

Universal Decimal Classification —

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UDC 624 Civil and structural
engineering in general

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Foreword

The English version of the Universal Decimal Classification (UDC) is being prepared and published as BS 1000 by the British Standards Institution (BSI) at the original joint request of the British Society for International Bibliography (BSIB) and the Association of Special Libraries and Information Bureaux (ASLIB), now amalgamated as Aslib. It has the approval of the Lake Placid Education Foundation, New York, proprietors of the Dewey Decimal Classification, from which the UDC derives. The English full edition of the UDC is authorized by the International Federation for Documentation (FID), PO Box 30115, 2500 GC, The Hague, Netherlands.

This section is part of the English full edition. It should be used in conjunction with the Abridged English Edition, BS 1000A, which refers to many other subjects of interest not listed in this schedule, and provides a conspectus of the whole scheme, together with an introduction to its use. For further practical information about the principles, application and utilization of the scheme, users should refer to BS 1000C.

This edition of BS 1000 [624] includes modifications authorized in “Extensions and Corrections to the UDC” (FID publication no. 248) up to and including Series 11, No. 1, dated April 1981. Subsequent issues of “Extensions and Corrections to the UDC” should be consulted to keep the schedule up to date. British Standards related to this Part of BS 1000 are listed on the inside back cover.

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

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 30, an inside back cover and a back cover.

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

Scope

Under 624 is classed information about civil and structural engineering in general, including substructures, super-structures, geotechnics, earthworks, foundations and tunnelling. Information about the civil engineering of land transport (railway engineering, highway engineering etc.) is classed under 625, and information about hydraulic construction works (including canal engineering, natural waterway engineering and harbour and shore engineering) is classed under 626/627. Public health engineering comes under 628.

Section 69 deals with building materials, building trades and building construction, whilst 72 covers architectural design as well as individual buildings according to their use.

Related subjects

332	Land and property. Real estate
351.785	Safety measures concerning buildings. Building inspection and control
528	Geodesy. Surveying. Photogrammetry. Cartography
534.83	Vibrations and their control. Control of disturbing noise. Noise abatement
534.84	Architectural acoustics. Sound level. Tone quality
614.8	Accidents. Risks or hazards (including protection against fire)
620.1	Materials testing. Defects of materials. Protection of materials
621.86	Materials handling in general
621.87	Cranes. Transporters. Lifts. Escalators. Levellers. Excavators. Dredgers
622	Mining
625	Civil engineering of land transport. Railway engineering. Highway engineering
626	General hydraulic engineering. Canal engineering. Agricultural hydraulics
627	Natural waterway, port, harbour and shore engineering. Navigational, dredging, salvage and rescue facilities. Dams and hydraulic power plant
628	Public health engineering. Water. Sanitation. Illuminating engineering
631.2	Farm buildings, structures and installations. Buildings for livestock, agricultural products, machinery and equipment
666.9	Gypsum, lime and cement industries. Binding agents. Plasters. Filling and moulding compounds. Mortar and concrete

69	Building
71	Physical planning. Regional, town and country planning, landscapes, parks, gardens
72	Architecture
744	Linear and geometric drawing

Auxiliary signs and subdivisions

Full information about the common and special auxiliary signs and subdivisions (often abbreviated to “common and special auxiliaries”) will be found in BS 1000A and BS 1000C.

Colon sign of relation. For the classification of information for the public, as in abstracts and bibliographies, maximum use of colon combination rather than of common or special auxiliaries is recommended. The use of the colon sign of relation is preferable for multiple entry systems, as it will help prevent the concealment of information. This usually results in longer notation, however, and for information for more restricted use, the application of auxiliaries, where available, may be simpler and more convenient provided that there is an adequate alphabetical subject index.

Common auxiliaries. The common auxiliaries of language = . . . , form (0 . . .), place (1/9), race and nationality (= . . .), time “ . . . ”, point of view .00 . . . , materials – 03 . . . and persons – 05 . . . are applicable throughout the UDC. However, they should be used mainly to express concepts not otherwise provided for in the schedules.

Special auxiliaries. The – 2/ – 9 special auxiliaries listed under 62 are applicable to this section. They may be detached and applied to any subdivision where the result forms a meaningful combination. The – 1 special auxiliary, subdivided as 624.1, may also be applied to any subdivision of 624, e.g.

624.824 – 15 Foundations for bascule bridges with fixed axis

The .0 special auxiliaries listed under 624 may be appended to other main numbers but it is preferable to use colon combination, e.g.

