IS 13391 : 1992
ISO 6813 : 1981

(Reaffirmed 1997)

भारतीय मानक

सड़क वाहन – टक्कर परीक्षण शब्दावली

Indian Standard

ROAD VEHICLES — COLLISIONS — TERMINOLOGY

UDC 629·3 : 656·084 : 001·4

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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Price Group 5

Indian Standard

ROAD VEHICLES — COLLISIONS — TERMINOLOGY

NATIONAL FOREWORD

This Indian Standard which is identical with ISO 3813 : 1981 'Road vehicles — Collisions — Terminology', issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of the Automotive Vehicles Testing Performance Evaluation Sectional Committee (TED 8) and approval of the Transport Engineering Division Council.

The text of ISO standard has been approved as suitable for publication as Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standard. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.

b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

The concerned technical committee has reviewed the provisions ISO 4130 : 1978, ISO 3984 : 1982 and referred in this adopted standard and has decided that they are acceptable for use in conjunction with this standard.

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1 Scope and field of application

This International Standard establishes the terminology relating to road vehicle collisions in either actual accidents or laboratory tests.

It is applicable to all types of collision except when the direction of the vehicle does not correspond to one of its main planes (for example collision of two skidding vehicles with a transverse component).

2 References

ISO 4130, *Road vehicles — Three-dimensional reference system and fiducial marks — Definitions.*

ISO 3984, *Road vehicles — Passenger cars — Moving barrier rear collision test method.*

3 Definitions

3.1 accident : Sudden, unpredicted event which adversely affects the state of a vehicle and/or its occupants. (See figure 1.)

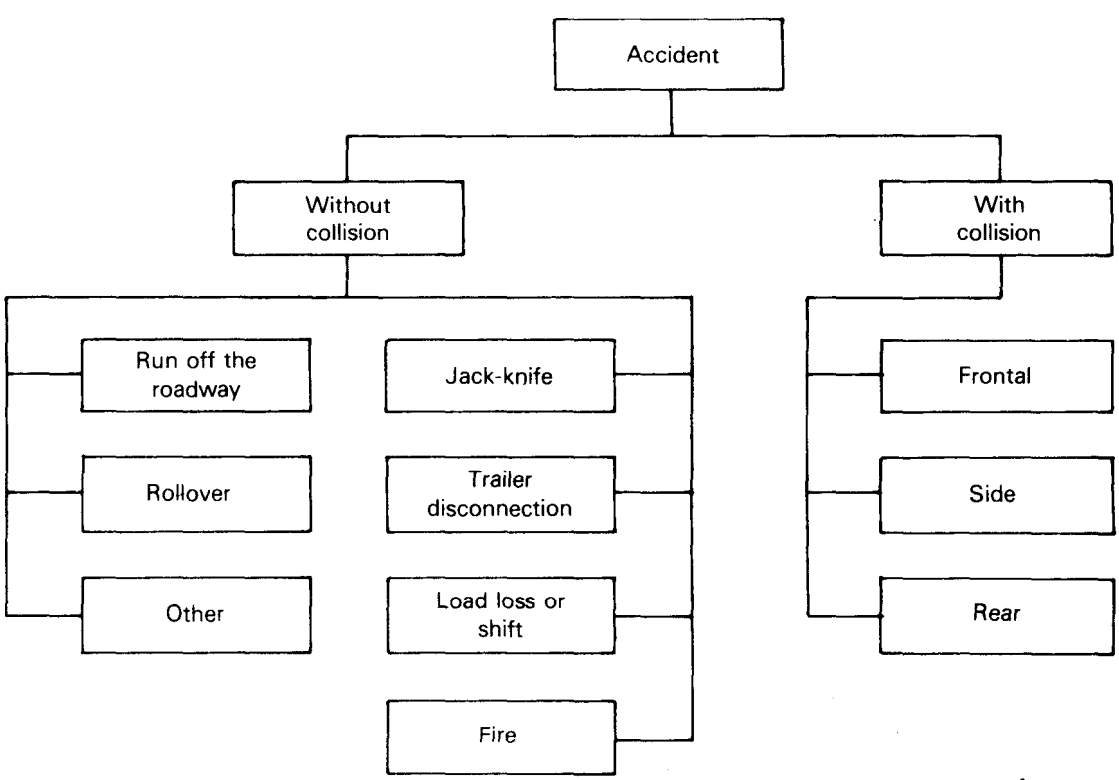


Figure 1

3.2 collision : Accident in which a vehicle strikes another vehicle or an obstacle, with ensuing damage to one or both. It is characterized by the following factors :

