

इंटरनेट

मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 11849 (1986): Method of determination of Centre of Gravity of automotive vehicles [TED 4: Automotive Braking Systems]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE



Indian Standard

METHOD OF DETERMINATION OF CENTRE OF GRAVITY OF AUTOMOTIVE VEHICLES

1. Scope — Gives the procedure for determining the position and the height of centre of gravity (CG) of car, jeep, truck and bus.

2. Terms and Definitions — For the purpose of this Standard following terms and definitions shall apply.

2.1 Height of Centre of Gravity — It is the height of centre of gravity from the supporting surface, when the vehicle is placed on a plain level horizontal surface. This is shown as 'Z' in Fig. 1.

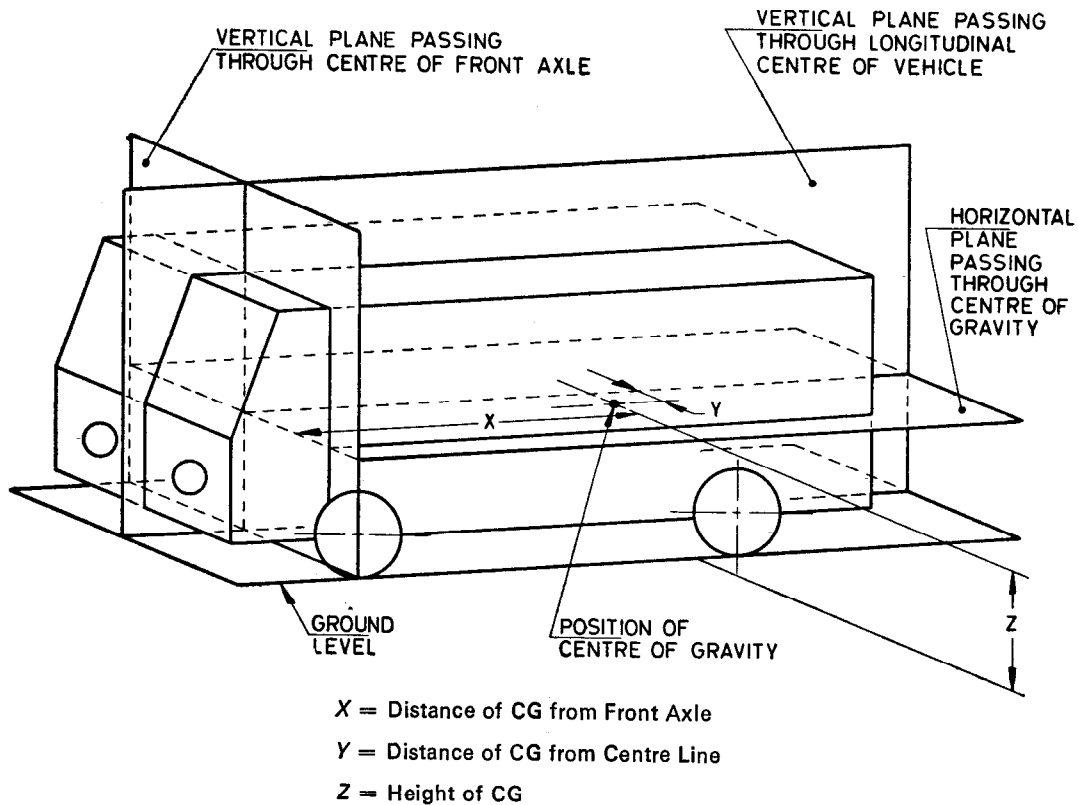


FIG. 1 CENTRE OF GRAVITY

2.2 Position of Centre of Gravity — The position of centre of gravity on a horizontal plane shall be defined on the longitudinal axis and on the transverse axis as follows (see Fig. 1).

2.2.1 Position of centre of gravity along with the longitudinal axis is defined as the least distance of centre of gravity from a transverse vertical plane passing through the centre line of the front axle of the vehicle. This is shown as 'X' in Fig. 1.

