

# CPC COOPERATIVE PATENT CLASSIFICATION

## E FIXED CONSTRUCTIONS

### BUILDING

## E02 HYDRAULIC ENGINEERING; FOUNDATIONS; SOIL SHIFTING

### E02D FOUNDATIONS; EXCAVATIONS; EMBANKMENTS (specially adapted for hydraulic engineering [E02B](#)); UNDERGROUND OR UNDERWATER STRUCTURES {(tunnels, tunnelling, mining [E21](#))}

#### WARNING

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups:

[E02D 29/09](#)

covered by

[E02D 29/06](#)

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| <p><b>1/00</b> <b>Investigation of foundation soil <u>in situ</u></b><br/>(investigation involving boring or specially adapted to earth drilling <a href="#">E21B 25/00</a>, <a href="#">E21B 49/00</a>; investigating or analysing materials by determining their chemical or physical properties, in general <a href="#">G01N</a>, e.g. sampling <a href="#">G01N 1/00</a>)</p> <p>1/02 . before construction work</p> <p>1/022 . . {by investigating mechanical properties of the soil (<a href="#">E02D 1/027</a> takes precedence)}</p> <p>1/025 . . . {combined with sampling}</p> <p>1/027 . . {by investigating properties relating to fluids in the soil, e.g. pore-water pressure, permeability (sampling of groundwater <a href="#">E02D 1/06</a>)}</p> <p>1/04 . . Sampling of soil {( <a href="#">E02D 1/025</a> takes precedence)}</p> <p>1/06 . . Sampling of ground water</p> <p>1/08 . after finishing the foundation structure {(testing of piles <a href="#">E02D 33/00</a>)}</p> <p><b>3/00</b> <b>Improving or preserving soil or rock, e.g. preserving permafrost soil</b> (securing of slopes or inclines <a href="#">E02D 17/20</a>; damming or interrupting passage of underground water <a href="#">E02D 19/12</a>; improving soil for agricultural purposes <a href="#">A01</a>; soil stabilisation for road building or like purposes <a href="#">E01C 21/00</a>, <a href="#">E01C 23/10</a>; setting rock anchoring bolts <a href="#">E21D</a>)</p> <p>3/005 . {Soil-conditioning by mixing with fibrous materials, filaments, open mesh or the like}</p> <p>3/02 . Improving by compacting (<a href="#">E02D 3/11</a> takes precedence; compacting soil locally before or while forming foundations <a href="#">E02D 27/26</a>, <a href="#">E02D 27/28</a>)</p> <p>3/026 . . by rolling with rollers usable only for or specially adapted for soil compaction, e.g. sheepsfoot rollers (rollers for soil working in agriculture <a href="#">A01B 29/00</a>; rollers for road paving, such rollers usable also for compacting soil <a href="#">E01C 19/23</a>)</p> <p>3/0265 . . . {Wheels specially adapted therefor; Cleats for said wheels}</p> <p>3/032 . . . Trench rollers</p> <p>3/039 . . . Slope rollers</p> | <p>3/046 . . by tamping or vibrating, e.g. with auxiliary watering of the soil (<a href="#">E02D 3/026</a>, <a href="#">E02D 3/08</a> take precedence; generating or transmitting mechanical vibrations for performing mechanical work in general <a href="#">B06B</a>; tamping or vibrating apparatus for working ballast or railways <a href="#">E01B 27/00</a>, for consolidating paving materials <a href="#">E01C 19/30</a>, for consolidating concrete in general <a href="#">E04G 21/06</a>)</p> <p>3/054 . . . involving penetration of the soil, e.g. vibroflotation</p> <p>3/061 . . . Tampers with directly acting explosion chambers (pile drivers with explosion chambers <a href="#">E02D 7/12</a>)</p> <p>3/068 . . . Vibrating apparatus operating with systems involving reciprocating masses (<a href="#">E02D 3/054</a>, <a href="#">E02D 3/061</a> take precedence)</p> <p>3/074 . . . Vibrating apparatus operating with systems involving rotary unbalanced masses (<a href="#">E02D 3/054</a> takes precedence)</p> <p>3/08 . . by inserting stones or lost bodies, e.g. compaction piles (sand drains for soil compaction <a href="#">E02D 3/10</a>; stressing soil while