Building and civil engineering – Vocabulary –
Part 3: Civil engineering – General
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Foreword

**Publishing information**
This part of BS 6100 is published by BSI and came into effect on 31 August 2007. It was prepared by Technical Committee B/500, Basic data. A list of organizations represented on this committee can be obtained on request to its secretary.

**Supersession**
This part of BS 6100 supersedes BS 6100-2.1:1992, BS 6100-2.2.1:1992, BS 6100-2.2.2:1999, BS 6100-2.2.3:1990 and BS 6100-2.3:1992, which are withdrawn.

**Relationship with other publications**
BS 6100 consists of the following parts.

- Part 0: Introduction and index.
- Part 1: General.
- Part 2: Spaces, building types, environment and physical planning.
- Part 4: Civil engineering – Transport.
- Part 5: Civil engineering – Water engineering, environmental engineering and pipelines.
- Part 6: Construction parts.
- Part 7: Services.
- Part 8: Work with timber and wood-based panels.
- Part 9: Work with concrete and plaster.
- Part 10: Contract terms.
- Part 11: Performance characteristics, measurement and joints.
- Part 12: Plant, equipment and persons.

**Information about this document**
BS 6100 has been completely restructured and compiled on different principles than previously. Consequently, this part of BS 6100 represents a full revision of the standard.

A general introduction to and explanation of the BS 6100 vocabulary is given in BS 6100-0, which provides an alphabetical index of all the terms in all parts of BS 6100. It is intended that individual parts of BS 6100 are used in conjunction with BS 6100-0 because they do not contain indexes themselves.

BS 6100-1 reproduces verbatim ISO 6707-1 and provides a vocabulary of general terms for the building and civil engineering industry. It is essential that individual parts of BS 6100 are read in conjunction with BS 6100-1.
BS 6100 does not repeat (or provide alternatives for) terms defined in other standards or in other parts of BS 6100. However, it does refer to where definitions can be found and includes a bibliography of all referenced standards.

**Presentational conventions**
Details of the structure, layout and presentational conventions used in this part of BS 6100 are given in Clause 2.

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

**Compliance with a British Standard cannot confer immunity from legal obligations.**
1 Scope

This part of BS 6100 defines terms within the civil and structural engineering industry, including:

a) structural design and structural members;
b) earthworks;
c) substructures, foundations and piles;
d) tunnels and tunnelling; and
e) superstructures, including large span structures and bridges.

2 Vocabulary structure

This part of BS 6100 does not contain its own index. Instead, a comprehensive index of terms is given in BS 6100-0. As a result, it is intended that this part of BS 6100 is used in conjunction with BS 6100-0.

The layout of this vocabulary is designed in accordance with ISO 10241 with terms arranged in a classified order and numbered in accordance with ISO 2145.

Each term has an individual number consisting of seven digits in two parts, the first of two digits, the second of five. Each number tells the following information about the term.

a) The first two digits represent which part of BS 6100 the term belongs to.
b) The third digit represents which group of terms it belongs to within the part.
c) The fourth digit represents which subgroup of terms it belongs to within the group, as follows.

1) Works.
2) Parts.
3) Materials.
4) Activities.
5) Processes.
6) Plant, equipment and documentation.
7) Properties.
8) Spaces.
9) Miscellaneous.
d) The fifth to seventh digits determine the location of the term within the subgroup.

Bold words within a definition indicate terms that are defined elsewhere in this part of BS 6100, other parts of BS 6100 or other standards. Reference to where the term is defined is given in parenthesis after the bold word.

NOTE 1 References to terms defined in BS 6100-1 are shown giving only the part number, e.g. (01); references to terms defined in all other parts of BS 6100 are shown using their full reference number, e.g. (07 59005).

NOTE 2 Where more than one definition source could be referred to, the reference containing the definition of most general applicability is given.
Alternative terms are given in medium type below preferred terms which are given in bold type. All alternative terms have the status of being deprecated. Abbreviations are given in bold type below the terms to which they relate.

In the vocabulary, terms of more than one word are written in their natural word order, e.g. pedestal elbow, and the word order is not inverted, e.g. elbow, pedestal. However, inverted forms of a term are included in the index in BS 6100-0.

Terms are only given in the singular form, even when the plural form is more common (unless the term is only found in the plural form).

3 Structural design and elements (03 1xxxx)

3.1 Works (03 11xxx)

03 11001 half-timbered building
  timber framed building (01) in which the spaces (01) between the exposed timber (01) components (01) are filled with another material (01)

3.2 Parts (03 12xxx)

03 12001 slender beam
  beam (01) with a slenderness ratio (01) exceeding a prescribed limit

03 12002 rib
  continuous projection at right angles to a flange (01) or slab (01), increasing resistance to bending

03 12003 bearing surface
  surface that transmits direct compressive load (01) from one structural member (01) to another

03 12004 panel
  distinct portion of a building element (01) surrounded by a frame (01) or other components (01) of the same type

03 12005 flat rolled-steel section (01) of rectangular cross-section, whose thickness (01) exceeds one-tenth of its width (01)

03 12006 strand
  assembly of wires or fibres of considerable length (01) spun helically in one or more layers around a core (01)

03 12007 hollow pot floor
  in-situ reinforced concrete (09 33032) ribbed floor (01), spanning in one or more directions, where voids (03 28003) between the ribs (03 12002) are formed by cellular blocks (01) made of fired clay (BS EN 12670) or lightweight concrete (BS EN 206)

03 12008 filler joist floor
  in-situ concrete (01) slab (01) containing embedded steel joists (01)
03 12009  **coffer slab**  
**concrete slab** (01) spanning in two directions and containing recesses on its underside

03 12010  **waffle slab**  
**coffer slab** (03 12009) with recesses that are curved on plan (BS ISO 10209-1)

03 12011  **hammer beam**  
short horizontal **structural member** (01) at the foot of a **principal rafter** (03 12018)

03 12012  **straining beam**  
upper horizontal **structural member** (01) of a **queen post truss** (03 12047) connecting the heads of the **queen posts** (03 12035)

03 12013  **trimmer**  
**structural member** (01) supported by a **trimming rafter** (03 12020) or trimming **joist** (01)

03 12014  **fitch beam**  
composite **beam** (01) consisting of one or more pieces of **timber** (01) of rectangular cross-section and one or more steel **plates** (01) bolted together parallel to the major axis

03 12015  **common rafter**  
**timber** (01) **rafter** (01), not forming part of a **truss** (01), that extends between **eaves** (01) and **ridge board** (06 32033)  
*NOTE* Sometimes given intermediate support by **purlins** (01).

03 12016  **jack rafter**  
shortened **rafter** (01) abutting a **hip rafter** (03 12017) or **valley rafter** (03 12019)

03 12017  **hip rafter**  
**rafter** (01) in the line of a **hip** (01)

03 12018  **principal rafter**  
inclined **structural member** (01) of a **roof truss** (01), in **compression** (01), connected to a **tie beam** (03 12030) and **posts** (01) and to which **struts** (01) are connected

03 12019  **valley rafter**  
**structural member** (01) in the line of a **valley** (01)

03 12020  **trimming rafter**  
**rafter** (01) of larger cross-section but the same **length** (01) as and parallel to **common rafters** (03 12015)

03 12021  **trimmed rafter**  
**rafter** (01) of the same cross-section as a **common rafter** (03 12015) supported by a **trimmer** (03 12013)

03 12022  **trussed purlin**  
**purlin** (01) in the form of a **lattice girder** (01)

03 12023  **furring piece**  
tapered piece of **timber** (01) fixed to the top of a **joist** (01) in a **flat roof** (01) to create a fall
03 12024 curb rafter
rafter (01) to the top, flatter, slope (01) of a mansard roof (01)

03 12025 heel strap
u-shaped, steel strap placed over the top of a principal rafter (03 12018) and bolted into the tie beam (03 12030) near the wall plate (01)

03 12026 sprocket piece
short, tapered piece of timber (01) fixed to the lower end of a common rafter (03 12015) to reduce the slope (01) of a roof (01) at the eaves (01)

03 12027 dead shore
vertical shore (01)

03 12028 flying shore
horizontal shore (01) that does not bear on the ground (01) and provides lateral support

03 12029 raking shore
inclined shore (01) that provides lateral support

03 12030 tie beam
structural member (01) connected to, and providing lateral restraint for, structural members (01) that are otherwise unrestrained

03 12031 straining sill
structural member (01) on the upper surface of a tie beam (03 12030), between posts (01) to take thrust from struts (01)

03 12032 tie rod
tie (01) in the form of a steel rod (01)

03 12033 string
horizontal tie (01) in a lattice truss (03 12048)

03 12034 king post
central post (01) in a king post truss (03 12046)

03 12035 queen post
one of a pair of posts (01) extending from the point of intersection of principal rafters (03 12018) and straining beam (03 12012) to the tie beam (03 12030)

03 12036 king rod
king post (03 12034) in the form of a steel rod (01)

03 12037 collar
horizontal structural member (01) tying a pair of principal rafters (03 12018) in opposite slopes (01)
cf. collar (03 44029)

03 12038 column head
enlargement at the top of a column (01)
03 12040 blockwork
masonry (01) of blocks (01) bonded and solidly put together with mortar (01)

03 12042 bowstring truss
roof truss (01) in the form of a simple arch (01) tied between its springings (01) and with bracing (01) between the arch (01) and the tie (01)

03 12043 Belfast truss
bowstring truss (03 12042) with lattice bracing (01)

03 12044 half truss
roof truss (01) whose shape (11 27004) is half a normal roof truss (01), partly supported by a main roof truss (01) and at an angle, usually 90 degrees to it on plan (BS ISO 10209-1)

03 12045 hammer beam truss
pitched roof truss (01) with a collar (03 12037) and hammer beams (03 12011)

03 12046 king post truss
pitched roof truss (01) that has a single main post (01)

03 12047 queen post truss
pitched roof truss (01) having two queen posts (03 12035)

03 12048 lattice truss
lattice girder (01) for a flat roof (01)

03 12049 wind girder
girder (01) with its major axis horizontal to resist wind action (01)

03 12050 friction grip connection
act or state of being joined with a high strength friction grip bolt (03 12051)

03 12051 high strength friction grip bolt
high tensile steel bolt (01), used with a high strength nut (06 72092) and hardened steel washer (06 72096), tightened to a predetermined shank tension (03 15002) so the clamping effect thus provided will transfer loads (01) in connected structural members (01) by friction

03 12052 shear connector
device that transmits shear (01) forces (01) between components (01)

03 12053 stud
small projection from the face of a component (01) to facilitate connection with another component

3.3 Activities (03 14xxx)

03 14001 plastic design
method of structural design based on the assumption that under increased loads (01) a redistribution of stress (01) takes place across a structural member (01) after yield point (01) is reached
03 14002  **prestress**
introduce into a structural member (01) internal stresses (01) of such magnitude and distribution that the stresses (01) resulting from subsequent applied loads (01) are modified.

03 14003  **post-tension**
prestress (03 14002) by tensioning prestressing tendons (01) after the concrete (01) has hardened.

03 14004  **shore**
erect shore (01).

03 14005  **backprop**
distribute construction loads (03 17023) through more than one level of construction (01).

### 3.4 Processes (03 15xxx)

03 15001  **deflection**
defformation (01) of a structural member (01) caused by bending.

03 15002  **tension**
state in part of a structural member (01) subject to forces (01) that extend it.

### 3.5 Properties (03 17xxx)

03 17001  **fatigue**
damage to a structural member (01) caused by repeated application of stresses (01) insufficient to induce failure (11 17012) by a single application.