624.072.9:624.5 Bracings of suspension bridges

The .0 special auxiliaries listed under 624.21 may be detached and applied to any of the 624.21/.8 main numbers.

Typographic presentation

Small type is used for cancelled numbers and text. The arrow → means either “see” or “see also” according to the context. The symbol ≅ “subdivide as” means that the number preceding it may be subdivided in the same way as, and with meanings analogous to the subdivisions of, the number which follows it.

Schedule

624 Civil and structural engineering in general. Substructures. Geotechnics. Earthwork. Foundations. Tunnelling. Bridges and other superstructures

Special auxiliary subdivisions

624 – 1	Civil engineering details <i>The – 1 special auxiliaries listed under 62 are not applicable to 624</i> 624 – 1 $\cong$ 624.1, e.g. 624 – 15 Foundations – 157 Underwater foundations – 166 Piers <i>These – 1 special auxiliaries may be applied to any subdivision of 624, e.g.</i> 624.824 – 15 Foundations for bascule bridges with fixed axis	624.012.3	Structures in precast concrete 624.012.3 $\cong$ 624.012.4 →624.04 Structural design. Graphical and analytical statics 624.07 Structural elements. Load-bearing members 624.9 Superstructures 666.97 Mortar and concrete industry 69.057 Industrialization of construction 691.32 Concrete. Concrete building elements 693.2 Masonry of treated material, stones, blocks etc. <i>The – 183 special auxiliaries listed under 62 are applicable here, e.g.</i>
– 2/ – 9	Details of construction machinery and equipment 624 – 2/ – 9 $\cong$ 62 – 2/ – 9		
624.01	COMPLETE STRUCTURES AND STRUCTURAL PARTS ACCORDING TO MATERIAL AND METHOD OF CONSTRUCTION		624.012.3 – 183.4 Structures in precast lightweight concrete. Structural lightweight concrete
.011	Structures in materials of organic origin		<i>[cancelled]</i> → 624.078.3
.1	Structures in wood. Wood structures	.33	Structures in precast reinforced concrete <i>Further particulars may be denoted by the – 183 special auxiliaries listed under 62, e.g.</i>
.13	Kinds of wood 624.011.13 $\cong$ 674.03, e.g. 624.011.131.11 Oak structures	.35	624.012.35 – 183.4 Structures in precast reinforced lightweight concrete
.14	Laminated wood structures. Plywood structures		
.15	Structures in reconstituted wood products. Laminated board structures. Chipboard structures etc.		
.17	Structures in reinforced wood	.36	Structures in prestressed precast concrete <i>Further particulars may be denoted by the – 183 special auxiliaries listed under 62, e.g.</i>
.2	Wood structures with substructures of other material		
.6	<i>[cancelled]</i> → 624.011.17		624.012.36 – 183.4 Structures in prestressed precast lightweight concrete
.7	Structures in organic materials other than wood		
.72	Structures in straw, reed, bamboo etc.		
.73	Structures in cork and similar materials →674.83 Cork-making 674.84 Synthetic cork. Cork substitute	.4	Structures in concrete, in-situ concrete (ordinary concrete), mass concrete →691.32 Concrete. Concrete building elements 693.5 Concrete construction work. Concreting. In-situ concrete. Mass concrete. Reinforced concrete. Prestressed concrete <i>Further particulars may be denoted by the – 183 special auxiliaries listed under 62, e.g.</i>
.74	Paper (wallpaper). Cardboard. Tarred paper, roofing felt etc.		
.75	Structures in other fibrous materials. Canvas (sailcloth). Felt (e.g. iron felt). Woven material →677 Textile industry		
.77	Structures in natural rubber		
.78	Structures in plastics, reinforced plastics		
.8	Structures in materials of animal origin. Skins, leather. Dung. Hairs. Feathers. Shells, bones, etc.		
.9	Structures in organic mineral materials		
.96	<i>[cancelled]</i> → 624.011.9		624.012.4 – 183.2. Structures in heavyweight concrete – 183.4 Structures in lightweight concrete
.012	Masonry structures in natural stone, cast stone, artificial masses, ceramic materials	.41	<i>[cancelled]</i> → 539, 620.17/.19, 624.04
.1	Structures in natural stone. Natural stone masonry	.43	<i>[cancelled]</i> → 624.078.3
.11/.12	Kinds of stone 624.012.11/.12 $\cong$ 553.5/.6, e.g. 624.012.114.8 Marble structures .012.117.1 Sandstone structures	.44	Structures in mass concrete →627.8 Dams. Hydraulic power plant works
.15	Masonry structures in reinforced natural stone. Reinforced natural stone masonry	.45	Structures in reinforced concrete. Reinforced concrete structures →693.55 Reinforced concrete construction <i>Further particulars may be denoted by the – 183 special auxiliaries listed under 62, e.g.</i>
.2	Structures in artificial stone. Cast stone structures		624.012.45 – 183.4 Structures in reinforced lightweight concrete
.25	Structures in reinforced artificial stone		
.26	Structures in prestressed artificial stone		

