

Specification for recovery vehicles and vehicle recovery equipment

ICS 43.160; 53.020.20

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Subcommittee MHE/3/14, Vehicle recovery cranes and equipment, upon which the following bodies were represented:

Association of Vehicle Recovery Operators
Automobile Association
Central Motorway Police Group
Health and Safety Executive
Institute of Vehicle Recovery
Lifting Equipment Engineers Association
Metropolitan Police
Ministry of Defence
Recovery Equipment Manufacturers and Suppliers Association
Road Haulage Association Ltd.
Road Rescue Recovery Association
Royal Automobile Club
Safety Assessment Federation Ltd.

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Foreword

This British Standard has been prepared under the direction of Technical Subcommittee MHE/3/14.

During the development of this standard there was no comparative subject in the work programmes of the relevant International and European technical committees (ISO/TC 96 and CEN/TC 147 respectively).

Attention is drawn to BS 7121-12 which covers the safe use of recovery vehicles and equipment.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 33 and a back cover.

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1 Scope

This British Standard specifies performance requirements for recovery equipment specifically for moving a casualty vehicle during breakdown or recovery activities. The standard includes winches used for the dragging or partial raising of the casualty vehicle.

Tow ropes and tow chains are not included in this standard.

2 Normative references

The referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 857, *Specification for safety glass for land transport*.

BS 7121-12:1999, *Safe use of cranes — Part 12: Recovery vehicles and equipment — Code of practice*.

BS EN 3 (all parts), *Portable fire extinguishers*.

BS EN 292-2:1991, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles and specifications*.

BS EN 294, *Safety of machinery — Safety distances to prevent danger zones being reached by the upper limbs*.

BS EN 418:1992, *Safety of machinery — Emergency stop equipment, functional aspects — Principles for design*.

BS EN 811, *Implementation of safety of machinery — Safety distances to prevent danger zones being reached by the lower limbs*.

BS EN 1012-1, *Compressors and vacuum pumps — Safety requirements — Part 1: Compressors*.

BS EN 12077-2:1999, *Cranes safety — Requirements for health and safety — Part 2: Limiting and indicating devices*.

BS EN 12385-1, *Steel wire ropes — Safety — Part 1: General requirements*.

BS EN 12385-4, *Steel wire ropes — Safety — Part 4: Stranded ropes for general lifting applications*.

BS EN 50081-1, *Electromagnetic compatibility — Generic emission standard — Part 1: Residential, commercial and light industry*.

BS EN 60204-32:1998, *Safety of machinery — Electrical equipment of machines — Part 32: Requirements for hoisting machines*.

BS EN 61000-6-2, *Electromagnetic compatibility (EMC) — Part 2: Generic standards — Immunity for industrial environments*.

BS EN 60529:1992, *Degrees of protection provided by enclosures (IP Code)*.

prEN 13557:2002, *Cranes, controls and control stations* (in preparation).

3 Terms and definitions

For the purposes of this British Standard, the following terms and definitions apply.

3.1

boom

lifting arm, used to impart a force upon the casualty vehicle

3.2

casualty vehicle

vehicle which is subject to recovery and/or subsequent movement by a recovery vehicle

3.3

coefficient of utilization

ratio between the minimum breaking load and the rated capacity

3.4

competent person

person who has such practical and theoretical knowledge and such experience of the recovery vehicle and equipment as is necessary to carry out the function to which the term relates in each particular context

3.5

fully slewing boom

lifting boom fixed to the recovery vehicle that can raise loads at any position within a slewing range of 360°

3.6

lift and tow

the act of conveying a casualty vehicle by partially raising one end of the casualty vehicle, by means of equipment mounted on the recovery vehicle, and using the effort of the recovery vehicle to tow the casualty vehicle, the remaining wheels of which stay in contact with the road or are mounted in a wheel dolly

3.7

mean sheave diameter

diameter to the bottom of the wire rope groove plus one nominal diameter of the wire rope for which the sheave was designed

3.8

minimum breaking load

specified load below which the item of equipment does not fail either by fracture or distortion to such an extent that the load is released

3.9

nominal winch drum diameter

diameter of the bare winch drum plus one wire rope diameter

3.10

non-slewing boom

lifting boom fixed to the recovery vehicle allowing loads to be raised only over the rear of the vehicle and in line with the longitudinal centre line of that vehicle

3.11

over lift boom

boom which imparts a force onto the casualty vehicle, usually from above the casualty vehicle

3.12

partially slewing boom

lifting boom fixed to the recovery vehicle that can raise loads at any position within a slewing range of less than 360°

3.13

plated mass

maximum mass given on a plate on the vehicle

3.14

rated capacity

maximum load (mass), as assessed by a competent person, which an item of lifting equipment may raise, lower or suspend under particular service conditions

NOTE This was previously known as Safe Working Load (SWL) and is often the same as the Working Load Limit or the Maximum Safe Working Load, which are other terms used, but it might be less.

