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# Maintenance and Serviceability

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## 1 Introduction

### 1.1. Vehicle market in 2012

In 2012, 5,369,720 new vehicles were sold in Japan, a significant increase of approximately 1,160,000 vehicles (27.5%) from the 4,212,190 sold in 2011.

The 2012 incentive system for environmentally friendly vehicles in Japan began slightly in advance in December 2011 and contributed to this significant increase in new vehicle sales. The popularity of this incentive system continued to drive vehicle sales until its end in August.

However, vehicle sales from September continued to decline compared to the previous year once the subsidy was ended.

A more detailed analysis of new vehicle sales reveals that the number of registered vehicles was 3,392,740. This is an increase of 701,200 vehicles (26.1%) compared to the previous year. Mini-vehicle sales were 1,979,446, the second highest annual total in history. This represented an increase of 458,301 vehicles (30.1%) compared to the previous year.

In terms of used vehicle sales, the number of registered vehicles was 4,015,909. This is an increase of 241,894 vehicles (6.4%) compared to the previous year. Used mini-vehicle sales were 2,903,194, an increase of 227,058 vehicles (8.5%) compared to the previous year.

In 2012, the total of both new and used registered and mini-vehicle sales reached 12,288,823, a significant increase of 1,628,453 vehicles (15.3%) compared to the previous year.

### 1.2. Vehicle ownership trends in 2012

The number of vehicles owned in Japan reached a peak at the end of December 2006 (the following values are also measured at the end of December in the appropriate year) at 79,450,000 vehicles, but began to decline starting in 2007. In 2010, the number began to increase again, a trend that continued in both 2011 and

2012, reaching 79,965,203 vehicles. This is an increase of 723,465 vehicles (0.9%) compared to the previous year. This number also represents an increase of over 510,000 vehicles compared to 2006, when the previous record for vehicle ownership was set, therefore setting a new record for the calendar year.

According to model type, the number of 4-wheeled registered vehicles was 47,973,971. This number was buoyed by new vehicle sales and it slowed the overall downward trend in the number of vehicles owned. Compared to the previous year, this represented a decline of 92,118 vehicles (0.2%). The number of 4-wheeled mini-vehicles reached 28,307,397, due to a series of new model launches and strong new vehicle sales. This is an increase of 706,499 vehicles (2.6%) compared to the previous year. The number of registered 2-wheeled vehicles that are owned also showed an increase to 1,593,510 vehicles. This is an increase of 18,057 vehicles (1.2%) compared to the previous year. The number of 2-wheeled mini-vehicles owned in Japan is 2,078,668, an increase of 79,300 vehicles (4.0%) compared to 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 0.6% compared to the previous year and is now at 37.1%, 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 2012 was 7.95 years, 0.21 years longer than the previous year. This means that the average vehicle age has continued to grow for the past 20 years in a row. This is now the highest average vehicle age in history. In addition to the fact that vehicles are being used for longer, the causes of this trend include the temporary insufficient supply of new vehicles brought on by the Great East Japan Earthquake and flooding in Thailand and the lack of used vehicles due to the decline in trade-

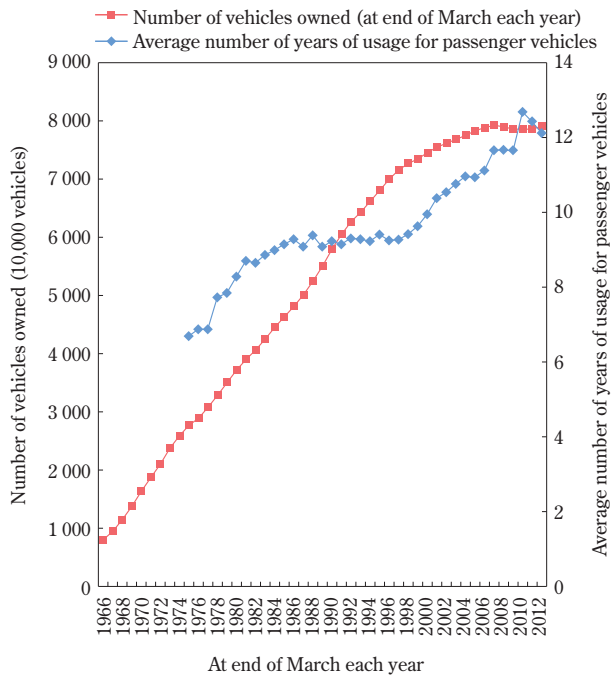


Fig. 1 Trends for number of vehicles owned and average number of years of usage for passenger vehicles (average age).

in vehicles, which has resulted in a large number of older vehicles in the used-vehicle market.