624.012.454	Reinforcement <i>If the reinforcement is not of steel, the material may be denoted by colon combination with the subdivisions of 691, e.g.</i> 624.012.454:691.12 Bamboo reinforcement <i>Special types of steel may be denoted by colon combination with the subdivisions of 669, e.g.</i> 624.012.454:669.14.018.29 Structural steel reinforcement <i>The shape of the reinforcement may be denoted by the – 4 special auxiliaries listed under 62, e.g.</i> 624.454 – 428.2 Helical reinforcement	624.046	STRUCTURAL DESIGN. GRAPHICAL AND ANALYTICAL STATICS FOR INVESTIGATION AND CALCULATION OF STRUCTURES →531.2 Statics. Forces. Equilibrium. Attraction <i>Particular calculation methods may be denoted by colon combination or by alphabetic extension</i>
.46	Structures in prestressed concrete. Prestressed concrete structures 624.012.46 ≅ 624.012.45 →693.56 Prestressed (reinforced) concrete <i>Further particulars may be denoted by the – 183 special auxiliaries listed under 62, e.g.</i> 624.012.46 – 183.4 Structures in prestressed lightweight concrete	.041	Establishing the general design. Systems and grids. Statics of structures in general
.5	[cancelled] → 691.5	.1	Internally and externally statically determinate structures
.6	Structures in glass 624.012.6 ≅ 666, e.g. 624.012.616.6 Structures in armoured glass. Structures in wired glass	.2	Statically indeterminate structures in general
.8	Structures in earth, mud, clay	.3	Internally statically determinate, externally statically indeterminate structures
.81	Structures in dried earth, adobe, mud. Pise	.4	Externally statically determinate, internally statically indeterminate structures
.82	Structures in baked clay. Structures in ordinary and refractory bricks	.5	Internally and externally statically indeterminate structures
.83/.89	[cancelled] → 691.43/.49	.6	Support reactions. Shear forces. Moments. Influence lines. Deflection curves. Diagram of resistance moments
.013/.013.9	[cancelled] → 624.014	.61	Support reactions. Shear forces. Shear lines. Intersection forces
.014	Metal structures →624.96 Supporting structures for transport and handling 624.97 Slender structures. Towers. Chimneys. Masts 693.8 Structural work in steel and other metals 693.97 Skeleton structures of metallic materials <i>Types of connection may be denoted by the .078.4 special auxiliaries</i>	.62	Moments. Moment lines
.1	Cast iron structures	.63	Influence lines
.2	Steel structures	.65	Deflection curves. Deflection lines
.24/.26	[cancelled] use 624.014.078.4	.66	Compatibility requirements. Support lines
.27	Tubular steel structures	.68	Diagram of resistance moments
.7	Structures in light metal (and light metal alloys) 624.014.7 ≅ 624.014.2 →693.82 Structural work in non-ferrous metals in general	.042	Calculation of loads and stresses <i>Further particulars may be denoted by the common auxiliaries of place</i> [Table I(e)], e.g. 624.042(1 – 198.2) Vertical loadings .042(1 – 198.4) Diagonal loadings .042(1 – 198.6) Horizontal loadings
.9	Structures in other metal	.1	Loads and stresses in general
.015	[cancelled], superfluous	.12	Internal stresses
.016	Structures in composite materials. Composite structures, e.g. 624.072.2:624.016 Composite beams 624.21.016 Composite bridges	.13	Foundation pressures
.5	[cancelled] → 624.94.012.45	.14	Uplift-pressures. Under-pressures
.7	[cancelled] → 624.94.014	.2	Static loading. Dead load (structure + floor load + internal fittings)
624.02	STRUCTURAL PARTS AND ELEMENTS 624.02 ≅ 692	.3	Incidental loads. Superimposed loads. Live loads <i>Further particulars may be denoted by colon combination, e.g.</i> 624.042.3:534.1 Loading by vibrations in general :534.222.092 Loading by explosion waves
.023/.023.943	[cancelled] → 624.07	.4	Wind loads. Snow loads. ice loads. Water loads
624.03	SIZE, PERMANENCE, LOCATION AND SHAPE OF STRUCTURES 624.03 ≅ 69.03 <i>The .03 special auxiliaries are preferably for use under 69</i>	.41	Wind loads. Pressure and suction
		.42	Snow loads
		.43	Ice loads
		.44	Water loads
		.5	Temperature effects
		.6	Various static effects
		.62	Stresses due to deformations
		.63	Stresses due to construction. Enforced stresses
		.65	Measures for artificial alteration of the conditions of stress
		.68	Effects of notches, holes or openings on the conditions of stress
		.7	Loads due to ground tremors, seismic effects
		.8	Dynamic loads
		.043/.043.7	[cancelled] → 624.041.66, 624.042.6, 624.07/.074.3
		.1	[cancelled] → 624.074.3
		.11/.12	[cancelled] → 624.041.66
		.2/.22	[cancelled] → 624.07
		.23	[cancelled] → 624.072.9
		.3	[cancelled] use 624.16:624.04
		.6	[cancelled] → 624.042.65
		.7	[cancelled] → 624.042.68
		.044	Calculation of deformation (strain)
		.2	Elastic deformations
		.3	Plastic deformations