03 17002  **monolithic**
formed of a single stone (01), or cast to form a structurally continuous mass.

03 17003  **normal stress**
stress (01) component perpendicular to the area concerned.

03 17004  **permissible stress**
stress (01) that can be sustained safely by a structural material (01) under a particular condition.

03 17005  **proof stress**
stress (01) applied to a material (01) sufficient to produce a specified permanent strain (01).

03 17006  **yield stress**
stress (01) corresponding to a yield point (01).

03 17007  **punching shear**
stress (01) imposed on a structural member (01) by a load (01) tending to penetrate that member.

**NOTE** Calculated by dividing the load (01) by the product of the perimeter of its bearing surface (03 12003) area and the thickness (01) of the member.
03 17008 elastic limit
highest stress (01) that can be applied without producing permanent deformation (01)

03 17009 ultimate bearing strength
stress (01) that can be supported by ground (01) or by a construction (01) without applying a factor of safety (01)

03 17010 effective length
length (01) of a beam (01), strut (01) or wall (01) assumed for calculating the slenderness ratio (01)

03 17011 effective span
length (01) of a beam (01) or concrete slab (01) assumed for design purposes

03 17012 simply supported
without, or assumed to be without, fixity at supports

03 17013 lever arm
distance between the centroids of compressive and tensile forces (01) in a structural member (01) subject to bending

03 17014 neutral axis
plane in a structural member (01) subject to bending, where longitudinal stress (01) is zero

03 17016 stress/strain curve
diagrammatic representation of the relationship between stress (01) and strain (01) in a material (01)

03 17017 secant modulus
slope (01) of the straight line drawn from the origin to any given point on a stress/strain curve (03 17016)

03 17018 tangent modulus
slope (01) of a stress (01) / strain (01) function

03 17019 section modulus
second moment of area of a plane section about its axis in its plane through the centroid, divided by the distance from that axis to the most remote point of that area

03 17020 plastic modulus
algebraic sum of the first moments of area about an axis through the centroid of a cross-section of a structural member (01)

03 17021 modular ratio
ratio of the elastic modulus (03 17022) of two materials (01) acting together in a structural member (01)

03 17022 elastic modulus
quotient of stress (01) divided by corresponding strain (01) in a material (01) over the range for which this value is constant

03 17023 construction load
load (01) specifically related to the execution of construction works (01)
4 Earthworks (03 2xxxx)

4.1 Parts (03 22xxx)

03 22001 berm
ledge formed in the side slope (01) of earthworks (01)

03 22002 benching
earthworks (01) formed in steps

03 22003 counterfort
projection from the hidden face of a retaining wall (01) provided at intervals to increase resistance to horizontal pressure

03 22004 toe wall
low retaining wall (01) at the foot of a ground (01) slope (01)

03 22005 cutting
section of earthworks (01) where the formation (03 22043) is below original ground level (01)

NOTE The length (01) usually greatly exceeds the width (01).

03 22006 side cut
berm (03 22001) wholly below original ground level (01)

03 22007 shallow trench
trench (01) up to 1.5 m in depth (01)

03 22008 medium trench
trench (01) greater than 1.5 m and up to 6.0 m in depth (01)

03 22009 deep trench
trench (01) that exceeds 6.0 m in depth (01)

03 22010 narrow trench
trench (01) that is too narrow for operatives (01) to enter

NOTE Usually for cables (01), small pipes (01) and trench fill foundations (03 32009).

03 22011 pit
open excavation (01) with characteristics (01) that differ from those for a trench (01)

03 22012 shallow pit
pit (03 22011) up to 1.5 m in depth (01)

03 22013 medium pit
pit (03 22011) greater than 1.5 m and up to 6.0 m in depth (01)

03 22014 deep pit
pit (03 22011) that exceeds 6.0 m in depth (01)

03 22015 trial pit
trial hole
pit (03 22011) to determine the nature of the ground (01) or the presence of underground structures (01) and services (01)
03 22016  fascine
firmly bound cylindrical bundle of brushwood (06 12114)

NOTE  Main applications are to increase loads (01) carried by very soft or waterlogged soils (01) or to support slopes (01).

03 22017  mix-in-place wall
impermeable wall (01) around an excavation (01) formed by mixing the soil (01) disturbed by vertical drilling with lime (BS EN 459-1) or hydraulic cement (09 13005) to stop water entering into the excavation (01)

03 22018  rock anchorage
ground anchorage (01) with its fixed anchor length (BS EN 1537) in rock (03 23027)

03 22019  soil anchorage
ground anchorage (01) with its fixed anchor length (BS EN 1537) in soil (01)

03 22020  ground anchorage primary reinforcement
rock anchorage (03 22018) installed in an excavation (01) to maintain overall stability of the face of the excavation (01)

03 22021  ground anchorage secondary reinforcement
rock anchorage (03 22018) installed in an excavation (01) to overcome local instability

NOTE  Local instability may be caused when fragments separate from the surface.

03 22022  rock bolt
ground anchorage (01) in which a bar (01) is fixed or tensioned (03 15002) in rock (03 23027)

03 22023  rock dowel
ground anchorage (01) in which a bar (01) is fixed in rock (03 23027) without tensioning (03 15002)

03 22024  cut off drain
drain (01) across a soil (01) or rock (03 23027) slope (01) intercepting liquid flow (BS EN ISO 772) down the slope (01) or preventing water running behind the face of an excavation (01)

03 22025  counterfort drain
deep trench (03 22009) filled with material (01) that drains freely, cut parallel to the line of steepest slope (01) and below the slip surface (03 27025) to improve slope stability (03 27045) by reducing pore water pressure (03 27011)

03 22026  slope drain
system of shallow drains (01) laid in a soil (01) or rock (03 23027) slope (01) to drain surface water (01)

03 22027  garland drain
drain (01) formed within an excavation (01), at the level of an impervious stratum (03 23001) underlying permeable strata (03 23001), to intercept water that would otherwise flow into the excavation (01)
03 22028 sub-drain
  drain (01) below formation (03 22043) to remove ground
  water (BS ISO 6107-1)

03 22029 vertical drain
  bored or driven hole filled with permeable material (01) to accelerate
  consolidation (03 25020) of compressible soils (01) by improving
  drainage (01)

03 22030 wick drain
  vertical drain (03 22029) with perforated plastics or cardboard as the
  permeable material (01)

03 22031 sand drain
  vertical drain (03 22029) with sand (BS EN 12670) as the permeable
  material (01)

03 22032 drainage layer
  layer of permeable material (01) to disperse sub-surface water

03 22033 drainage blanket
  drainage layer (03 22032) near the base of an embankment (01)

03 22034 well point
  small diameter, long tube (01) installed vertically in the ground (01),
  with a perforated length near the foot through which ground
  water (BS ISO 6107-1) is pumped

03 22035 well point system
  dewatering (01) from a number of well points (03 22034)
  NOTE Usually around the periphery of an excavation (01).

03 22036 shallow well system
  dewatering (01) in which ground water (BS ISO 6107-1) is pumped
  from perforated tubes (01) surrounded by filter medium (05 33003)
  installed in holes less than 10 m in depth (01)

03 22037 deep well system
  dewatering (01) in deep excavations (01) in which individual
  submersible pumps (05 12125) are installed in holes bored to the
  required depth (01)

03 22038 vacuum well system
  dewatering (01) in which a vacuum is induced in a well (05 21002) or
  around well points (03 22034) so that pumps (01) can remove
  ground water (BS ISO 6107-1) from less permeable ground (01)

03 22039 horizontal well system
  dewatering (01) in which a flexible perforated pipe (01), surrounded
  by a fine mesh, is installed at the bottom of a trench (01) and connected
to a vacuum pump (01) at ground level (01)

03 22040 multi-stage dewatering
  dewatering (01) in which well point systems (03 22035) or shallow
  well systems (03 22036) are installed at ground level (01) and at one
  or more deeper levels (01) as excavation (01) proceeds

03 22041 eductor system
  dewatering (01) with an eductor (07 42291)
03 22042 electro-osmotic drainage
dewatering (01) fine soils (01) using an electric potential difference (11 27112)

03 22043 formation
surface of the ground (01) in its final shape (11 27004) after completion of earthworks (01)

03 22044 critical slip circle
circular surface of the soil (01) on which it is assumed a slip (03 25009) will occur

03 22045 brob
nail spike
metal fastening (01) with its head bent at right angles to the shaft

4.2 Materials (03 23xxx)

03 23001 stratum
naturally occurring layer of a single soil (01) or rock (03 23027) type

03 23002 subsoil
soil (01) immediately below topsoil (06 13001)

03 23003 peat
dark, spongy soil (01) of vegetable origin and characterized by a high degree of compressibility (11 27020)

NOTE Usually fibrous.

03 23004 clay puddle
pug
clay (BS EN 12670) remoulded with water to a consistency where it is pliable under hand pressure; used as a water seal (01)

03 23005 cohesive soil
soil (01) that, by virtue of its clay (BS EN 12670) content and moisture, will form a coherent mass

03 23006 non-cohesive soil
soil (01) that will not form a coherent mass

03 23007 overconsolidated clay
clay (BS EN 12670) that retains some of the imposed stress (01) from a previous greater overburden (03 23019)

03 23008 colluvial deposit
rock (03 23027) deposited by gravity from its place of formation

03 23009 drift
soil (01) deposited as a result of glacial action (01)
cf. drift (03 41004)

03 23010 aeolian deposit
wind deposit
soil (01) deposited as a result of wind action (01)
03 23011 alluvial deposit
soil (01) deposited by a stream (BS EN ISO 772) or river (BS EN ISO 772), in its channel (01) or on its flood plain (05 28005)

03 23013 granular soil
non-cohesive soil (03 23006) the particle size (01) of which is greater than 0.06 mm

03 23014 running sand
sand (BS EN 12670) that exhibits flow characteristics (01) similar to liquid due to lack of confinement or water flow

03 23015 cobble
rounded to sub-angular rock (03 23027) fragments between 60 mm and 200 mm in size (01)

03 23016 hoggin
naturally occurring material (01) consisting mainly of gravel (03 23029) and sand (BS EN 12670) and containing sufficient clay (BS EN 12670) to bind the mixture when compacted

03 23017 loam
fertile soil (01), mainly of clay (BS EN 12670), silt (03 23028) and sand (BS EN 12670)
NOTE Often contains decayed vegetable matter.

03 23018 non-plastic soil
soil (01) with a plasticity index (BS EN ISO 14688-2) of zero or with a plastic limit (BS EN ISO 14688-2) that cannot be determined

03 23019 overburden
soil (01) or rock (03 23027) that overlies other material (01)

03 23020 heavy ground
ground (01) the excavated faces of which require support relatively quickly

03 23021 saturated soil
soil (01) having all its voids (03 28003) filled with water

03 23022 stabilized soil
soil (01) modified to improve and maintain its loadbearing capacity and resistance to weathering (01)
NOTE Techniques include compaction (03 24008), chemical techniques, dewatering (01).

03 23023 spoil
excavated material that is unsuitable or surplus to requirements

03 23024 isotropic soil
soil (01) that has identical properties (01) in all directions
NOTE Usually applied to permeability (01).