3.15

recovery

act of retrieving a casualty vehicle from an accident or abnormal situation, including broken down vehicles and/or the subsequent movement of the casualty vehicle

3.16

recovery equipment

equipment specifically designed for moving a casualty vehicle during breakdown or recovery activities

3.17**recovery vehicle**

vehicle fitted with recovery equipment

3.18**snatchblock**

wire rope sheave and hook assembly comprising of one sheave only, that can be reeved onto a wire rope without disconnecting the wire rope ends

NOTE This is generally used for two fall working.

3.19**transporter**

vehicle designed to carry a casualty vehicle entirely on its bed

3.20**type test**

test of recovery equipment or components to show certain specifications are met

3.21**under lift boom**

boom which imparts a force onto the casualty vehicle, usually from below the casualty vehicle

3.22**wheel frames**

equipment used to lift and tow utilizing the wheels of the casualty vehicle

NOTE Wheel frames are also known as Wheel grids or Spectacle frames.

3.23**winch design rating**

maximum allowable tensile force that may be applied to the wire rope by the winch

3.24**fail safe**

arrangement of a control system such that a single fault does not lead to a dangerous operating condition and the fault does not remain undetected

3.25**tipping line**

line about which the recovery vehicle can overturn due to the forces applied by the casualty vehicle or other external load

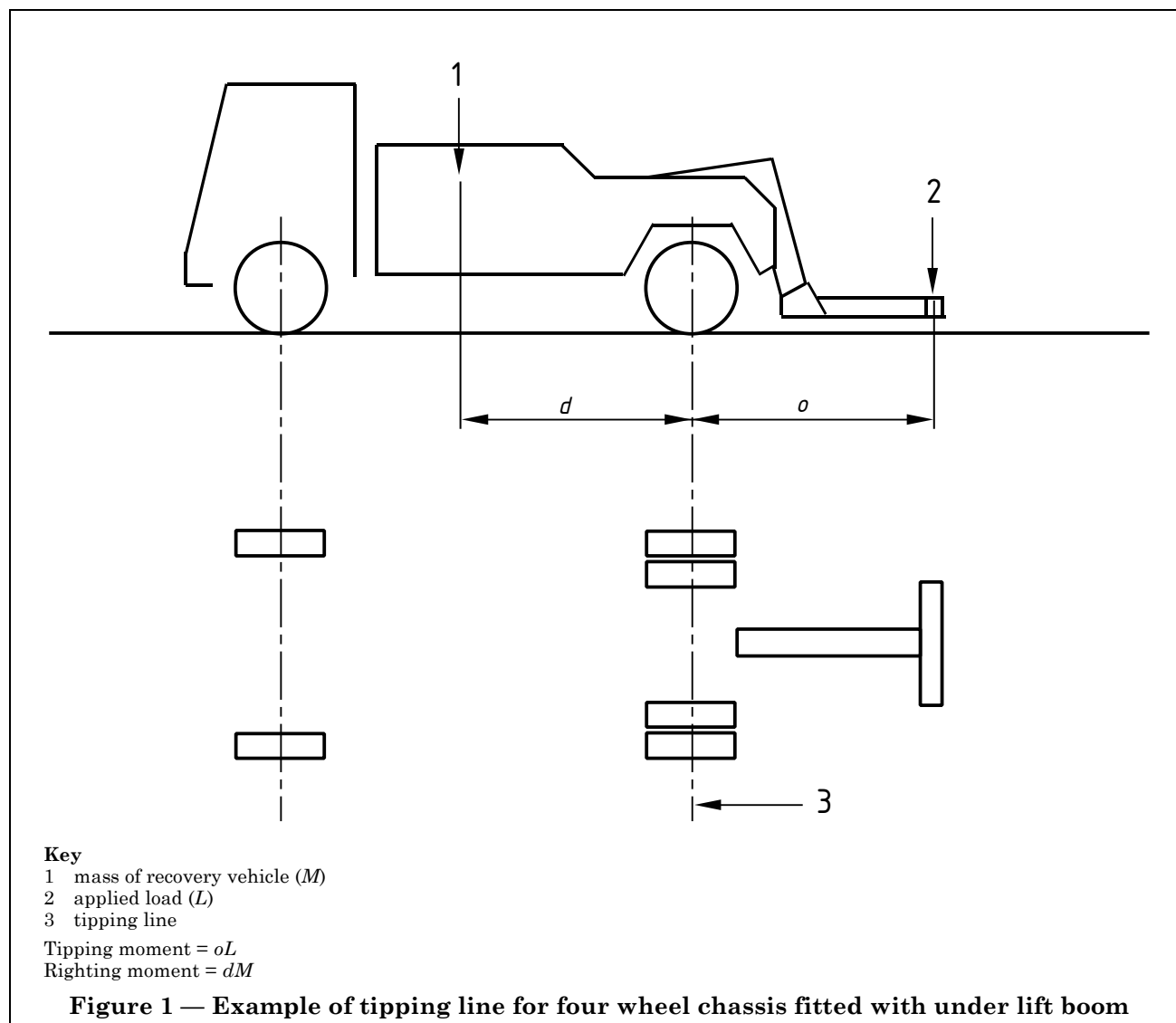
NOTE Examples of tipping lines are shown in Figure 1 to Figure 5.