The average number of years of usage of passenger vehicles scrapped in one year (equivalent to the average life span of a human being) between April 2011 and March 2012 was 12.16 years. This shrunk by 0.27 years compared to the value from the previous year of 12.43 years and it has now decreased for the past 2 years in a row (Fig. 1). This may also be an effect of the insufficient supply of new vehicles due to the Great East Japan Earthquake. Normally, these older vehicles would have already been scrapped. Instead these vehicles are continuing to be used and distributed as used vehicles, and will be counted in the average number of years of usage when finally scrapped.

In contrast, the average age of registered trucks at the end of March 2012 was 10.43 years. This increased by 0.39 years compared to the previous year and is now the highest age in history after increasing for the past 19 years in a row.

According to a study by the Light Motor Vehicle Inspection Organization, the current average age of mini-vehicles at the end of December 2012 is 7.68 years (the following values are also measured at the end of December in the appropriate year). This is 0.14 years longer than that recorded in 2011 (7.54 years). This organiza-

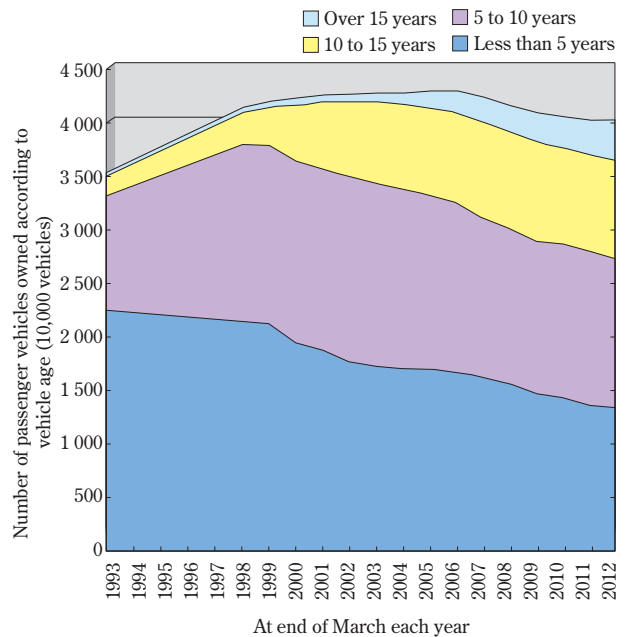


Fig. 2 Trends for vehicle age breakdown amongst total number of passenger vehicles owned.

tion 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 by 1.55 years or approximately 25% over the past 7 years.

The average age of mini-vehicle trucks at the end of December 2012 was 11.32 years. This is 0.26 years longer than that recorded in 2011 (11.06 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 by 1.99 years or approximately 21% over the past 7 years, mirroring the same trend as for mini-vehicles.

The average number of years of usage of passenger mini-vehicles was 12.61 years at the end of December 2011 (the following values are also measured at the end of December in the appropriate year). In 2012 this had increased by 0.59 years to 13.20 years. This data for mini-vehicles started being recorded in 2005 and the average number of years of usage that year was 11.49 years. This means that the average number of years of usage has increased by 1.71 years. The same trend is seen in the average number of years of usage of mini-vehicle trucks. In 2011 it was 14.23 years, but had increased by 0.46 years to 14.69 years by 2012. This represents a total increase of 1.91 years compared to the average number of years of usage recorded in 2005 of