- collision type;
- object struck;
- collision direction;
- axis alignment;
- closing speed, $V_1 \pm V_2$.

(See figures 2 and 5.)

3.2.1 frontal collision

- between two vehicles : both vehicles undergo a frontal impact
- between a vehicle and a fixed obstacle : the vehicle undergoes a frontal impact.

[See figure 2 a).]

3.2.2 side collision between two vehicles : One vehicle undergoes a side impact, the other a frontal impact. [See figure 2 b).]

3.2.3 rear collision

- between two vehicles : one vehicle undergoes a rear impact, the other a frontal impact;
- between a vehicle and a fixed obstacle : the vehicle undergoes a rear impact. [See figure 2 c).]

3.2.4 collision direction : A collision may be longitudinal or angled (see figure 3).

3.2.5 collision angle between two vehicles : The collision angle is measured between the two vertical planes, each being the vertical longitudinal zero plane[1], of a vehicle. The angle shall be measured between 0 and 180°, (left or right) with a front collision identified as 0° and a rear collision as 180° (see figure 4).

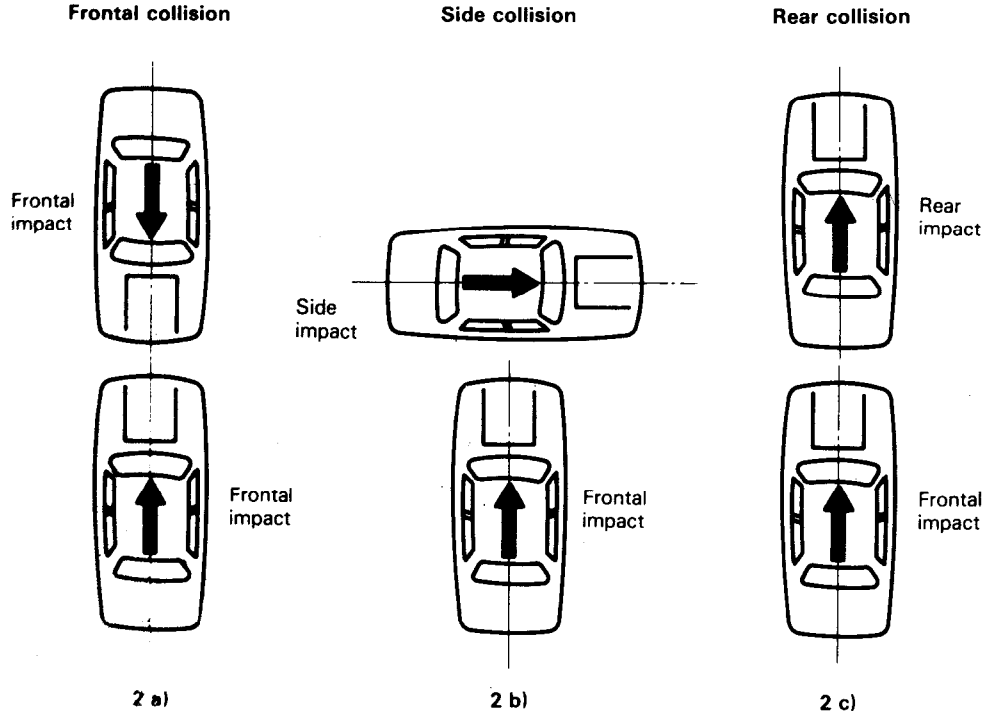


Figure 2

1) As defined in ISO 4130.