03 23025 overbreak
amount of rock (03 23027) excavated beyond the prescribed profile (01)
03 23026 overdig
amount of soil (01) excavated beyond the prescribed profile (01)

03 23027 rock
relatively hard naturally occurring part of the earth's crust that has not been broken down into loose material (01) that can be readily excavated (01) by hand

03 23028 silt
soil (01) that consists of particles between 0.002 mm and 0.06 mm in size (01)

03 23029 gravel
non-cohesive granular material (01) that results from natural disintegration (05 39040) of rock (03 23027) and consists of particles between 2 mm and 60 mm in size (01)

4.3 Activities (03 24xxx)

03 24001 site investigation
determination of physical characteristics (01) of sites (01) as they affect design and construction (01), and stability of neighbouring structures (01)

03 24002 ground investigation
soil survey
exploration and recording of the location and characteristics (01) of soils (01) and rocks (03 23027), and ground (01) conditions

03 24003 contiguous bored piling
retaining wall (01) construction using bored piles (BS EN 1536) in close proximity to, or touching, each other, in one or two rows

03 24004 secant piling
retaining wall (01) construction using interlocked bored piles (BS EN 1536)

03 24005 ground improvement
soil improvement
in situ decrease of permeability (01), increase of strength (11 27007) or decrease of compressibility (11 27020) of the ground (01) by mechanical means or grout (01) injection

03 24006 heavy tamping
ground improvement (03 24005) to a substantial depth (01) by repeatedly dropping a heavy weight from a considerable height (01)

03 24007 vibroreplacement
stone column
ground improvement (03 24005) in which a large tubular vibrator is used to form a deep hole into which gravel (03 23029) or stone (01) backfill (01) is introduced as the vibrator is withdrawn

03 24008 compaction
process of packing particles more closely together
03 24009 shallow compaction
compaction (03 24008) by ramming, rolling or tamping the
ground (01) surface to achieve ground improvement (03 24005) to
a shallow depth (01)

03 24010 vibrocompaction
compaction (03 24008) of granular soil (03 23013) or fill (01) by
vibrating a large tubular vibrator that is inserted deep into the
ground (01) and withdrawn

03 24011 vibroflotation
vibrocompaction (03 24010) in which jets of water are introduced to
assist penetration and compaction (03 24008)

03 24012 claquage
hydrofracture
ground improvement (03 24005) where grout (01) is injected under
significant pressure, usually through tube-a-manchettes (03 26055),
to form fissures so that a matrix of grout (01) is formed

03 24013 ground freeze
stabilize ground (01) temporarily by local freezing of the water within it

03 24014 ground injection
ground improvement (03 24005) by injection of grout (01)

03 24015 grade
shape the finished surface of earthworks (01) by mechanical means

03 24016 trim
shape earthworks (01) finally

03 24017 pole back
excavate (01) behind existing ground (01) supports and provide
support to the new face

03 24018 jet
apply water under pressure to displace material in order to aid
penetration of driven piles (BS EN 12699), well points (03 22034)
or caissons (01)

03 24019 strip
remove the upper layer of soil (01), including topsoil (06 13001)
and vegetation, preparatory to carrying out works on or in
subsoil (03 23002)

03 24020 skim
remove the top layer of, or irregularities in, the ground (01) surface by
mechanical means

03 24021 grub up
uproot small trees (06 12036), hedges (06 12007) and
shrubs (06 12035)

03 24022 blast
excavate (01) hard ground (01) with explosive (BS 5607)
lay-on blasting
method of blasting (03 24022) by placing an explosive (BS 5607) against a boulder (BS EN 12670) or other object without containing it in a shot hole (03 28001)

03 24024 drill and blast
excavate (01) hard ground (01) in which explosives (BS 5607) are placed in drilled holes and detonated

popshot
carry out secondary breakage of material employing small explosive (BS 5607) charges in shot holes (03 28001)

4.4 Processes (03 25xxx)

03 25001 boiling
displacement of soil (01) at the base of an excavation (01) or adjacent to the toe of an embankment (01) caused by pressure of water

03 25002 internal erosion
removal of soil (01) particles caused by liquid flow (BS EN ISO 772) through a soil (01)

03 25003 piping
internal erosion (03 25002) leading to sudden collapse
cf. piping (03 45001)

03 25004 cryoturbation
disturbance of a soil (01) structure by the action (01) of ground (01) ice

03 25005 ravelling
failure (11 17012) of exposed cohesive soil (04 23005) by fracturing

03 25006 heave
upward displacement of the ground (01) as a result of excavation (01), surcharge (03 27031) or installing displacement piles (BS EN 12699)

03 25007 subsidence
downward movement of the ground (01) surface that results from collapse, removal or displacement of underlying material (01)

03 25008 cambering
downwarping of a hard rock (03 23027) stratum (03 23001) in an escarpment valley side or excavation (01) due to extrusion of a soft underlying stratum (03 23001)

NOTE The soft underlying stratum (3) is typically of clay (BS EN 12670).

03 25009 slip
landslip
movement of a mass of soil (01) or rock (03 23027) by gravity

NOTE Often a rotational displacement.

03 25010 rotational slide
rotation of a mass of soil (01) along a curved slip surface (03 27025)
03 25011 circular slide
rotational slide (03 25010) on a slip surface (03 27025) that is approximately circular

03 25012 non-circular slide
rotational slide (03 25010) on a slip surface (03 27025) that is not wholly circular

03 25013 translational slide
movement of a shallow mass of soil (01) in a plane roughly parallel to the slope (01) due to a weakness on the plane

03 25014 flow slide
mud flow
translational slide (03 25013) in saturated soil (03 23021), caused by a sudden increase in pore water pressure (03 27011), in which the soil (01) flows as a viscous fluid

03 25015 slab slide
translational slide (03 25013) in which the sliding mass remains more or less intact
NOTE Usually occurring in the weathered (01) surface of a slope (01).

03 25016 block slide
translational slide (03 25013) in which a block of relatively strong rock (03 23027) or stiff to hard clay (BS EN 12670) moves down a slope (01) as a unit

03 25017 debris slide
translational slide (03 25013) of debris, forming a mantle on a slope (01) or the disturbed material at the toe of a rotational slide (03 25010), when rainfall (05 29004) or diverted surface water (01) causes downward movement of the debris

03 25018 compound slide
movement of a soil (01) mass that combines the characteristics (01) of a rotational slide (03 25010) and a translational slide (03 25013)

03 25019 landslide
large scale slip (03 25009) or flow slide (03 25014)

03 25020 consolidation
reduction of bulk volume of soil (01), usually over a period of time, that results from the closer packing of particles caused by an increase in effective stress (03 27014)

03 25021 misfire
complete or partial failure (11 17012) of an explosion, after action to initiate it

4.5 Plant, equipment and documentation
(03 26xxx)

03 26001 undisturbed sample
soil (01) sample (01) obtained by specialist methods so that its content and structure are not appreciably altered by the sampling (01)
03 26002 plate bearing test
**test** (11 14010) to assess bearing **characteristics** (01) of **ground** (01) by loading a **plate** (01) in contact with undisturbed **ground** (01) and observing the **effect** (ISO 8930)

03 26003 standard penetration test
**test** (11 14010) in which a **penetrometer** (03 26052) is driven into **soil** (01) a standard distance with standard blows; the number of blows required is used to estimate **soil** (01) behaviour

03 26004 vane test
in situ **test** (11 14010) of **cohesive soil** (03 23005) using a **measuring instrument** (BS 6953) with a blade of cruciform cross-section that is rotated to measure **shear strength** (01)

03 26005 triaxial compression test
**laboratory test** (11 14010) in which a cylindrical **specimen** (11 12001) of **soil** (01) or **rock** (03 23027) is subjected to simultaneous axial loading and radial confining pressure to determine its **shear strength** (01)

03 26006 unconfined compression test
**compression** (01) **test** (11 14010) on a cylindrical **sample** (01) of **cohesive soil** (03 23005) without lateral restraint

03 26007 Proctor test
one of a number of **tests** (11 14010) to determine the **dry density/moisture content relationship** (03 27004)

03 26008 sedimentation test
**test** (11 14010) to determine **sizes** (01) of fine particles by **measuring** (01) their rates of fall through a liquid at rest

03 26009 sheeting
boards or steel **sheets** (01) used to support the **ground** (01) in an **excavation** (01) or retained **material** (01)

03 26010 close sheeting
close timbering
pieces of **sheeting** (03 26009) placed close together to hold up the **ground** (01) in an **excavation** (01)

03 26011 open sheeting
open timbering
pieces of **sheeting** (03 26009) spaced at intervals in an **excavation** (01) to support **ground** (01) that is sufficiently firm to make **close sheeting** (03 26010) unnecessary

03 26012 trench sheet
**section** (01) used to support the sides of a **trench** (01) or an **excavation** (01)

*NOTE* Generally a cold **rolled-steel section** (01) installed vertically.

03 26013 timbering
**temporary works** (10 61001, 10 61002) in **timber** (01)
03 26014 rider shore
inclined shore (01) that springs from the upper surface of a
raking shore (03 12029)

03 26015 back shore
jack shore
member laid on and fixed to the top of a raking shore (03 12029)
and supported on the sole piece (03 26020), from which a
rider shore (03 26014) is wedged

03 26016 waling
in timbering (03 26013), horizontal member supporting a
cofferdam (01) wall (01) or sheeting (03 26009)

03 26017 face waling
face piece
waling (03 26016) across the end of a trench (01) or tunnel (01)

03 26018 ground frame
top frame
frame (01) of walings (03 26016) and struts (01) set at or about
ground level (01) as a guide for the first setting of runners (03 26027)
or trench sheet (03 26012)

03 26019 shoring headtree
horizontal member placed immediately on the heads of
dead shores (03 12027)

03 26020 sole piece
member in contact with the ground (01), on which the foot of a
raking shore (03 12029) or dead shore (03 12027) rests

03 26021 needle
horizontal member inserted into or through a wall (01) and wedged up
to provide support

03 26022 wall piece
vertical member placed in direct contact with a wall (01) to distribute
the thrust from one or more shores (01)

03 26023 lip
lipping block
short length of timber (01), fixed to the top of a strut (01), that
projects sufficiently beyond its end to rest on a waling (03 26016)

03 26024 lacing
lacing boards
in timbering (03 26013), members fixed to pairs of
walings (03 26016), struts (01) or shores (01) to provide
extra rigidity

03 26025 puncheon
post (01) to support a higher waling (03 26016) or strut (01) from
the one below
03 26026 kicking piece
length of timber (01) fixed to a waling (03 26016) to take the thrust from the end of a strut (01) that is not at right angles to the waling (03 26016)

03 26027 runner
vertical member to support the sides or face of an excavation (01) and progressively driven or lowered as excavation (01) proceeds, its lower end being kept below the bottom of the excavation (01)

03 26028 guide runner
runner (03 26027) driven ahead as a guide for driving intermediate runners (03 26027)

03 26029 poling board
sheeting (03 26009) in contact with the ground (01) and supporting the face or sides of an excavation (01)

NOTE Usually 1 m to 5 m long.

