Articulated road trains – Steady minimum turning radius test procedure

1. Scope

This standard specifies the steady minimum turning radius test methods for tractors coupled to semi-trailers (hereinafter referred to as the "articulated road train").

2. Normative reference

The following standards contain which, thorough reference in this Standard, constitute provisions of this Standard. The most recent editions of the standard indicated below shall be applied.

JIS D0101 Glossary of terms relating to kinds of automobiles

JIS D0102 Road vehicles -- Dimension, masses, weights and performances -- Vocabulary

JASO Z117-2 Road vehicles -- Vehicle dynamics test methods -- Part 2: General conditions for heavy vehicles and buses

3. Definitions

Definitions of main terms used in this standard shall be based on **JIS D0101** and **JIS D0102** and as follows.

a) Steady minimum turning radius

When an articulated road train turns in the range in which the turning inner rear wheel of a trailer does not reverse, the minimum value of the turning radius traced by the outermost wheel is referred to as the steady minimum turning radius (see **Figure 1**).

b) Outer body steady minimum turning radius

When an articulated road train turns keeping the steady minimum turning radius, the radius traced by outermost portion of the articulated road train (except mirror devices and flexible antennas attached other than the vehicle body) is referred to as the outer body steady minimum turning radius (see **Figure 1**).

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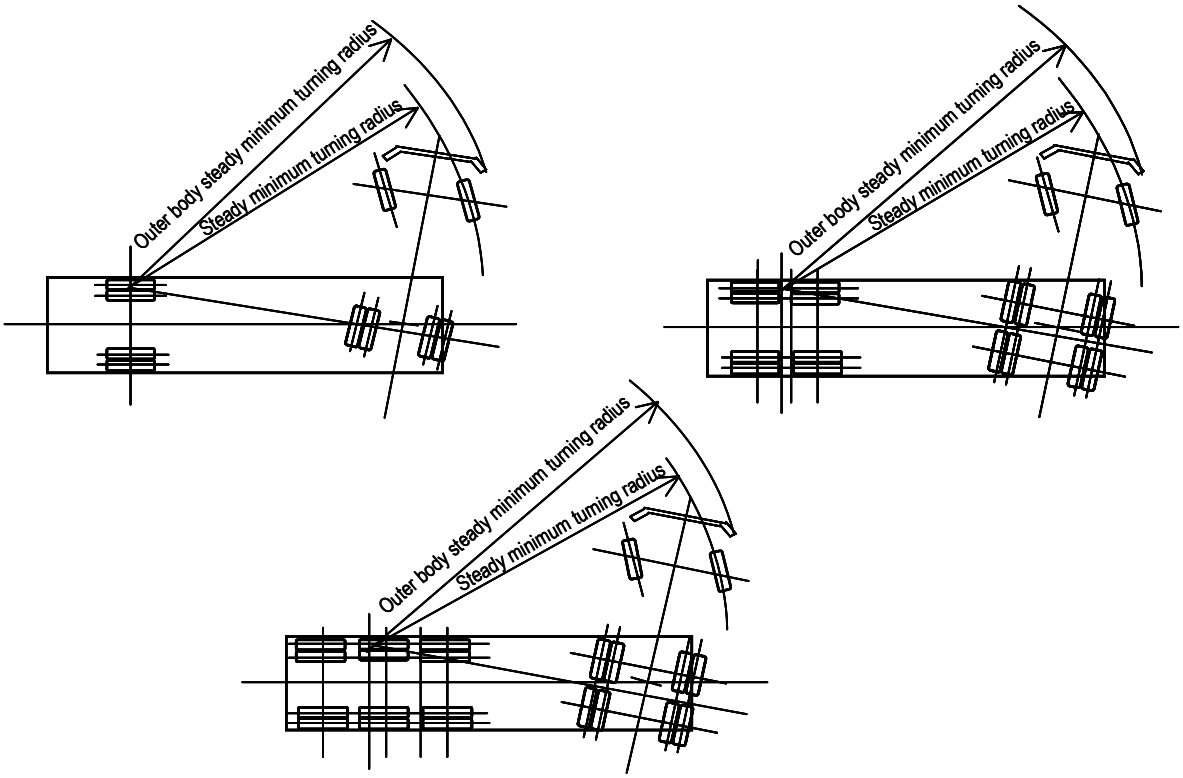

Figure 1 Steady minimum turning radius

c) Articulated wheel base

The horizontal distance between the centres of the front and rear axles is referred to as the articulated wheel base. When an articulated road train has 3 axles, the distance between the front and rear axles of the semi-trailer tractor is called the first wheel base (C_1). The distance between the rear axle of the semi-trailer tractor and the axle of the trailer is called the second wheel base (C_2). For an articulated road train with 4 axels, it is called the third wheel base (C_3). For an articulated road train with 5 axels, it is called the fourth wheel base (C_4). For an articulated road train with 6 axels, it is called the fifth wheel base (C_5) (see **Figure 2**).