.045	<i>[cancelled]</i> → 624.042.2	624.072.31	Short columns. Piers. Thick walls (without buckling risk)
624.046	Load-bearing capacity. Stability	.32	Arches. Arched girders
.2	Carrying capacity	.322	Fixed arches
.3	Stability	.2	Rigidly fixed arches
.4	Rigidity	.4	Elastically fixed arches
.5	Safety factor. Load factor	.323	Hinged arches
.047	Movable structures. Stationary structures	.1	One-hinged arches
.1	Movable structures →69.033 Dismantlable, transportable and temporary buildings. Degree of permanence of buildings	.2	Two-hinged arches
.2	Stationary structures	.3	Three-hinged arches
.048	Model statics. Use of models in structural design	.6	Hinged arches with tension tie
.049	<i>[cancelled]</i> use 69:744	.324	<i>[cancelled]</i> → 624.072.323.2
624.05	SITE, ORGANIZATION AND PLANT. CONSTRUCTION METHODS 624.05 ≅ 69.05 <i>The .05 special auxiliaries are preferably for use under 69</i>	.5	<i>[cancelled]</i> → 624.072.323.6
624.07	STRUCTURAL ELEMENTS. LOAD-BEARING MEMBERS	.325	<i>[cancelled]</i> → 624.072.323.3
.071	Elements for taking only an axial stress	.326	Continuous arches. Continuous arched girders
.2	Flexible elements. Elements for suspended structures. Cables	.327	Bow-string arches →624.072.226 Hanging trusses 624.072.227 Composite trusses
.22	Ropes. Suspension ropes	.2	Stiffened bow-string arches. Langer beams
.23	Cables. Suspension cables	.328	Arches partially stressed during construction. Prestressed arches
.232	Carrying cables	.1	Melan
.234	Back-stay cables	.33	Frames. Plane frameworks. Parts of frames and frameworks <i>Statistical aspects may be denoted by colon combination with the subdivisions of 624.04, structural aspects by other subdivisions of 624.07, e.g.</i> 624.072.33:624.041.1 Statically determinate frameworks :624.072.32 Arched frameworks
.25	Chains. Suspension chains	.331	Hinged frames
.3	Rigid elements	.1	One-hinged frames
.32	Elements under tension. Tension bars etc.	.2	Two-hinged frames
.322	Carrying members	.3	Three-hinged frames
.324	Suspension rods. Overhead rails	.332	Simply-supported frames. Rampant frames
.34	Elements for taking a biaxial stress (without buckling). Compression bars etc.	.333	<i>[cancelled]</i> → 624.072.336.23
.072	Elements for taking a biaxial stress	.334/.334.1	<i>[cancelled]</i> → 624.072.336.3
.1	Discs in general <i>Shape may be denoted by the – 4 special auxiliaries listed under 62, e.g.</i> 624.072.1 – 422.41 Square discs .42 Rectangular discs	.335	Continuous frames
.14	Discs, prestressed	.336	Portal structures. Frameworks
.2	Elements under bending stress. Girders. Beams. Plate girders <i>Materials may be denoted by colon combination with the subdivisions of 624.01, shape by the – 4 special auxiliaries listed under 62, e.g.</i> 624.072.2:624.014.2 Steel girders :624.014.2 – 413 Steel plate girders :624.014.2 – 415 Lightweight section steel girders	.2	Portal frames
.21	Cantilevered beams and brackets	.23	Multi-storey frames
.22	Beams on two or more supports	.3	Triangular frameworks. Trusses
.221	Simply-supported beams	.32	Vierendeel girders
.222	Beams fixed at one or both ends	.4	Frameworks with parallel chords
.223	Elastically fixed beams	.5	Frameworks with polygonal chords
.226	Hanging trusses	.338	Specific parts of frames and frameworks →624.075.22 Compression members in frameworks
.1	With one truss post	.2	Frame tie beams. Frame posts. Frame corner-pieces etc.
.2	With two truss posts	.4	Upper chord. Lower chord
.227	Composite trusses	.5	Diagonals
.1	Single, with one strut	.6	Vertical bars
.2	Double, with two struts	.8	Framework nodes →624.078 Structural connections and connection links and their calculation
.23	Continuous beams on three or more supports with constant or variable moments of inertia	.4	Elements subject to combined stresses
.232	Beams on fixed supports allowing free rotation of beam	.44	Curved or buckled members. Frame corner pieces
.233	Beams on supports subject to elastic settlement and rotation	.45	Fixed beams subject to bending and tension stresses
.5	Beams on continuous elastic foundation or bedding (e.g. railway track)	.46	Curved girders, e.g. girders for bridges with a deck curved in plan <i>[cancelled]</i> → 624.072.45
.238	Continuous beams hinged together to be statically determinate. Gerber girders	.6	<i>[cancelled]</i> → 624.072.46
.24	Plate girders	.7	Girders with closed hollow sections. Hollow girders. Box girders. Tubes <i>Specific forms may be denoted by the – 4 special auxiliaries listed under 62, e.g.</i> 624.072.7 – 422.11 Tubes with circular section
.3	Elements subject to bending and axial stress →624.075.2 Elements subject to buckling stress	.9	Bracings. Longitudinal bracings. Transverse bracings. Cross bracings. Diagonal bracings <i>Further particulars may be denoted by colon combination, e.g.</i> 624.072.9:624.042.41 Wind bracings