**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)

Work content		Vehicle inspection (shaken) maintenance			Regular inspection maintenance				Collision repair	Other mainte- nance	Total	Number of shops and composi- tion ratio	Number of mechani- cs and composi- tion ratio
		2 years	1 year	Subtotal	1 year	6 months	3 months	Total					
Full-time	Sales volume	5 933	3 376	9 309	332	98	254	684	4 118	5 404	19 515	57 176	170 529
	Change in sales volume compared to previous year	54	-71	-17	-27	-8	0	-35	-555	-1 024	-1 631	-90	231
	Composition ratio	30.4%	17.3%	47.7%	1.7%	0.5%	1.3%	3.5%	21.1%	27.7%	100.0%	62.2%	49.3%
	Ratio of increase or decrease compared to previous year	100.9%	97.9%	99.8%	92.5%	92.5%	100.0%	95.1%	88.1%	84.1%	92.3%	99.8%	100.1%
Additional business	Sales volume	2 304	650	2 954	130	25	37	192	1 239	1 809	6 194	15 024	49 791
	Change in sales volume compared to previous year	318	79	397	-13	-5	1	-17	-34	-101	245	184	234
	Composition ratio	37.2%	10.5%	47.7%	2.1%	0.4%	0.6%	3.1%	20.0%	29.2%	100.0%	16.4%	14.4%
	Ratio of increase or decrease compared to previous year	116.0%	113.8%	115.5%	90.9%	83.3%	102.8%	91.9%	97.3%	94.7%	104.1%	101.2%	100.5%
Full-time + additional business	Sales volume	8 237	4 026	12 263	462	123	291	876	5 357	7 213	25 709	72 200	220 320
	Change in sales volume compared to previous year	372	8	380	-40	-13	1	-52	-589	-1 125	-1 386	94	465
	Composition ratio	32.0%	15.7%	47.7%	1.8%	0.5%	1.1%	3.4%	20.8%	28.1%	100.0%	78.6%	63.7%
	Ratio of increase or decrease compared to previous year	104.7%	100.2%	103.2%	92.0%	90.4%	100.3%	94.4%	90.1%	86.5%	94.9%	100.1%	100.2%
Dealer	Sales volume	6 849	1 254	8 103	1 581	201	125	1 907	6 021	9 058	25 089	15 961	109 160
	Change in sales volume compared to previous year	-263	123	-27	-129	17	-85	-197	75	-1 073	-1 222	-54	-1 504
	Composition ratio	27.3%	5.0%	32.3%	6.3%	0.8%	0.5%	7.6%	24.0%	36.1%	100.0%	17.4%	31.5%
	Ratio of increase or decrease compared to previous year	96.3%	90.5%	95.4%	86.0%	108.1%	94.0%	88.4%	99.1%	91.4%	94.2%	99.7%	98.6%
Private owner-run	Sales volume	703	230	933	76	47	8	131	490	630	2 184	3 706	16 571
	Change in sales volume compared to previous year	80	4	84	-25	27	-19	-17	-41	-95	-69	-47	-186
	Composition ratio	32.2%	10.5%	42.7%	3.5%	2.2%	0.4%	6.0%	22.4%	28.8%	100.0%	4.0%	4.8%
	Ratio of increase or decrease compared to previous year	112.8%	101.8%	109.9%	75.2%	235.0%	29.6%	88.5%	92.3%	86.9%	96.9%	98.7%	98.9%
Total	Sales volume	15 789	5 510	21 299	2 119	371	424	2 914	11 868	16 901	52 982	91 867	346 051
	Change in sales volume compared to previous year	103	-148	-45	-290	35	-24	-279	-681	-2 034	-3 039	-7	-1 225
	Composition ratio	29.8%	10.4%	40.2%	4.0%	0.7%	0.8%	5.5%	22.4%	31.9%	100.0%	100.0%	100.0%
	Ratio of increase or decrease compared to previous year	100.7%	97.4%	99.8%	88.0%	110.4%	94.6%	91.3%	94.6%	89.3%	94.6%	100.0%	99.6%

12.78 years.

In general, the ratio of older vehicles within the total number of vehicles that are owned is continuing to increase. As of the end of March 2012, the total number of registered passenger vehicles was 40,143,441 and the number of vehicles with an age of 10 years or more within this total exceeded 13 million vehicles for the first time. The number of such older vehicles was 13,015,044, which accounts for 32.42% of the total number of registered passenger vehicles (Fig. 2).

## 2 Recent Trends in Vehicle Maintenance Industry

The Japan Automobile Service Promotion Association (JASPA) conducted its 2012 survey of the vehicle repair and maintenance industry at the end of June 2012. 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 91,867 businesses and valid responses were received from approximately 10% of all workplaces. The values

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	51 736	35 840	3 717	431	143	91 867	- 7	100.0%
Number of shops that obtained designation		26 220	2 719	316	105	29 360	108	100.4%
Acquisition ratio		73.2%	73.2%	73.3%	73.4%	32.0%		
Total number of personnel	177 698	287 264	67 732	13 362	7 837	553 893	- 31 582	94.6%
Total number of maintenance personnel	123 142	210 393	51 051	10 459	6 054	401 099	- 1 122	99.7%
Number of Class 1 auto mechanics	1 109	3 885	1 230	130	54	6 408	342	105.6%
Number of Class 2 auto mechanics	80 732	154 890	36 903	7 021	3 882	283 428	101	100.0%
Number of Class 3 auto mechanics	21 712	26 719	5 619	1 301	864	56 215	- 1 668	97.1%
Total number of mechanics	103 553	185 494	43 752	8 452	4 800	346 051	- 1 225	99.6%

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 2012	40 915	15 657	4 954	2 387	2 271	1 659	1 884	2 121	1 273	73 121	451	73 572
Change	1 728	1 972	765	- 160	- 396	18	- 21	- 487	- 877	2 542	13	2 555

that were reported, such as for sales volume, were those from the accounting period closest to the time of the survey at the end of June (e.g., from the 2011 fiscal year). Therefore, this can be said to be a survey of the actual conditions of the vehicle maintenance industry affected by Great East Japan Earthquake that occurred at the end of the 2010 fiscal year.

## 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 73,572 at the time of the survey on June 30, 2012, a reduction of 118 businesses (0.2%).

