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JATMA News

THE JAPAN AUTOMOBILE TYRE MANUFACTURERS ASSOCIATION, INC.

Effect of Decreasing Rolling Resistance in Passenger-vehicle Tyres in Reducing CO_2 Emissions

The Japan Automobile Tyre Manufacturers Association, Inc. (JATMA; chairman: Ikuji Ikeda) has compiled the results of member companies' efforts to reduce carbon dioxide (CO_2) output by decreasing the rolling resistance of their tyres. The full members of JATMA are Bridgestone Corporation, Sumitomo Rubber Industries, Ltd., The Yokohama Rubber Co., Ltd., Toyo Tire & Rubber Co., Ltd.

1. Introduction

   In the lifecycle of a tyre (raw material procurement, manufacturing, distribution, use, end of life and recycling), over 80% of CO_2 emissions occur in the usage stage. By decreasing rolling resistance of tyres, fuel efficiency is improved and lead to the reduction of CO2 emissions of automobile.

   Japanese tyre industry has introduced a "tyre labeling system" applicable to replacement summer tyres for passenger vehicles for the first time in 2010. Consumers can choose "fuel efficient tyres*", tyres with low rolling resistance, with reference to the grade on the label when they purchase tyres. This effect of decreasing rolling resistance in reducing CO2 emissions has compiled in 2015 for the first time**. As the members of JATMA are committed to decreasing the rolling resistance of their tyres, we have compiled the effect of decreasing rolling resistance for 2016 this time.

   Notes:

   * Tyres whose rolling resistance performance is grade A or better and whose wet-gripping performance is within the range of grades a to d.
   (Please refer to http://www.jatma.or.jp/english/labeling/outline.html.)

   ** http://www.jatma.or.jp/english/tyrerecycling/pdf/news1188e.pdf

2. Progress Status of Promotion of Reduced Rolling Resistance

   To evaluate overall CO_2 emissions of passenger-vehicle tyres, it is necessary to confirm rolling resistance not only in tyres included in the JATMA labeling system, but also in original equipment tyres and winter tyres, which are excluded from the labeling system.

For this purpose, JATMA had conducted a survey of rolling-resistance coefficients and number of all passenger-vehicle tyres sold by JATMA members in Japan in 2006 and in 2012 last time, and JATMA conducted the second survey in same manner with those in 2016.

Figure 1 shows the component ratio of number of sold tyre for each grade according to the JATMA labeling system, which is described in Table 1. Tyres of grade A or higher, which correspond to "fuel efficient tyres" (tyres with low rolling-resistance coefficients), accounted for 29.7% of total sales in 2006, 54.7% of total sales in 2012 and 76.9% of total sales in 2016. These figures indicate a rapid increase in the sales ratio of tyres with low rolling resistance.

Table 1 Tyre rolling resistance coefficient (RRC) and classification under the JATMA labeling system

RRC Unit: N/kN	Classification under JATMA labeling system	
RRC≦6.5	AAA	Fuel efficient tyre
6.6≦RRC≦7.7	AA	
7.8≦RRC≦9.0	A	
9.1≦RRC≦10.5	B	—
10.6≦RRC≦12.0	C	
12.1≦RRC	(Lower than C)	

Figure1 Component ratio of number of tyres sold by grade (of tyres sold in Japan by JATMA member manufacturers)

