JATMA
THE JAPAN AUTOMOBILE TYRE MANUFACTURERS ASSOCIATION, INC.

TYRE INDUSTRY OF JAPAN

2023

TYRE INDUSTRY OF JAPAN *2023*

Contents

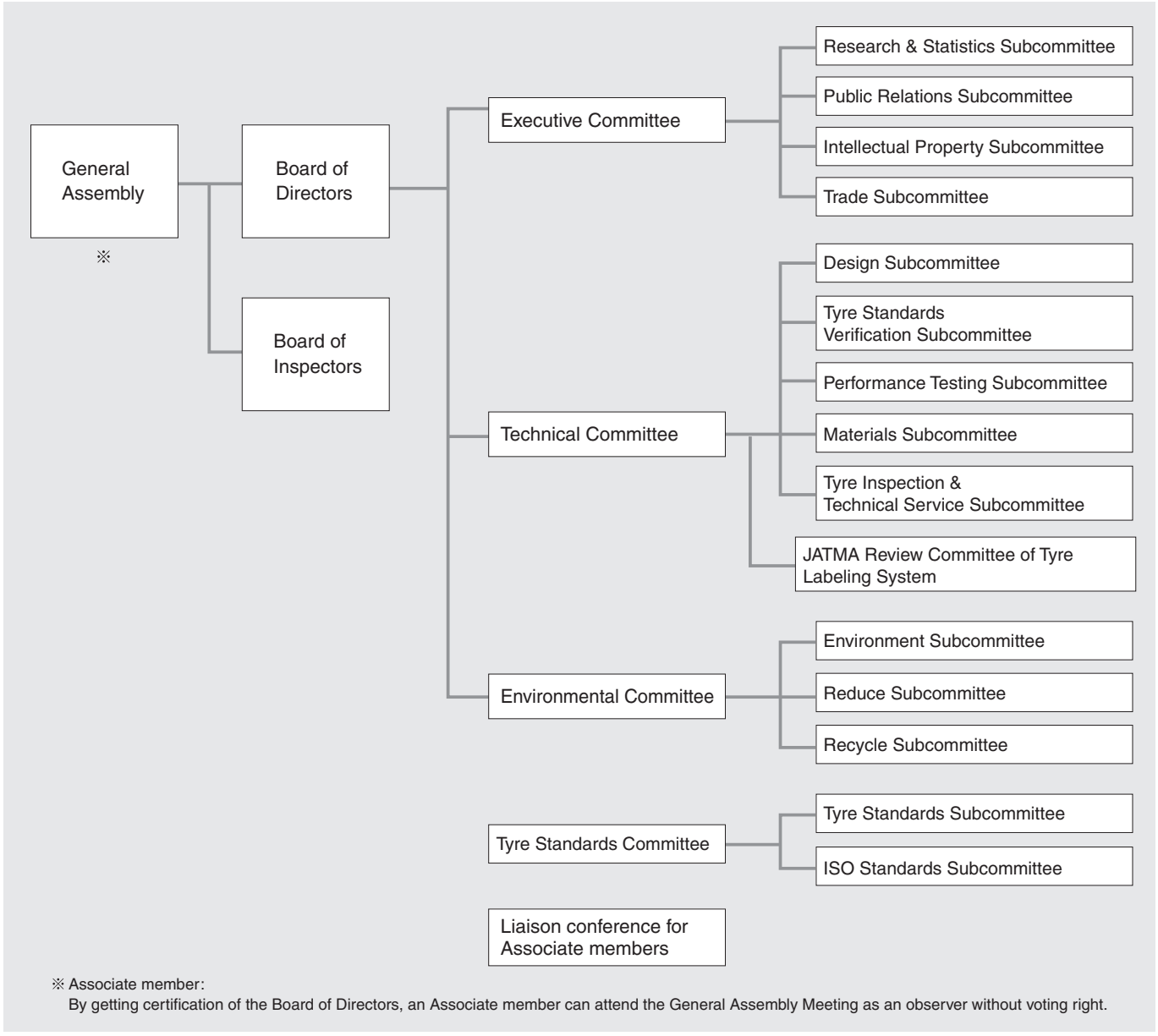
The Japan Automobile Tyre Manufacturers Association, Inc.

Chairman: Masataka Yamaishi, President, Chairman of the Board, The Yokohama Rubber Co., Ltd.
Vice-Chairman: Satoru Yamamoto, President and CEO, Representative Director, Sumitomo Rubber Industries, Ltd.
Executive Director: Kenji Kurata
Established: September 1947 (incorporated in December 1968)
Head Office: Toranomon No. 33 Mori Bldg., 8F, 8-21, Toranomon 3-chome, Minato-ku, Tokyo 105-0001, Japan
Tel.: 03 (3435) 9091 Fax: 03 (3435) 9097

Members:
[Full members]
Bridgestone Corporation
Sumitomo Rubber Industries, Ltd.
The Yokohama Rubber Co., Ltd.
Toyo Tire Corporation
[Associate members]
Nihon Michelin Tire Co., Ltd.
Goodyear Japan, Ltd.

Organization

Under General Assembly and Board of Directors, three committees are established: Executive Committee, Technical Committee, and Environmental Committee. The committees have relevant subcommittees which promoting their activities such as surveys and studies.



※ Associate member:
By getting certification of the Board of Directors, an Associate member can attend the General Assembly Meeting as an observer without voting right.

JATMA Member Companies

[Full members]

Bridgestone Corporation

President Masahiro Higashi

Established: March 1, 1931

Capital: ¥126,354 million
(as of the end of December 2022)

Annual sales: revenue[*1] (consolidated) ¥4,110,100 million
(fiscal year ending December 2022)

Employees: (consolidated) 129,262
(as of the end of December 2022)

Head office: 1-1, Kyobashi 3-chome,
Chuo-ku, Tokyo 104-8340
Tel.: 03 (6836) 3001
https://www.bridgestone.com/

*1 International Financial Reporting Standards (IFRS) has been applied from 2020

Sumitomo Rubber Industries, Ltd.

President Satoru Yamamoto

Established: March 6, 1917

Capital: ¥42,658 million
(as of the end of December 2022)

Annual sales: revenue[*2] (consolidated) ¥1,098,664 million
(fiscal year ending December 2022)

Employees: (consolidated) 40,365
(as of the end of December 2022)

Head office: 6-9, Wakinohama-cho 3-chome, Chuo-ku,
Kobe, Hyogo Prefecture 651-0072
Tel.: 078 (265) 3000
https://www.srigroup.co.jp/english/

*2 International Financial Reporting Standards (IFRS) has been applied from 2016.

The Yokohama Rubber Co., Ltd.

President Masataka Yamaishi

Established: October 13, 1917

Capital: ¥38,909 million
(as of the end of December 2022)

Annual sales: revenue (consolidated) ¥860,477 million
(fiscal year ending December 2022)

Employees: (consolidated) 28,468
(as of the end of December 2022)

Head office: 2-1 Oiwake, Hiratsuka City,
Kanagawa Prefecture, 254-8601
Tel.: 0463 (63) 0400
https://www.y-yokohama.com/global/profile/company/

Toyo Tire Corporation

President Takashi Shimizu

Established: August 1, 1945

Capital: ¥55,935 million
(as of the end of December 2022)

Annual sales: (consolidated) ¥497,213 million
(fiscal year ending December 2022)

Employees: (consolidated) 11,744
(as of the end of December 2022)

Head office: 2-13, Fujinoki 2-chome, Itami,
Hyogo Prefecture 664-0847
Tel.: 072 (789) 9100
https://www.toyotires-global.com/

[Associate members]

Nihon Michelin Tire Co., Ltd.

President Gen Sudo

Established: June 10, 1975

Capital: ¥100 million
(as of the end of December 2022)

Employees: 500
(as of the end of December 2022)

Head office: 880 Uekinocho, Ota City,
Gunma Prefecture 373-8668
Tel.: 0276-25-4321
https://www.michelin.co.jp/

Goodyear Japan, Ltd.

President Yujiro Kanahara

Established: January 10, 1952

Capital: ¥2,336 million
(as of June 1, 2023)

Employees: 199
(as of June 1, 2023)

Head office: Ark Hills South Tower 7F,
1-4-5 Roppongi, Minato-ku,
Tokyo 106-0032
https://www.goodyear.co.jp/

I History of the Japanese Tyre Industry

1. Brief History of the Japanese Tyre Industry

The production scale of the automobile tyre industry of Japan steadily increased from the second half of 1990s to 2008, supported by almost steady demand in the domestic market and active export. It declined severely in 2009 due to the world economic crisis. Though it recovered to a certain extent in 2010, it gradually decreased thereafter, and one of the causes is globalization of the production system. Since 2017, it increased from the previous year for three consecutive years, but in 2020, it was considerably lower than the previous year due to the spread of COVID-19 around the world. The number of tyre production in 2022 was 132.45 million units, and the amount of rubber consumption was 1.00 million tons. Both figures were lower than the previous year, and did not reach the level of 2019 before the spread of COVID-19.

The tyre industry of Japan accounts for about 80% of the domestic rubber industry in terms of rubber consumption, and its trend by decade is as follows.

(1) 1940s-1950s

The industry restructured after World War II, following the destruction of facilities and equipment. In the early 1950s, after the long-term government regulation and during the Korean War, the industry enjoyed special procurement and improved tyre demand. However, after the Korean War, deflationary pressures affected the Japanese economy. Demand for tyres decreased sharply, and the tyre market experienced considerable difficulty.