624.073	Plane load-bearing structures. Plates. Discs <i>Shapes may be denoted by the – 4 special auxiliaries listed under 62, e.g.</i> 624.073 – 422.11 Circular plates – 422.3 Triangular plates	624.074.5	Space frames. Lattices →624.072.336 Portal structures Frameworks <i>[cancelled]</i> → 624.166, 624.97 <i>[cancelled]</i> → 624.95
.1	Theory	.6	Elements with stress conditions that must be checked for stability
.11	Freely supported plates	.7	Elements subject to buckling stress
.111	Skew plates	.22	Compression members in frameworks →624.071.34 Elements for taking a biaxial stress
.112	<i>[cancelled]</i> → 624.073 – 422.11	.224	Multi-sectional compressed members
.113	Plates freely supported on two or more sides	.23	Long columns. Stanchions
.114	Plates freely supported on one side	.234	Long columns and stanchions with one end free, the other end fully fixed
.12	Clamped plates (fixed plates)	.235	Long columns with both ends fully fixed
.121	Plates with all sides clamped	.24	Articulated columns (composed of several members joined together)
.122	Plates with three sides clamped	.25	Compression chords of frameworks
.123	Plates with two sides clamped	.3	Elements subject to instability (overturning or tilting)
.124	Plates with one side clamped	.4	Elements subject to buckling and bulging
.126	Skew plates	.078	Structural connections, connection links and their calculation <i>Details of stress and strain may be denoted by colon combination with the subdivisions of 53, e.g.</i> 624.078:531.222 Tension forces :531.223 Compression forces :531.226 Shear forces :531.43 Friction forces :539.61 Adhesion forces
.13	Plates on point supports	.1/2	<i>[cancelled]</i> → 624.078.4
.131	Plates supported on one column	.3	Joints and their calculation
.132	Plates supported on several columns	.32	Expansion joints. Running joints. Settlement joints
.135	Plates on supports with mushroom heads (e.g. mushroom ceilings)	.34	Construction joints
.136	Plates on supports without mushroom heads (e.g. flat ceilings)	.342	Course joints (horizontal)
.14	<i>[cancelled]</i> → 624.074.4	.344	Vertical joints
.2	Plates with elastic supports	.35	<i>[cancelled]</i> → 624.078.45
.4	Continuous plates	.36	Joints that do not allow expansion
.5	Plate-like frames. Beam grillages. Diagonal beam grillages. Ribbed floors etc.	.37	Dummy joints
.6	Plates with disturbance ranges (e.g. with holes or other openings)	.38	Joint filling (preformed, sealing fillers) <i>For materials of organic origin</i> → 691.1 <i>For bedding, filling, jointing materials</i> → 691.58