The total number of workplaces (number of certified maintenance shops) was 91,867, the first decline for 5 years (by 7 shops) compared to the previous 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 57,176 shops (62.2% of the total number of workplaces). This represented a decrease of 90 shops (0.2%) compared to the previous year. Maintenance shops that were run as an additional business accounted for 15,024 shops (16.4%). This was an increase of 184 shops (1.2%) compared to the previous year.

The number of maintenance shops at vehicle dealers was 15,961 shops (17.4%), a decrease of 54 shops (0.3%) compared to the previous year. The number of private owner-run maintenance shops was 3,706 (4.0%). This number decreased by 47 shops (1.3%) from the previous year.

The number of so-called designated workshops (i.e., private shops permitted to carry out the Japanese *shaken* vehicle inspection procedure) is increasing consistently and reached 29,360 shops in 2012. This is an increase of 108 shops (0.4%) compared to the previous year. The number of workplaces that have obtained this designation (i.e., the designation acquisition ratio) accounts for 32.0% of the total number of workplaces.

If the designation acquisition ratio is examined according to the different types of business, 13,266 shops out of the total number of full-time vehicle maintenance shops (57,176) have obtained the designation. This is an increase of 74 shops (0.6%) compared to the previous year and represents a designation acquisition ratio of 23.2%.

In the case of maintenance shops that were run as an additional business, 4,546 shops out of the total of 15,024 have obtained the designation. This is an increase of 26 shops (0.6%) compared to the previous year and represents a designation acquisition ratio of 30.3%.

There were a total of 15,961 maintenance shops at

vehicle dealers and of these 13,160 have obtained the designation. This is an increase of 20 shops (0.2%) compared to the previous year and represents a designation acquisition ratio of 64.6%.

In the case of private owner-run maintenance shops, 1,232 shops out of the total of 3,706 have obtained the designation. This is a decrease of 12 workshops (1.0%) compared to the previous year and represents a designation acquisition ratio of 33.2%.

Table 2 compares the scale of maintenance shops based on the number of vehicle maintenance personnel employed. The total number of workplaces is 91,867, out of which 51,736 shops have 2 to 3 maintenance personnel. This means that these small shops account for 56.3% of the total number. There are 35,840 shops with 4 to 10 maintenance personnel (39.0%). The number of these shops that have obtained the designation is 26,220. Therefore, the designation acquisition ratio for shops of this scale is 73.2%. The number of shops with 11 to 20 maintenance personnel is 3,717 (4.0%). The number of these shops that have obtained the designation is 2,719 (a designation acquisition ratio of 73.2%).

The number of shops with 21 to 30 maintenance personnel is 431, a decrease of 53 shops compared to the previous year. Shops of this scale account for 0.5% of the total number of all vehicle maintenance businesses. The number of these shops that have obtained the designation is 316 (a designation acquisition ratio of 73.3%). The number of shops with 31 or more maintenance personnel is 143 (0.2%). The number of these shops that have obtained the designation is 105 (a designation acquisition ratio of 73.4%).

At the time of the survey in June 2012, the number of private companies was 73,121 after subtracting the number of public offices. However, at the time of the June 2006 survey, the number of private companies was 75,790 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 2012 survey, the number of maintenance-related personnel was 553,893. This was a decrease of 5.4% compared to the previous year (Table 2).

Over the last 10 years, the number of maintenance-related personnel has held relatively steady at around 540,000 people, but the number suddenly increased by

17,484 people in 2009, by 6,165 people in 2010, and then again by 15,252 people in 2011, resulting in three straight years of increases. However, this changed in 2012 and the number decreased by 31,582 people.

When these changes in the numbers of maintenance-related personnel are examined by business type, full-time vehicle maintenance businesses and those run as an additional business showed reductions in the number of personnel for three years in a row. The number of maintenance-related personnel decreased to 34,908 people, 9,105 (2.6%) less than the previous year. The number of maintenance-related personnel at maintenance shops at vehicle dealers also decreased to 159,320 people, 16,014 (9.1%) less than the previous year.

In the case of private owner-run maintenance shops, the number of maintenance-related personnel decreased to 53,665 people, 6,463 (10.7%) less than the previous year.

The number of maintenance personnel (shop workers) was 401,099, a decrease of 1,122 people (0.3%) compared to the previous year.

The number of mechanics was 346,051, a decrease of 1,225 people (0.4%) compared to the previous year.

The number of personnel who obtained the Class 1 vehicle mechanic qualifications was 6,408 people, an increase of 342 (5.6%) compared to the previous year. The number of personnel who obtained the Class 2 vehicle mechanic qualifications was 283,428 people, an increase of 101 compared to the previous year.

The number of personnel with Class 3 vehicle mechanic qualifications was 56,215 people, a decrease of 1,668 (2.9%) compared to the previous year.