forming foundations <a href="#">E02D 27/28</a>)</p> <p>3/10 . . by watering, draining, de-aerating or blasting, e.g. by installing sand or wick drains (<a href="#">E02D 3/11</a> takes precedence; soil-penetrating vibrators with auxiliary watering <a href="#">E02D 3/054</a>; drainage of soil in general <a href="#">E02B 11/00</a>)</p> <p>3/103 . . . {by installing wick drains or sand bags}</p> <p>3/106 . . . {by forming sand drains containing only loose aggregates (sand piles <a href="#">E02D 3/08</a>)}</p> <p>3/11 . by thermal, electrical or electro-chemical means (freezing soil for interrupting passage of underground water <a href="#">E02D 19/14</a>)</p> <p>3/115 . . by freezing</p> <p>3/12 . Consolidating by placing solidifying or pore-filling substances in the soil (making piles <a href="#">E02D 5/46</a>; soil-conditioning or soil-stabilising materials <a href="#">C09K 17/00</a>; consolidation of ground around boreholes or wells <a href="#">E21B 43/025</a>)</p> <p>3/123 . . {and compacting the soil (<a href="#">E02D 3/126</a> takes precedence)}</p> |
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- 3/126 . . {and mixing by rotating blades}
- 5/00 Bulkheads, piles, or other structural elements specially adapted to foundation engineering (engineering elements in general F16)**
- 5/02 . Sheet piles or sheet pile bulkheads {(foundations made with sheet pile bulkheads [E02D 27/30](#); cofferdams [E02D 19/04](#))}
- 5/03 . . Prefabricated parts {, e.g. composite sheet piles}
- 5/04 . . . made of steel
- 5/06 . . . . Fitted piles or other elements specially adapted for closing gaps between two sheet piles or between two walls of sheet piles
- 5/08 . . . . Locking forms; Edge joints; Pile crossings; Branch pieces
- 5/10 . . . made of concrete or reinforced concrete {(moulds therefor [E02D 5/70](#))}
- 5/105 . . . . {of prestressed concrete ([E02D 5/12](#) takes precedence)}
- 5/12 . . . . Locking forms; Edge joints; Pile crossings; Branch pieces
- 5/14 . . Sealing joints between adjacent {sheet} piles (sealing joints not restricted to foundation piles [E04B 1/68](#))
- 5/16 . . Auxiliary devices rigidly or detachably arranged on sheet piles for facilitating assembly {(as parts of driving or pulling apparatus [E02D 7/00](#), [E02D 13/00](#))}
- 5/18 . Bulkheads or similar walls made solely of concrete in situ {(moulds therefor [E02D 5/68](#); making foundation slots [E02D 17/13](#); sealing diaphragms other than those made of concrete [E02D 19/18](#))}
- 5/182 . . {using formworks to separate sections}
- 5/185 . . {with flexible joint members between sections (joints in foundation structures [E02D 29/16](#); flexible joints in hydraulic engineering [E02B 3/16](#), in building [E04B 1/68](#))}
- 5/187 . . {the bulkheads or walls being made continuously, e.g. excavating and constructing bulkheads or walls in the same process, without joints}
- 5/20 . Bulkheads or similar walls made of prefabricated parts and concrete, including reinforced concrete, in situ
- 5/22 . Piles (sheet piles, {i.e. elements shaped to mutually lock or mate} [E02D 5/02](#); {pile shoes [E02D 5/72](#); foundations on piles [E02D 27/12](#), [E02D 27/20](#))}
- 5/223 . . {Details of top sections of foundation piles ([E02D 5/54](#) takes precedence)}
- 5/226 . . {Protecting piles (piles with protecting cases [E02D 5/60](#))}
- 5/24 . . Prefabricated piles
- NOTE**
- Documents covered both by [E02D 5/26](#) - [E02D 5/32](#) and by one or several of the groups [E02D 5/48](#) - [E02D 5/64](#) are classified in all relevant groups unless specific priority rules to the contrary are given
- 5/26 . . . made of timber with or without reinforcement; Means affording protection against spoiling of the wood (cases [E02D 5/60](#); impregnating agents [B27K 3/16](#)); Self-cleaning of piles placed in water