(2) 1960s

Around 1960, full-fledged motorization, including increased automobiles on the road and the advent of expressways, spurred the industry toward a technological revolution, including expansion and automation of equipment, as well as changes in the raw materials for tyres, and enjoyed a high-growth phase.

(3) 1970s

From 1970, the industry suffered demand downturns temporarily as a result of the first oil crisis. However, exports led the growing Japanese economy. Tyre production expanded, as a result of an increase in the number of vehicles produced and registered, and product diversification spurred demand.

(4) 1980s

Low economic growth under the worldwide recession following the second oil crisis (1979) combined with the progress of radial tyres, which caused demand downturns, forcing the Japanese tyre industry into a period of extreme difficulty. In 1983, however, a turnaround was seen owing to economic recovery in Japan and in principal nations worldwide. In September 1985, however, tyre demand dropped, influenced by the strong yen. Then in December 1986, the Japanese economy started to grow steadily, backed by solid consumer spending and capital investment. As a result, the volume of rubber consumption reached the 1-million-ton mark in 1989.

(5) 1990s

With the collapse of Japan's "bubble economy," the stock market crashed, corporate profits declined, the job environment became uncertain, consumer spending and capital investment slowed, and the yen appreciated causing further deepening of economic stagnation. Signs of recovery were seen in 1995, but in 1997 Japan entered a recession. In 1998 and 1999, large-scale restructuring in the financial sector and the introduction of foreign capital into the automotive industry arose as serious concerns. On the other hand, the global economy in general remained steady despite economic difficulties in Southeast Asia, supported by the robust U.S. economy. In this environment, the Japanese tyre industry grew overall, although rubber consumption fell below the 1-million-ton mark in 1993. Supported by brisk exports, Japanese tyre production volume increased to 1.13 million tons in 1999, a record high.

(6) 2000s

The Japanese economy was on a trend of gentle recovering, and although it was still suffering from such problems as continuing high prices of raw materials, it continued the biggest economic growth after the Second World War owing to improved corporate earnings and increased capital investments. Global economy continued strong as a whole until 2007 owing to supports by the robust economy of the United States, Europe, Middle East and BRICs countries, and tyre rubber production volume marked a record high every year from 2002 and it reached 1.36 million tons in 2007.

However, tyre production volume took a downward turn in 2008 after seven years due to the serious worldwide economic crisis from September 2008 and decreased by 360,000 tons, then declined to 990,000 tons under 1 million tons after fifteen years.

(7) 2010s

The economy of Japan recovered, supported by the government's economic policies etc, but stagnated in 2011 due to the Great East Japan Earthquake and the record appreciation of the yen. After 2013, it continued its gradual increase by the effect of high stock prices and the depreciation of the yen, but since 2018, due to the effect of the global economic slowdown, it experienced a negative growth in 2019. The world economy also gradually recovered from the financial crisis, and in addition to the United States where stable growth continues and Europe that turned into positive growth since the second half of 2013, emerging economies also remained robust in general due to recovery in resource prices and other factors, however, growth slowed in many countries and regions since the middle of the 2018. The losing momentum of growth led to the decrease of the tyre volume for export from Japan, and the tyre production amount on a rubber consumption basis in Japan has decreased from 1.20 million tons in 2010 to 1.07 million tons in 2019.

(8) 2020-2022

The Japanese economy was sluggish throughout the year in 2020 due to the impact of COVID-19. Since 2021, effect to the progress of COVID-19 vaccination and the relaxation of behavioral restrictions, it turned to positive but moderate growth due to the turmoil in the global supply network and high prices of commodities. The world economy was also affected by COVID-19, and had negative growth in many countries and regions in 2020. Since 2021, although the economic activities were normalized and economic recovery trend continued, the world economy carried a burden stemmed from high prices of raw materials and soaring energy costs. Under such the circumstances, the rubber amount used for tyre production in Japan for both domestic and export in 2022 almost stayed at the same level as in the previous year, but they did not reach the level of 2019, before the spread of COVID-19.

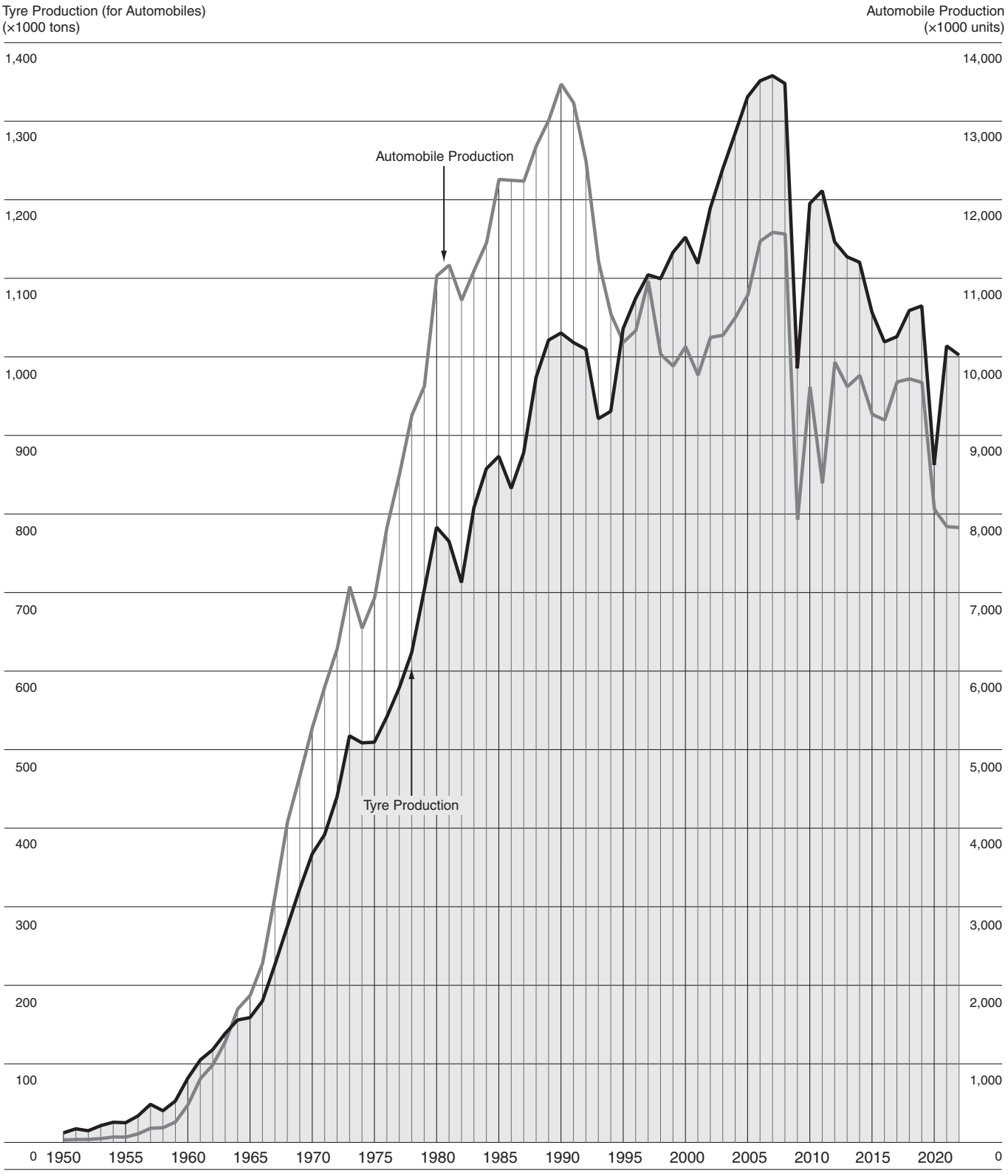
2. Changes in Production Volume of Tyres and Automobiles

Table 1: Changes in Production Volume of Tyres and Automobiles

	1950	1960	1970	1980	1990	2000	2010	2014	2015	2016	2017	2018	2019	2020	2021	2022
Tyre Production (for Automobiles) (×1000 tons)(quantity of rubber)	14	83	369	784	1,031	1,153	1,196	1,121	1,058	1,020	1,026	1,060	1,066	863	1,015	1,003
Automobile Production (×1000 units)	32	482	5,289	11,043	13,487	10,141	9,629	9,775	9,278	9,205	9,691	9,730	9,684	8,068	7,847	7,835

Source: JATMA

Figure 1: Changes in Production Volume of Tyres and Automobiles



II The Japanese Tyre Industry Today

1. Overview

The proportion of the tyre industry (fig. 2 and 3) in the rubber industry in terms of consumption of raw materials (natural rubber and synthetic rubber) 81.2% was the same as the previous year. The amount of sales value increased by 1.1 percentage points from the previous year to 53.5%.