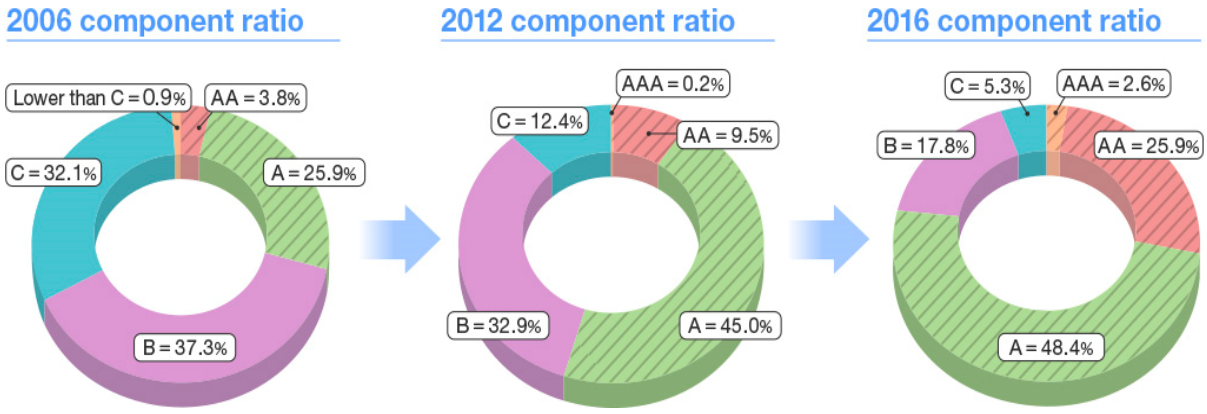


Table 2 Weighted-average RRC

2006	2012	2016
9.80	9.06	8.44

3. Reduction of CO_2 Emissions During Tyre Usage Stage

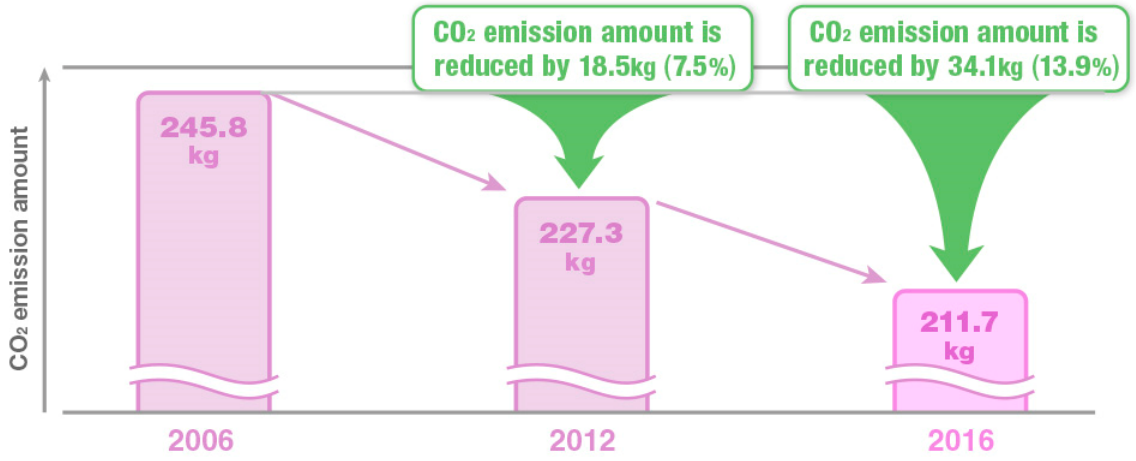
(1) Based on *Tyre LCCO$_2$ Calculation Guidelines* Ver. 2.0***, published by JATMA, we calculated CO_2 emission amount during tyre usage stage using RRC shown in Table 2. CO_2 emission amount in 2016 was 211.7kg/tyre (total amount over the driving life of the tyre)****.

The reduction in CO_2 emission amount from 2006 to 2012 was 18.5kg (7.5%) per tyre on last survey, and the reduction from 2012 to 2016 was 34.1kg(13.9%) per tyre on this survey.

*** http://www.jatma.or.jp/english/tyrerecycling/pdf/lcco2guideline_en.pdf

**** Calculated based on a driving life for passenger-vehicle tyres of 30,000km.

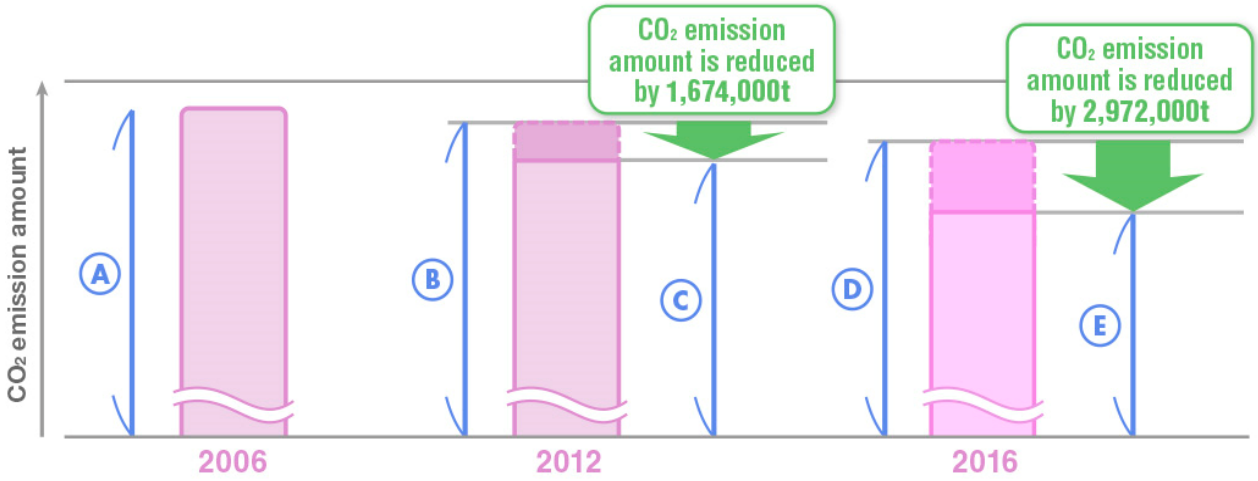
Figure2 CO_2 emission amount during tyre usage stage (per tyre)



(2) Because it is difficult to grasp CO_2 emission amount during tyre usage stage for one year accurately, the total CO_2 amount emitted from the time the tyre is sold to the time it is discarded is used as a proxy****.

On this basis, when 2006 and 2012 were compared on last survey, the reduction in CO_2 emission amount during tyre usage stage due to the reduction in rolling resistance for 2012 was 1,674,000t. The reduction amount of CO2 emission in 2016 compared to 2006 has become 2,972,000t on this survey (Figure 3).

Figure3 Reduction in CO_2 emission amount during tyre usage stage



Ⓐ : CO_2 emission amount of tyres sold in 2006 (245.8kg/tyre) × number of tyres sold in 2006
Ⓑ : CO_2 emission amount of tyres sold in 2006 (245.8kg/tyre) × number of tyres sold in 2012
Ⓒ : CO_2 emission amount of tyres sold in 2012 (227.3kg/tyre) × number of tyres sold in 2012
Ⓓ : CO_2 emission amount of tyres sold in 2006 (245.8kg/tyre) × number of tyres sold in 2016
Ⓔ : CO_2 emission amount of tyres sold in 2016 (211.7kg/tyre) × number of tyres sold in 2016