

Specification for

Mobile elevating work platforms

Committees responsible for this British Standard

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- Associated Offices Technical Committee
- Association of Loading and Elevating Equipment Manufacturers
- British Ports Federation and the National Association of Ports Employers
- British Railways Board
- British Telecommunications plc
- Construction Plant-hire Association
- Department of Trade and Industry [Mechanical Engineering and Manufacturing Technology Division (Mmt)]
- Electricity Supply Industry in England and Wales
- Federation of Wire Rope Manufacturers of Great Britain
- Garage Equipment Association
- Health and Safety Executive
- International Powered Access Federation
- London Regional Transport

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Foreword

This British Standard has been prepared under the direction of the Mechanical Handling Standards Policy Committee, and is based on the draft European Standard prEN 280 which is the work of CEN/TC 98, Mobile Elevating Work Platforms in which members of MHE/12 participate. The initial drafting has been carried out by the Technical Policy Committee of the International Powered Access Federation (IPAF), the main changes to the CEN/TC 98 draft being in respect of wire ropes and chains and the introduction, at the request of the Health and Safety Executive (HSE), of the principle that “single component failure” should not cause unconvenanted movement of the work platform.

Clause 7.2.4.1 of prEN 280 (the equivalent of which in this British Standard is 6.1.3) allows certain types of mobile elevating work platform (MEWP) to be excluded from the requirements given in that clause.

The arguments for these exclusions are the difficulty and substantial cost of producing a fool-proof interlocking system, particularly on some low cost MEWPs with some manual functions.

The main argument against the exclusions is safety and how to prevent the operators forgetting to engage stabilizers.

Certain compromises were considered but it was decided that until the matter can be resolved in CEN/TC 98, all MEWPs should preferably comply with the requirement of 6.1.3 i), but if this is not reasonably practicable they should comply with the requirement of 6.1.3 ii).

It is not the intent of this standard to provide a detailed design manual but, as it is generally accepted that many MEWPs have much in common with mobile cranes, advantage has been taken of British and International Standards on this subject.

There is general agreement that as MEWPs lift persons, the treatment of the design of wire rope systems should be based on twice the calculated loads, doubling the safety factor derived from mobile crane standards, and that wire rope and chain systems used to level the work platform should be duplicated.

Also the extending structure drive system designs are required to include duplication or a separate safety device to prevent the work platform plummeting if a component should fail.

In anticipation of the European Community’s single market programme recommendations for approval procedures have been included as an appendix.

Other appendices covering recommendations for examinations and tests after major alterations, periodical examinations and tests, guidelines for the design of load supporting hydraulic and pneumatic cylinders, and examples of a safe and an unsafe hydraulic control circuit are included.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 22, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

0 Introduction

The purpose of this standard is to define rules for safe-guarding persons and objects against the risk of accidents associated with the operation of mobile elevating work platforms (MEWPs).

a) Types of possible accidents that may occur include:

- 1) shearing;
- 2) crushing;
- 3) falling;
- 4) impact;
- 5) trapping;
- 6) electric shock;
- 7) material failure (e.g. fatigue, wear, corrosion);
- 8) instability of the MEWP.

b) Persons and objects to be safeguarded are as follows:

- 1) operators and passengers;
- 2) servicing and inspection personnel;
- 3) persons adjacent to the MEWP;
- 4) loads carried on work platforms;
- 5) components of the MEWP.

This standard does not repeat all the general technical rules applicable to every fluid, electrical, mechanical or structural component, and sets out only the requirements special to MEWPs that materials and equipment have to meet in the interests of safety requirements.

This standard specifies many safety devices and features. However, these cannot guarantee safe operation in all circumstances because of the highly mobile nature of MEWPs, the widely varying nature and conditions of working locations, and the great versatility of some extending structures.

Consequently the safety requirements of this standard have been drawn up on the basis that MEWPs:

- i) are only operated by persons who have been adequately trained;
- ii) are periodically maintained by competent persons, according to manufacturers' instructions, working conditions, frequency of use and national regulations;
- iii) are checked for function daily before start of work, or, if seldom used, before start of work;
- iv) are not put into operation unless all required controls and all safety devices are in working order.

When mention is made of a design detail for the sake of clarity, this should not be considered to be the only possible design; any other solution may be applied if it is equivalent in operation and at least equally safe.

1 Scope

This British Standard specifies requirements for the classification, design calculations and stability criteria, construction, safety, examinations and tests of group A and group B mobile elevating work platforms (MEWPs) with power operated extending structures and/or work platforms.