03 26030 setting frame (01) that supports the ground (01) around an excavation (01)

03 26031 cross poling
poling board (03 26029) placed horizontally across the face of a tunnel (01); in a trench (01) where runners (03 26027) or sheeting (03 26009) cannot be driven continuously and vertically, horizontally across a gap between runners (03 26027) or sheeting and tucked in behind them

03 26032 tucking frame
frame (01) in which walings (03 26016) support sheeting (03 26009) boards at their ends

03 26033 tucking board
narrow piece of timber (01) behind walings (03 26016) in tucking frames (03 26032)

03 26034 soldier
vertical members that support walings (03 26016) or horizontal poling boards (03 26029)

03 26035 ground prop
in timbering (03 26013), post (01) between the lowest frame (01) and a foot block (03 26039) on the bottom surface of an excavation (01)

03 26036 base plate
plate (01) that distributes load (01) from a vertical or raking structural member (01)

03 26037 adjustable base plate
base plate (03 26036) embodying a screw jack (12 56030)

03 26038 sole plate
horizontal member that distributes load (01) from posts (01) or frames (01)

03 26039 foot block
in timbering (03 26013), a timber (01) pad to spread a load (01)
03 26040 ledge
unframed member fixed across a board or boarding (01) to hold it (or them) together

03 26041 liner
in timbering (03 26013), a member driven between opposite members of a frame (01) to lock them in position

03 26042 page
short thin wedge (06 32230)

03 26043 cleat
block to prevent movement of a strut (01) or waling (03 26016)

03 26044 cutting-out piece
short piece of timber (01) that may be cut out to dismantle timbering (03 26013)

03 26046 guide frame
timber (01) frame (01) erected above ground level (01) as a guide for runners (03 26027) or sheet piling (01) or as a staging (01) from which they may be driven

03 26047 slope rail
rail (08 32002) fixed at an angle to indicate the slope (01) of earthworks (01) under construction (01)

03 26048 stank
small temporary dam (01)

03 26049 clay cutter
percussive boring tool (01), used in cohesive soils (03 23005), that consists of an open-ended steel tube (01) to which a cutting shoe is attached

03 26050 shell
percussive boring tool (01), used in granular soils (03 23013), that consists of an open-ended steel tube (01) to which a cutting shoe is attached and that carries a flap valve (01) at its lower end to prevent material falling out

03 26051 soil sampler
open ended tube (01) driven into the ground (01) to obtain an undisturbed sample (03 26001)

03 26052 penetrometer
measuring instrument (BS 6953) that establishes the resistance of ground (01) to penetration

03 26053 piezometer
device installed below ground (01) surface to measure (01) ground water (BS ISO 6107-1) pressure

03 26054 slip indicator
device inserted vertically into sloping soil (01) mass to measure (01) distortions due to soil (01) movements and to monitor slope stability (03 27045)

NOTE Usually a small diameter tube (01).
03 26055  tube-a-manchette
steel tube (01) approximately 50 mm diameter with perforations at
300 mm centres over a limited length (01), the perforations being
covered by pliable sleeves

03 26056  shot
explosive (BS 5607) and primer (BS 5607) placed in a
shot hole (03 28001)

03 26057  blasting agent
mixture for blasting (03 24022) that does not contain self
explosive (BS 5607) ingredients such as nitroglycerine or TNT
NOTE  This term is not used in official British classifications.

03 26058  firing circuit
circuit that connects the exploder (BS 5607) to one or more
detonators (BS 5607)

03 26059  connecting wire
electric (07 17002) cable (01), used only once, that forms part of the
firing circuit (03 26058) within the blast area (BS 5607)

4.6  Properties (03 27xxx)

03 27001  maximum dry density
dry density (BS EN ISO 12570) or soil (01) obtained by a specified
amount of compaction (03 24008) or the optimum moisture
content (01)

03 27002  relative compaction
ratio of the dry density (BS EN ISO 12570) of a soil (01) to its
maximum dry density (03 27001)

03 27003  Atterberg limits
limits of moisture content (11 27033) of a soil (01) below which a
cohesive soil (03 23005) is no longer plastic and above which it is
liquid

03 27004  dry density/moisture content relationship
relationship between dry density (BS EN ISO 12570) and
moisture content (11 27033) of a soil (01) with a given amount
of compaction (03 24008)

03 27005  clay fraction
fraction of a soil (01) composed of particles smaller in size (01)
than 0.002 mm

03 27006  gravel fraction
fraction of a soil (01) composed of particles between 2 mm and
60 mm in size (01)

03 27007  sand fraction
fraction of a soil (01) composed of particles between 0.06 mm
and 2 mm in size (01)

03 27008  silt fraction
fraction of a soil (01) composed of particles between 0.002 mm
and 0.06 mm in size (01)
03 27009  particle size distribution
percentage of prescribed grain sizes (01) present in a soil (01)

03 27010  perched water table
water table (BS ISO 6107-3) maintained above the general standing water level of the ground (01) below

NOTE  It is usually maintained by an impervious stratum (03 23001).

03 27011  pore water pressure
pressure of water contained in soil (01) or rock (03 23027)

03 27012  total stress
combination of all stresses (01) acting at a point in a soil (01) or rock (03 23027) mass

03 27013  total pressure
pressure on a horizontal plane in a mass of soil (01), principally due to the weight (11 27002) of the overburden (03 23019)

03 27014  effective stress
difference between total stress (03 27012) and pore water pressure (03 27011)

NOTE  For most purposes, that part of total stress (03 27012) borne by inter-particle contact.

03 27015  pore pressure ratio
ratio of the pore water pressure (03 27011) to the total pressure (04 27013)

03 27016  artesian
condition existing in an aquifer (BS ISO 6107-3) in which the head (01) of the water is sufficient to cause the water to rise above the surface of the ground (01)

03 27017  degree of saturation
ratio of the volume of water contained in voids (03 28003) to the total volume of voids (03 28003) in a material (01)

03 27018  percentage air voids
volume of air voids (03 28003) in a soil (01) expressed as a percentage of the total volume of the soil (01)

03 27019  skin friction
frictional resistance (11 27016) of surrounding soil (01) on the surface of structural members (01) below ground level (01)

cf. skin friction (03 36007)

03 27020  internal angle of friction
in granular soils (03 23013) the angle whose tangent, when multiplied by the force (01) normal to the assumed sliding surface, is equal to the shear strength (01) of the soil (01)

03 27022  angle of repose
steepest angle to the horizontal at which the sides of a heap of granular material (01) will be at rest

03 27025  slip surface
surface of soil (01) on which a slip (03 25009) occurs
03 27026 slip circle
circular slip surface (03 27025)

03 27027 slip plane
slip surface (03 27025) in one plane

03 27028 toppling failure
failure (11 17012) of a rock (03 23027) slope (01) where steeply inclined discontinuities cause individual rock (03 23027) masses to overbalance

03 27029 wedge failure
failure (11 17012) by sliding of a wedge of rock (03 23027) or stiff clay (BS EN 12670) to the intersection of two or three well defined joint planes or fissures (BS EN 12670) behind a slope (01)

03 27030 drawdown
distance by which water table (BS ISO 6107-3) in or around a well (05 21002) or borehole (01) is lowered by pumping

03 27031 surcharge
material (01) or load (01) above formation (03 22043) either supported by a retaining structure (01) or used to increase the rate of consolidation (03 25020)

03 27032 earth pressure at rest
value of lateral pressure in a soil (01) mass, with a horizontal upper surface, completely at rest and undisturbed by any external force (01)

03 27033 active earth pressure
minimum value of lateral pressure in a soil (01) confined by a smooth vertical wall (01) as the wall (01) is moved away from the soil (01) mass allowing the soil (01) to expand until it reaches a state of equilibrium

03 27034 passive earth pressure
maximum value of lateral pressure in a soil (01) confined by a smooth vertical wall (01) as the wall (01) is moved towards the soil (01) mass causing the soil (01) to compress (01) until it reaches a limiting state when soil (01) failure (11 17012) occurs

03 27035 gross loading intensity
intensity of vertical loading on the ground (01) at the base of a foundation (01) due to all loads (01) above that level

03 27036 ultimate bearing capacity
value of the gross loading intensity (03 27035) for a particular foundation (01) at which the resistance of the soil (01) to displacement of the foundation (01) is fully mobilized

03 27037 net loading intensity
decrease or increase in intensity of vertical loading at the base of a foundation (01)

cf. net loading intensity (03 37001)

NOTE Due, typically, to the weight (11 27002) of a new structure (01) including earthworks (01).
03 27038 **presumed bearing value**
net loading intensity (03 27037) considered appropriate to the particular type of ground (01) for preliminary design purposes

*NOTE* Usually obtained from a table.

03 27039 **allowable net bearing pressure**
net loading intensity (03 27037) taking into account the ultimate bearing capacity (03 27036), an appropriate factor of safety (01), the amount and kind of settlement (01) expected and the ability of the structure (01) to accommodate the settlement (01)

03 27040 **A-line**
line on a graph of liquid limit (BS EN ISO 14688-2) against plasticity index (BS EN ISO 14688-2), giving an empirical boundary between inorganic clays (BS EN 12670) and silty and organic soils (01)

03 27041 **air voids line**
line on a graph relating dry density (BS EN ISO 12570) to moisture content (11 27033) of a soil (01) that has a constant percentage of air voids (03 28003)

03 27042 **saturation line**
air voids line (03 27041) where the volume of air voids (03 28003) is zero

03 27043 **bulb of pressure**
contour line indicating assumed points of equal pressure below a foundation (01)
cf. bulb of pressure (03 37002)

03 27044 **California bearing ratio**
ratio of the force (01) required to achieve a given penetration of a prescribed piston into a soil (01) to the force (01) required to produce the same penetration into a standard sample (01) of crushed rock (09 23012)

03 27045 **slope stability**
degree of stability of a soil (01) slope (01), represented by a factor of safety (01)

03 27046 **depth of cut-off**
depth (01) reached by a diaphragm wall (01), sheet piling (01), contiguous bored piling (03 24003) or cofferdam (01) wall (01) below formation (03 22043)

03 27047 **depth of penetration**
total depth (01) below external ground level (01) reached by a caisson (01) or the sheet piling (01) of a cofferdam (01)

03 27048 **foundation level**
level (01) of the lowest part of a foundation (01) relative to datum (01)

03 27049 **soil profile**
representation of a vertical section of soil (01) strata (03 23001) derived from a ground investigation (03 24002)
03 27050 haul
distance through which material (01) is transported

03 27051 chargeweight
weight of an individual explosive (BS 5607) charge used in a shot (03 26056) or lay-on blasting (03 24023)

4.7 Spaces (03 28xxx)

03 28001 shot hole
hole drilled in rock (03 23027) and charged with explosives (BS 5607) for excavation (01)

03 28002 firing point
place at which an explosion is initiated

03 28003 void
space (01) filled with fluids between particles

5 Substructures and foundations (03 3xxxx)

5.1 Parts (03 32xxx)

03 32001 ground beam
beam (01) in a substructure (01) transmitting load (01) to a pile (01), pad foundation (03 32006) or other foundation (01)

03 32002 leg
support in an underpinning (01) forming part of the permanent work cf. leg (03 46004)

03 32003 tanking
impervious membrane that prevents infiltration of subsurface water

03 32004 kentledge
material (01) used as a temporary load (01)

03 32005 grillage
assembly (01) of layers of beams (01) on top of and at right angles to each other, to distribute or concentrate a load (01)

03 32006 pad foundation
isolated foundation (01) that spreads a concentrated load (01)

03 32007 piled raft
foundation (01) formed of piles (01) and a raft foundation (01) acting together

03 32008 widestrip foundation
strip foundation (01) of such a width (01) that transverse reinforcement (09 33068) is necessary

03 32009 trench fill foundation
foundation (01) formed by backfilling (01) a mechanically excavated narrow trench (03 22010) with loadbearing concrete (01)
03 32010 soldier pile
vertical member that supports walings (03 26016) or horizontal poling boards (03 26029)

03 32011 needle pile
small diameter pile (01) of cast-in-place reinforced concrete (2),
steel tube (01) or bar (01) drilled or driven through and connected to an existing foundation (01) or substructure (01), and the surrounding soil (01) to improve structural stability

03 32012 mini pile
small pile (01) installed with lightweight equipment

NOTE Usually less than 300 mm in diameter.