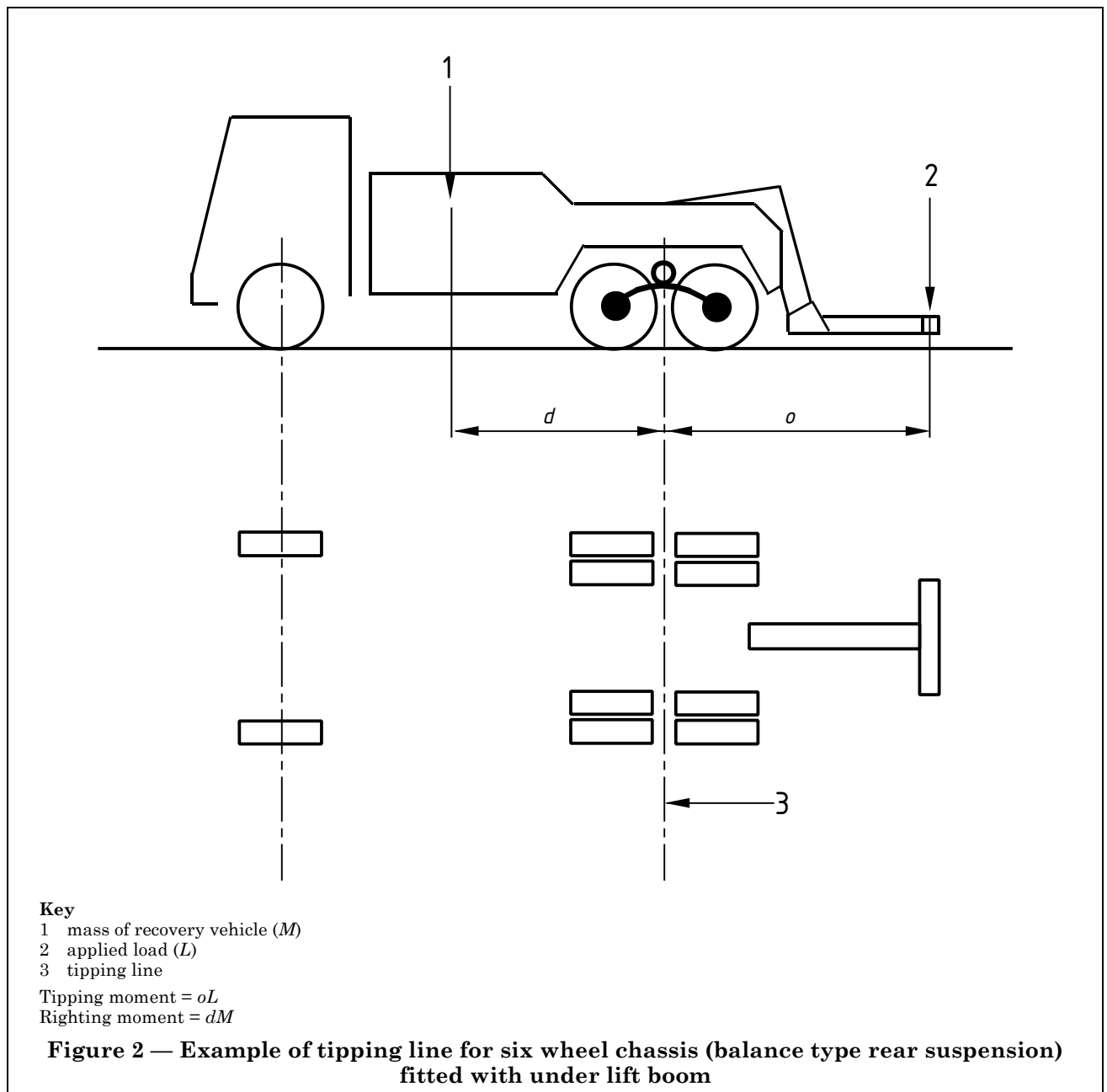
3.26**tipping moment**

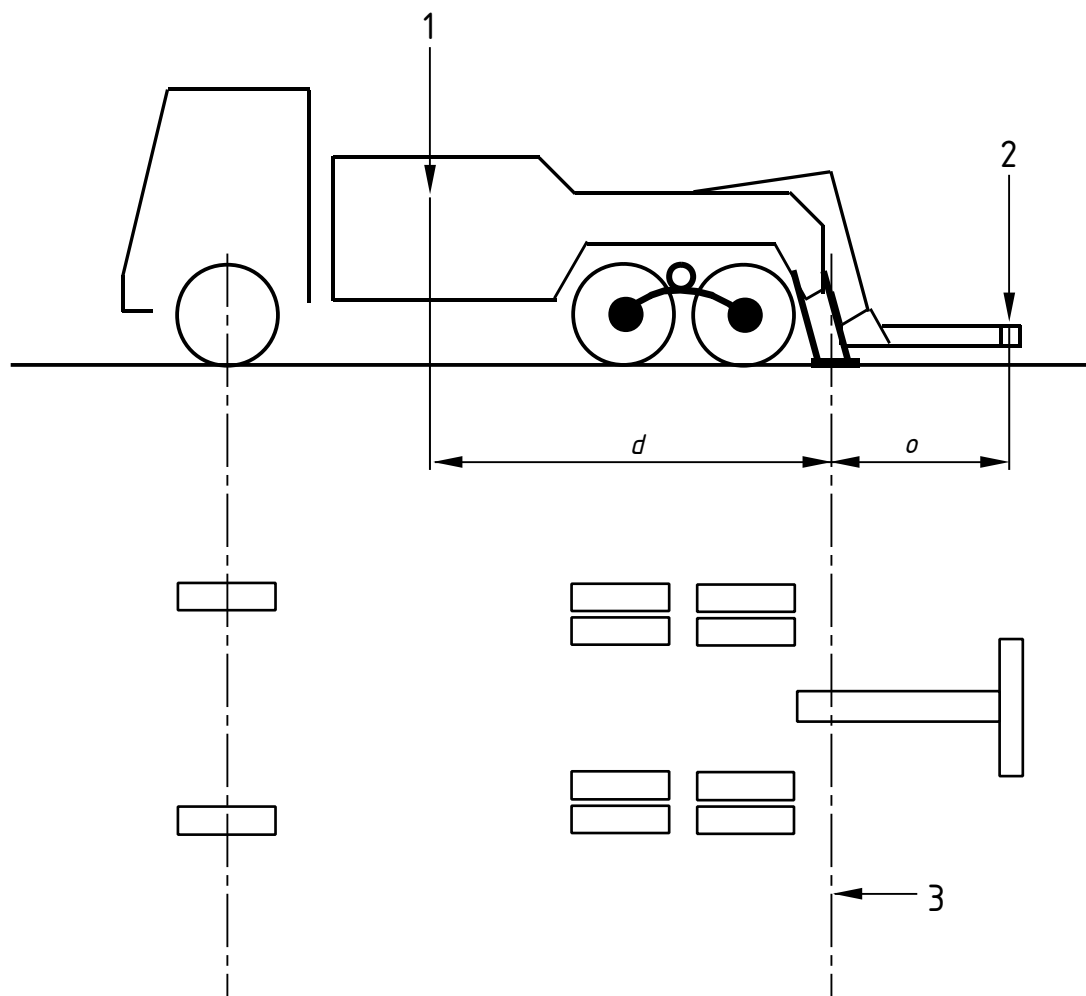
moment about the tipping line that can overturn the recovery vehicle, see Figure 1 to Figure 5

