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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION
R 611

BRAKING OF MOTOR VEHICLES
AND THEIR TRAILERS

TERMINOLOGY

1st EDITION

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BRIEF HISTORY

The ISO Recommendation R 611, *Braking of Motor Vehicles and their Trailers – Terminology*, was drawn up by Technical Committee ISO/TC 22, *Automobiles*, the Secretariat of which is held by the Association Française de Normalisation (AFNOR).

Work on this question by the Technical Committee began in 1960 and led, in 1962, to the adoption of a Draft ISO Recommendation.

In January 1964, this Draft ISO Recommendation (No.588) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies:

| | | |
|----------------|----------------|-------------|
| Australia | Israel | Portugal |
| Austria | Italy | Romania |
| Colombia | Japan | Spain |
| Czechoslovakia | Korea, Rep. of | Sweden |
| France | Netherlands | Switzerland |
| Greece | New Zealand | U.S.S.R. |
| Hungary | Poland | Yugoslavia |

Four Member Bodies opposed the approval of the Draft:

| | |
|---------|----------------|
| Belgium | United Kingdom |
| Germany | U.S.A. |

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in August 1967, to accept it as an ISO RECOMMENDATION.

CONTENTS

| | Page |
|--------------------------------------|------|
| Introduction | 3 |
| I. List of terms to be defined | 3 |
| II. Definitions | 5 |

BRAKING OF MOTOR VEHICLES AND THEIR TRAILERS

TERMINOLOGY

INTRODUCTION

This ISO Recommendation relating to braking terminology deals with the definitions of the main terms used in connection with braking. These terms may designate either material parts which are actuated when a braking system is operating or quantities which are involved in the whole or a part of this operation.

Except for term 1, the terms thus defined pertain to motor vehicles and their trailers, i.e. single and articulated vehicles or road trains.

In the definition of term 1, "Braking equipment", the word "vehicle" may be assumed to have its broadest meaning.

I. LIST OF TERMS TO BE DEFINED

1. Braking equipment
2. Braking device
 - 2.1 General definition
 - 2.2 Definitions related to conditions of use
 - 2.2.1 Service brake
 - 2.2.2 Auxiliary brake
 - 2.2.3 Emergency brake
 - 2.2.4 Parking brake
3. Braking device: Operation and organization
 - 3.1 Sources of energy
 - 3.1.1 Muscular
 - 3.1.2 Mechanical (elastic deflection)
 - 3.1.3 Kinetic
 - 3.1.3.1 Mechanical servo-brake
 - 3.1.4 Depression
 - 3.1.4.1 Depression (vacuum) servo-brake
 - 3.1.5 Compressed air
 - 3.1.6 Hydraulic
 - 3.1.7 Electrical

- 3.2 Control
 - 3.2.1 By the driver
 - 3.2.1.1 By hand
 - 3.2.1.2 By foot
 - 3.2.2 Without action of the driver (automatic control)
 - 3.2.2.1 By inertia
 - 3.2.2.2 By gravity
 - 3.2.2.3 By traction
 - 3.2.2.4 By variation of pressure
 - 3.2.2.5 Electrically
- 3.3 Transmission (GB) – Linkage (USA)
 - 3.3.1 Nature of the transmission (linkage)
 - 3.3.1.1 Mechanical
 - 3.3.1.2 Hydraulic
 - 3.3.1.3 Pneumatic
 - 3.3.1.4 Electric
 - 3.3.1.5 Combined
 - 3.3.2 Structure of the transmission (linkage)
 - 3.3.2.1 Single circuit transmission (linkage)
 - 3.3.2.2 Multiple circuit transmission (linkage)
 - 3.3.2.3 Single line transmission (linkage) (articulated vehicle or road train)
 - 3.3.2.4 Multiple line transmission (linkage) (articulated vehicle or road train)
- 3.4 Brake (proper)
 - 3.4.1 Friction brake
 - 3.4.1.1 Drum brake
 - 3.4.1.2 Disc brake
- 4. Retarding device (retarder)
 - 4.1 Engine
 - 4.2 Exhaust brake
 - 4.3 Engine retarding device (retarder)
 - 4.4 Hydrodynamic retarding device (retarder)
 - 4.5 Aerodynamic retarding device (retarder)
 - 4.6 Electro-magnetic retarding device (retarder)
- 5. Braking mechanics
 - 5.1 Braking force
 - 5.2 Braking power
 - 5.3 Braking time (GB) – Brake system application time (USA)
 - 5.3.1 Initial delay time (GB) – Brake activation time (USA)
 - 5.3.2 Build up time
 - 5.3.3 Time of active braking (GB) – Braking time (USA)
 - 5.3.4 Final release time (GB) – Brake release time (USA)
 - 5.4 Braking distance (GB) – Brake system application distance (USA)
 - 5.4.1 Stopping distance
 - 5.5 Braking deceleration
 - 5.5.1 Braking co-efficient (average or instantaneous)