03 32013 composite pile
pile (01) constructed to suit particular conditions using more than one method of construction (01)

03 32014 raking pile
pile (01) installed at an inclination to the vertical

03 32015 totally preformed pile
driven pile (BS EN 12699) manufactured or assembled above ground level (01)

03 32016 timber pile
totally preformed pile (03 32015) of timber (01)

03 32017 steel pile
totally preformed pile (03 32015) of steel

03 32018 H-pile
steel pile (03 32017) of rolled steel H-section (01)

03 32019 box pile
steel pile (03 32017) of hollow section (01)

03 32020 pipe pile
tubular pile
cylindrical box pile (03 32019)

03 32021 small diameter bored pile
bored pile (BS EN 1536) with a diameter of 600 mm or less

03 32022 large diameter bored pile
bored pile (BS EN 1536) with a diameter greater than 600 mm

03 32023 percussive bored pile
bored pile (BS EN 1536) with the hole being cut by percussive means

03 32024 rotary bored pile
bored pile (BS EN 1536) with the hole being formed by an excavation (01) tool (01) mounted on a kelly bar (03 36017)

03 32025 augered pile
bored pile (BS EN 1536) that utilizes a hole formed by auger boring (01)

03 32026 straight shafted augered pile
augered pile (03 32025) without enlarged base (BS EN 1536)
underreamed pile
belled pile
large diameter bored pile (03 32022) that has an enlarged base (BS EN 1536) formed by undercutting

ejacked pile
pile (01) forced into place by jacking it against a reaction
NOTE Usually formed in short sections; typically jacked against weight (11 27002) of structure (01).

king pile
long pile (01) installed prior to forming an excavation (01) and providing intermediate support to struts (01) in wide, struttled sheet pile (01) excavation (01)

rock socket
lower portion of a pile (01) boring, penetrating into sound rock (03 23027)

5.2 Materials (03 33xxx)

drilling fluid
mixture of water and other materials (01) used in boring, drilling, tunnelling or other excavation (01) to lubricate tools (01), stabilize excavated faces and transport spoil (03 23023)

filter cake
semi-stable layer of permeable soil (01) formed in the face of an excavation (01) by the infiltration of particles from a drilling fluid (03 33001)

slip layer
coat (01) applied to a pile (01) shaft to minimize negative skin friction (03 36008)

5.3 Activities (03 34xxx)

mud-in
stir bentonite (01) powder and water into granular soil (03 23013) with auger boring (01) to facilitate the installation of a temporary casing (BS EN 12699)

direct circulation boring
method of boring in which fluid passes down a central pipe (01) to lubricate the tool (01) and make the spoil (03 23023) rise

reverse circulation boring
method of boring in which the lubricating fluid is used to transport spoil (03 23023) by pumping it up a central pipe (01)

air lifting
pumping technique in which air is pumped into the base of a suction pipe (01) to reduce density (01) of material (01) in the pipe (01) and induce upward flow to evacuate solids and fluids
03 34005 **blow**  
single application of a **force** (01) to drive a **pile** (01) into the **ground** (01)

03 34006 **compressed air work**  
work in a chamber that has been pressurized with **compressed air** (BS EN 12110)

### 5.4 Processes (03 35xxx)

03 35001 **blow out**  
sudden major escape of **compressed air** (BS EN 12110) from a **tunnel** (01) or **caisson** (01), often accompanied by an inrush of **soil** (01) and water

03 35002 **blow down**  
reduce air pressure in a **compressed air caisson** (03 46024) to overcome resistance to sinking

### 5.5 Plant, equipment and documentation (03 36xxx)

03 36001 **crib**  
temporary **frame** (01) or layers of horizontal members that transfer a vertical **load** (01) from one level to another

03 36002 **allowable pile load**  
**load** (01) that may be applied to a **pile** (01), taking account of its **ultimate bearing capacity** (03 27036), **negative skin friction** (03 36008), **pile** (01) spacing, overall bearing capacity of the **ground** (01) below, allowable **settlement** (01) and appropriate **factor of safety** (01)

03 36003 **pile design load**  
**load** (01) that a **pile** (01) is designed to carry

03 36004 **pile working load**  
**load** (01) that a **pile** (01) carries in service

03 36005 **pile proof load**  
**load** (01) greater than the **pile design load** (03 36003) applied to a selected **pile** (01) to confirm its suitability

03 36006 **shaft adhesion**  
supportive **adhesion** (01) by which a **pile** (01) shaft transfers **load** (01) into surrounding **soil** (01) or **fill** (01)

03 36007 **skin friction**  
support given by the combined effect of **shaft friction** (03 37003) and **shaft adhesion** (03 36006)  
cf. **skin friction** (03 27019)

03 36008 **negative skin friction**  
downdrag  
downward pressure, exerted by a combination of frictional **forces** (01) and **adhesion** (01) on a **pile** (01) by surrounding **soil** (01) or **fill** (01), when the **soil** (01) or **fill** (01) settles relative to the **pile** (01) shaft
decompression tables
schedules (10 26009) of pressure changes with time, which govern the return to atmospheric pressure of persons subjected to a higher pressure

single acting hammer
impact hammer (BS EN 12699) that uses internal power to raise the pile ram (03 36018) and is then allowed to fall

double acting hammer
impact hammer (BS EN 12699) that uses internal power to raise the pile ram (03 36018) and to increase the downward force (01)

drop hammer
impact hammer (BS EN 12699) raised by a winch (12 36023) and allowed to fall

NOTE Usually a metal weight.

pile frame
movable structure (01) for installing driven piles (BS EN 12699) with an impact hammer (BS EN 12699) in the correct position and alignment

driving cap
cap placed temporarily on top of a steel pile (03 32017) to distribute the blow (03 34005) over the cross-section and to minimize damage to the pile head (BS EN 12699) during driving (BS EN 12699)

drilling bucket
boring tool in the form of a cylindrical container, at the bottom of a kelly bar (03 36017) that incorporates cutting teeth or blades and has corresponding openings in its base plate (01)

kelly bar
sliding shaft on a drilling rig (12 26045) that transmits the driving force (01) or torque to the drill (12 16005) from a driven rotary table

pile ram
rising and falling part of an impact hammer (BS EN 12699)

air deck
airtight platform (06 52012) in a caisson (01) or shaft (01) for compressed air work (03 34006)

5.6 Properties (03 37xxx)

net loading intensity
decrease or increase in intensity of vertical loading at the base of a foundation (01) due to excavation (01) or the weight (11 27002) of a new structure (01) including earthworks (01)
cf. net loading intensity (03 27037)

bulb of pressure
mass (11 27001) of soil (01) around and beneath a pile (01) or group of piles (01) that is subjected to stress (01) by the applied loading
cf. bulb of pressure (03 27043)
03 37003 shaft friction
supportive friction by which a pile (01) shaft transfers load (01) into surrounding soil (01) or fill (01)

03 37004 drop
stroke
distance which a drop hammer (03 36012) or pile ram (03 36018) falls

5.7 Miscellaneous (03 39xxx)

03 39001 decompression illness
illness that may be suffered by people who are subjected to a too rapid reduction in air pressure after they have been doing compressed air work (03 34006)

03 39002 pain only decompression illness
bends
decompression illness (03 39001) caused by the formation of nitrogen bubbles in limb joints
NOTE Manifested by pain in one or more of limb joints.

03 39003 serious decompression illness
decompression illness (03 39001) affecting cardiovascular, neurological, respiratory or gastro-intestinal systems

6 Tunnels, shafts and caissons (03 4xxxx)

6.1 Works (03 41xxx)

03 41001 adit
tunnel (01) driven from ground (01) surface to provide access to, or drainage (01) from, underground workings

03 41002 pilot tunnel
tunnel (01) driven ahead of, on the line of and of smaller cross-section than a main tunnel (01) to facilitate first stage excavation (01), ground investigation (03 24002), ground (01) treatment, drainage (01), surveying (BS 6953) or ventilation

03 41003 immersed tube tunnel
tunnel (01) assembled under water from preformed structural units
NOTE Usually floated into position and sunk on to prepared foundation (01).

03 41004 drift
adit (03 41001) that slopes downwards from its entrance
cf. drift (03 23009)

03 41005 heading
tunnel (01) of small cross-section
03 41006  box heading
heading (03 41005) of straight-sided cross section where the
ground (01) is supported at its top, sides and across the floor (01)
NOTE  Usually supported with timber (01).

03 41007  poled heading
piled heading
heading (03 41005) in poor ground (01) where full support is given to the
ground (01) using timber (01) boards or steel sheets (01) driven
ahead of the tunnel face (03 42019)

03 41008  stope
shaft (01) excavated upwards

03 41009  timber heading
heading (03 41005) constructed mainly of timber (01)

03 41010  cross tunnel
tunnel (01) connecting two tunnels (01) running alongside; gives access between tunnels (01) for operators of emergency services

03 41011  step plate tunnel
length of tunnel (01) consisting of tunnel rings (03 42014) of increasing diameter as a transition between tunnels (01) of significantly different diameters

03 41012  blind heading
length of tunnel (01) or heading (03 41005) beyond any access

03 41013  access shaft
shaft (01) that facilitates entry of people and equipment to a tunnel (01)
NOTE  Not necessarily part of the permanent work.

6.2  Parts (03 42xxx)

03 42001  tunnel eye
provision for a connecting tunnel (01) within a tunnel lining (03 42005)

03 42002  thrust pit
pit (03 22011) or shaft (01) for pipe jacking (01) or thrust boring (01)

03 42003  jacking station
thrust pit (03 42002) together with the plant (01) needed for pipe jacking (01) or thrust boring (01)

03 42004  intermediate jacking station
additional plant (01) for pipe jacking (01) or thrust boring (01) located along a drive

03 42005  tunnel lining
cover and support to the rock (03 23027) or soil (01) surface at the periphery of a tunnel (01) excavation (01)

03 42006  primary lining
structural tunnel lining (03 42005)
03 42007 secondary lining
  tunnel lining (03 42005) supplementing the primary lining (03 42006) for decoration, improved fluid flow, protection or structural enhancement

03 42008 expanded lining
  primary lining (03 42006) of tunnel segments (03 42011) that are expanded circumferentially against the surrounding ground (01)

03 42009 tunnel grommet
  tunnel grummet
  compressible washer (06 72096) used with bolted segments (03 42012) to prevent leakage through bolt (01) holes

03 42010 shaft lining
  cover and support to the rock (03 23027) or soil (01) surface at the periphery of a shaft (01) excavation (01)

03 42011 tunnel segment
  arc shaped component (01) forming part of a tunnel lining (03 42005) or shaft lining (03 42010)

03 42012 bolted segment
  tunnel segment (03 42011) connected to adjacent tunnel segments (03 42011) with bolts (01)

03 42013 smooth bore segment
  tunnel segment (03 42011) that provides a smooth internal surface
  NOTE Usually of concrete (01).

03 42014 tunnel ring
  assembly (01) of tunnel segments (03 42011) to form a complete circular section one tunnel segment (03 42011) wide

03 42015 grout hole
  small diameter hole in a tunnel lining (03 42005) for injecting grout (01)

03 42016 grout plug
  plug to seal (11 14007) a grout hole (03 42015)

03 42017 iron
  tunnel segment (03 42011) of cast iron or spheroidal graphite iron

03 42018 blanket
  layer of material (01) placed on a bed (01) to increase cover (01) and/or impermeability so a tunnel (01) may be driven underneath
  NOTE Usually under water.