3.27**righting moment**

moment about the tipping line that resists the overturn of the recovery vehicle, see Figure 1 to Figure 5



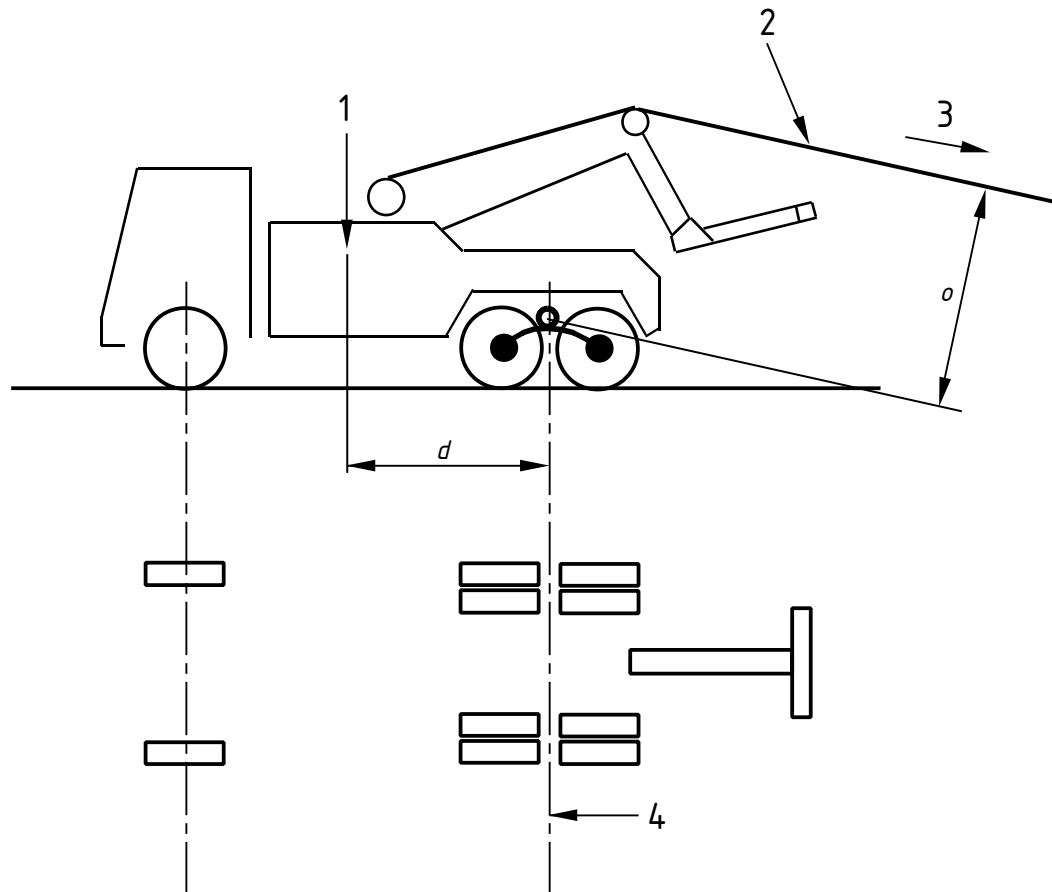


**Key**1 mass of recovery vehicle (M)2 applied load (L)

3 tipping line

Tipping moment = oL Righting moment = dM

Figure 3 — Example of tipping line for six wheel chassis with rear stabilizers/stiff legs deployed and under lift boom