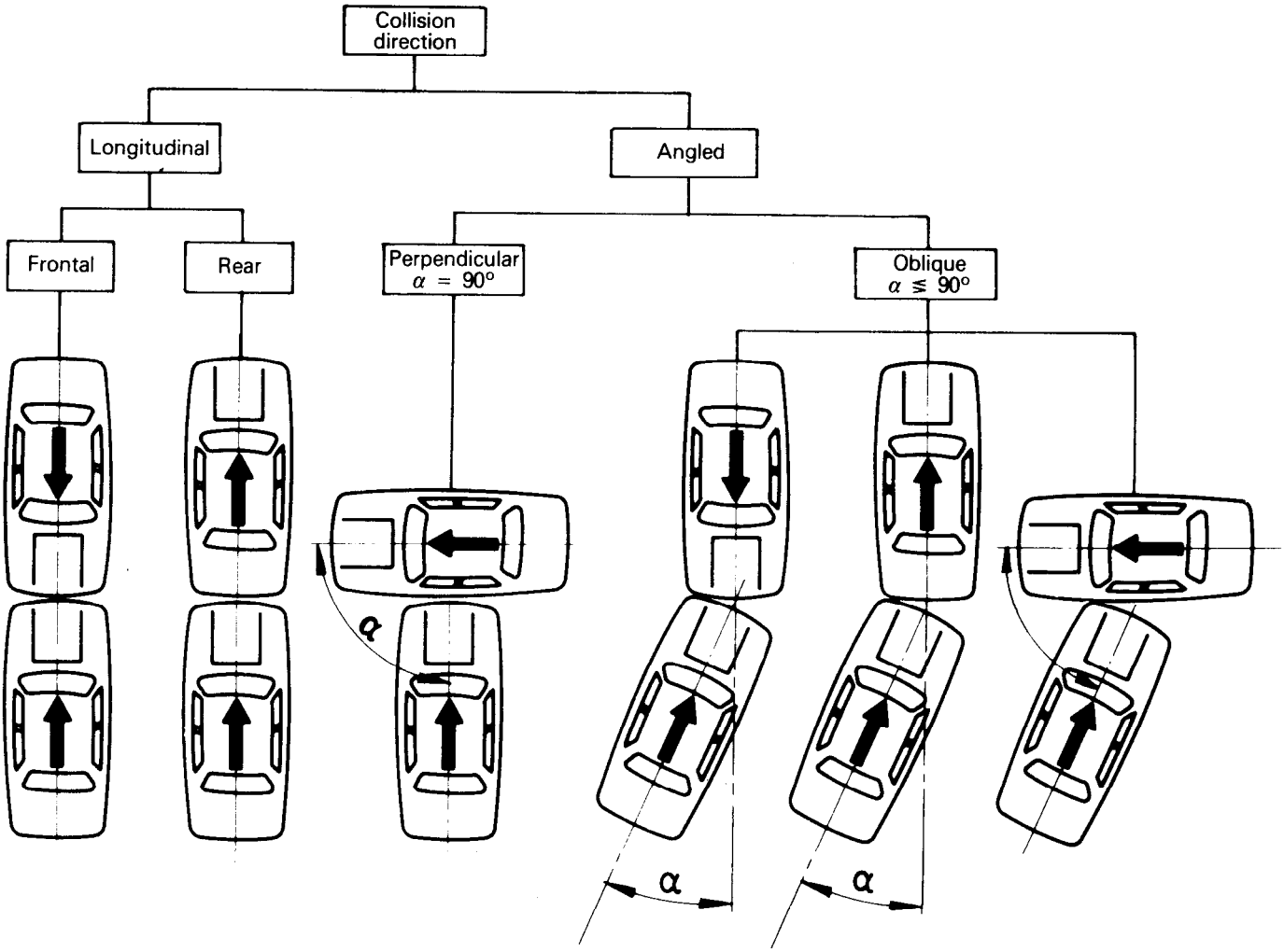


Figure 3

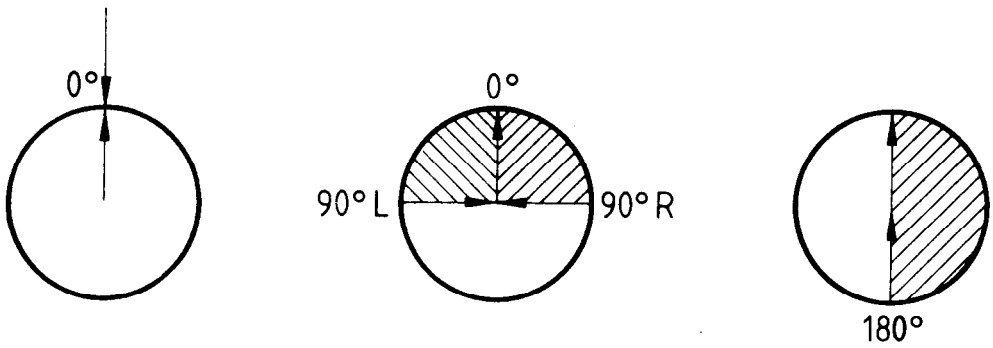


Figure 4

3.2.6 collision between a vehicle and a fixed or moving obstacle : If the obstacle face is flat and vertical (for example barrier), the obstacle or barrier face shall be regarded as being the front of another vehicle.

The collision angle is measured between two vertical planes, one of which is the vehicle's vertical longitudinal zero plane and the other is perpendicular to the obstacle's flat, vertical surface. [See figure 5 a).]

If the obstacle presents a curved face (pole, tree, etc.) the collision direction is, in any case, longitudinal (for frontal and rear collisions) [see figures 5 b) and c)] or perpendicular (for side collision). [See figure 5 d).]