This standard does not apply to:

- a) permanently installed personnel lifting appliances;
 - b) fire fighting and fire rescue appliances;
 - c) unguided work cages suspended from lifting appliances;
 - d) order picking trucks;
 - e) tail lifts;
 - f) movable appliances with platforms guided by their supporting structures, which require support from external structures;
- NOTE When movable appliances with platforms guided by their supporting structures are used without support, this standard is applicable.
- g) work platforms which, being wholly manually operated and extended, cannot be extended under load or comply with the interlocking requirements of this standard.

NOTE 1 This standard may be taken as a basis for any of the types listed in a) to g) or similar types of machine not covered by other standards but not complying completely with this standard, or where existing standards do not deal with design and stability as completely as this standard.

NOTE 2 The titles of the publications referred to in this standard are listed on the inside back cover.

2 Classification of MEWPs

MEWPs fall into two main groups (see Figure 1 and Figure 2):

- A where their permitted range of movement is controlled by the actuators reaching full stroke or by mechanical stops;
- B where maintenance of the positions of the work platform within the permitted range of movement requires the full stroke of one or more actuators to be limited in some configurations.

These two groups are divided into three subgroups related to travelling:

- 1 travelling is only allowed with the MEWP in its transport position;
- 2 travelling with raised work platform is controlled only from a point of control at the chassis;
- 3 travelling with raised work platform is controlled from a point of control at the work platform.

3 Definitions

For the purposes of this British Standard the following definitions apply.

3.1 mobile elevating work platform (MEWP)

it consists, as a minimum, of a working platform(s), an extending structure and a chassis

3.2 work platform

a fenced platform or a cage that can be moved under load to the required working position and from which erection, repair, inspection or similar work can be carried out

3.3 extending structure

the structure that is connected to the chassis at one end and supports the work platform and that raises or lowers the work platform to its required position

3.4 chassis

the base of the MEWP, including stabilizers; it may be pulled, pushed, self-propelled, etc.

3.5 stabilizers

all devices including outriggers, forming part of the chassis, used to maintain or increase the stability of the MEWP

3.6 outrigger

extensible supports used to maintain or increase the stability of the MEWP and that may be capable of supporting or levelling the MEWP

3.7 access position¹⁾

the position that provides access to the work platform

3.8 transport position¹⁾

the position of the work platform and extending structure prescribed by the manufacturer, in which the MEWP is brought to the place of use

3.9 lowering

all operations to move the work platform to a lower level

3.10 raising

all operations to move the work platform to a higher level

3.11 rotating

a circular movement of the work platform about a vertical axis

3.12 slewing

a circular movement of the extending structure about a vertical axis

3.13 travelling

all movements of the chassis

3.14 vehicle mounted MEWP

a MEWP in which the travelling controls are located within the cab of the vehicle

3.15 pedestrian controlled MEWP

a MEWP in which the powered-travel controls are located so that they are capable of being operated by a person walking close to the MEWP

3.16 self-propelled MEWP

a MEWP in which the travelling controls are located at the work platform

3.17 safe working load (SWL)

the maximum authorized load the MEWP is designed to carry in a given configuration