.7/.75	<i>[cancelled]</i> → 624.073.135/.136, 624.073.5	.4	Connections and their calculation. Points of junction. System centres <i>Further particulars may be denoted by colon combination, e.g.</i> 624.078.4:539.61 Bond strength. Adhesion :620.179.4 Adhesion testing
.8	Discs as load-bearing structures	.41	Points of connection
.82	Disc walls. Deep girders	.41	Butted connections
.074	Space structures	.414	Interlocking connections. Indentations. Crankings. Dovetail halvings etc.
.1	Bridge-shaped structures	.415	Overlapping or embracing connections. Plate connections. Strip-steel connections. Tyre connections. Fishplate connections
.11	Skew bridge-shaped structures	.416	Points of junction. System centres. Connection plates
.2	Cupolas. Domes	.42	Brad connections. Dowelled connections. Nailed connections. Screw-bolt connections
.22	Flat cupolas. Semi-cupolas	.422	Brad connections. Stud-bolt connections
.23	Caps	.424	Dowelled connections
.24	Surmounted cupolas	.425	Nailed connections
.25	Pointed cupolas	.427	Screw-bolt connections →624.078.46 Screwed connections. Bolted connections
.26	Cupolas over a square or rectangular plan, or squinch arches or pendants	.43	Glued connections →621.792 Joining by adhesion or pressure. Bonding, gluing etc.
.27	Ribbed cupolas. Umbrella cupolas	.44	Riveted connections
.28	Parts of cupolas	.45	Welded connections →621.791 Welding and allied techniques
.282	Soffits, intrados. Back, extrados	.46	Screwed connections. Bolted connections
.283	Base. Abutments. Springings	.465	Connections using high-tensile prestressed screws
.284	Tension bars. Tie anchors. Ring anchors →624.071.32 Elements under tension. Tension bars etc.	.48	Combined connections
.285	Squinch arches. Pendants	.484	Glued connections with existing nailed or riveted connection
.286	Lanterns. Crown openings		
.287	Ribs. Groins		
.288	Vault stones. Keystones		
.3	Vaults →624.072.32 Arches. Arched girders		
.32	Vaults according to shape and height 624.074.32 ≅ 624.072.32		
.35	Interpenetration of vaults		
.352	Cross vaults. Groined vaults		
.353	Barrel vaults with lunettes. Welsh vaults		
.354	Cloistered vaults		
.36	Continuous vaults. Corbelled vaults		
.362	Continuous vaults		
.364	Corbelled vaults		
.38	Parts of vaults 624.074.38 ≅ 624.074.28		
.4	Stressed skin structures. Space frames. Shells		
.42	Stressed skin structures		
.421	Folded plate structures		
.43	Shells		
.432	Axially symmetrical shells. Cupola shells		
.433	Cylindrical shells. Vault shells		
.434	Translation shells. Paraboloid shells		
.435	Conoid shells		
.436	Shells with horizontal edges		
.437	Composite shells		
.438	Parts of shells. Shell surfaces, edges		