The proportion of the tyre industry in the rubber industry in 2022 (excluding cart tyres, tubes and flaps)

Figure 2: Raw material consumption
(the amount of natural rubber and synthetic rubber)

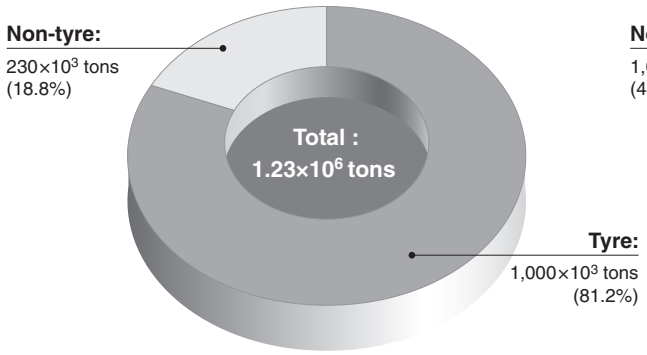
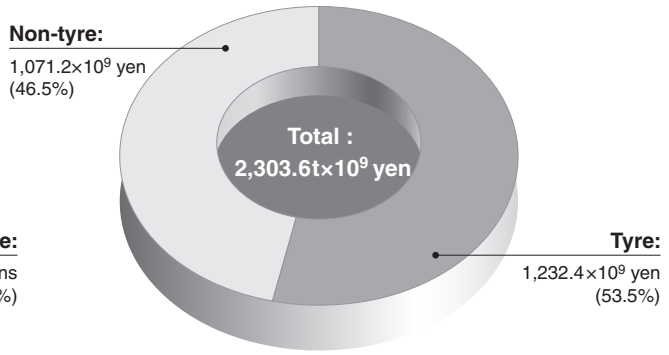
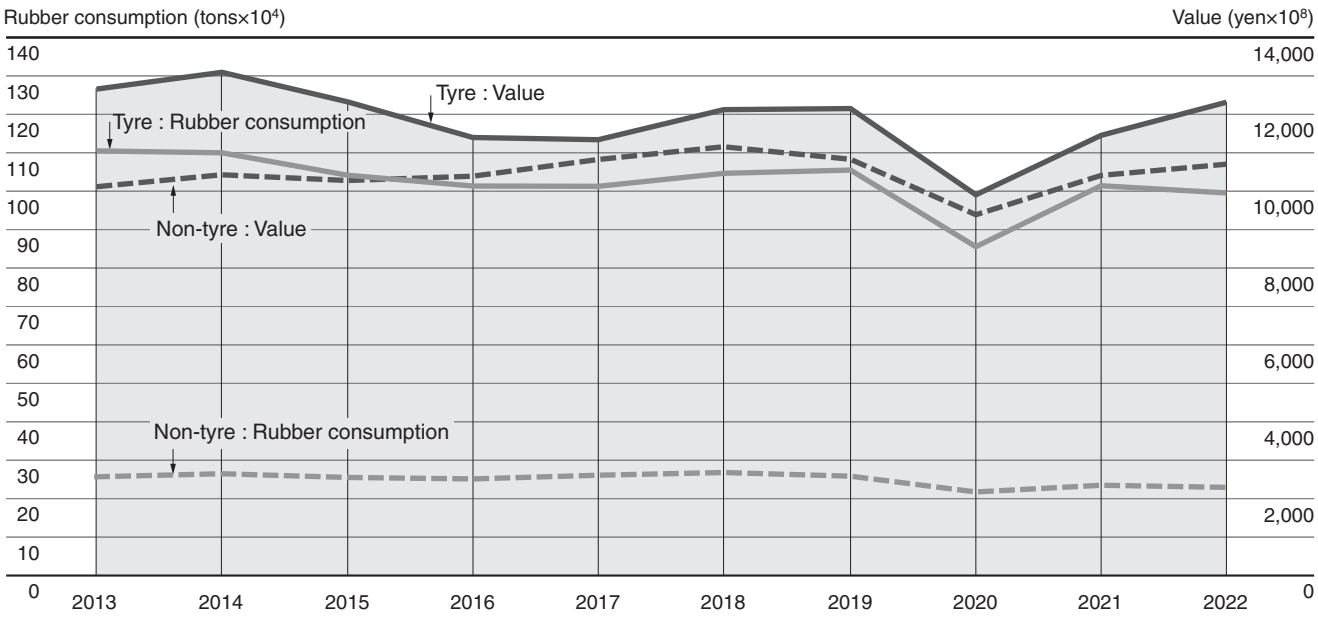


Figure 3: The sales amount



Source: Current Production Statistics by the Ministry of Economy, Trade and Industry

Figure 4: Trends in the raw material consumption (the amount of natural rubber and synthetic rubber) and the sales amount of the tyre industry of Japan



Source: Current Production Statistics by the Ministry of Economy, Trade and Industry

2. Trends in Production by Tyre Category

The production volume of automobile tyres decreased by 3.7% from the previous year to 132.45 million tyres in 2022. Passenger car tyres decreased by 5.5% from the previous year mainly due to decreasing shipment volume to overseas. Light truck tyres decreased by 0.4% as well. On the other hand, truck & bus tyres increased by 5.1% from the previous year because export volume increased considerably.

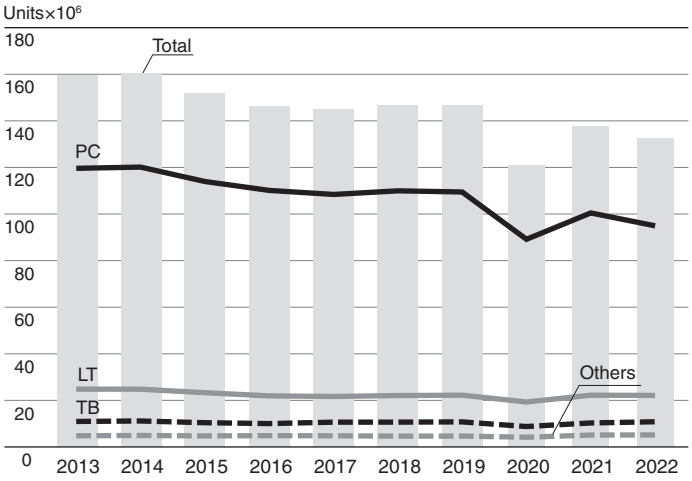
Table 2: Automobile tyre production in 2022

	Production	
	Units($\times 10^3$)	2022/2021(%)
Passenger car tyres	94,790	94.5
Light truck tyres	21,975	99.6
Truck and bus tyres	10,673	105.1
Others	5,015	101.1
Total	132,453	96.3

Note: "Others" are off-the-road tyres, industrial tyres, agricultural tyres, cart tyres, and motorcycle tyres.

Source: JATMA

Figure 5: Trends in automobile tyre production



3. Trends in Sales of Original Equipment Tyres

The sales volume of original equipment tyres decreased by 0.9% to 36.61 million tyres in 2022, which was a decrease for five consecutive years.

Because of decreasing production volume of passenger cars, which were greatly affected by the shortage of parts such as semiconductors worldwide, the sales volume of their tyres decreased by 1.9% from the previous year. Truck & bus tyres decreased by 8.5% as well. However, the sales volume of Light truck tyres exceeded the previous year by 4.7% because the production of Mini trucks was strong.

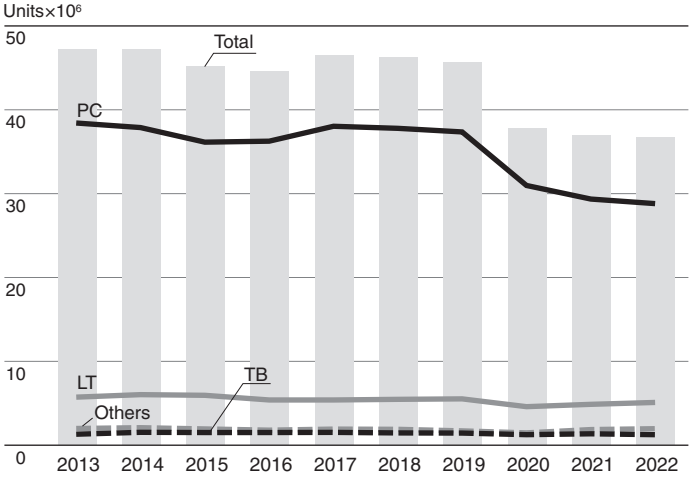
Table 3: Sales of original equipment tyres in 2022

	Sales	
	Units($\times 10^3$)	2022/2021(%)
Passenger car tyres	28,682	98.1
Light truck tyres	4,970	104.7
Truck and bus tyres	1,124	91.5
Others	1,838	106.1
Total	36,614	99.1

Note: 1. "Others" are off-the-road tyres, industrial tyres, agricultural tyres, cart tyres, and motorcycle tyres.
2. Imported tyres are included.

Source: JATMA

Figure 6: Trends in sales of original equipment tyres



4. Trends in Sales of Replacement Tyres

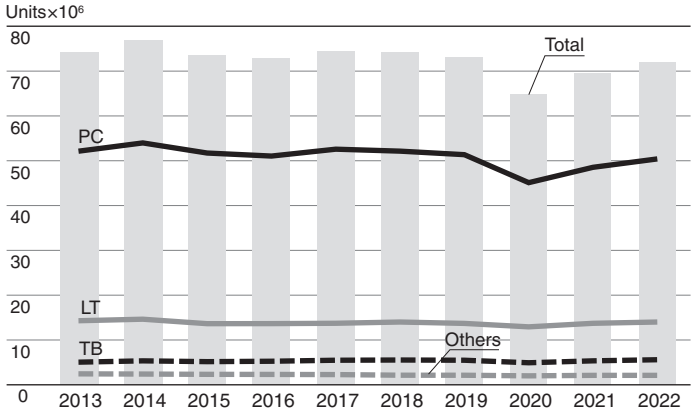
The sales volume of replacement tyres increased by 3.5% from the previous year to 72.02 million tyres in 2022, which was an increase for two consecutive years.