II. DEFINITIONS

1. BRAKING EQUIPMENT

The braking equipment of a vehicle consists of all the braking and retarding devices with which that vehicle is equipped.

2. BRAKING DEVICE

2.1 General definition

A mechanism, the function of which is to reduce the speed of a vehicle down to the stopping point, if necessary, or to maintain it at rest (see Note 1 (a), page 11).

2.2 Definitions related to conditions of use

According to circumstances a braking device can take any of the following forms:

- Service brake, see term 2.2.1,
- Auxiliary brake, see term 2.2.2,
- Emergency brake, see term 2.2.3,
- Parking brake, see term 2.2.4.

2.2.1 Service brake

The primary braking device controlled by the driver and used during normal driving of the vehicle.

2.2.2 Auxiliary brake

A braking device the action of which may be added to the service brake.

2.2.3 Emergency brake

A braking device controlled by the driver and intended to act in place of the service brake in the event of its failure.

2.2.4 Parking brake

A braking device designed to prevent movement, even on a slope, of a stationary vehicle especially in the absence of the driver.

3. BRAKING DEVICE: OPERATION AND ORGANIZATION

A braking device operates by the application of an effort produced at the expense of a source of energy (see clause 3.1). This effort is applied by means of the following elements:

- Control, see clause 3.2,
- Transmission, see clause 3.3,
- Brake (proper), see clause 3.4.

3.1 Sources of energy

3.1.1 Muscular

Effort of the driver.

3.1.2 Mechanical (elastic deflection)

The effort provided by action of compressed springs.

3.1.3 Kinetic

The effort provided, by means of a suitable coupling, by some moving part of the vehicle to supplement, but not replace, the muscular effort of the driver.

3.1.3.1 *Mechanical servo-brake*

A mechanism by means of which kinetic energy of the vehicle is made available to supplement the muscular effort of the driver.

3.1.4 Depression

The effort provided by means of a depression used to supplement, but not replace, the muscular effort of the driver.

3.1.4.1 *Depression (vacuum) servo-brake*

A mechanism by means of which a depression of the engine is made use of to supplement the muscular effort of the driver.

3.1.5 Compressed air

The effort required to actuate the braking device is provided by the pressure exerted by the compressed air stored in a reservoir on the vehicle.

3.1.6 Hydraulic

The effort required to actuate the braking device is provided either by the pressure exerted within an hydraulic accumulator or by resisting the movement of a confined liquid.

3.1.7 Electrical

The effort required to actuate the braking device is provided by the sources of electrical energy with which the vehicle is equipped.

3.2 Control

The element or mechanism of the braking device which governs the action of that braking device as a whole.

It may be operated

3.2.1 By the driver

3.2.1.1 By hand.

3.2.1.2 By foot.

3.2.2 Without action of the driver (automatic control)

3.2.2.1 *By inertia (overrun)*

Proximity between a trailer and the towing vehicle.

3.2.2.2 *By gravity*

The dropping of the trailer drawbar.

3.2.2.3 *By traction*

Tension of a cable between a trailer and the towing vehicle.

3.2.2.4 *By variation of pressure*

Variation of pressure in a connecting hose between a trailer and the towing vehicle.

3.2.2.5 *Electrically*

Breaking or completing of an electrical circuit between a trailer and the towing vehicle.

3.3 Transmission (GB) – Linkage (USA)

A mechanism by means of which the action of the energy source is brought to bear on the brakes.

When the operation of the brakes results from an effort applied to the control by the driver, without the intervention of another source of energy, the control is one of the extremes in the chain of elements which constitute the braking device.

3.3.1 Nature of the transmission (linkage)

3.3.1.1 *Mechanical*

The effort exerted at the expense of the source of energy is transmitted to the brakes through the medium of rigid components articulated with each other, or by means of cables.

3.3.1.2 *Hydraulic*

The effort exerted at the expense of the source of energy is transmitted to the brakes through the medium of a confined liquid.