2.2.2 Position of centre of gravity along transverse axis of the vehicle is defined as the least distance of centre of gravity from a vertical plane passing through the longitudinal centre line of the vehicle. This position of centre of gravity may be on left hand side or right hand side of the vertical plane. Left hand and right hand sides are with reference to driver when seated in the driving seat.

3. Preparation of the Vehicle

3.1 The vehicle shall conform in all its parts and components to the design and/or production series as applicable.

Adopted 16 October 1986

© May 1987, BIS

Gr 2

3.2 The tyres fitted on the vehicle shall not have done more than 10 percent of its life and shall be inflated to the pressure recommended by the vehicle manufacturer. Tread depth measurement may be used to assess the tyre life.

3.3 The vehicle loading shall be as per the vehicle kerb weight as defined in IS:9211-1979 'Denominations and definitions of weights of road vehicles'.

3.4 All axle suspensions of the vehicle shall be blocked by some means so that its springs do not get deflected during the tests.

4. Test Procedure

4.1 The front and rear axles of the test vehicle shall be weighed separately. The least count of the weigh bridge shall be 1 percent of the measured value. These weights shall be denoted as W_1 and W_2 . Then total weight of the test vehicle shall be taken and this shall be denoted as 'W'. The wheel base of the two axled test vehicle from both the sides shall be measured. This shall be denoted as l_1 and l_2 . In case of the test vehicle having more than two axles, the wheel base of the test vehicle shall be mean centre of the rear axles and front axle. The mean value of wheel base shall be denoted by 'L' which is $L = \frac{l_1 + l_2}{2}$.

4.1.1 Similarly the mean value of front and rear track width shall be obtained by the formula:

$$a = \frac{a_1 + a_2}{2}$$

where

a = Mean value of front and rear track width,

a_1 = Width of front track, and

a_2 = Width of rear track.

4.1.2 Then the test vehicle shall be placed on the weighing platform such that front axle wheels (or rear axle wheels) shall be on the weighing platform and other axle wheels shall remain outside on the same level. This weight shall be denoted by W_3 . The parking brake of the vehicle shall be applied and engine shall be switched off. Then the wheels which are outside the weighing platform shall be lifted through certain height. Then the height of centre of lifted wheels from ground level shall be measured and denoted by 'Y'.

4.1.3 The weight of the wheels which are on the weighing platform shall be measured and shall be denoted as ' W_4 '. Then the vehicle shall be brought to its original position. The right side and left side weights of the vehicle shall be taken and denoted as ' W_5 ' and ' W_6 '. The rolling radius of the wheels of the test vehicle shall be measured as per 4.1.4 and shall be denoted as 'r'. The height of the centre of gravity and its position shall be worked out from the formula given below:

a) Height of centre of gravity (Z) $= r + \frac{L (W_4 - W_3) \sqrt{L^2 - Y^2}}{W \cdot Y}$

b) Position of centre of gravity along longitudinal axis (X) $= \frac{W_2 \times L}{W}$ from front axle (when rear axle is lifted)

c) Position of centre of gravity along transverse axis (Y) $= a \left(\frac{W_6}{W} - \frac{1}{2} \right)$ towards right hand side.

OR

$a \left(\frac{W_5}{W} - \frac{1}{2} \right)$ towards left hand side.

4.1.4 Procedure for measuring rolling radius — Keeping the vehicle on level ground the contact points of front or rear tyres shall be marked with chalk both on the ground and on the tyre. The vehicle shall be stopped after five revolutions of the tyre when the chalk mark on the tyre comes in contact with the ground and this point on the ground shall be marked. The distance between the initial and final positions on the ground shall be measured and the rolling radius shall be calculated as follows:

$$\text{Rolling radius } r = \frac{\text{Measured distance}}{10 \pi}$$

EXPLANATORY NOTE

The overall performance of an automotive vehicle is a function of performance of its various components, systems, weight distribution over the axles, loading pattern et cetra. For the stability of the vehicle and to decide loading pattern of the vehicle, the height and position of centre of gravity of the vehicle plays an important role.

This standard contains technical requirements for determining the height and position of centre of gravity of automotive vehicles so that the procedure is applied on uniform basis by all concerned.