Table 4: Sales of replacement tyres in 2022

	Sales	
	Units(×10³)	2022/2021(%)
Passenger car tyres	50,386	103.9
Light truck tyres	13,985	102.1
Truck and bus tyres	5,569	104.6
Others	2,084	100.1
Total	72,024	103.5

Note: 1. "Others" are off-the-road tyres, industrial tyres, agricultural tyres, cart tyres, and motorcycle tyres.
2. Imported tyres are included.
Source: JATMA

Figure 7: Trends in sales of replacement tyres



Trends in Sales of Summer Tyres and Winter Tyres for Replacement (for Four-Wheeled Vehicles)

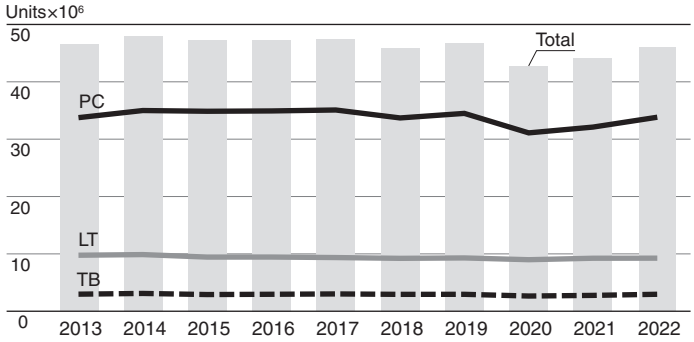
The sales volume of replacement summer tyres (normal tyres except snow tyres) increased by 4.4% from the previous year to 46.00 million tyres in 2022, which was an increase for two consecutive years. The sales volume of all categories increased from the previous year, as passenger car tyres, light truck tyres, and truck & bus tyres increased by 5.4%, 0.1%, and 7.1%, respectively.

Table 5-1: Sales of summer tyres for replacement (for four-wheeled vehicles) in 2022

	Summer tyres		
	Units(×10³)	2022/2021(%)	Summer tyre rate(%)
Passenger car tyres	33,812	105.4	67.1
Light truck tyres	9,238	100.1	66.1
Truck and bus tyres	2,945	107.1	52.9
Total	45,995	104.4	65.8

Note: 1. "Summer tyre rate" indicates a percentage of summer tyres in total number of replacement tyre sales.
2. Imported tyres are included.
3. All-season tyres are included in this category.
Source: JATMA

Figure 8-1: Trends in sales of summer tyres for replacement (for four-wheeled vehicles)



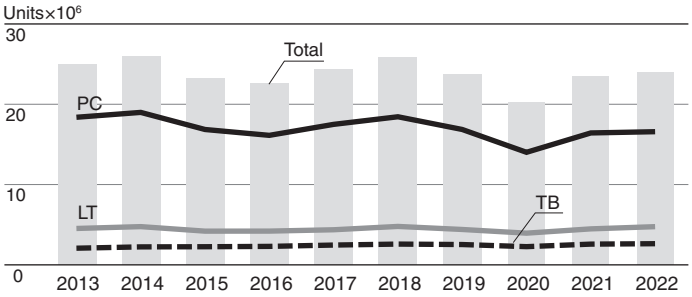
The sales volume of replacement winter tyres increased by 2.1% from the previous year to 23.95 million tyres in 2022, which was an increase for two consecutive years. The sales volume of all categories increased from the previous year because of snowfall in the Tokyo Metropolitan Area in January, as passenger car tyres, light truck tyres, and truck & bus tyres increased by 1.0%, 6.1%, and 2.0%, respectively.

Table 5-2:
Sales of winter tyres for replacement (for four-wheeled vehicles) in 2022

	Winter tyres		
	Units(×10³)	2022/2021(%)	Winter tyre rate(%)
Passenger car tyres	16,574	101.0	32.9
Light truck tyres	4,747	106.1	33.9
Truck and bus tyres	2,624	102.0	47.1
Total	23,945	102.1	34.2

Note: 1. "Winter tyre rate" indicates the percentage of winter tyres in total number of replacement tyre sales.
2. Imported tyres are included.
Source: JATMA

Figure 8-2: Trends in sales of winter tyres for replacement (for four-wheeled vehicles)



5. Trends in Sales of Export Tyres

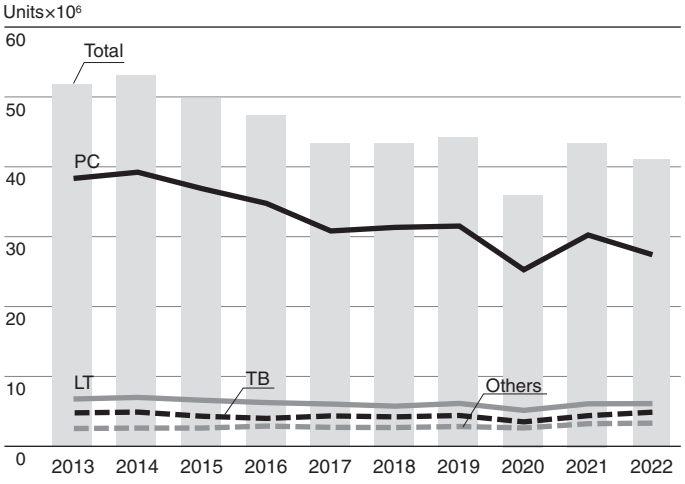
The export volume of automobile tyres decreased by 5.1% from the previous year to 41.10 million in 2022. As for passenger car tyres, export volume decreased by 9.4% from the previous year, but light truck tyres and truck & bus tyres increased by 0.5%, and 11.9%, respectively.

Table 6: Sales of export tyres in 2022

	Sales	
	Units(×10³)	2022/2021(%)
Passenger car tyres	27,260	90.6
Light truck tyres	5,956	100.5
Truck and bus tyres	4,728	111.9
Others	3,158	102.5
Total	41,102	94.9

Note: "Others" are off-the-road tyres, industrial tyres, agricultural tyres, cart tyres, and motorcycle tyres.
Source: JATMA

Figure 9: Trends in sales of export tyres



6. Exports by Region of Destination

The export volume of automobile tyres in 2022 decreased by 2.1% from the previous year to 42.55 million, however, it increased on a value basis by 28.3% from the previous year to 696.9 billion yen. The total of product weight for export increased by 2.5% from the previous year to 1.14 million tons.

By region (on a quantity basis) apart from North America, the export volume for the other regions decreased, and for world wide resulted in a decrease from the previous year as well.

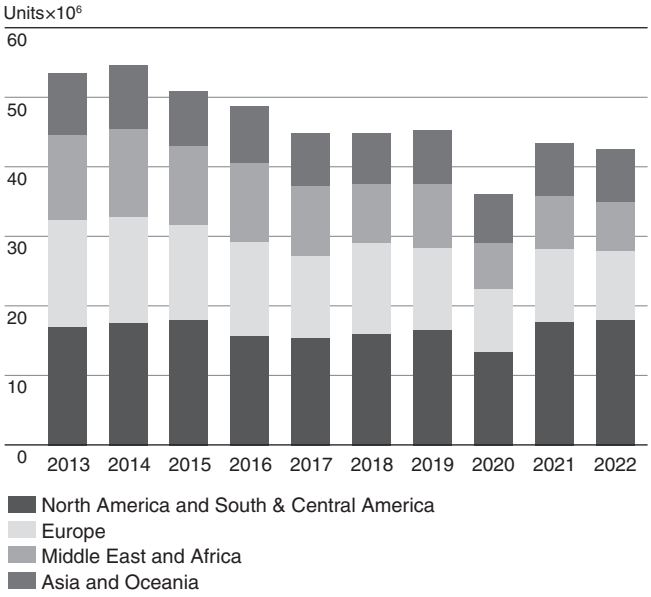
Table 7: Exports by region of destination in 2022

	Tyre Units(×10³)				2022/2021 (%)	Value (FOB) (yen×10⁶)	2022/2021 (%)
	PC	TB&LT	Others	Total			
North America	11,453	3,321	638	15,412	102.4	230,583	144.7
South & Central America	1,682	667	325	2,674	96.6	85,164	148.5
Europe	7,430	645	1,729	9,804	93.7	103,789	92.0
Middle East	4,017	1,773	42	5,832	97.7	63,938	122.1
Africa	625	671	48	1,344	86.0	31,194	128.0
Asia	4,351	866	388	5,605	98.5	102,639	141.8
Oceania	1,223	525	134	1,882	95.3	79,619	123.1
Total	30,781	8,468	3,304	42,553	97.9	696,926	128.3
Weight(tons)	401,097	347,308	386,770	1,135,175	102.5		

Source: Trade Statistics of Japan

Note: 1. Exchange rates are averages of Tokyo InterBank offered spot exchange rate.
2021: 1USD = 110yen
2022: 1USD = 131yen
2."Others" doesn't include Aircraft tyres and Bicycle tyres.
3. Weight and Value include tubes.

Figure 10: Export trend by region



7. Imports by Region of Origin

The import volume of automobile tyres in 2022 increased by 4.0% from the previous year to 28.65 million on a quantity basis, and increased on a value basis by 25.1% from the previous year to 161.0 billion yen. Product weight total of import increased by 4.3% from the previous year to 0.28 million tons.

By region (on a quantity basis), import volume from Asia increased which account for about 90% of the total and the total volume also increased from the previous year as well.