The average age of maintenance personnel has continued to rise consistently, but a decline was recorded for the first time in 2010. The average age increased once again in 2011 and increased again by 0.5 years to 43.3 years in 2012.

## **2. 2. Demand for vehicle maintenance**

### **2. 2. 1. Trends in total maintenance sales volume**

The total maintenance sales volume in the 2012 survey (results from the 2011 fiscal year) was 5.2982 trillion yen, a decrease of 303.9 billion yen (5.4%) compared to the previous year.

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.

At full-time vehicle maintenance businesses, the maintenance sales volume generated from vehicle inspection (*shaken*) maintenance accounted for 47.7% of the total sales volume, which was an increase of 3.6% compared to the previous year and the highest recorded figure. The sales volume from regular inspection maintenance was 68.4 billion yen (3.6% of the total sales volume), while sales from collision repairs accounted for 21.1% and all other maintenance accounted for 27.7% of sales.

However, at dealer-based maintenance shops, sales generated from vehicle inspection maintenance amounted to 810.3 billion yen (32.3% of the total sales volume). The sales volume from regular inspection maintenance was 190.7 billion yen (7.6%) and the sales from collision repairs were 602.1 billion yen (24.0%). All other maintenance contributed 905.8 billion yen and accounted for 36.1% of the sales volume.

The other maintenance category includes items such as extraordinary maintenance for a breakdown or malfunction, regular vehicle maintenance such as oil changes, voluntary inspections requested by the vehicle's owner, additional maintenance for a vehicle issued a limited inspection certificate, vehicle customization services, and the like.

A year-on-year comparison of overall sales volumes according to the content of the maintenance work shows that the sales volume from vehicle inspection maintenance decreased by 0.2% compared to the previous year and the sales volume from regular inspection maintenance also decreased by 8.7%. The same was true for the sales volume from collision repairs, which decreased by 5.4% and other maintenance, which decreased by 10.7%.

The sales volume from compulsory vehicle inspection maintenance barely decreased at all, but the sales volumes from work items such as regular inspection maintenance and other maintenance decreased significantly. This indicates that spending by vehicle owners is becoming more selective.

### **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 during the year per shop was 1,529, a decrease of 112 vehicles (6.8%) compared to the previous year. When the number of vehicles is broken down according to the content of the work that was performed, the aver-

age number of vehicles brought in for vehicle inspection maintenance per shop was 363, an increase of 3 vehicles (0.8%) compared to the previous year. This accounted for 23.7% of the total number of vehicles that were brought in (1,529 vehicles). The number of vehicles brought in for regular inspection maintenance per shop was 203, an increase of 3 vehicles (1.5%) compared to the previous year. This accounted for 13.3% of the total number of vehicles brought in. The number of vehicles brought in for collision repairs per shop was 98, a decrease of 8 vehicles (7.5%) compared to the previous year. This accounted for 6.4% of the total number of vehicles brought in. The number of vehicles brought in for other maintenance per shop was 865, a large decrease of 110 vehicles (11.3%) compared to the previous year. This accounted for 56.6% of the total number of vehicles brought in.

Looking at the average number of vehicles brought in for maintenance per shop according to the type of business, the number of vehicles brought into full-time vehicle maintenance businesses was 784. This was a decrease of 37 vehicles (4.5%) compared to the previous year. The average number of vehicles brought into maintenance shops run as an additional business was 1,237 per shop, a decrease of 84 vehicles (6.4%) compared to the previous year. The average number of vehicles brought into maintenance shops at dealers was 4,469 per shop, a decrease of 420 vehicles (8.6%) compared to the previous year.

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 vehicle inspection maintenance was 278 per shop. This was an increase of 9 vehicles (3.3%) compared to the previous year. This also accounted for 35.5% 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 359 per shop, an increase of 17 vehicles (5.0%) compared to the previous year. This accounted for 29.0% 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 vehicle inspection maintenance was 670. This was a decrease of 36 vehicles (5.1%) compared to the previous year and accounted for 15.0% of all the vehicles brought into those shops for maintenance.

Next, the number of vehicles brought into full-time vehicle maintenance businesses for regular inspection maintenance was 74 per shop. This was a decrease of 1 vehicle (1.3%) compared to the previous year and accounted for 9.4% 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 93 per shop, a decrease of 9 vehicles (8.8%) compared to the previous year. This accounted for 7.5% of the vehicles brought into those shops for maintenance. The average number of vehicles brought into maintenance shops at dealers was 769 per shop, an increase of 29 vehicles (3.9%) compared to the previous year. This accounted for 17.2% of the vehicles brought into those shops for maintenance.

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 364 per shop. This was a decrease of 37 vehicles (9.2%) compared to the previous year and accounted for 46.4% 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 for other maintenance was 710 per shop, a decrease of 72 vehicles (9.2%) compared to the previous year. This accounted for 57.4% of all the vehicles brought into those shops for maintenance. On the other hand, the average number of vehicles brought into maintenance shops at dealers for other maintenance was 2,805 per shop, a decrease of 412 vehicles (12.8%) compared to the previous year. This accounted for 62.8% of all the vehicles brought into those shops for maintenance.