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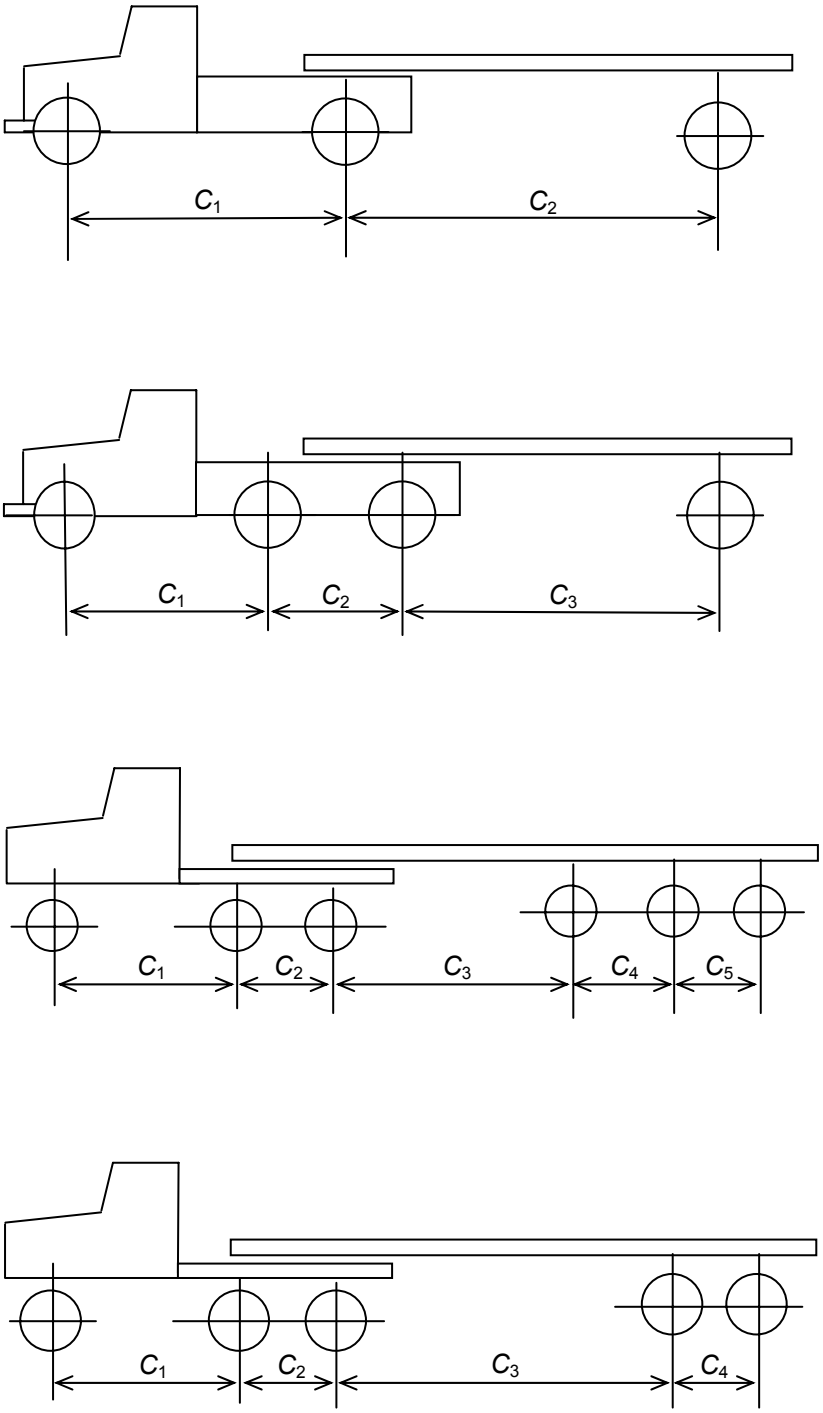

Figure 2 Articulated wheel base

4. Test methods

4.1 Test road and test equipment

4.1.1 Test road

A test road shall be based on **JASO Z117-2**, **6.1** (Test road).

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4.1.2 Test equipment

Test equipment shall be as follows.

a) Locus tracing equipment

Equipment or a tool for tracing the running locus of a test vehicle shall be used.

b) Measuring tape

A measuring tape long enough for measuring the diameter of the running locus circle traced by a test vehicle shall be used.

4.2 Test procedure

Perform the test as specified below.

a) As a rule, use an unloaded articulated road train with a driver for the test. Install the locus tracing equipment. The conditions of tyres shall be based on **JASO Z117-2**, **6.3.2** (Tyres).

b) Turn the test vehicle and gradually reduce the turning radius immediately before the trailer rear wheel is reversed. In this case, hold the steering wheel so that the trailer rear wheel does not rotate[(1)], continuously drive the vehicle without stopping until the locus overlaps, and stop outside the running locus circle. However, when the minimum turning radius of the test vehicle is equal to that of the semi-trailer tractor, the rear wheel of the trailer may travel forward.

Note: [(1)]

The condition in which the trailer rear wheel does not rotate shall be within ±180 degree rotation of the turning inner rear wheel of the trailer while the test vehicle turns 360 degree.

c) Turn the test vehicle at an extremely low speed clockwise and counter clockwise once for each direction.

d) Measure the diameter of the running locus at two locations orthogonal to each other.

e) Enter test records and results in **Attached Table 1**.

5. Evaluation and presentation of test results

5.1 Enter the key specifications of a test vehicle and steady minimum turning radius test results in **Attached Table 1.**

5.2 Test vehicle specifications and conditions during the test shall be entered as follows.

a) Enter values of technical specifications for test vehicle specifications.

b) Divide the articulated wheel base column into five for a vehicle with 6 axels and enter the first, second, third, fourth, and fifth wheel base in order.

c) Divide the tread column into six and enter the first to sixth axle tread in order.

d) Divide the dual tyres distance column into six and enter the dual tyres distance if dual tyres are equipped.

e) For the tyre inflation pressure column, in the case of dual tyres, enter pressure of an outer tyre in the upper column and pressure of an inner tyre in the lower column.

f) Divide the load distribution column under the conditions during the test so that load of right and left wheels for all 6 axels can be entered.

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