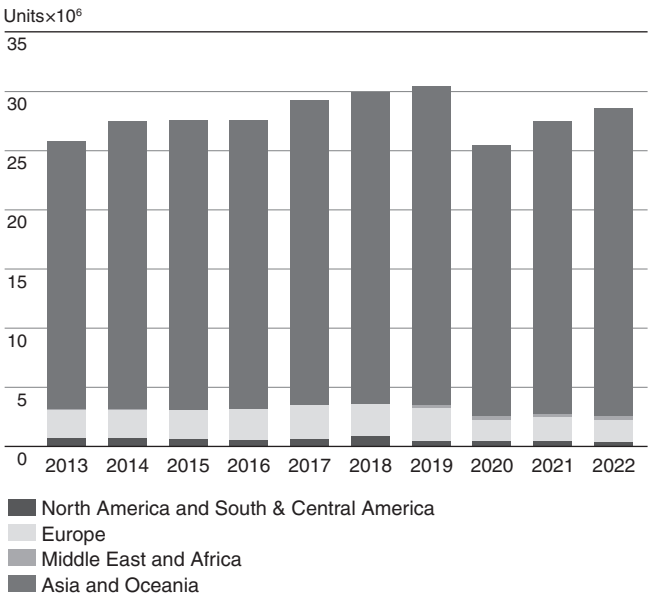
Table 8: Imports by region of origin in 2022

	Tyre Units(×10³)				2022/2021 (%)	Value (CIF) (yen×10⁶)	2022/2021 (%)
	PC	TB&LT	Others	Total			
North America	237	44	27	308	88.0	4,309	110.3
South & Central America	59	2	6	67	70.5	1,425	85.7
Europe	1,610	91	210	1,911	92.8	23,330	105.5
Middle East	12	2	0	14	107.7	378	214.8
Africa	260	0	0	260	110.6	1,681	136.1
Asia	19,870	2,828	3,396	26,094	105.2	129,852	130.4
Oceania	0	0	0	0	–	7	700.0
Total	22,048	2,967	3,639	28,654	104.0	160,982	125.1
Weight(tons)	183,439	66,408	30,853	280,700	104.3		

Source: Trade Statistics of Japan

Note: 1."Others" doesn't include Aircraft tyres and Bicycle tyres.
2. Weight and Value include tubes.

Figure 11: Import trends by region



III Measures for Tyre Safety

1. Safety Standards for Automobile Tyres

Various standards have been specified regarding tyres from the viewpoint of automobile safety because tyres are automobile's important parts.

Each Individual state has its own legislation specifying the standards and the tyres are requested to satisfy the standards of the state where the tyres are to be used. In Japan we have the Safety Regulations for Road Vehicles and their detailed items, enacted by the Ministry of Land, Infrastructure, Transport and Tourism.

In addition to these regulations, the guidelines for the items to be complied in usage and maintenance of automobile tyres are specified in "Standards for Selection, Usage and Maintenance of Automobile Tyres" by JATMA to ensure and enlighten the tyre safety.

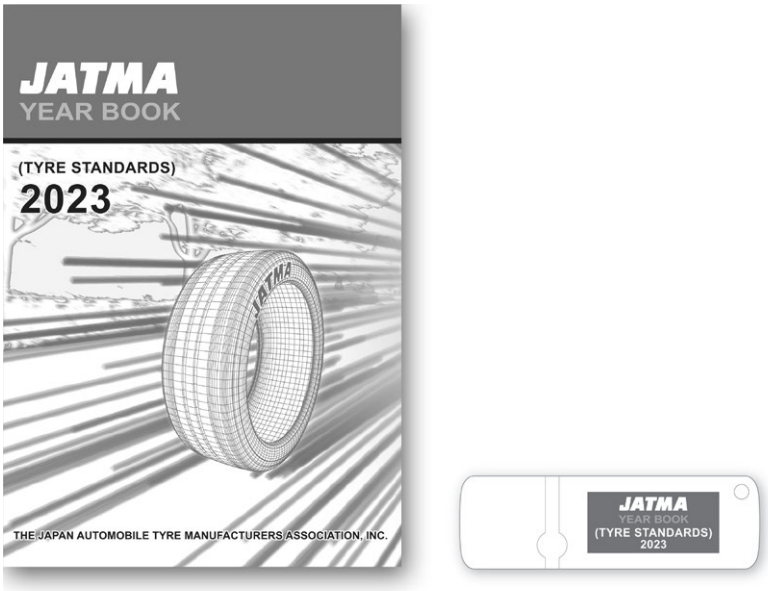
2. Tyre Standards

Besides the safety standards, standards for specifications of automobile tyres, rims and valves are set by the Tyre Standards Committee which comprises representatives from tyre manufacturers and vehicle manufacturers, and government ministries concerned and published in book form as JATMA YEAR BOOK annually by JATMA. JATMA YEAR BOOK is designed to promote standardization, simplification, and unification of tyre use within Japan, and is contributing to rationalization of production and use of fair tyres while ensuring the interchangeability.

The JATMA standards are quoted in the Federal Motor Vehicle Safety Standards and Regulations of U.S., applied to tyres exporting to Canada, Australia and so on; and recognized as one of authoritative guidelines such as the ETRTO standards of Europe and TRA standards of US.

The JATMA standards cover the following tyre categories:

- passenger car tyres,
- light truck tyres,
- truck and bus tyres,
- off-road vehicle tyres,
- agricultural equipment tyres,
- industrial vehicle tyres, and
- motorcycle tyres.



3. Legal Limits on Tread Wear

Worn tyres could be a threat to road safety. They're easier to slip especially on wet roads because of the degradation of their braking performance, comparing to new tyres. Thus the Ministry of Land, Infrastructure, Transport and Tourism prescribed requirements for tyre groove depth (minimum groove depth) in its Safety Regulations for Road Vehicles, and proscribed the use of tyres of insufficient groove depth on roads. (see table 9 and 10 (table 10 for high-speed driving)). Shown in figure 12 is the result of actual inspection on in-service vehicles conducted by JATMA. As it is shown, the number of improper inflation pressure tyres, uneven wear tyres are notably high.

4. Product Inspection

In 1954, JATMA started its tyre inspection activity at its branch offices.
Defective or damaged tyres are now observed and checked at five offices according to the requests from their consumers to find causes of the damages and to provide advice to them regarding correct usage of tyres.

Table 9: Wear limit for automobile tyres

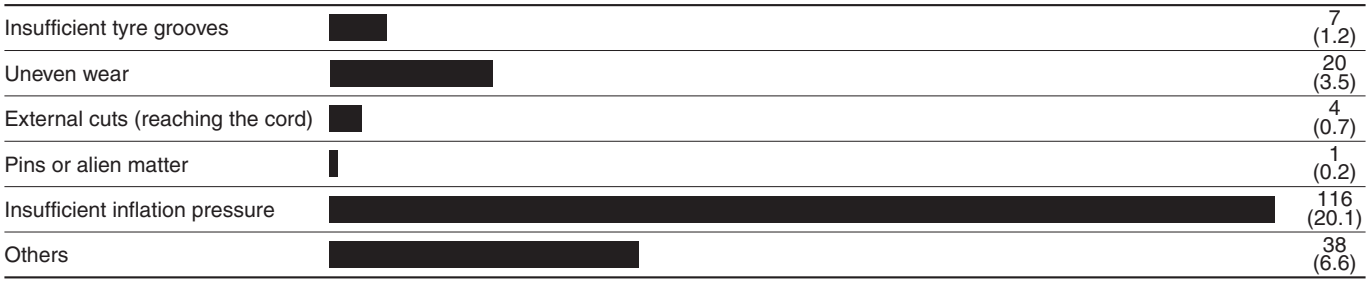
Tyre type	Groove depth limit
Passenger car tyres	1.6 mm
Light truck tyres	1.6 mm
Truck and bus tyres	1.6 mm
Motorcycle tyres	0.8 mm

Table 10: Wear limit for automobile tyres in high-speed driving

Tyre type	Groove depth limit
Passenger car tyres	1.6 mm
Light truck tyres	2.4 mm
Truck and bus tyres	3.2 mm

Figure 12: Breakdown of tyre defects

(Parentheses show defect rates)



Notes:
1. Multiple tyre defects per vehicle are possible, thus the number of tyre defects does not correspond to the number of vehicles with tyre defects.
2. The defect rate is the number of defects divided by the number of vehicles inspected.
3. Tyre inspections were carried out a total of 15 times (3 times on expressways and 12 times on ordinary roads) in 2022.

Ⅳ Consideration for Environment

1. Tyre Labeling System for Low Car Exterior Sound Tyres

The purpose of this system is to contribute to the reduction of vehicle traffic noise from the tyre sector.
This is an industry voluntary system established to clarify “Low Car Exterior Sound Tyres”, which are tyres that meet a certain standard level on rolling sound emissions of tyres from a travelling vehicle, and how to display the labels.

• Scope

Replacement summer and winter tyres for passenger cars, light trucks, and trucks & buses.

• Performance Requirements

The limits of rolling sound emissions stipulated in UN R117-02.

• How to Display the Labels

Display the name and/or the label (shown on the right) representing “Low Car Exterior Sound Tyres”.

2. Tyre Labeling System for Fuel-Efficient Tyres

For the purpose of providing consumers with easy-to-understand and more appropriate information, it has been in operation since January 2010.
A system established as an industry voluntary standard to classify rolling resistance performance and wet grip performance based on a grading system and label them.

• Scope

Summer tyres for passenger car that are purchased as replacement tyres by consumers at tyre dealers etc.

