The number of such undue claims reached its peak in 2007 at 667 cases, but has now decreased by 17% compared to that level.

The National Agency of Vehicle Inspection is making an effort to eliminate unlawfully modified vehicles.

Since 2006 the agency has continued to dispatch vehicle inspectors to the custom car shows held in major cities throughout Japan. These inspectors issue warnings in writing to all exhibitors showing exhibition vehicles that do not clearly indicate that the vehicle could not be driven lawfully on Japanese public roads due to non-compliance or possible non-compliance with the Japanese Safety Regulations for Road Vehicles. In 2014 the agency dispatched 43 vehicle inspectors to the Tokyo Auto Salon, Osaka Auto Messe, Nagoya Auto Trend Show, and the Fukuoka Custom Car Show, checking on some 2,205 vehicles being displayed and issuing warnings in writing to the exhibitors of 122 exhibition vehicles.

The number of items that were non-compliant with the safety regulations rose from 224 last year to 306 this year and the total number of non-compliant items per vehicle is also increasing. If the non-compliant items are broken down for further analysis, items that are adhered to the vehicle windows and protrusions from the vehicle's tires and wheels account for 75% of all non-compliant items.

These vehicle inspectors were also dispatched to 21 auto accessory stores across Japan to survey the vehicle parts and accessories that were displayed in these stores, especially parts advertised as compliant with *shaken* inspections. These surveys identified some 61 products that might not comply with safety regulations depending on the mounting position and method. The stores were then issued warnings about providing customers with appropriate advice about how to use these products in a way not in violation of Japanese vehicle safety regulations.

4 Measures for Diagnostic Equipment and Electronic Maintenance

In July 2010, MLIT established a generic scanning tool promotion investigative commission (Chairman: Yoshihiro Suda, Director of the Advanced Mobility Research Center, Institute of Industrial Science, University of Tokyo). In April 2011, guidelines were formulated for the standard specifications of the generic scanning tool so that it could be used by small-scale vehicle maintenance businesses, and also for the method of providing development information on the generic scanning tool for large-sized vehicles (diesel-engine commercial vehicles). The commission has proposed the creation of a training program to promote the adoption and use of the generic scanning

tool and also proposed that the vehicle maintenance industry create a technical skill certification system for the vehicle maintenance businesses.

In August 2011, the vehicle maintenance technology advancement investigative commission (Chairman: Yoshihiro Suda) was also established. This commission examined the possibility of constructing a system that would allow for inspection and maintenance work on any vehicle to be carried out accurately by operating the generic scanning tools in cooperation with the FAINES internet-based vehicle maintenance information retrieval system. Furthermore, the commission also proposed assigning the lead role for performing maintenance on vehicles that incorporate advanced electronic controls to Class 1 vehicle mechanics. A report was published on September 10, 2013, subtitled "The direction of environmental improvement and development of human resources" as part of an effort to encourage and give priority to the obtainment of Class 1 vehicle mechanic qualifications.

In FY 2013, MLIT created a program to promote the advancement of maintenance using scanning tools to support the adoption of scanning tools by vehicle maintenance businesses by offering to subsidize one-third of the tool purchasing cost up to a maximum of 100,000 yen. Obviously this program was an effort to encourage these vehicle maintenance businesses to adopt and start using the generic scanning tool. This same program continued to be carried out in FY 2014 as well.

JASPA has established a training program to promote the spread and use of the generic scanning tool. The report from the vehicle maintenance technology advancement investigative commission also proposed that the vehicle maintenance industry create a technical skill certification system for vehicle maintenance businesses. Therefore, JASPA coordinated with the regional vehicle service promotion associations, and scanning tool basic training courses were held by these vehicle service promotion associations in each region starting in 2012. Scanning tool application training courses also began in 2013. Of the scanning tool training courses held by each of the regional service promotion associations during FY 2014, the basic training course was held 136 times and attended by 1,435 participants, while the application training course was held 350 times and attended by 4,294 participants. In addition, the possibility of holding follow-up training after the scanning tool application training courses to help maintain the skill level of the attendees,

and step up training for those who wish to attain higher level skills than those taught in the application training courses are also being considered.

Starting in 2013, JASPA also created a certification system for vehicle maintenance businesses that were making effective use of the scanning tool, and that were capable of diagnosing the functions of automotive electronic control systems. The number of maintenance businesses that received this certification from regional service promotion associations during FY 2014 was 1,997.

5 Machine Tools

Every year at the end of July, the Japan Automotive Service Equipment Association examines and announces the actual results of the automotive machine tool sales from the previous fiscal year. The latest machine tool sales that have been announced are those from fiscal year 2013 (from April 2013 to March 2014).

In 2013, total automotive machine tool sales amounted to 103 billion 13.16 million yen, an increase of 6.3 billion 55.96 million yen (6.6%) compared to the previous fiscal year. The total sales of automotive machine tools have increased for four years in a row. The amount of this increase has also continued to remain high from the 3%-level in 2010 and 2011, to the 9%-level in 2012, and the 6%-level in 2013. The Japan Automotive Service Equipment Association has corrected the figures from FY 2012 after finding errors in the tabulations. The corrected total of automotive machine tool sales in 2012 was 96.6 billion 57.2 million yen, an increase of 6.2 billion 16.54 million yen (6.9%) compared to the previous year. Furthermore, the sales figures for FY 2013 did not include the aggregate of one company's portion of the total sales after that company withdrew from the association. Consequently, when the FY 2013 sales are estimated using only the current association members, the figures appear to show an increase of 9.8% compared to the previous year.

The sales results of the scanning tools show that, in fiscal year 2011 slightly fewer than 56,000 tools were

sold at an average unit price of 39,000 yen. In fiscal year 2012 sales dropped to 31,984 tools and the average unit price rose to 65,000 yen. In FY 2013 the sales volume was 22,530 tools at an average price of 141,000 yen. Obviously, the number of scanning tools being sold continues to decline while the average price of the tools has risen sharply. The majority of the tools that are being purchased have changed from simple models to generic models with standard specifications or functions. There has clearly been a shift in the preferences of customers toward generic models due to the Japanese government subsidies for the scanning tools and other efforts to promote greater adoption and use.

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