3.3.1.3 *Pneumatic*

The effort exerted at the expense of the source of energy is transmitted to the brakes through the medium of air the pressure of which is higher or lower than atmospheric pressure.

3.3.1.4 *Electric*

The effort exerted at the expense of the source of energy is transmitted to the brakes by means of an electric current.

3.3.1.5 *Combined*

For instance, hydro-pneumatic.

3.3.2 Structure of the transmission (linkage)

3.3.2.1 *Single-circuit transmission (linkage)*

The effort exerted at the expense of the source of energy is transmitted to all the brakes of the vehicle by a single distribution device.

3.3.2.2 *Multiple-circuit transmission (linkage)*

The brakes on the vehicle are split up into distinct groups; the effort exerted at the expense of the source of energy is transmitted to each group by a distribution device separate for each of them.

3.3.2.3 Single line transmission (linkage) (articulated vehicle or road train)

A single hose is used for applying the brake of the trailer and for the filling of its air reservoir or for exhausting its vacuum reservoir.

3.3.2.4 Multiple line transmission (linkage) (articulated vehicle or road train)

One hose is used for producing an increase of pressure in the compressed air reservoir or for exhausting the vacuum reservoir of the trailer, and other hoses are used for applying the trailer brake.

3.4 Brake (proper)

An element of the braking device which is integral with a fixed part of the vehicle and in any case is independent of the rotation of the wheels. This element, when operated by the brake transmission either directly or through a component of the power drive transmission, works by friction upon a component attached to one or more of the wheels.

3.4.1 Friction brake

A brake in which components, integral with a fixed part of the vehicle, apply friction to components attached to one or more of the wheels.

3.4.1.1 Drum brake

A friction brake in which friction is applied either to the internal or external surface of a drum or to both these surfaces at the same time, the drum being attached to one or more wheels.

3.4.1.2 Disc brake

A friction brake in which friction is applied to the faces of one or more discs firmly attached to one or more wheels.

4. RETARDING DEVICE (RETARDER)*

A device the function of which is to reduce or limit the speed of a vehicle, but not to stop it (see Note 1 (b), page 11).

4.1 Engine

The engine connected with the vehicle transmission (in gear) and running gear under idling conditions will exert a retarding effort on the moving vehicle.

4.2 Exhaust brake

A mechanism which impedes the flow of exhaust gases from the engine and so increases the retarding effort of the engine running under idling conditions.

* All definitions in section 5 with the exception of clause 5.4.1 (Stopping distance) apply also to the retarding device.

4.3 Engine retarding device (retarder)

A retarding effort is exerted by the engine, when valve timing has been altered (by means of a suitable change in the camshaft drive).

4.4 Hydrodynamic retarding device (retarder)

A retarder in which a retarding effort is obtained by the action of a liquid the movement of which is dependent on the movement of the vehicle.

4.5 Aerodynamic retarding device (retarder)

A retarder in which a retarding effort is obtained by causing an increase of air resistance to the body of the moving vehicle or to a device connected to it (for instance, by means of opening out moving surfaces).

4.6 Electro-magnetic retarding device (retarder)

A retarder in which a retarding effort is obtained by the action of an electro-magnetic field on a rotating metal disc (Foucault currents, hysteresis).

5. BRAKING MECHANICS*

Mechanical phenomena which occur from start to finish of the action of a braking device.

5.1 Braking force

Retarding force applied to a vehicle during operation of a braking device.

5.2 Braking power

Product of the braking force and the speed of the vehicle.

5.3 Braking time (GB) – Brake system application time (USA)

The time elapsing from the moment when the driver starts to operate the control to the moment when the brakes proper cease their action, or the vehicle stops.

5.3.1 Initial delay time (GB) – Brake system activation time (USA)

The time elapsing from the moment when the driver starts to operate the control to the moment when the retarding effort is first applied.

5.3.2 Build-up time

The time elapsing from the moment when the retarding effort is first applied to the moment when that effort attains its sustained value.

5.3.3 Time of active braking (GB) – Braking time (USA)

The time elapsing from the moment when the retarding effort is first applied to the moment when it finally ceases, or the vehicle stops.

5.3.4 Final release time (GB) – Brake release time (USA)

The time elapsing from the moment when the driver ceases to operate the control to the moment when the brakes proper cease their action.

* All definitions in section 5 with the exception of clause 5.4.1 (Stopping distance) apply also to the retarding device.