03 42019 tunnel face
  current end area of a tunnel (01) excavation (01)

03 42020 tunnel portal
  entrance, or structure (01) forming an entrance, to a tunnel (01)

03 42021 tunnel crown
  highest point of a tunnel (01) cross-section
03 42022 tunnel invert
bottom surface of a tunnel (01)

03 42023 lining roll
rotational displacement of a tunnel ring (03 42014)

03 42024 liner plate
tunnel segment (04 42011) of pressed steel

03 42025 steel lattice rib
steel rib in a lattice frame (01) used to support fabric
reinforcement (09 33095) in the arch (01) of a tunnel (01) where the
whole is embedded by being sprayed over with concrete (01)

03 42026 segmental lining
tunnel lining (03 42005) of tunnel segments (03 42011)

03 42027 guillotine door
vertical sliding door (BS EN 12433-1) with one guided plate (01)

03 42028 springline
line along the side of a tunnel (01) indicating where the curve of
the tunnel arch (03 47015) begins

NOTE Horizontal diameter in a circular tunnel (01).

03 42029 tunnel shoulder
position around a periphery on either side of a tunnel (01)
approximately half way between the springline (03 42028) and the
tunnel crown (03 42021)

03 42030 tunnel knee
position around a periphery on either side of a tunnel (01)
approximately half way between the springline (03 42028) and the
lowest point

6.3 Materials (03 43xxx)

03 43001 muck pile
pile of shattered rock (03 23027) in a tunnel (01) after a
round (BS 5607) is fired

03 43002 soil conditioner
additive (01) injected into a cutter head (03 46070) to
facilitate handling of excavated material by lubrication or
coagulation (BS 6068-1.4)

03 43003 rebound
portion of sprayed concrete (09 33035) that bounces from the surface
to which it is applied because of the velocity (BS EN ISO 772) at the
time of impact

03 43004 silica fume
by-product of producing silicon metal and ferro-silicon alloys; it
consists of mainly spherical particles of amorphous silicon dioxide and
is highly pozzolanic
03 43005 tailskin grease
grease (01) applied to tail seal (03 46059) to increase its impermeability

6.4 Activities (03 44xxx)

03 44001 box the face
box up
cover the whole or part of a tunnel face (03 42019) to provide support

03 44002 dental treatment
tunnel lining (03 42005) of small areas of the periphery at faults (01) or large fissures (BS EN 12670) using concrete (01)

03 44003 clay pocketing
method of tunnelling through loose ground (01) by digging out small pockets around the periphery of the excavation (01), backfilling (01) them with clay (BS EN 12670) and embedding a tunnel shield (03 46032) in the clay (BS EN 12670) to make a watertight seal

03 44004 shield roll
rotation of a tunnel shield (03 46032) about its axis during a drive

03 44005 blanket
deposit an impermeable layer on a tunnel face (03 42019) to limit compressed air (BS EN 12110) losses

03 44006 pull
advance a tunnel (01) or shaft (01) after a round (BS 5607)

03 44007 back grouting
process of injecting grout (01) around a tunnel lining (03 42005) after initial injection of grout (01)

03 44008 blind boring
process of drilling a hole without carrying out an exploratory probe (03 44011)

03 44009 cut and cover
construction of a tunnel (01) with an open excavation (01) that is subsequently covered with soil (01)

03 44010 new Austrian tunnelling method
tunnelling in firm ground (01) or rock (03 23027) using an in situ ground support system

NOTE Rock bolts (03 22022) and shotcrete (09 33034) are commonly used.

03 44011 probe
drill a small diameter hole outside or in front of a tunnel (01) for ground investigation (03 24002)

03 44012 forepole
support loose ground (01) by driving poling boards (03 26029) immediately ahead of the tunnel face (03 42019)

03 44013 muck out
remove excavated material from a tunnel (01)
03 44014 raise boring
method of excavating (01) a shaft (01) by boring upwards

03 44015 scale down
remove from the arch (01) of a tunnel (01) rock (03 23027) pieces loosened but not dislodged by a round (BS 5607), or that become loose later

03 44016 shove
incremental forward movement of a tunnel shield (03 46032), tunnel boring machine (03 46029) or pipe (01)

NOTE Usually by means of hydraulic rams (05 12121).

03 44017 directional drilling

technique for installing a pipe (01) or duct (01) on a slightly curved line using a machine with a guided steerable drilling head to form a hole into which the pipe (01) or duct (01) is inserted

03 44018 impact moling

technique for installing a pipe (01) or duct (01) using a percussive soil (01) displacement device to form a hole into which a pipe (01) or duct (01) is pulled or pushed

03 44019 wet process

process of spraying concrete (01) where the hydraulic binder (01), aggregate (01) and water are mixed before being supplied to a nozzle

03 44020 dry process

process of spraying concrete (01) where a dry hydraulic binder (01) and aggregate (01) mix is supplied to a nozzle and water added at the nozzle

03 44021 break out

construct an opening in the side of a tunnel (01) for a junction with another tunnel (01)

03 44022 break up

construct an opening in the roof of a tunnel (01) for a junction with a shaft (01) or an enlarged tunnel (01)

03 44023 caulk

form a pre-formed joint (01) between tunnel segments (03 42011) to form a watertight seal

03 44024 lock in

enter a personnel lock (BS EN 12110) and thence a tunnel (01) or shaft (01)

03 44025 lock out

leave a tunnel (01) or shaft (01) through a personnel lock (BS EN 12110)

03 44026 decant

undergo rapid decompression in a personnel lock (BS EN 12110) and then move to a decant lock (03 46095) nearby to be compressed to an appropriate pressure and then decompressed in accordance with normal practice

NOTE This procedure is now exceptional in UK.
03 44027 oxygen decompression
use of oxygen for breathing during decompression

03 44028 chemical injection
inject chemicals into the ground (01) to modify fill (01) and/or soil (01) behaviour by physiochemical processes or by cementing the fill (01) and soil (01) together

03 44029 collar
ensure the correct location of a larger diameter hole by first drilling a smaller one for a short distance, then enlarging the hole to the required size (01) and finally inserting the full size (01) rock drill (12 26040) rod (01)
cf. collar (03 12037)

03 44030 spile
stabilize a tunnel face (03 42019) by insertion of poles, bars (01) or holes filled with grout (01) forward of the tunnel face (03 42019)

6.5 Processes (03 45xxx)

03 45001 piping
excess water pressure from within a caisson (01) causing material at the base, outside, to become unstable; the material partly removed by the flowing water is replaced by material from within the caisson (01) thus forming a hollow similar to a pipe (01)
cf. piping (03 25003)

03 45002 squat
downward deflection (03 15001) from true of a tunnel crown (03 42021)

6.6 Plant, equipment and documentation (03 46xxx)

03 46001 horse head
rectangular frame (01) that supports a main tunnel (01) during construction (01) of an opening in its tunnel lining (03 42005)

03 46002 Prince of Wales feathers
frame (01) supporting the top of a main tunnel (01) during construction (01) of an opening that consists of a central post (01) with splayed struts (01) supporting a tunnel head tree (03 46016)

03 46003 side tree
vertical or inclined support at the side of a heading (03 41005) or horse head (03 46001)

03 46004 leg
vertical or nearly vertical member at the side or face of a heading (03 41005) to support head boards (03 46007) or heading head trees (03 46006) and to cover the exposed ground (01)
cf. leg (03 32002)

NOTE Usually of timber (01).
03 46005 **sprag**  
inclination from the vertical of a **side tree** (03 46003)  
or **leg** (03 46004)

03 46006 **heading head tree**  
transverse member, part of a **frame** (01), in the **soffit** (01)  
of a **heading** (03 41005), that supports the **ground** (01),  
**head boards** (03 46007) and **poling boards** (03 26029)

03 46007 **head board**  
longitudinal board that supports the **soffit** (01) of a  
**heading** (03 41005)

03 46008 **face board**  
board that supports a **tunnel face** (03 42019)

03 46009 **byatt**  
biatt  
temporary transverse horizontal member to support a **deck** (01),  
**walkway** (01) or **guarding** (01) in an **excavation** (01)

03 46010 **arch rib**  
**structural member** (01) with the **profile** (01) of a **tunnel** (01) that  
supports **ground** (01) or **tunnel lining** (03 42005)

03 46011 **benk bar**  
longitudinal corrugated steel plank to support **ground** (01)  
or **tunnel lining** (03 42005), or to **forepole** (03 44012)

03 46012 **kicker**  
temporary horizontal member wedged across a **tunnel** (01) to  
distribute **load** (01) from a horizontal or raking **strut** (01) supporting  
**face boards** (03 46008)

03 46013 **timber brob**  
timber (01) block fixed to a **heading head tree** (03 46006) to prevent  
a **side tree** (03 46003) moving inwards due to **ground** (01) pressure

03 46014 **Yankee brob**  
z-shaped steel strap in **tunnel** (01) **timbering** (03 26013)

03 46015 **thrust wall**  
**wall** (01) that takes reaction from **hydraulic jacks** (12 56028) when  
**pipe jacking** (01) or **thrust boring** (01)  

*NOTE*  Usually temporary.

03 46016 **tunnel head tree**  
upper horizontal member of a **horse head** (03 46001)

03 46017 **roof board**  
length of **timber** (01) supporting the **ground** (01) above  
a **tunnel heading** (03 41009)

03 46018 **side board**  
length of **timber** (01) placed longitudinally between  
**side trees** (03 46003) to support the **ground** (01) at the sides of  
a **tunnel heading** (03 41009)
03 46019  lagging
timber (01) or steel plank placed horizontally between
arch ribs (03 46010) to provide temporary support to ground (01)
or tunnel lining (03 42005)

03 46020  slurry support
support to a tunnel face (03 42019) provided by slurry (01)
under pressure in a compartment at the front of a tunnel boring
machine (03 46029)

03 46021  support and transport system
system for supporting ground (01) and removing excavated material
using slurry (01)

03 46022  breast plate
horizontal timber (01) supporting vertical face boards (03 460083)
that is itself supported by a tunnel shield (03 46032) or other
structure (01)

03 46023  timber heading head tree
length of timber (01) supporting roof boards (03 46017)

03 46024  compressed air caisson
pneumatic caisson
caisson (01), with an air deck (03 36019) and air lock (01); the air in
the working chamber is maintained above atmospheric pressure to
exclude water

03 46025  wet caisson
caisson (01), sunk in water bearing ground (01), that is open at the
bottom allowing water to enter

03 46026  ring beam
frame (01) at ground level (01) surrounding a caisson (01) and on
which it is supported

03 46027  box caisson
caisson (01) closed at the bottom and open to the atmosphere at
the top

03 46028  choker ring
bottom section of a caisson (01) including its cutting edge;
of larger external horizontal dimensions (01) than the remainder
of the caisson (01)

03 46029  tunnel boring machine
machine for advancing a tunnel (01) by rotary cutting

03 46030  shaft boring machine
boring machine operating downwards in a vertical direction

03 46031  earth pressure balanced tunnelling machine
tunnel boring machine (03 46029) with a cutting head that operates
in a chamber from which wet spoil (03 23023) is removed by an
enclosed archimedean screw (05 12122) of sufficient length (01) to
achieve atmospheric pressure at its discharge end
03 46032 tunnel shield
mobile steel structure (01) supporting ground (01) at the tunnel face (03 42019) ahead of the tunnel lining (03 42005)

NOTE Usually cylindrical.

03 46033 Greathead shield
tunnel shield (03 46032) for hand excavation (01)

03 46034 open shield
tunnel shield (03 46032) that does not cover the tunnel face (03 42019)

NOTE The tunnel shield (03 46032) is normally used for soft ground (01).