• Grading System

Rolling Resistance Coefficient (RRC)

·····A range of five grades (Grade AAA to C)

Wet Grip Performance

·····A range of four grades (Grade a to d)

Unit (N/kN)

RRC	Grade
RRC ≦ 6.5	AAA
6.6 ≦ RRC ≦ 7.7	AA
7.8 ≦ RRC ≦ 9.0	A
9.1 ≦ RRC ≦ 10.5	B
10.6 ≦ RRC ≦ 12.0	C

Unit (–)

Wet Grip Performance (G)	Grade
155 ≦ G	a
140 ≦ G ≦ 154	b
125 ≦ G ≦ 139	c
110 ≦ G ≦ 124	d

• Performance requirements for fuel efficient tyres

Rolling Resistance Coefficient

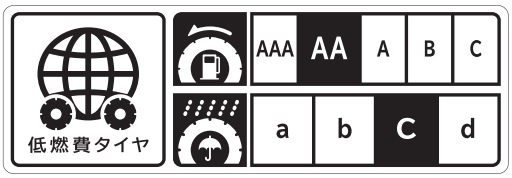
·····9.0 and below (Grade AAA to A)

Wet Grip Performance

·····110 and above (Grade a to d)

• How to Display the Labels

(example)



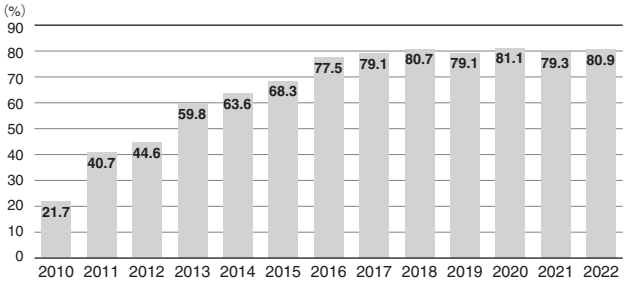
: Uniform mark of fuel efficient tyres


: Rolling Resistance Performance


: Wet Grip Performance

• The spread of fuel efficient tyres :

The labeling system started in 2010, and in recent years, it is widely used and more than 80% is “Fuel Efficient Tyres”.



3. Preventing Global Warming

The tyre industry has been working to reduce GHG emissions throughout the entire life cycle of tyres.
To encourage consumer's cooperation to reduce CO_2 emissions during the "use stage", which accounts for over 80% of emissions during the lifecycle, JATMA started a tyre labeling system which includes information on RRC.
In 2012, JATMA developed "Tyre $LCCO_2$ Calculation Guidelines Ver.2.0" which explains how to calculate greenhouse gases throughout the entire lifecycle showing some examples. In 2021, JATMA developed "Tyre $LCCO_2$ Calculation Guidelines Ver.3.0", which complies with international standards and includes the latest data.
We also use this guideline to publicize the effects on resource usage saving and CO_2 emissions reduction. Together with our stakeholders, we are working to contribute to the prevention of global warming.

- Reduction Effect of CO_2 Emissions by Reducing Rolling Resistance of Passenger Car Tyres
- Effects on resource usage saving and CO_2 emissions reduction through the spread of retread tyres for trucks and buses

(https://www.jatma.or.jp/english/environment_recycle/globalwarming.html)

4. Effort to Reduce

In 2005, JATMA adopted a concept of reduce coefficient, which focuses on both longer tyres life and lighter weight tyres.
We are promoting the monitoring of the reduce achievement rate aiming at the benchmark effect in designing new products. By this promoting, we are striving to reduce the amount of ELT (End-of-Life Tyres) generated (target 10%, effective 3-5%).
In recent years, the performance required for tyres has been diversified in terms of noise reduction, wet grip, rolling resistance, etc., and it is also important to consider the balance between these requirements and reduce coefficient.

Table 11: Monitoring of reduce achievement rates

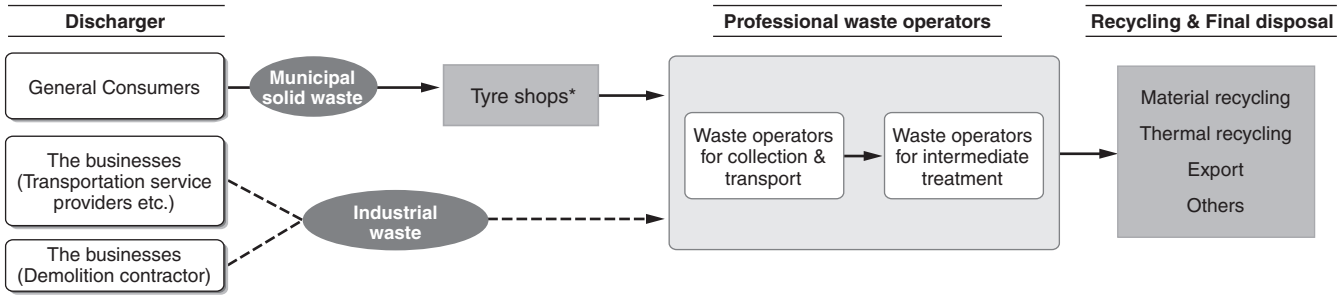
Category	Tyre size	Classification	Reduce achievement rates				
			2018	2019	2020	2021	2022
Passenger car tyres	155/65R13	Summer tyres	–	144	–	96	106
		Studless tyres	102	–	85	98	–
Passenger car tyres	175/65R14	Summer tyres	95	124	–	98	108
		Studless tyres	103	–	85	99	100
Passenger car tyres	195/65R15	Summer tyres	102	114	–	108	110
		Studless tyres	99	–	95	100	–
Passenger car tyres	215/45R17	Summer tyres	101	120	–	118	115
		Studless tyres	97	–	72	102	–
Light truck tyres	145R12 (145/80R12)	Summer tyres	–	110	–	–	100
		Studless tyres	–	–	–	97	121
Light truck tyres	185R14 (185/80R14)	Summer tyres	–	124	–	–	98
		Studless tyres	–	–	–	97	–
Light truck tyres	205/70R16	Summer tyres	–	101	115	133	–
		Studless tyres	–	–	96	–	122
Truck and bus tyres	225/80R17.5	Summer tyres	118	109	100	–	113
		Studless tyres	87	–	–	111	100
Truck and bus tyres	245/70R19.5	Summer tyres	117	107	–	–	113
		Studless tyres	93	–	–	107	107
Truck and bus tyres	11R22.5	Summer tyres	118	106	100	–	141
		Studless tyres	87	–	100	110	114

Note: 1. Wear Life Index (L) = Wear life on design specification of new product (km) ÷ Wear life on design specification of old product (km)
Weight Index (W) = Weight of new product (kg) ÷ Weight of old product (kg)
Reduce Coefficient = Wear Life Index (L) ÷ Weight Index (W)
Reduce Achievement Rate = Reduce Coefficient ×100
2. 7.50R16 has been replaced by 245/70R19.5 since 2007.

Source: JATMA

5. Current Status on ELT (End-of-Life Tyres) Recycling

Figure 13: Processing flow of ELT recycling



*Tyre shops such as tyre dealers, tyre shops, car accessory stores, gas stations, car dealers, car maintenance shops, etc. However, those who do not sell automobile tyres are excluded.

(1) Volume of ELT generated

In 2022 (January to December), the sum of generated by replacing tyres and scrapped vehicles in Japan was 92 million tyres on a quantity basis and 1 million tons on a weight basis.

Compared with the previous year, ELT increased by 1 million tyres and by 21 thousand tons.

① The amount of ELT generated by replacing tyres.

The amount of ELT generated by replacing tyres was 80 million tyres and 891 thousand tons, which was both an increase compared with the previous year.

It was almost the same level as 2019, before the COVID-19 pandemic.

② The amount of ELT generated by scrapped vehicles.

The amount of ELT generated by scrapped vehicles was 12 million tyres and 117 thousand tons, a decrease in both number and weight from the previous year.

In 2022, new car sales decreased, and trade ins decreased. Therefore the amount of ELT generated by scrapped vehicles has decreased.

(2) Current status of the ELT recycling

In 2022, the amount used by recycling method increased by 113% for material recycling, 104% for thermal recycling, and 126% for export, compared to the previous year, all increased. The total recycling amount increased by 80,000 tons from the previous year to a total of 984,000 tons.

Due to soaring prices of fossil fuels such as coal, the demand of ELT as an alternative fuel is increasing. In addition, the Act on Rationalizing Energy Use revised this spring will require business operators to further switch to non-fossil fuels, which is also boosting the demand of ELT as a fuel.

(3) Others

• In recent years, the domestic thermal recycle users have continued to purchase cut / shredded ELT from overseas, and the annual import volume in 2022 was about 80 thousand tons.

This import volume is not included in the JATMA statistics.

• In the thermal recycling of ELT, there is an increasing demand for shredded products from which iron materials such as bead wire are removed. The iron materials are separated beforehand and have been recycled. Therefore, the name of the “Other reuse” category of conventional material recycling has been changed to “Other (including iron raw materials)” and the separated iron materials have been included in this category.

• The recycling to extract oil, carbon black, etc., from ELT has been done in gasification facilities, so the category name had been “Gasification facilities”.

However, there are facilities other than Gasification facilities for this type of recycling. Therefore, the category name has been changed to “Pyrolysis”.