### **2.2.3. Trends in regular inspection maintenance fees according to type of business**

The average unit price of regular inspection maintenance was compared amongst the different types of maintenance shop businesses. The average unit price at a full-time vehicle maintenance business was 16,195 yen. Compared to the average unit price in the previous year of 16,852 yen, this was a decrease of 657 yen (3.9%). The average unit price at a maintenance shop run as an additional business was 13,762 yen, a decrease of 53 yen (0.4%) from the average unit price in the previous year of 13,779 yen. The average unit price at a maintenance shop at a dealer was 15,541 yen. Compared to the average unit price in the previous year of 18,193 yen, this

was the largest decrease that was seen at 2,652 yen (14.6%).

A closer look at the regular inspection maintenance work performed at the maintenance shops at dealers shows that the average number of vehicles brought in for this maintenance was 769 per shop, an increase of 3.9% compared to the previous year. However, it accounted for only 190.7 billion yen of the total sales volume, a decrease 11.6% compared to the previous year. This also caused the significant decline in the average unit price to 15,541 yen. It is thought that dealers are trying to ensure the number of vehicles brought in for maintenance or service by setting low prices.

The sales volume from vehicle inspection maintenance and regular inspection maintenance remained at nearly the same level as the previous year, but the sales volume from collision repairs and especially from other maintenance declined greatly compared to the previous year. If the number of vehicles brought into maintenance shops for service is also considered, then this trend appears to be driven by the efforts of owners to cut back on spending on vehicles.

The number of vehicles brought into maintenance shops for service is a value that was calculated by the people that conducted this survey. These independent calculations were based on the numerical values listed in the survey and due to rounding there are cases where a slight shift occurred after the decimal point or in the unit place. However, this does not change the overall trends and the values are shown as is.

### **2.3. Maintenance technical information**

JASPA began operating the FAINES internet-based subscription service for providing vehicle maintenance technical information in 1998. At the end of March 2013 the number of FAINES subscribers had reached 26,898 businesses, an increase of 596 workplaces (2.3%) compared to the previous year. The number of subscribers continues to increase, but the rate of increase each year is declining.

The number of times that FAINES was used per month increased from approximately 45,000 times in the previous year to around 50,000 times. The number of times that it is used a month per business also increased from 24 times a month last year to 25 times a month.

The types of information that FAINES provides and the data stored in its system are as follows: (1) maintenance manual information: 1,004 pieces of data, 451 ve-

hicle models (last year: 892 pieces of data and 423 vehicle models), (2) examples of breakdown repairs and maintenance advice: 4,490 pieces of data (last year: 4,033 pieces of data), (3) technical information: 1,463 pieces of data (last year: 1,378 pieces of data), (4) service data for Japanese and imported vehicles: (main specification values for vehicles, engines, the chassis, and the like) 2,528 pieces of data (last year: 2,420 pieces of data), (5) guidelines for timing belt changes: 76 pieces of data (last year: 116 pieces of data), (6) new vehicle maintenance technologies: 545 pieces of data, (7) fuel injection system troubleshooting manual: 338 pieces of data, (8) list of rims applicable to tires: 1 piece of data, (9) illustrated manual for chassis number and power unit model stamping positions, and the like: 184 pieces of data (last year: 47 pieces of data), (10) vehicle maintenance standard work points table: 4,388 pieces of data from the 1995 version to the 2011 version.

### 3 Inspection and Maintenance System Trends

#### 3.1. Vehicle inspections

In 2012 the total number of *shaken* renewal inspections (sum of data from the Japanese Ministry of Land, Infrastructure, Transport and Tourism (MLIT), the National Agency of Vehicle Inspection, and the Light Motor Vehicle Inspection Organization) was 32,259,484 cases, a reduction of 39,306 cases (0.1%) compared to the previous year. The number of vehicles specified to receive maintenance was 22,945,364, an increase of 62,639 vehicles (0.3%) compared to the previous year.

The specified maintenance rate rose by 0.2% compared to the previous year to 71.1%.

Closer analysis of the data for registered vehicles shows that the number of registered vehicles subjected to a renewal inspection was 21,533,550, a decrease of 55,028 vehicles (0.3%) compared to 2011. The number of registered vehicles specified to receive maintenance was 16,065,757, an increase of 31,373 vehicles (0.2%) compared to the previous year. The specified maintenance rate increased by 0.1% to 74.4%.

In 2012, the number of inspections conducted by the National Agency of Vehicle Inspection to assess compliance with the Japanese Safety Regulations for Road Vehicles (total of new inspections, renewal inspections, structural change inspections, and re-inspections) was 7,264,686. This was a decrease of 85,367 inspections (1.2%) compared to 2011.