03 46035 compartmental shield
large tunnel shield (03 46032) divided into compartments to provide access for excavation (01)

03 46036 jacking shield
tunnel shield (03 46032) for pipe jacking (01)

03 46037 roadheader
self-propelled machine for cutting and loading soft to medium hard rock (03 23027) in sections by means of a rotating cutter mounted exactly or transversely on a boom

03 46038 cutting edge
leading edge of a tunnel shield (03 46032) or a caisson (01) shoe

03 46039 hood
upper part of a tunnel shield (03 46032) that protrudes ahead of its body to provide overhead protection

03 46040 front shield diaphragm
curtain plate
diaphragm across the front of a tunnel shield (03 46032) or one of its compartments to control the ingress of unstable ground (01)

03 46041 rear shield diaphragm
dam shield
diaphragm across the rear of a tunnel shield (03 46032) or one of its compartments used in conjunction with a front shield diaphragm (03 46040) to control ingress of unstable ground (01)

03 46042 tail skin
cylindrical rear portion of a tunnel shield (03 46032) or tunnel boring machine (03 46029) in which the tunnel segments (03 42011) are erected

03 46043 plough
steel plate (01) that protrudes from the external surface of a tunnel shield (03 46032) and is used to correct or prevent shield roll (03 44004)

03 46044 face ram
one of a group of hydraulic cylinders mounted within a tunnel shield (03 46032) supporting the tunnel face (03 42019)
03 46045 drum digger
tunnel boring machine (03 46029) with peripheral drive motors and
no centre spindle

NOTE For use in soft ground (01) and not currently available.

03 46046 separation plant
equipment on the ground (01) surface for removing solids from
a slurry (01)

03 46047 desanding plant
equipment for treating and eliminating sand (BS EN 12670) from
a slurry (01)

03 46048 grout pan mixer
gROUT (01) mixer that uses compressed air (BS EN 12110) to drive a
paddle and pump the mixture through a pipe (01)

03 46049 unshielded tunnel boring machine
tunnel boring machine (03 46029) without a tunnel
shield (03 46032) for support

03 46050 closed mode shield
tunnel shield (03 46032) that supports the tunnel face (03 42019)
while advancing

03 46051 air pressurized shield machine
shield machine (BS EN 12336) in which the forward part,
including the cutter head (03 46070), is separated from the rear
by a bulkhead and air pressure is applied to this part in order to support
the tunnel face (03 42019)

03 46052 reaming tunnel boring machine
tunnel boring machine (03 46029) that enlarges a
pilot tunnel (03 41002) in one or more steps

03 46053 ram shoe
fitting on the end of a hydraulic cylinder on a tunnel shield (03 46032)
to spread the load (01) on the tunnel ring (03 42014) or similar
support against which the hydraulic cylinders are pushed to advance the
tunnel shield (03 46032)

03 46054 continuous miner
self propelled machine that cuts coal (BS 3323) or soft materials by
means of a transversely rotating drum

03 46055 creator arm
swing arm on a boring machine or tunnel shield (03 46032) for
picking up supports and setting them down in position

03 46056 blade shield
tunnel shield (03 46032) of circular or D shape, whose outer
skin is formed of a series of blades that are advanced by rams while
the ground (01) is excavated by cutter boom (12 26039)

03 46057 closed shield
tunnel shield (03 46032) modified for use in subaqueous tunnels (01)
in which access to the tunnel face (03 42019) is limited to a number
of openings that can be closed to prevent inrushes of mud or water
03 46058 part face machine
shield machine (BS EN 12336) in which only part of the tunnel face (03 42019) is mechanically excavated at a time and the cutter head (03 46070) moves across the tunnel face (03 42019)

03 46059 tail seal
flexible device fitted to the tail skin (03 46042) of a tunnel shield (03 46032), forming a seal between it and the assembled tunnel (01) preventing material from the tunnel face (03 42019) outside the tunnel shield (03 46032) or behind the tunnel lining (03 42005) entering the tunnel (01)

03 46060 snorer
device for removing water from a compressed air (BS EN 12110) tunnel (01) by means of a pipe (01) to free air and a valve (01) controlled input; water is driven out by differential air pressure

03 46061 reaction ring
device for securing the position of a tunnel boring machine (03 46029) in soft ground (01) using hydraulic cylinders to exert pressure on to the walls of the tunnel (01)

03 46062 gun strut
horizontal longitudinal strut (01) mounted within a tunnel shield (03 46032) and restrained so as to provide support to face boards (03 46008) whilst the tunnel shield (03 46032) is being moved forward

03 46063 steering jack
one of a set of hydraulic jacks (12 56028) installed in a jacking shield (03 46036), controlling the direction of the tunnel (01) drive

03 46064 thrust ring
strong, steel ring bearing against the end of a tunnel lining (03 42005) through which the force (01) from hydraulic jacks (12 56028) is transmitted in microtunnelling (01), or in advancing a tunnelling machine or tunnel shield (03 46032)

03 46065 lead pipe
length of pipe (01) modified to facilitate first length of pipe (01) in pipe jacking (01) that has been modified to facilitate connection to the tail of a jacking shield (03 46036)

03 46066 drilling carriage
mobile staging (01) for rock drills (12 26040) in tunnel (01) excavation (01)

03 46067 drifter
heavy percussive rock drill (12 26040) for mounting on a screw or chain feed with reversible rotation and air or water flushing

03 46068 rocker shovel
powered front-loading self-propelled shovel that discharges overhead to its rear
pneumatically powered rotary percussive rock drill (12 26040) axially mounted on a pneumatic cylinder for excavation (01) of stopes (03 41008)

cutter head
front end of an excavator (12 26006) with a cutter for rock (03 23027) or soft ground (01)

rock cutter
device rolled across the face of rock (03 23027) with the concentration of pressure or stress (01) spalling (01) the rock (03 23027)

roller cutter
rock cutter (03 46071) in the form of a truncated cone that rotates around its axis; the side, reinforced by tungsten carbide bits (12 16006), bears against the face of the rock (03 23027)

disc cutter
rock cutter (03 46071) in the form of a disc whose tapered periphery bears upon the face of rock (03 23027) and that rotates about a central axis

toothed cutter
disc cutter (03 46073) with a toothed periphery

gauge cutter
rock cutter (03 46071) positioned so as to define the finished diameter of the excavation (01)

variable gauge cutter
gauge cutter (03 46075) mounted so the diameter may be varied and/or so compensation for wear may be provided

bench
mid section between a tunnel crown (03 42021) and a tunnel invert (03 42022) excavated in horizontal steps

cherry picker
hoist (12 36026) mounted on a carriage or on a monorail (01) fixed to the roof for lifting empty wagons over full ones in a narrow tunnel (01)

erector
plant (01) used to install tunnel linings (03 42005) situated within or immediately behind a shield machine (BS EN 12336)

lifting finger
short bent bar (01) passed through a hole in a tunnel segment (03 42011) to lift it

roller bolt
pulley wheel, with its axle parallel to the tunnel (01) axis, that is fixed to an assembled tunnel ring (03 42014) to facilitate assembly (01) by hand of the next tunnel ring (03 42014)

NOTE Usually where no tunnel shield (03 46032) is used.
03 46082 roller bracket
bracket (01) temporarily fixed to a tunnel lining (03 42005) and incorporating a roller that, with others, supports a movable gantry (03 52007) or staging (01)

03 46083 safety curtain
diaphragm of steel or timber (01), across the upper part of a pressurized tunnel (01) to diminish the risk to life caused by a blow out (03 35001) in the case of a flood

03 46084 pressure chamber
compartment at the tunnel face (03 42019) filled with fluid pressurized to balance ground (01) and ground water (BS ISO 6107-1) pressure

03 46085 water curtain
water spray from nozzles, in a pattern, to reduce the spread of dust during the excavation (01) of a tunnel (01)

03 46086 sand tray
horizontal plate (01) in front of a tunnel shield (03 46032) to trap incoming soft ground (01) and prevent it filling the tunnel shield (03 46032)

03 46087 Manchester gate
safety device placed across track (01) at the top of a slope (01) to halt runaway vehicles

03 46088 automatic guidance system
system of lasers and computers (07 22031) that produces a visual display from which an operator can steer a machine or that directly controls the movements of a machine

03 46089 blasting curtain
flexible material placed across a tunnel (01) to limit the spread of material from an explosion

03 46090 reek
collection of gaseous fumes in a tunnel (01) after blasting (03 24022)

03 46092 muck lock
air lock (01) for transfer of plant (01) or material (01)

03 46093 medical lock
chamber for the therapeutic recompression and decompression of people suffering from decompression illness (03 39001)

NOTE Usually of two compartments.

03 46094 blister lock
vertical air lock (01) that has separate chambers for materials (01) and people

03 46095 decant lock
chamber, adjacent to but separate from compressed air (BS EN 12110) workings for the decompression of people leaving the compressed air (BS EN 12110) workings
03 46096 traverser
sub-frame upon which a small length of track (01) of a railway (01) is mounted on wheels to allow wagons to be moved from one track (01) to an adjacent parallel track (01)

03 46097 pumping system
pump (01) and pipe (01) system that carries cleaned slurry (01) from the separation plant (03 46046) to the slurry machine (03 46111) and return the slurry (01) carrying excavated material

03 46098 by-pass circuit
circuit in a pumping system (03 46097) to maintain the flow in the pipe (01) while access to the tunnel face (03 42019) is closed or otherwise unavailable

03 46099 flat car
vehicle that moves on track (01) and consists of a flat surface mounted on a pair of axles

03 46100 segment car
flat car (03 46099) adapted to carry one or more tunnel segments (03 42011) securely

03 46101 grout car
vehicle that moves on track (01) carrying a container for transporting grout (01)

03 46102 bridge cylinder
short conveyor for transferring spoil (03 23023) from a machine to a main conveyor or from one conveyor to another travelling in a different direction

03 46103 California crossover
prefabricated unit of four rails (04 22051) so spaced to provide track (01) through the central pair of rails (04 22051) as well as the outer pairs and connected by crossovers (04 22043) at each end; the unit is placed above existing track (01) and has ramps (01) at each end
NOTE The unit is used to provide a passing place in tunnelling; it can be moved to another position as the tunnel (01) advances.

03 46104 man riding skip
bucket for handling spoil (03 23023), adapted, with safety devices, for carrying people in and out of shafts (01)

03 46105 scaling bar
metal rod (01) used to scale down (03 44015)

03 46106 drop line
wire suspended down a shaft (01) to provide a vertical line in a survey

03 46107 Weisbach triangle
trigonometrical device for transferring an above-ground survey to below ground (01)

03 46108 offset table
schedule (10 26009) of the distances of a series of reference points from a reference line
03 46109 drilling pattern
representation of the arrangements, on the exposed surface of the rock (03 23027), of the pattern of entry of shot holes (03 28001), annotated to show the size (01) and depth (01) of each shot hole (03 28001) and the type and amount of explosive (BS 5607) used in each

03 46110 nozzle man
operative (01) in a shotcrete (09 33034) gang who manipulates the nozzle and controls final disposition of the material

NOTE When using the dry process (03 44020) also controls consistency.