624.078.486	Glued connections with existing screwed connection	624.078.62	Cylindrical hinges. Ball hinges
.49	Connections by mechanical action	.64	Sliding hinges. Pin hinges. Hinges for cantilevers
.492	Prestressing connections	.7	Anchorage
.494	Shrinkage connections		→624.153.7 Anchor blocks. Anchorage foundations
.5	Bearings and their calculation	.72	Anchor rings. Anchor loops
.52	Fixed bearings. Rocker bearings. Pin bearings	.74	Anchor bars. Anchor ties
.54	Movable bearings. Roller bearings. Pendulum bearings. Ball bearings. Slide bearings.	.8	Stiffeners
	Rolling contact bearings	.82	Stiffening beams. Stiffeners
.55	[cancelled]	84	Stiffening rings
.6	Hinges	.09	[cancelled] → 624.21.09

Principal divisions

624.1	SUBSTRUCTURES. EARTHWORKS. FOUNDATIONS. TUNNELLING	624.131.258	Lava. Tuff. Trass. Pumice. Perlite
624.12	ROCK ENGINEERING AND MECHANICS	.259	Weathering zone of rocky ground
	624.12 ≅ 624.13	.26	Humus
	→624.19 Tunnels. Tunnelling. Galleries.	.27	Soils with organic admixtures
	Gallery construction	.272	Slime. Ooze
.121	Rock mechanics	.276	Peaty soil. Peat. Coal
	624.121 ≅ 624.131, e.g.	.28	Soils with special admixtures (iron pyrites, sulphides)
	624.121.532 Mountain pressure	.29	Other soils
	.537 Stability. Planes of rupture.	.3	Soil examination, sampling and tests
	Slip surfaces	.31	Investigation of the ground
	.54 Mountain movements. Deformations		<i>Further particulars may be denoted by colon combination with the subdivisions of 550.8 and 624.131.4/6</i>
	Rheology	.32	Geophysical exploration
.123	.542 Settlements. Mountain failure		<i>Further particulars may be denoted by colon combination with the subdivisions of 550.83, e.g.</i>
.127	Rock clearing and excavation		624.131.32:550.834 Acoustical methods
	Securing of rock slopes. Protective works in mountainous country		:550 836 Geothermal methods
624.13	GEOTECHNICS. SOIL MECHANICS. EARTHWORKS. FROZEN GROUND ENGINEERING		:550.837 3 Geoelectrical methods
	→55 Geology. Meteorology. Hydrology	.33	Prospecting
.131/.132	Preliminary works. Earth moving Soil mechanics. Structural soil technology. Technical preparatory work	.34	Trial bores
.131	→69.051 Selection, investigation of the site.		624.131.34 ≅ 622.24
	State of site at start of work	.35	→550.822 Geological drilling
.1	Generalities. Origin of soil. Engineering geology.	.36	Pile-driving tests
	Mineralogical, geological and biological factors in assessing soils	.363	Sampling
.2	Classification of soils for engineering	.364	Sampling from test pits
	→624.131.431 Phases and stratification of soils.	.365	Sampling from boreholes
	Compound	.365	Sampling apparatus
.21	Cohesionless soils (frictional soils)	.367	Handling and protection of soil samples
.211	Stones. Pebbles. Shingle	.37	Laboratory tests. Model tests
.212	Gravel. Sand		<i>Further particulars may be denoted by colon combination with the subdivisions of 624.131.4/5, e.g.</i>
.213	Very fine sand. Rock flour Rock dust		624.131.37:624.131.41 Tests for chemical and physicochemical properties of soil
.216	Running sand. Quicksand		:624.131.43 Tests for physical and mechanical properties of soil
.22	Cohesive soils		:624.131.431.3 Determination of water content of soil
.221	Clay. Mud. Silt		:624.131.439.82 Tests for consistency limits of soil (Atterberg)
.222	Loam	.371/.379	[cancelled] use 624 131.37.624.131.4/5
.223	Marl	.38	Field tests and investigations
.224	Boulder clay	.381	Penetration tests (deep sounding)
.225	Varve clays	.382	Foundation soil tests
.226	Stiff fissured clays	.2	Surface testing
.23	Loess	.3	Testing soil in the borehole
.232	Loess clay	.5	Testing soil in pits or shafts
.24	Naturally cemented soils	.383	Trial loading of bearing surfaces (vertical and horizontal)
.241	Conglomerates (cemented by siliceous materials, lime, clay)	.384	Test loading and test driving of piles
.242	Bog iron ore	.385	Dynamic investigations
.25	Rock-type soils	.386	Earth pressure measurements
.251	Sandstone		
.252	Shale. Slate. Schist		
.253	Limestone. Marl. Chalk		
.254	[cancelled] → 624.131.253		
.255	Metamorphic rocks. Gneiss. Quartzite. Marble etc.		
.256	Plutonic rocks. Granite etc.		
.257	Volcanic rocks. Basalt etc.		