3.3 axis alignment : A collision between two vehicles or between a vehicle and a fixed or moving obstacle is centered if the main planes of the two vehicles or the vehicle and the obstacle are the same; otherwise it is offset. (See figures 6 and 7.)

For main planes is intended :

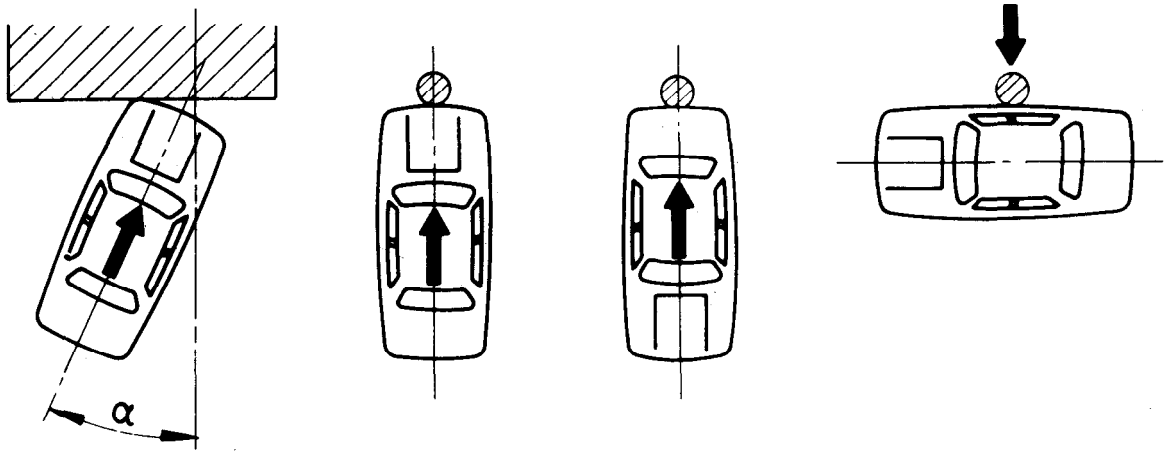
— in the frontal or rear collision, the vertical longitudinal zero plane of each vehicle;[1)]

— in the side collision, the vertical longitudinal zero plane for the striking vehicle and the vertical transverse plane (containing the driver's R-point) for the vehicle struck.

3.4 offset : In a collision between two vehicles, or a vehicle and a fixed or moving obstacle , the offset is the distance between the vertical planes, each being the main plane of each. (See figures 6, 7, 8 and 9.)