Table 12: Volume of ELT

(Tyres: millions; Weight: kt)

	2018				2019				2020				2021				2022					
	tyres	weight	distribution(%)		tyres	weight	distribution(%)		tyres	weight	distribution(%)		tyres	weight	distribution(%)		tyres	weight	distribution(%)		2022/2021(%)	
			tyres	weight			tyres	weight			tyres	weight			tyres	weight			tyres	weight	tyres	weight
The amount generated by replacing tyres	82	892	85	86	81	884	84	86	73	806	85	86	77	854	85	87	80	891	87	88	104	104
The amount generated by scrapped vehicles	14	140	15	14	15	142	16	14	13	131	15	14	14	133	15	13	12	117	13	12	85	88
Total	96	1,032	100	100	96	1,026	100	100	86	937	100	100	91	987	100	100	92	1,008	100	100	101	102

Source: JATMA

Table 13: Status of ELT

(Weight: kt)

				2018		2019		2020		2021		2022		
				weight	distribution(%)	weight	distribution(%)	weight	distribution(%)	weight	distribution(%)	weight	distribution(%)	2022/2021 (%)
Kind of recycling	Domestic	Material Recycling	Retreaded tyre bases	51	5	51	5	46	5	50	5	53	5	106
			Reclaimed rubber	120	12	132	13	115	12	84	9	85	8	101
			Other (including iron raw materials)	1	1	0	0	1	1	1	1	15	2	1,500
			Subtotal (A)	172	17	183	18	162	17	135	14	153	15	113
		Thermal Recycling	Paper manufacturing	446	43	402	39	412	44	425	43	433	43	102
			Chemical factories	66	6	66	6	96	10	112	11	136	13	121
			Cement factories	64	6	70	7	69	7	73	7	81	8	111
			Steel manufacturing	14	1	18	2	16	2	17	2	0	0	0
			Pyrolysis	61	6	56	5	10	1	1	0	2	1	200
			Tyre manufacturing	20	2	9	1	2	0	2	0	3	1	150
			Small boilers	3	1	2	1	2	1	3	1	5	1	167
			Subtotal (B)	674	65	623	61	607	65	633	64	660	66	104
	Abroad	Export	Whole tyres (used tyres)	148	14	158	15	141	15	133	13	168	17	127
			Cut / shredded (for raw and fuel)	3	1	2	1	2	1	3	1	3	1	100
			Subtotal (C)	151	15	160	16	143	15	136	14	171	17	126
Total recycling (A+B+C)				997	97	966	94	912	97	904	92	984	98	109
Landfill				1	1	1	1	5	1	11	2	14	2	127
Incineration, etc.				34	3	59	6	20	2	72	7	9	1	13
Subtotal (D)				35	3	60	6	25	3	83	8	23	2	28
Total (A+B+C+D)				1,032	100	1,026	100	937	100	987	100	1,008	100	102

Note: There can be some cases that distribution's subtotals and the sums of their constituent items don't match due to the handling of decimals.

Source: JATMA

6. The Status of Illegal Dumping of ELT

The total number of cases was 76 and the quantity was 25,163 tons. Compared to the previous year, the total quantity increased by 664 tons.

7. JATMA Support Program

With the aim of reducing the illegal dumping of ELT, JATMA has been operating a restoration support program since 2005.

During the 18 years from FY2005 to FY2022, we have provided support of 379.26 million yen to a total of 23 projects, and 2,993 thousand ELT weighing 30 thousand tons have been removed.

JATMA will continue to operate this support system.

V References

1. Automobiles and Tyres

①The number of registered automobiles as of the end of December 2022 increased by 0.1% from the previous year to 78.17 million units. The sales volume of replacement tyres (for four-wheeled vehicles) were 69.94 million, which increased by 3.6% from the previous year.

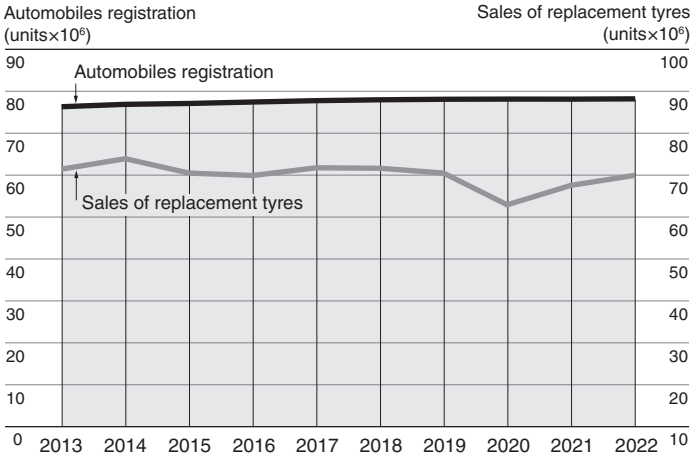
Table 14: Automobile registrations and sales of replacement tyres in 2022

Automobile	Registrations($\times10^3$)	2022/2021(%)
Passenger cars	62,158	100.0
Trucks and buses	16,007	100.5
Total	78,165	100.1
Replacement tyres	Sales($\times10^3$)	2022/2021(%)
Passenger car tyres	50,386	103.9
Commercial vehicle tyres	19,554	102.8
Total	69,940	103.6

Source: Ministry of Land, Infrastructure, Transport and Tourism, JATMA

Note: The number of automobile registrations does not include tricycles, towed vehicles, and large special vehicles.

Figure 14: Trends in automobile registrations and sales of replacement tyres



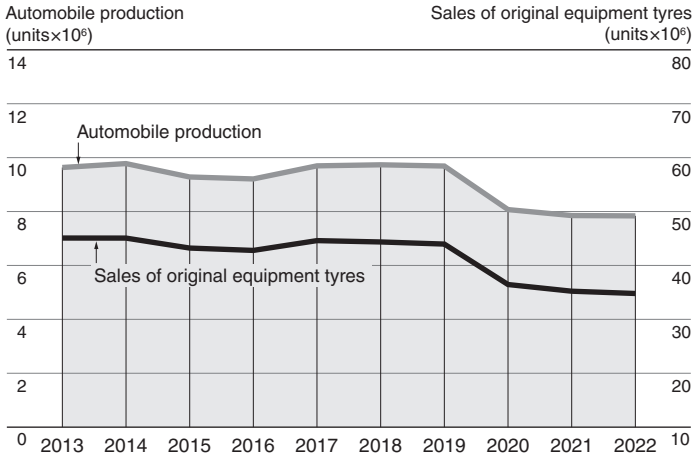
②The volume of domestic production of automobile in 2022 decreased by 0.2% from the previous year to 7.84 million units. The sales volume of original equipment tyres (for four-wheeled vehicles) decreased by 1.2% from the previous year to 34.78 million tyres.

Table 15: Automobile production and sales of original equipment tyres in 2022

Automobile	Productions($\times10^3$)	2022/2021(%)
Passenger cars	6,566	99.2
Trucks and buses	1,269	103.3
Total	7,835	99.8
Original equipment tyres	Sales($\times10^3$)	2022/2021(%)
Passenger car tyres	28,682	98.1
Commercial vehicle tyres	6,094	102.0
Total	34,776	98.8

Source: Japan Automobile Manufacturers Association, JATMA

Figure 15: Trends in automobile production and sales of original equipment tyres



2. Distribution Channels

The distribution of automobile tyres is divided into three channels: original equipment, replacement and exports. The channel for replacement is particularly wide-ranging with distributors as key stations as shown in Figure 16. The routes for the channels are roughly divided into two types: the first type is distributors sell tyres directly to logistics, bus and taxi companies, and government and municipal users. The other next is tyre dealers supplying tyres to logistics, bus and taxi companies, government and municipal users, and general customers. In addition, the component ratio (quantity) of sales for each channel in 2022 is 24.5% for original equipment, 48.1% for replacements and 27.4% for exports.

Figure 16: Distribution channels

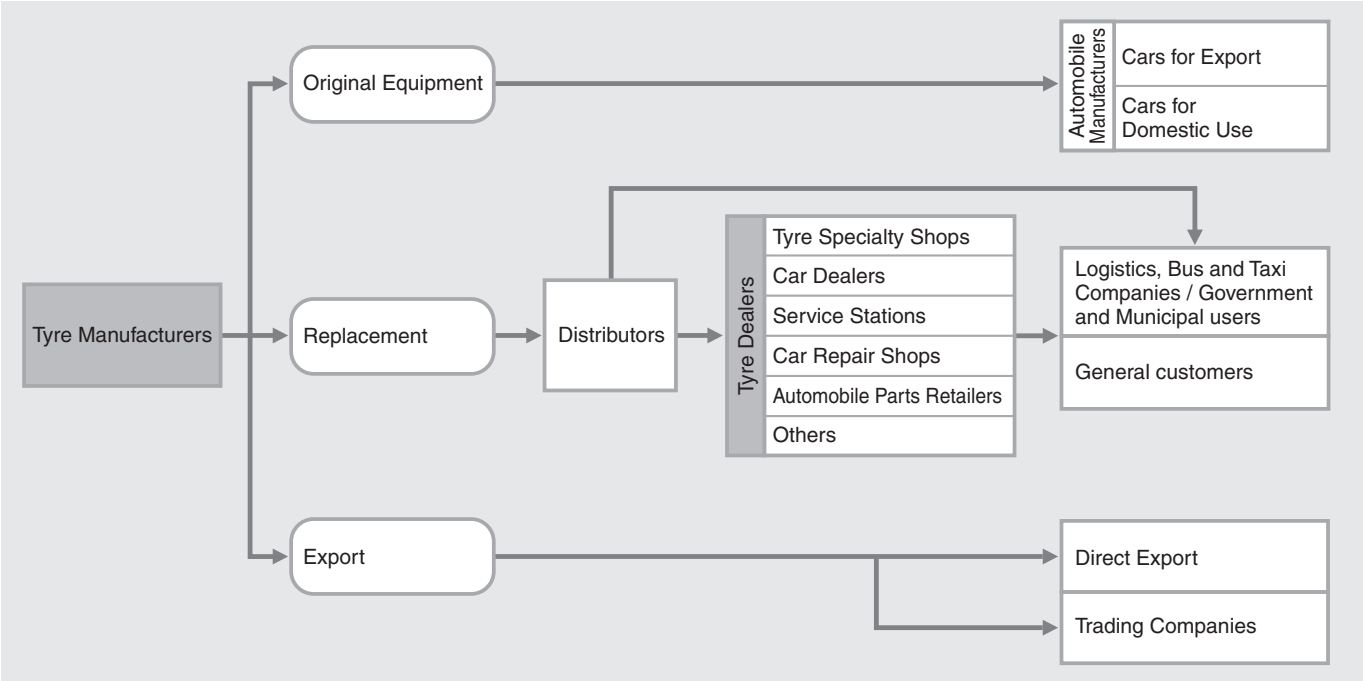
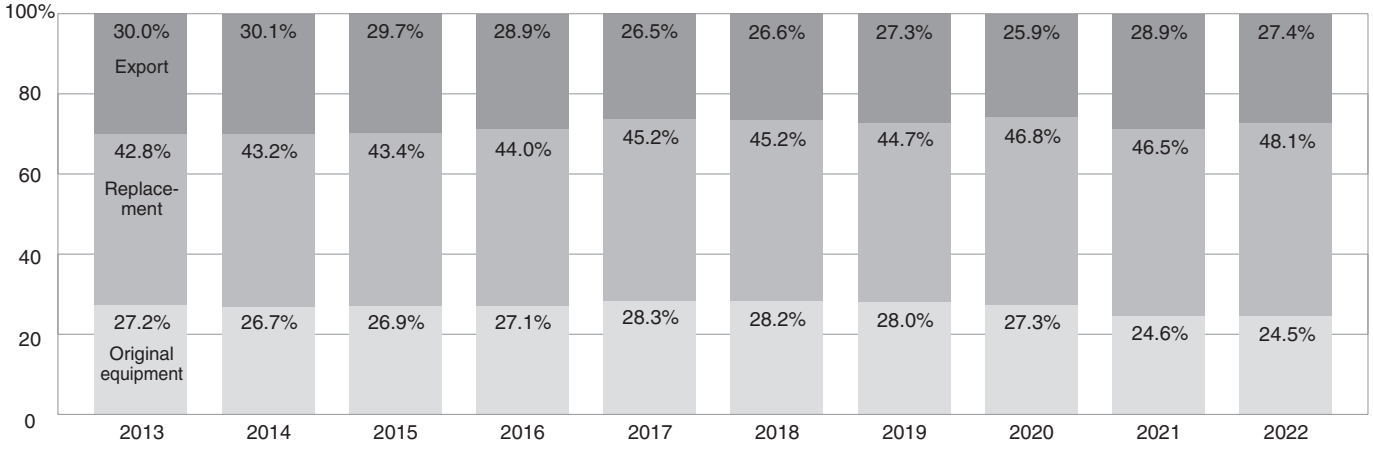