The number of on-street inspections was 132,054, an increase of 5,654 (4.4%) compared to 2011.

The breakdown of the number of the different types of inspections indicates that there were 971,940 new inspections (including preliminary inspections), an increase of 64,996 (7.1%) compared to 2011. The number of renewal inspections was 5,467,793, a decrease of 86,401 (1.6%) compared to 2011. The number of structural change inspections was 66,347, a decrease of 1,766 (2.6%) compared to 2011.

Since September 2008, the term re-inspection covers the number of admissions to a workshop based on a single application. There were 763,520 re-inspections in 2012, a decrease of 62,196 (7.6%) compared to 2011.

This decrease in the number of re-inspections has continued for 7 years in a row since 2006.

When the data for mini-vehicle inspections is examined, there were 10,725,934 renewal inspections, an increase of 15,722 (0.2%) compared to 2011. The number of renewal inspections for mini-vehicles first exceeded 10 million in 2010 and it has now exceeded this number for 3 years in a row.

The number of mini-vehicles specified to receive maintenance was 6,879,607 and the specified maintenance rate was 64.1%, an increase of 0.2% compared to the previous year.

The number of vehicles brought into the Japan Light Motor Vehicle Inspection Organization for a renewal inspection was 3,846,327. This total consisted of 2,661,209 vehicles that were brought in by maintenance personnel and 1,185,118 vehicles that were brought in by the owner for vehicle inspection maintenance.

#### 3.2. Initiatives to upgrade inspections and eliminate unlawfully modified vehicles

The National Agency of Vehicle Inspection began operations in July 2002 and marked its 10th anniversary in 2012. Its basic policy for 2012 was to maintain and improve inspection reliability. In the second year of its third 5-year plan, the National Agency of Vehicle Inspection is actively pushing to respond to advances in automotive technologies and societal demands to improve the quality of its inspection work, to help ensure the safety and environment of vehicles, and the like.

Efforts to upgrade inspections include the electronic collection and storage of vehicle image and inspection data to prevent unauthorized secondary modification of vehicles and unauthorized vehicle inspection mainte-



nance. In addition, the collection and analysis of inspection data will allow vehicle malfunctions to be identified so that recalls can be implemented and also allow inspection information to be provided to the vehicle users.

In 2012, images of vehicles obtained during a new inspection or the like began to be used to verify the vehicle during renewal inspections or at other times. In addition, in the case of a vehicle owner whose vehicle fails a renewal inspection, the measurement values and other inspection results that were obtained from the advanced inspection facilities can now be provided to that owner via offices that are fully equipped to handle this information.

The operational rules for the inspections, which are the guidelines and requirements for the vehicle inspections stipulated by the National Agency of Vehicle Inspection, were subject to 59 revisions in 2012 to ensure consistency with the revisions that were made to the Japanese Safety Regulations for Road Vehicles.

During 2012, there were a total of 171 cases of undue claims made during vehicle inspections according to the reports from inspection stations across Japan. This was a decrease of 56 cases (25%) compared to 2011. The number of such undue claims reached its peak in 2007 at 667 cases, but has decreased for 5 years in a row and has now fallen to one-quarter of the peak level.

In addition, efforts were also being made to eliminate unlawfully modified vehicles. One of these initiatives was to dispatch some 44 vehicle inspectors to 4 different custom car shows held in major cities throughout Japan to check on 2,100 vehicles that were being exhibited. The inspectors issued warnings in writing to certain exhibitors for 113 exhibition vehicles that did 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.

## **4 Measures for Diagnostic Equipment and Electronic Maintenance**

Hybrid and electric vehicles have been launched in recent years to improve the safety, environmental performance, and comfort of vehicles. Conventional mechanical systems are giving way to new technologies that electronically control and coordinate the vehicle's behavior and conditions via information obtained from sensors throughout the vehicle. In addition, these elec-

tronic control systems are increasingly being connected together into networks, which is further popularizing these systems in more vehicles. Vehicles now consist of tens of thousands of mechanical and electronic parts and devices. As a result, there is always the possibility that electronic controls will not be able to carry out intended functions due to aging or severe vibrations from daily use, or even due to changes in the state of the vehicle body caused by an accident or other factors.

New inspection and maintenance methods are being established to ensure that the performance of the vehicles on Japan's roads remains high and to ensure the good condition of the vehicle. However, vehicle maintenance technologies must be improved even further so that the proper functioning of electronic controls and electronic devices can be confirmed and to ensure that the necessary maintenance can be carried out efficiently when a malfunction is diagnosed.