- 624.131.387 Pore water pressure measurements
 .388 Foundation soil testing on rocky ground
 .2/.4 *[cancelled]* → 624.131.382
 .389 Other field tests. Control tests of soil samples etc.
 .4 Properties of soil
For soil science → 631.4, with which this section is broadly in parallel
 .41 Chemical and physicochemical properties of soil
 .411 Composition of the various kinds of soil
 .412 Physicochemical properties of soil in general
 .413 Electrochemical properties of soil
 .414 Colloidal properties of soil
 .1 Colloidal effects of grain size distribution.
 Flocculation
 .3 Absorption. Hydration. Swelling
 .4 Thixotropy
 .415 Soil reaction, Soil acidity, pH
 .43 Physical and mechanical properties of soil
 .431 Phases and stratification of soil, Compound
 .1 Relative density (specific gravity) of grains
 .2 Pore space. Voids ratio
 .3 Water content of soil
 .4 Structure. Texture
Further particulars may be denoted by colon combination with the subdivisions of 551.24
 .5 Bulk density. Dry density
 .6 Grain size
 .7 Grain shape
 .432 Capillarity
 .433 Permeability
 .2 Effect of density
 .3 Effect of viscosity
 .4 Effect of air
 .5 Effect of solutions
 .7 Effect of position and gradient of the ground
 .434 Shrinkage and swelling of soil
 .436 Thermal properties of soil. Effects of heat or cold on soil
 → 624.139 Frozen ground engineering
 .5 Effect of heat on soil
 .6 Effect of cold on soil
 .437 Electrical properties of soil
 624.131.437 $\cong$ 537, e.g.
 624.131.437.311 Resistivity of soil
 .438 *[cancelled]* → 624.131.439
 .439 Mechanical properties of soil
 .1 Friction
 .2 Cohesion (true and apparent)
 .3 Relation between loading and voids ratio (water content). Hydrodynamic stress phenomena. Variation with time
 .4 Compressive strength
 .5 Shear strength
 .6 Effect of repeated loads on the strength
 .7 Effect of impact on the strength
 .8 Consistency (stiffness). Resistance to deformation (viscosity)
Further particulars may be denoted by colon combination with the subdivisions of 539.3
 .82 Consistency limits (Atterberg)
 .83 Other determinations of consistency (cone, needle)
 .9 *[cancelled]* → 624.131.414.4
 .46 Biological properties and effects of soils
 .47 Soil surveys and mapping
 → 528 Geodesy. Surveying.
 Photogrammetry. Cartography
 .471 Soil mapping
 .472 Soil profiles
 .473 Soil surveys
 .5 Soil statics. Soil dynamics
 → 624.121 Rock mechanics
 .51 Generalities
 .52 Foundation pressure. Pressure distribution. Hydrodynamic forces. Bearing capacity
 → 624.042.14 Uplift-pressures.
 Under-pressures
 .521 Generalities
- 624.131.522 Pressure distribution around foundations.
 Foundation pressure
 .2 Point load
 .3 Uniformly distributed load (e.g. as with raft foundation)
 .33 Load from a number of points or surfaces
 .4 Distribution of pressure with pile foundations
 .42 With single piles
 .43 With pile groups
 .523 Hydrodynamic forces. Uplift, Capillary pressure. Buoyancy. Pore water pressure
 → 624.131.387 Pore water pressure measurements
 .524 Bearing capacity. Permissible earth deformation
 .2 Of shallow (surface) foundations
 .3 Of deep foundations
 .4 Of piles
 .526 Settlement analysis
 .53 Earth pressures (active and passive). Pressure distribution. Stability. Slip surfaces. Landslips
 Generalities
 .1/.5 *[cancelled]* → 624.137, 624.19
 .6 Lateral stability of piers and piles
 .7 Stability of tubes and conduits
 .532 Active earth pressure
 .2 With elastic condition of soil
 .3 With plastic condition of soil
 .5 Internal pressure In hollow spaces. Supporting resistance, Filling
 .533 Passive earth pressure
 .534 Effect of soil deformation on active and passive earth pressure
 .535 Effect of vibrations on active and passive earth pressure
 .536 Effect of pore water movements on active and passive earth pressure, Hydrodynamic stresses
 .537 Stability, Planes of rupture. Slip surfaces
 → 624.139.3 Soil stability on slopes in frozen ground regions
 .54 Rheology of the ground. Movements of the ground. Deformations
 .541 According to dimensions
 .1 One-dimensional
 .2 Two-dimensional
 .3 Three-dimensional
 .542 Settlements. Foundation or embankment soil failure
 .543 Failure of slopes. Flow slides
 .55 Soil vibrations. Earth tremors
 → 699.84 Vibration-proof, sound-proof construction
 .551 Causes of earth tremors
 .1 Natural occurrences. Earthquakes. Waves
 .2 Blasting. Explosions
 .3 Other building operations
 .4 Traffic
 .5 Machinery
 .552 Effect of earth tremors
 .2 Effect upon bearing capacity and settlement
 .3 Effect upon earth stresses
 .4 Effect upon deformations
 .6 Effect upon groundwater pressure
 .6 Water in the soil. Groundwater flow. Percolation. Scouring. Capillary effects. Flow pressure
 → 532 Mechanics of fluids in general. Mechanics of liquids
 556.3 Groundwater hydrology. Geohydrology. Hydrogeology
 622.5 Mine drainage. Unwatering
 624.151.2 Foundations with control of water level
 .61 Natural flow of groundwater
 .62 Flow nets
 .63 Flow to wells, sumps and drains
 .64 Seepage forces
 .65 Uplift pressures under dams, weirs and other structures