3.4.1 In longitudinal collision, the vertical longitudinal zero planes are considered.[1)] (See figure 6.)

3.4.2 In perpendicular collisions, the vertical longitudinal zero plane of the striking car and the vertical transverse plane (containing the driver's R-point) of the struck car are considered.



Oblique — 5 a)

Longitudinal (frontal collision) — 5 b)

Longitudinal (rear collision) — 5 c)

Perpendicular (side collision) — 5 d)

Figure 5

1) As defined in ISO 4130.

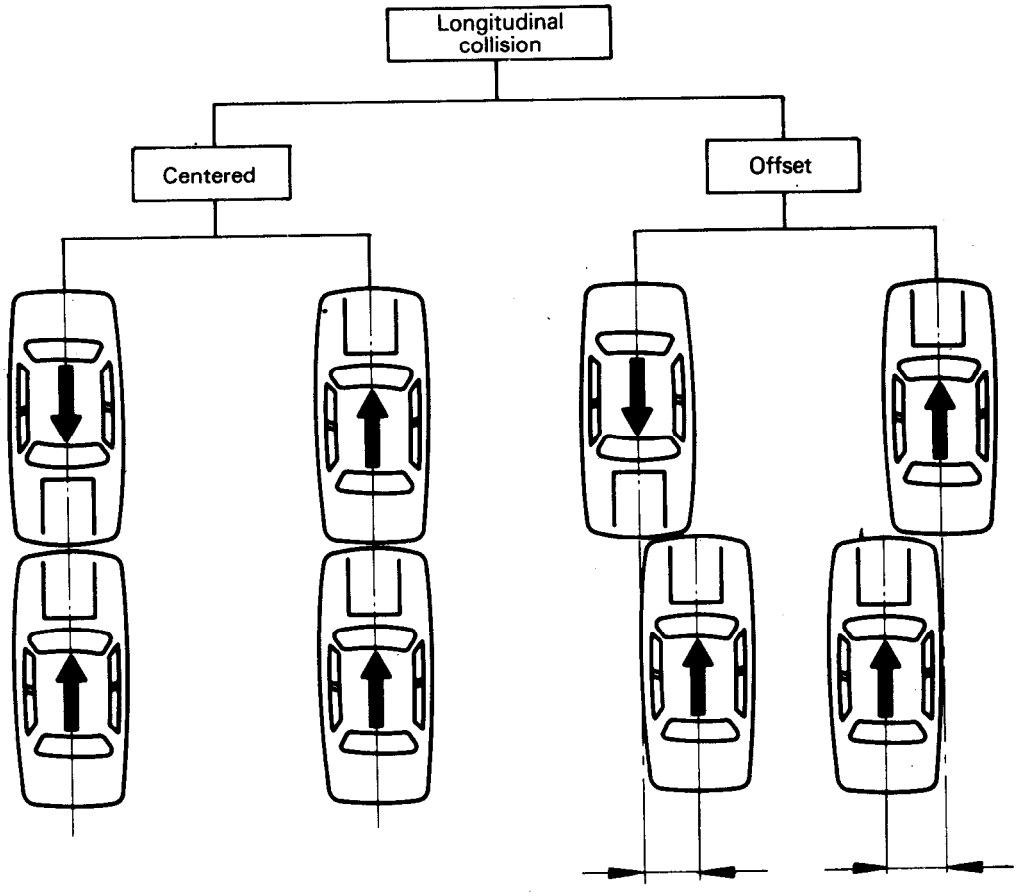


Figure 6

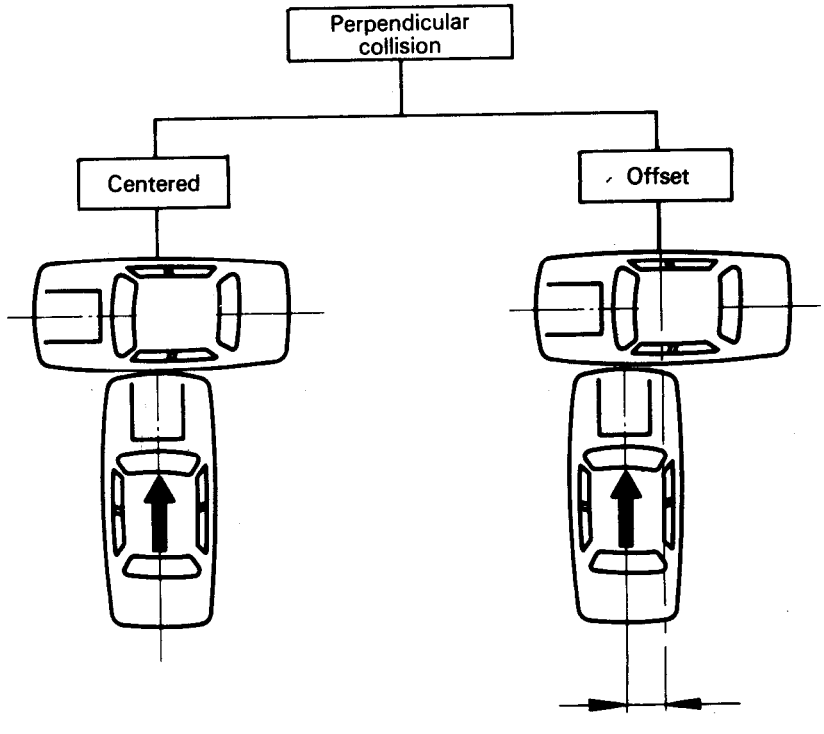


Figure 7

3.4.3 In oblique collisions, the main planes are considered but the measurement shall be made on the vertical plane tangent to vehicle horizontal projection (between arrows in figure 8).

3.4.4 In front and rear collisions, the offset can also be expressed as the portion of front (or rear) end involved (1/3, 1/2, 2/3 etc.) and by indicating left or right (for example see figure 9).