From July 2010 to April 2011, 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) to carry out various studies. The commission focused on the development of standard specifications for generic scanning tools that could be used at small-scale maintenance shops, and also formulated guidelines for the provision of heavy-duty vehicle (diesel commercial vehicle) scanning tool development information. In addition, a training program was established to promote the spread and use of generic scanning tools. The commission also proposed that the vehicle maintenance industry create a technical skill certification system for maintenance shops. JASPA received these proposals and contacted the vehicle service promotion associations in each region to coordinate preparation for the holding of scanning tool basic training courses. Training courses were then held at each of the regional service promotion associations starting in 2012.

An instructor training course was also held to prepare for the scanning tool application training course to start in 2013.

In August 2011, MLIT also launched a vehicle maintenance technology advancement investigative commission (Chairman: Yoshihiro Suda, see above) based on the results of the generic scanning tool promotion investigative commission.

The purpose of this new commission was to carry out

even more detailed investigations and examinations of the best ways to advance maintenance technologies, and to come up with concrete measures to accomplish these goals. This commission issued a report of its findings in July 2012.

The main points of this report and the direction of future efforts are as follows.

- The necessary functions of general scanning tools were evaluated and organized into standard specifications. In the future these will be utilized when the final products are manufactured.
- Guidelines were created so that heavy-duty vehicle (diesel) manufacturers can provide the necessary information for developing scanning tools. This created the necessary environment for promoting the adoption of generic scanning tools for heavy-duty vehicles. There are currently no stipulations for heavy-duty vehicles that form a foundation like J-OB2 II for passenger vehicles. Therefore, guidelines for inspection and maintenance were compiled to help achieve a common understanding amongst heavy-duty vehicle manufacturers.
- JASPA is promoting and conducting the basic and application training courses for vehicle mechanics as part of the maintenance industry's efforts to train maintenance personnel. The basic training course began in 2012. The report introduced an outline of that training and other human resource development efforts that will be pursued in the future.
- This report also contains details about how inspection and maintenance information is obtained and provided via the internet, maintenance work to upgrade the quality of inspections, the promotion of greater use of IT in maintenance work, and the role to be played by FAINES as a means of providing maintenance information.
- Since vehicles are international products, the distribution and active usage of maintenance equipment and information facilitates the distribution of vehicles outside Japan. Therefore, this report also pointed out the necessity for a more international perspective in regard to inspection and maintenance issues.

The generic scanning tool and vehicle maintenance technology advancement investigative commissions both issued reports in quick succession. These reports indicated that even if a large number of maintenance personnel recognized the necessity of a scanning tool

as one of the best ways to address inspection and maintenance work on vehicles with increasingly advanced electronic controls, the adoption of scanning tools may still not make progress within the maintenance industry as a whole. The individual roles of MLIT, the Japan Vehicle Service Promotion Association, vehicle manufacturers, and the machine tool industry were clarified within these reports. Therefore, concrete actions to promote the adoption of scanning tools and expand its use in vehicle maintenance, to develop human resources, and to provide inspection and maintenance information are now beginning in earnest.

It is assumed that conducting vehicle maintenance without a scanning tool will not be allowed in the future. Consequently, actions are now starting to be taken to push the Japanese vehicle maintenance industry toward accepting the scanning tool as another ordinary piece of inspection and maintenance equipment as well as a useful tool.

## 5 Machine Tools

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Every year at the end of July, the Japan Automotive Service Equipment Association examines and then 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 2011 (from April 2011 to March 2012).

2011 automotive machine tool sales amounted to 90,440,660,000 yen. This is a slight increase of 3.3% compared to the previous fiscal year, and has increased for 2 years in a row. However, this sales volume still remains approximately 20% lower than the peak volume achieved in 2007.

The delay in the supply of new vehicles and other effects due to the impact of the Great East Japan Earthquake in March of 2011 reduced investment in vehicle maintenance equipment in the first half of the fiscal year and led to a significant decline in demand. However, investment recovered in the second half of the fiscal year due to reconstruction demand, rapid recovery in the new car supply, and a sudden increase in new car sales due to the incentive system and preferential tax scheme for environmentally friendly vehicles. This in turn spurred a recovery in demand for maintenance equipment and resulted in slightly volatile sales trends.

There has been a gradual increase in the number of both certified maintenance shops and designated maintenance

nance shops within the vehicle maintenance shops that make up the machine tool market. However, the number of larger scale maintenance shops at vehicle dealers has continued to decrease and the overall scale of the maintenance equipment market appears to be unchanging and almost flat.

Current trends include the rapid shifting of production outside Japan, an increase in the number of vehicles equipped with an idling stop function that will require battery service equipment, an increasing number of hybrid and electric vehicles that is boosting demand for insulated tools, as well as greater demand for car washing equipment and machines for decontamination. These trends serve to indicate the changes that are now occurring in the Japanese automotive industry and society.

Consequently, this data will be of great interest in the future.

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