¹⁾ Access position and transport position may be identical

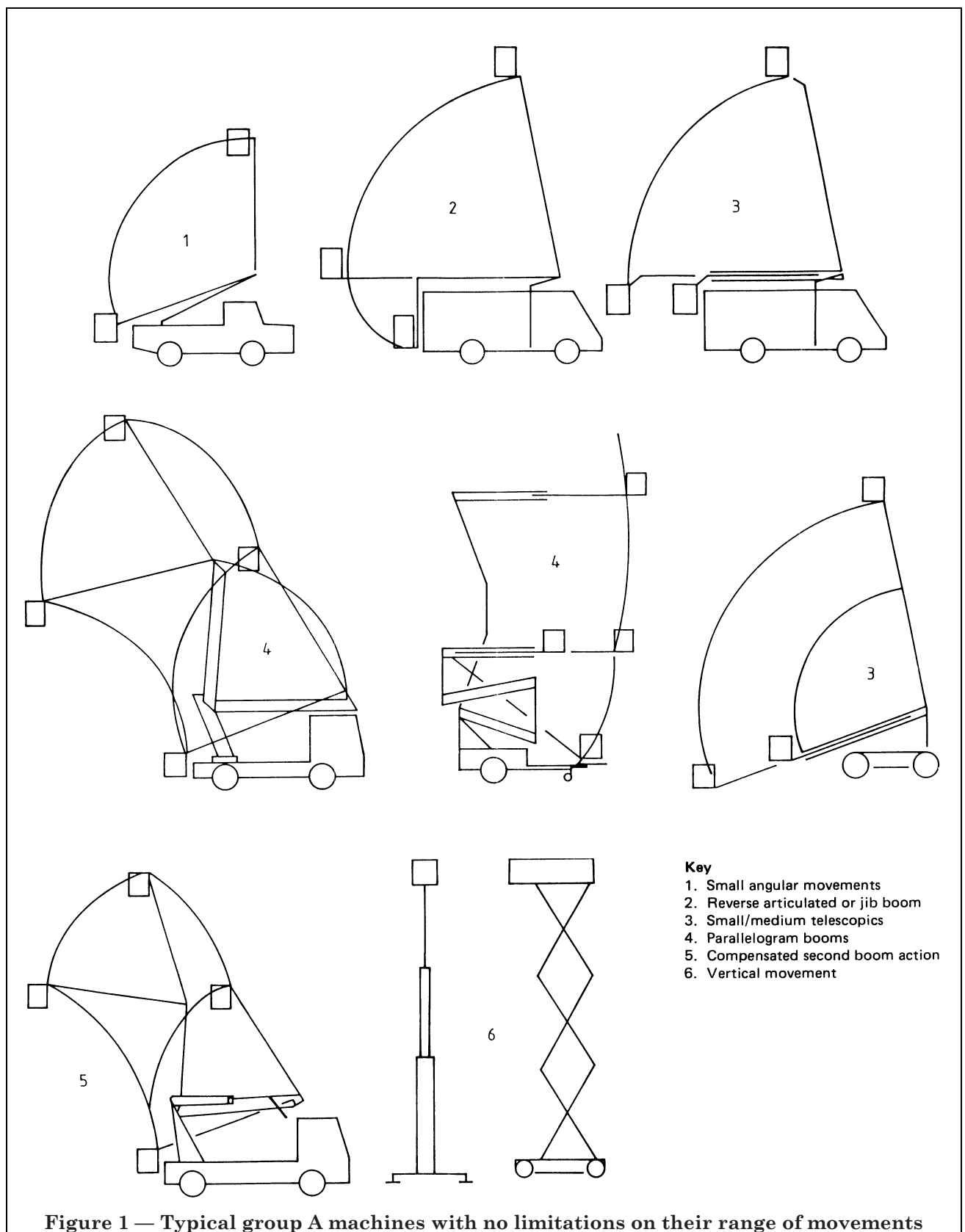
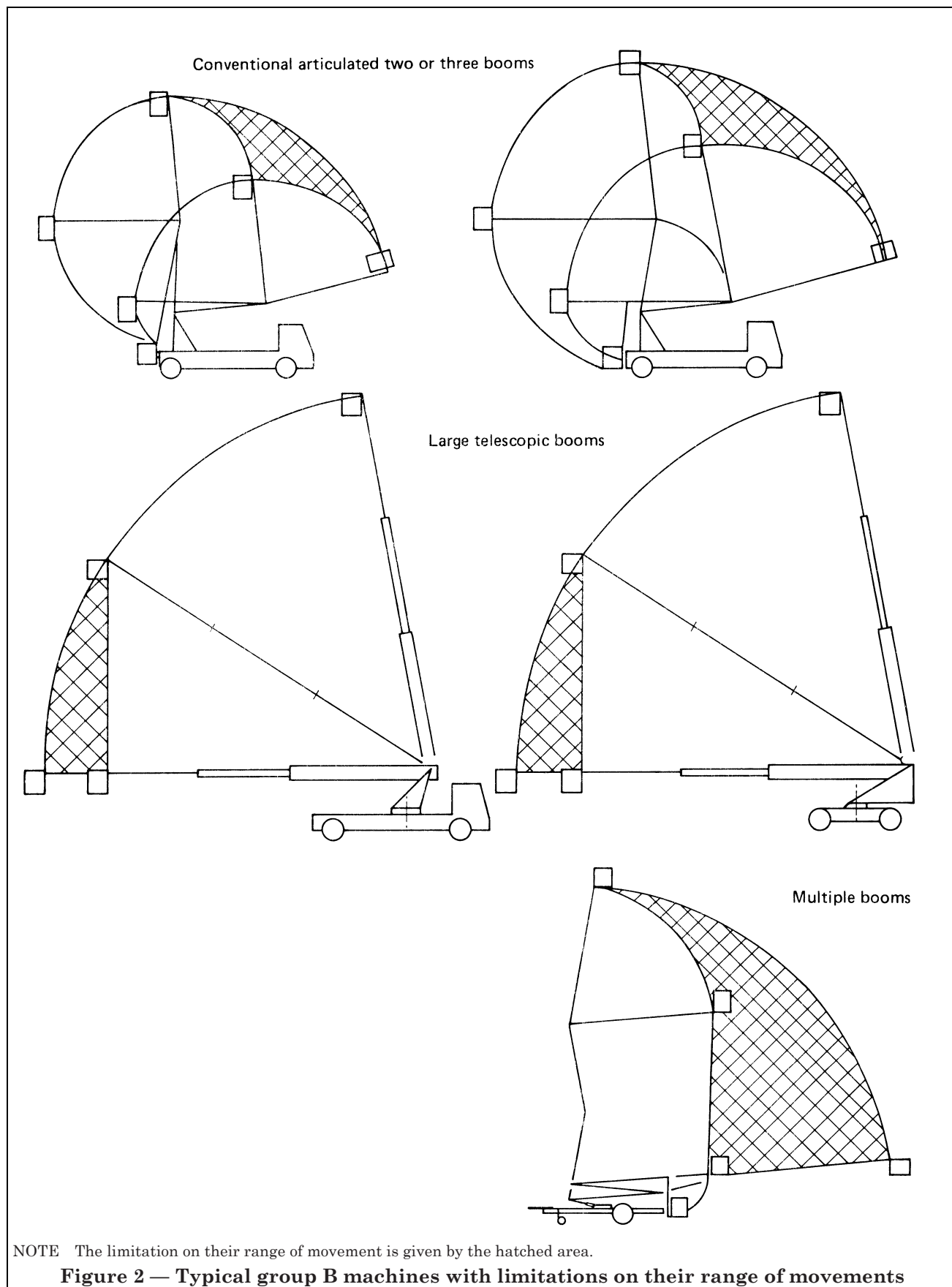