03 46111 slurry machine
shield machine (BS EN 12336) for use in soft ground (01) with a bulkhead through which the excavated material (01) is transported from the face in a slurry (01)

6.7 Properties (03 47xxx)

03 47001 dimensional creep
difference between actual advance of an assembly (01) and the theoretical advance

03 47002 ironbound
condition arising from a change of alignment, where the tail of a tunnel shield (03 46032) binds against a preformed tunnel lining (03 42005)

03 47003 lead
distance that one side of a tunnel lining (03 42005) or a tunnel shield (03 46032) is in front of the other

03 47004 look up
distance that the bottom of a tunnel lining (03 42005) or tunnel shield (03 46032) is in front of the top

03 47005 overhang
distance that the top of a tunnel lining (03 42005) or tunnel shield (03 46032) is in front of the bottom

03 47006 rock mass rating
empirical geomechanical classification for quantitively assessing rock (03 23027) and predicting tunnel (01) support requirements

03 47007 closed mode
characteristic (01) of a shield machine (BS EN 12336) that maintains support of the tunnel face (03 42019) while advancing

03 47008 gauge pressure
air pressure measured by gauge (12 86029) above atmospheric pressure

03 47009 hydrostatic balance
at a particular level, balance between pressure of air in a tunnel (01) and ground water (BS ISO 6107-1) pressure

03 47010 tunnel air pressure
pressure of air in a tunnel (01)
03 47011 air loss
quantity of compressed air (BS EN 12110) lost, measured at atmospheric pressure

03 47012 stand-up time
time that the span (01) of the unsupported excavated roof of a tunnel (01) remains stable

03 47013 overburden pressure
pressure in the horizontal plane at a given depth (01) due to the weight (11 27002) of overburden (03 23019)

03 47014 water head
head (01) of water

03 47015 tunnel arch
profile (01) of the upper portion of a tunnel (01)

6.8 Spaces (03 48xxx)

03 48002 relieving hole
hole to break rock (03 23027) and thereby control and localize the effects of the initial blast in a round (BS 5607)
NOTE Usually 75 mm to 100 mm in diameter.

03 48003 cut
group of shot holes (03 28001) surrounding a relieving hole (03 48002)

03 48004 burn cut
cut (03 48003) in which all the shot holes (03 28001) are parallel

03 48005 confined space
space (01) with restricted ventilation where there is a reasonably foreseeable risk to health and safety

03 48006 air bubble
space formed in the upper part of the slurry (01) compartment of a slurry machine (03 46111) in which compressed air (BS EN 12110) is used to maintain the slurry (01) at a pressure appropriate to the conditions at the tunnel face (03 42019)

03 48007 wedge cut
cut (03 48003) in which central shot holes (03 28001) start in a pattern of two vertical lines and converge in pairs to encompass a wedge-shaped block (01) of rock (03 23027)

03 48008 trimming hole
shot hole (03 28001) on the perimeter of an excavation (01) to define its profile (01) and fired last

03 48009 injection point
opening for grout (01) in a tunnel shield (03 46032) or tunnel lining (03 42005)
6.9 Miscellaneous (03 49xxx)

03 49001 deoxygenated air
air with a reduced amount of oxygen

03 49002 blackdamp
air found in tunnels (01) and mines; it has less oxygen than normal but more carbon dioxide

03 49003 firedamp
flammable mixture of methane and other gases

03 49004 explosive atmosphere
mixture of flammable substances in the form of gas, mist or dust in which, after ignition, combustion spreads rapidly throughout the unconsumed mixture

03 49005 potential explosive atmosphere
atmosphere that could become an explosive atmosphere (03 49004)

7 Superstructures (03 5xxxx)

7.1 Works (03 51xxx)

03 51001 large span structure
structure (01) with a span (01) in excess of 50 m

03 51002 cable supported structure
structure (01) with support provided by suspended cables (01)

03 51003 cable stayed structure
structure (01) with support provided by straight, inclined cables (01)

03 51004 framed structure
structure (01) with a strength (11 27007) and stability relying mainly on its structural skeleton (03 52006) rather than on loadbearing walls (01)

03 51005 tower
long, slender structure (01), either isolated or forming part of a building (01)

03 51006 lattice tower
pylon
tower (03 51005) of open structural members (01) with intersecting diagonal structural members (01)

03 51007 mast
long, slender, vertical support
NOTE Often held in position by guys (03 52011).

03 51008 cooling tower
structure (01) for lowering temperature of water by evaporative cooling
03 51010 shelter
structure (01) that affords protection from the elements, criminal action or hostile action

03 51011 ski jump
structure (01) with an inclined platform (06 52012) to facilitate take-off by ski jumpers
NOTE Usually a framed structure (03 51004).

03 51012 velodrome
arena that comprises both a banked track for cycle racing and facilities for spectators

03 51013 stand
free-standing tiered structure (01) for spectators

03 51014 grandstand
large, permanent covered stand (03 51013)
NOTE Often incorporates additional amenities.

03 51015 amusement structure
structure (01) that accommodates facilities intended to give members of the public thrills or excitement

03 51016 hoarding
construction (01) providing a surface to carry advertisements

03 51017 box girder bridge
bridge (01) the main structural members (01) of which are box girders (01)

03 51018 slab bridge
bridge (01) composed of a single slab (01) of stone (01) or concrete (01)

03 51019 girder bridge
bridge (01) the main structural members (01) of which are girders (01)

03 51020 lattice girder bridge
bridge (01) the main structural members (01) of which are lattice girders (01)

03 51021 deck bridge
bridge (01) in which the deck (01) is positioned at the top of the main beam (01)

03 51022 through bridge
bridge (01) in which the deck (01) is positioned at or close to the bottom of the main beam (01)

03 51023 drawbridge
movable bridge (01) in which the deck (01) can be rotated about a hinge at one end and the other end raised

03 51024 retractable bridge
movable bridge (01) in which the deck (01) can be withdrawn from its normal position
03 51025 transporter bridge
bridge (01) at a high level supporting a carrier from which
a platform (06 52012) or container is suspended and transported
from one bank (05 28001) to another

03 51026 Bailey bridge
lattice girder bridge (03 51020) fabricated in small units to facilitate
transportation and speedy erection
NOTE Originally designed for military purposes.

03 51027 cableway
Blondin
aerial ropeway (01) suspended between only two supports

7.2 Parts (03 52xxx)

03 52001 lamella roof
roof (01) supported by a space frame (01) with connecting
structural members (01) forming a diamond pattern

03 52002 dome
curved roof (01) structure (01) of a hemispherical or approximately
hemispherical shape (11 27004)

03 52003 hyperbolic paraboloid roof
shell roof (01) of hyperbolic paraboloidal shape (11 27004)

03 52004 barrel vault roof
shell roof (01) partly cylindrical in cross-section

03 52005 steel frame
frame (01) with structural members (01) of steel

03 52006 structural skeleton
frame (01) forming the main loadbearing part of a structure (01)

03 52007 gantry
high level platform and its supports enabling activities to be carried out
or equipment supported at that level, but also allowing passage or
operations underneath

03 52008 crane gantry
columns (01) and beams (01) supporting the ends of a
moving crane (01)

03 52010 hoarding
temporary structure (01) enclosing a site (01) or erected as
a barrier (01) to prevent access

03 52011 guy
rope (01) fixed at one end of a structure (01) and at the end to an
anchorage to provide restraint

03 52012 sway brace
bracing (01) to resist lateral forces (01) in a superstructure (01)
03 52013 Pratt truss
truss (01) having vertical and diagonal structural members (01) between the chords (03 52015) that together form right angled triangles

03 52014 Warren truss
truss (01) that, between the upper and lower chords (03 52015), has only inclined structural members (01) forming triangles

03 52015 chord
top or bottom longitudinal structural member (01) of a truss (01)

03 52017 standard bridge beam
one of a range of nationally agreed sizes (01) of precast prestressed concrete (01) beams (01)

03 52018 cross head
lateral beam (01) that connects the tops of columns (01) forming part of a bridge pier (01)

03 52019 bridge cap
top of a bridge pier (01) or bridge abutment (01) on which bridge bearings (03 52028) are seated

03 52020 wing wall
wall (01) that extends a bridge abutment (01) to retain the side slope (01) of fill (01)

03 52021 bank seat
foundation (01) at the top of a bank (05 28001) forming an end support for a bridge (01)

NOTE Usually shallow.

03 52022 bridge parapet
protective fence (01) or wall (01) at the edge of a bridge (01)

03 52023 suspended span
simply supported span between cantilevers (01) in a cantilever bridge (01)

03 52024 catenary cable
heavy uniform cable (01) hanging freely from two points in a curve

03 52025 bridge suspender
one of several hangers (06 72050) from a catenary cable (03 52024) supporting a deck (01)

03 52026 cable saddle
metal block over which cables (01) pass

NOTE For example at the top of a tower (03 51005) of either a suspension bridge (01) or an aerial ropeway (01).

03 52027 bearing
component (01) to transfer the load (01), from a structural member (01) subject to movement, on to a fixed support

03 52028 bridge bearing
bearing (03 52027) from a bridge (01)
03 52029 roller bearing
φ(03 52027) with one or more rollers between parallel upper and lower plates (01)
03 52030 single roller bearing
φ(03 52029) with one roller
03 52031 multiple roller bearing
φ(03 52029) with two or more rollers
03 52032 rocker bearing
φ(03 52027), constrained to prevent relative horizontal movement, with a cylindrical or spherical surface
03 52033 linear rocker bearing
φ(03 52032) with a cylindrical surface
03 52034 spherical rocker bearing
φ(03 52032) with a spherical surface
03 52035 knuckle bearing
φ(03 52027) that permits rotation by sliding of one part on another and provides two or more structural members (01) with mating cylindrical or spherical surfaces
03 52036 knuckle pin bearing
φ(03 52035) with a cylindrical pin
03 52037 cylindrical knuckle bearing
φ(03 52035) with cylindrical mating surfaces
03 52038 spherical knuckle bearing
φ(03 52035) with spherical mating surfaces
03 52039 knuckle leaf bearing
φ(03 52035) with a pin passing through a number of interleaved plates (01) fixed alternately to the upper and lower bearing plates (01)
03 52040 sliding bearing
φ(03 52027) that consists of two surfaces sliding one on the other
03 52041 pot bearing
φ(03 52027) with a metal piston supported by a disc of unreinforced elastomer (BS EN 923) confined with a metal cylinder
03 52042 elastomeric bearing
φ(03 52027) that consists of a block of elastomer (BS EN 923)
03 52043 elastomeric laminated bearing
φ(03 52042) that is reinforced internally with steel plates (01)
03 52044 plain pad bearing
φ(03 52042) without reinforcement (01)
03 52045 strip pad bearing
φ(03 52044) the length (01) of which is at least 10 times its width (01)
7.3 Activities (03 54xxx)

03 54001 box frame construction

construction (01) of a long, narrow multi-storey building (01) with concrete (01) floors (01) carried on loadbearing walls (01) across the width of the building (01)

03 54002 lift slab construction

construction (01) in which concrete slabs (01) are cast one on top of the other near ground level (01) for subsequent raising to their final positions and support by previously constructed columns (01)

7.4 Properties (03 57xxx)

03 57001 HA loading

normal design load (01) for highways (01)

NOTE This represents the effects (ISO 8930) of normal permitted vehicles. Attention is drawn to the Road Vehicles (Construction and Use) Regulations [1].

03 57002 HB loading

highway (01) load (01) requirements derived to cover abnormal indivisible loads (01) likely to use the roads (01) in an area

03 57003 RU loading

railway (01) load (01) requirements derived by a Committee of the International Union of Railways to cover present and anticipated future loads (01) on railways (01) in Great Britain and in Europe

03 57004 RL loading

railway (01) load (01) requirements derived by the London Underground Ltd to cover present and anticipated future loads (01) on lines that carry only rapid transit passenger stock and lift engineers’ works trains
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