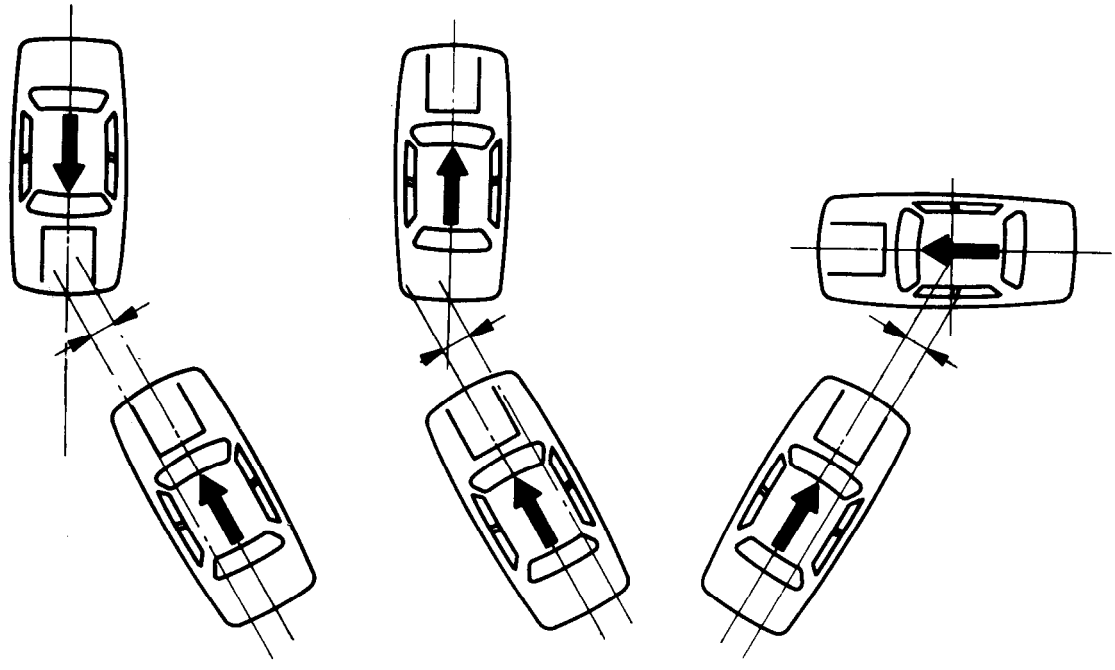
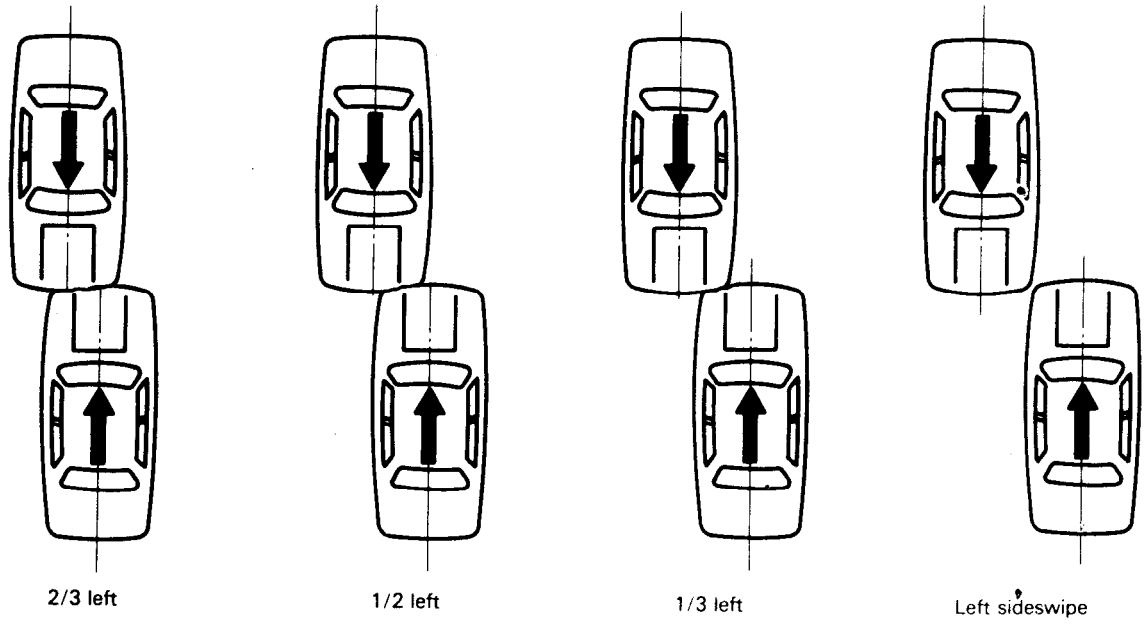


Figure 8



NOTE — The sideswipe is the limit case of offset.

Figure 9

3.5 closing speed : Relative velocity between the vehicle and the other vehicle or obstacle, at the beginning of the collision.

3.6 impact : Sudden contact between a vehicle and another vehicle or an obstacle. It is characterized by the following factors :

— impact type;

— direction and magnitude of the principal force acting on the vehicle;

— deformation;

— impact location.

3.6.1 frontal impact : Impact in which the damage to the vehicle occurs predominantly between the front corners of the vehicle.

A "pure frontal impact" is an impact in which the principal force acting on the vehicle at impact occurs at an angle not greater than 45° (left or right) to the vertical longitudinal zero plane of the vehicle.

3.6.2 side impact : Impact in which the damage to the vehicle occurs predominantly between the front and the rear corners, on the same side, of the vehicle.

A "pure side impact" is an impact in which the principal force acting on the vehicle at impact occurs at an angle between 45° and 135° (left or right) to the vertical longitudinal zero plane of the vehicle.

3.6.3 rear impact : Impact in which the damage to the vehicle occurs predominantly between the rear corners of the vehicle.

A "pure rear impact" is an impact in which the principal force acting on the vehicle at impact occurs at an angle not greater than 45° (left or right) to the vertical longitudinal zero plane of the vehicle.

3.6.4 impact angle : Measured between two vertical planes, one of which contains the vertical longitudinal zero plane of the vehicle and the other contains the principal force acting on the vehicle. This angle is measured around the vehicle from the front, either right or left, and does not exceed 180°.