Figure 1 — Typical group A machines with no limitations on their range of movements



3.18**permitted range of movement**

all the positions of the work platform and extending structure, excluding positions which (i) are possible with full movement of the work platform and/or extending structure actuator(s) but which would cause instability, unacceptable tilting of the work platform or unacceptable stresses in the extending structure or chassis and (ii) are prevented by automatic means

3.19**actuator**

a hydraulic, pneumatic, electrical or other power device producing the force to operate the extending structure, stabilizers or work platform

3.20**working platform levelling system**

the system which maintains the floor of the working platform substantially horizontal

3.21**extending structure and/or work platform drive system**

any system that causes movement of the working platform and/or extending structure from the transport position

4 Maximum operating speeds

4.1 The maximum operating speeds of the extending structure of the MEWPs shall be as follows.

- a) Raising and lowering of the work platform: 0.4 m/s.
- b) Telescoping of boom: 0.43 m/s.
- c) Slewing with work platform at maximum radius (horizontal speed at the outer edge of the work platform): 0.7 m/s.
- d) Where speed is not uniform the average speed over the complete movement shall be used.

NOTE These speeds apply to movement of the work platform resulting from operation of a single control. Simultaneous operation of more than one control may give faster movements.

4.2 The maximum operating speeds of the chassis of the MEWPs shall be as follows.

- a) Travel with a raised and manned work platform on MEWPs of subgroups A2, A3, B2 and B3:
 - 1) subgroup A2 and subgroup B2: 2.25 m/s;
 - 2) subgroup A3 and subgroup B3: 0.7 m/s.
- b) Travel with work platform in transport position for pedestrian controlled MEWPs: 1.0 m/s.

5 Load and force factors, and design and stability calculations**5.1 General**

The design and stability calculations shall conform to the laws and principles of applied mechanics and strength of materials.

The manufacturer shall be responsible for identifying the positions of the MEWP and combinations of loads and forces acting in all possible directions and positions, to produce the conditions of maximum stress and/or instability.

Design and/or stability calculations shall be required for each of these conditions.

5.2 Loads and forces

The following loads and forces shall be taken into account:

- a) structural load:
 - 1) static, acting on those parts not part of the extending structure or work platform;
 - 2) dynamic, acting on the extending structure and work platform;
- b) safe working load:
 - 1) the mass of x persons (see **5.3.2.1**), which is considered to be a dynamic load on the work platform when the work platform is stationary; plus
 - 2) the mass of equipment, y (see **5.3.2.1**) not expressed as a number of persons, which is considered to be a static load on the work platform when the work platform is stationary;
- c) wind loads on the structure and on the persons and equipment on the work platform;
- d) manual forces applied by the persons on the work platform;
- e) special loads and forces created by special working methods and conditions of use of the MEWP including transporting, such as objects carried outside the work platform and wind forces on large objects carried on the work platform; these methods and conditions of use shall be approved by the manufacturer.

5.3 Load and force factors to be considered in design**5.3.1 Force factors**

5.3.1.1 Forces created by structural loads, SWLs and special loads shall be multiplied by a factor of 1.0 and calculated as acting vertically downwards.