Figure 17: Trends in sales share of automobile tyres

(based on unit)



3. Raw Materials

More than 100 raw materials are used in the production of automobile tyres, including rubber, reinforcing agent, tyre cord, compounding ingredients and bead wire.

The tyre composition in weight varies depending on the tyre category, but approximately half consists of rubber (natural rubber 29% and synthetic rubber 19%), and the others are reinforcing agent 22%, tyre cord at 14% and so on.

Figure 18: Tyre raw material weight composition

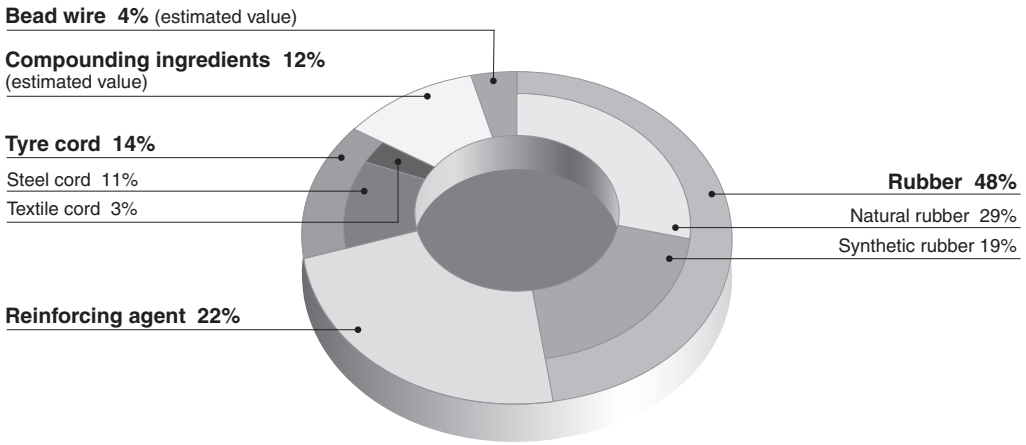


Table 16: Basic composition

Composition	Examples
Rubber	Natural rubber, Synthetic rubber
Reinforcing agent	Carbon black, Silica
Tyre cord	Steel cord, Textile cord (Nylon, Polyester, Rayon, etc.)
Compounding ingredients	Vulcanizing agent, Vulcanizing accelerator, Vulcanizing accelerator aid, Antioxidant, Filler, Softener etc.
Bead wire	

4. Consumption of Rubber by Tyre and Tyre Products

According to IRSG (International Rubber Study Group) research, it was estimated that the total rubber consumption by tyre and tyre products of the world in 2022 was 17.05 million tons, decreased by 1% from the previous year.

By region, it was estimated that the Asia and Oceania regions account for more than 70% of the world's rubber consumption, among others, China and Japan account for 40% and 6%, respectively.

Table 18: Consumption of Rubber by Tyre and Tyre Products

2020–2022: Unit: ×1,000 tons

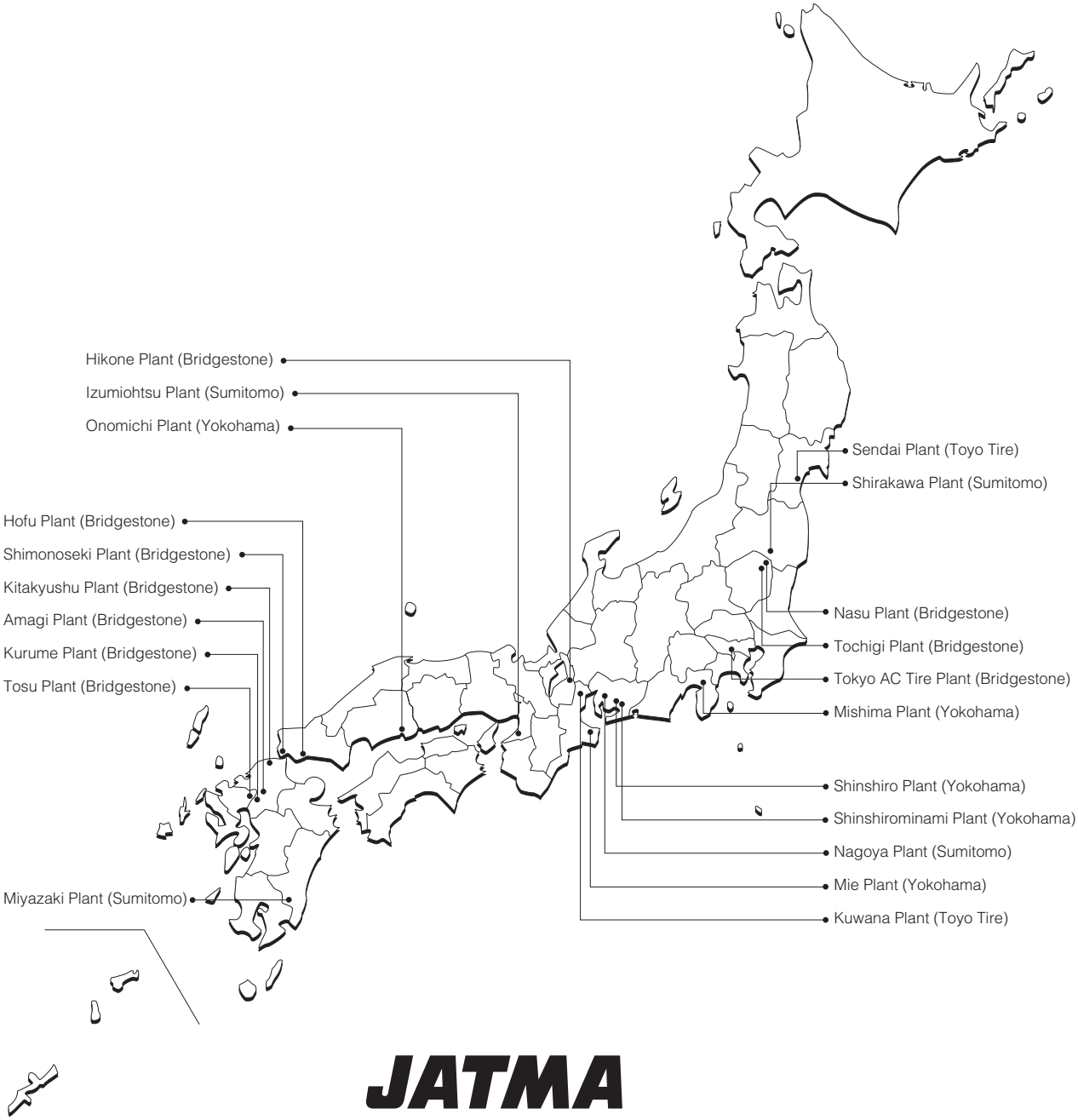
	2020	2021	2022	2022/2021(%)	composition ratio(%)
Asia and Oceania	10,986	12,066	12,026	100	71
(China)	(6,755)	(7,131)	(6,871)	(96)	(40)
(Japan)	(864)	(990)	(961)	(97)	(6)
Europe, Middle East and Africa	2,536	2,804	2,725	97	16
North, South and Central America	2,029	2,324	2,301	99	14
Total	15,550	17,194	17,052	99	100

Note: Each value is rounded, so the total doesn't match.

Source: IRSG "The World Rubber Industry Outlook" (February 2023)

Distribution of Member Companies' (Full Members) Automobile Tyre Plants

(July 2023)



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