3.7 principal force : Maximum value of the resultant of the forces acting to deform and displace the vehicle at the moment of impact.

3.8 deformation : Displacement of a point or points with respect to their initial position before the impact. Displacement is measured parallel to the vehicle vertical appropriate main plane as a maximum value (at a single point) or as an average value in a more or less wide area (see figure 10).

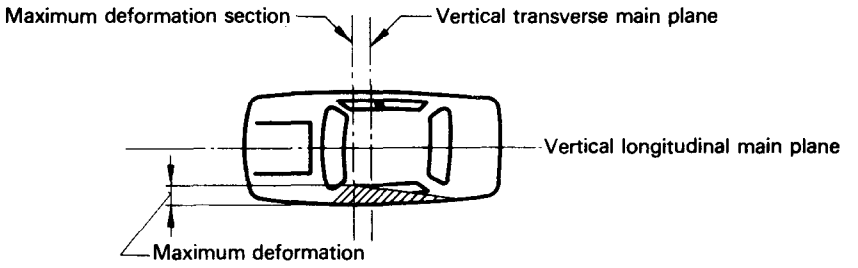


Figure 10

3.9 impact location : The impact location is identified by the area of deformation. The main zones are subdivided horizontally and vertically according to figures 11 and 12.

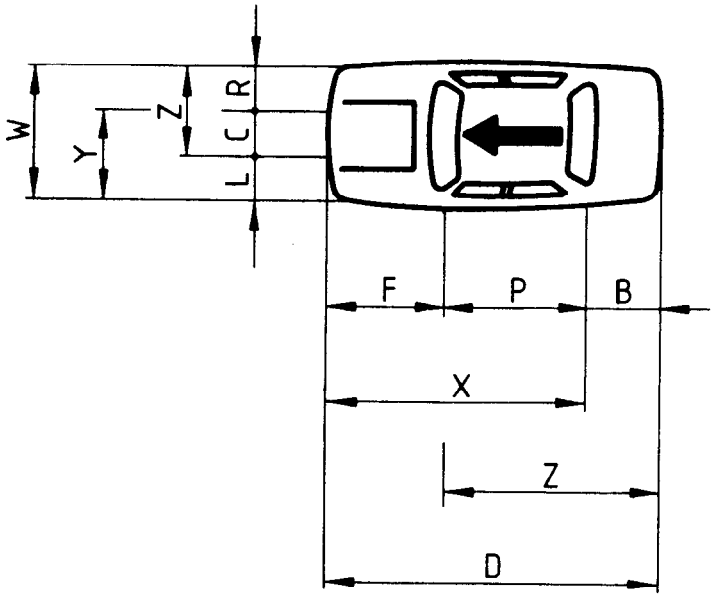


Figure 11

Specific horizontal location		
Front and rear zones	R	1/3 right
	C	1/3 centre
	L	1/3 left
	Y	2/3 left
	Z	2/3 right
	W	Total width
Left and right side zones	F	Front section
	P	Centre section
	B	Rear section
	X	Front + centre section
	Z	Rear + centre section
	D	Total length

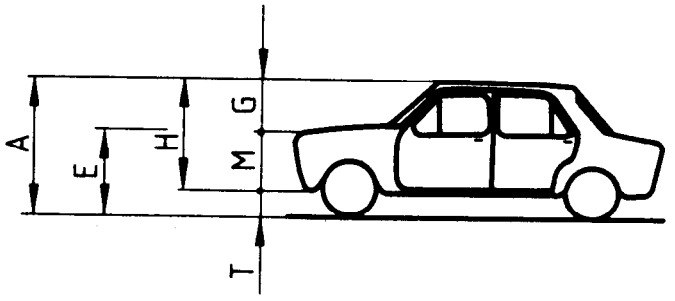


Figure 12

Specific vertical location		
Front, rear and side zones	G	Above belt line
	M	Belt line to floor
	T	Floor to ground
	H	Floor to roof
	E	Belt line to ground
	A	Total height from ground

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