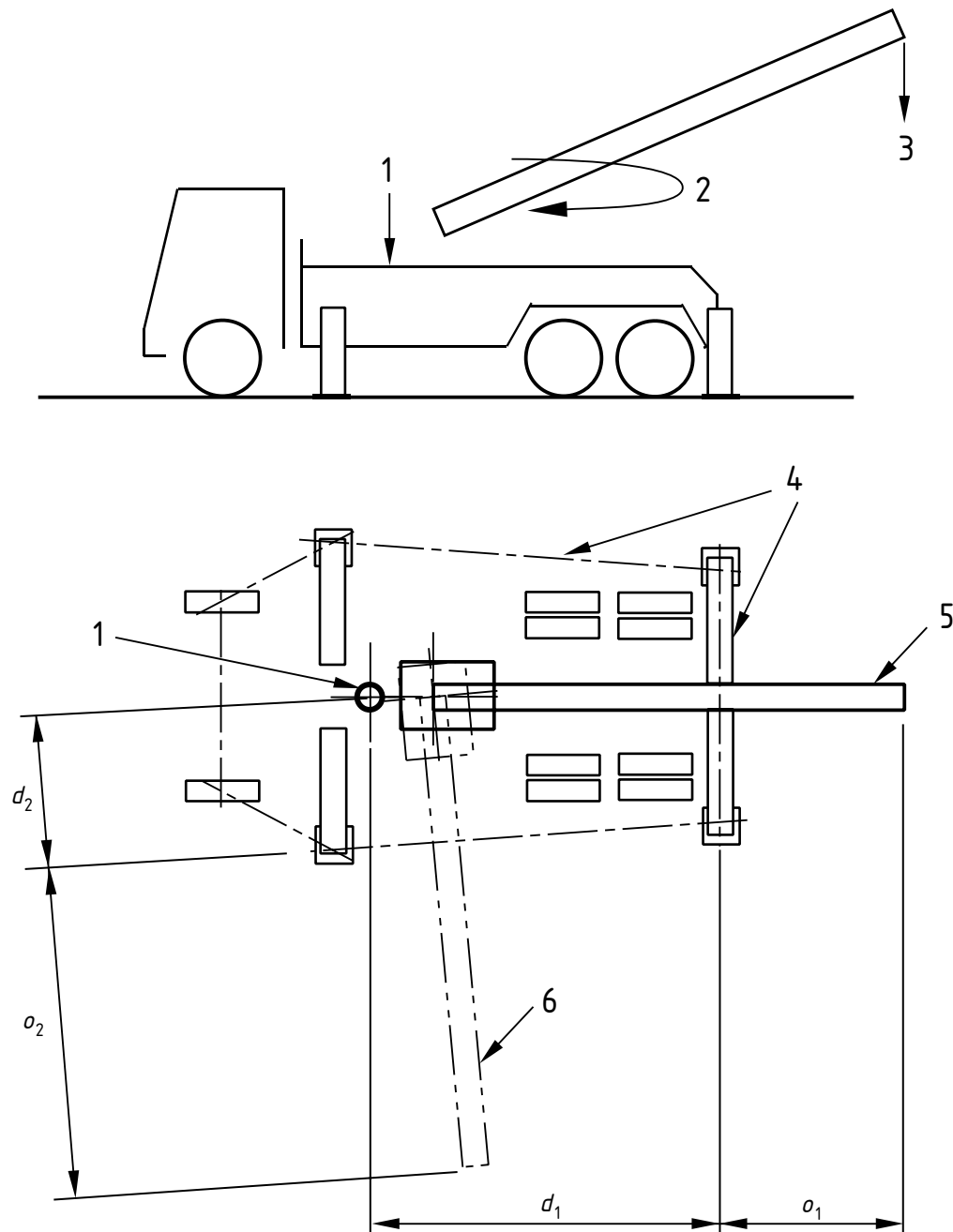
**Key**

- 1 mass of recovery vehicle (M)
- 2 winch rope
- 3 applied load (L)
- 4 tipping line

Tipping moment = oL

Righting moment = dM

Figure 4 — Example of tipping line for winch fitted to six wheel chassis (balance type rear suspension) fitted with under lift boom

**Key**

- 1 mass of recovery vehicle (M)
- 2 rotating boom
- 3 applied load (L)
- 4 tipping line
- 5 condition 1
- 6 condition 2

Condition 1: Tipping moment = $o_1 L$ Righting moment = $d_1 M$

Condition 2: Tipping moment = $o_2 L$ Righting moment = $d_2 M$

Figure 5 — Example of tipping line for vehicle fitted with rotating boom and four stabilizer legs