- 5/28 . . . made of steel {or other metals ([E02D 5/52](#) takes precedence)}
- 5/285 . . . . {tubular, e.g. prefabricated from sheet pile elements (sheet pile boxes [E02D 27/30](#); concrete piles with metal casings [E02D 5/30](#))}
- 5/30 . . . made of concrete or reinforced concrete or made of steel and concrete {([E02D 5/50](#) takes precedence; assembled from segments [E02D 5/523](#); prestressed concrete [E02D 5/58](#))}
- 5/32 . . . with arrangements for setting {or assisting in setting} in position by fluid jets {(placing piers by using fluid jets in general [E02D 7/24](#))}
- 5/34 . . Concrete or concrete-like piles cast in position{; Apparatus for making same ([E02D 5/50](#) takes precedence; moulds [E02D 5/665](#); placing, removing moulds [E02D 7/00](#) - [E02D 11/00](#); placing the concrete [E02D 15/04](#))}
- 5/36 . . . making without use of mouldpipes or other moulds
- NOTE**
- Documents covered both by [E02D 5/34](#) - [E02D 5/46](#) and by one or several of the groups [E02D 5/48](#) - [E02D 5/64](#) are classified in all relevant groups unless specific priority rules to the contrary are given
- 5/38 . . . making by use of mould-pipes or other moulds
- 5/385 . . . . {with removal of the outer mould-pipes (documents also covered by one or several of the groups [E02D 5/40](#) - [E02D 5/44](#) are classified in all the relevant groups)}
- 5/40 . . . . in open water
- 5/42 . . . . by making use of pressure liquid or pressure gas for compacting the concrete
- 5/44 . . . . with enlarged footing or enlargements at the bottom of the pile
- 5/445 . . . . . {by application of pyrotechniques}
- 5/46 . . . making in situ by forcing bonding agents into gravel fillings or the soil (consolidating soil in general [E02D 3/12](#))
- 5/48 . . Piles varying in construction along their length{, i.e. along the body between head and shoe, e.g. made of different materials along their length ([E02D 5/50](#), [E02D 5/52](#) take precedence)}
- 5/50 . . Piles comprising both precast concrete portions and concrete portions cast in situ {([E02D 5/523](#) takes precedence)}
- 5/52 . . Piles composed of separable parts, e.g. telescopic tubes {Piles composed of segments}
- 5/523 . . . {composed of segments}
- 5/526 . . . . {Connection means between pile segments}
- 5/54 . . Piles with prefabricated supports or anchoring parts; Anchoring piles {([E02D 5/44](#) takes precedence; ground anchors [E02D 5/80](#); anchored foundations [E02D 27/50](#))}
- 5/56 . . Screw piles {(placing piles by screwing down [E02D 7/22](#))}
- 5/58 . . Prestressed concrete piles {(segmental piles [E02D 5/523](#))}
- 5/60 . . Piles with protecting cases
- 5/62 . . Compacting the soil at the footing or in {or along} a casing by forcing cement or like material through tubes
- 5/64 . . Repairing piles

- 5/66 . Mould-pipes or other moulds {(for plant use [B28B](#))}
- 5/665 . . {for making piles}
- 5/68 . . for making bulkheads or elements thereof
- 5/70 . . for making sheet piles {not used}
- 5/72 . Pile shoes
- 5/74 . Means for anchoring structural elements or bulkheads (anchoring piles [E02D 5/54](#); anchored foundations [E02D 27/50](#))
- 5/76 . . Anchorings for bulkheads or sections thereof {in as much as specially adapted therefor}
- 5/765 . . . {removable}
- 5/80 . . Ground anchors {(for galleries, tunnels or shafts [E21D 21/00](#))}
- 5/801 . . . {driven by screwing}
- 5/803 . . . {with pivotable anchoring members}
- 5/805 . . . {with deformable anchoring members}
- 5/806 . . . {involving use of explosives}
- 5/808 . . . {anchored by using exclusively a bonding material}
- 7/00 Methods or apparatus for placing sheet pile bulkheads, piles, mouldpipes, or other moulds (for both placing and removing [E02D 11/00](#); {accessories for coupling driver to piles or the like [E02D 13/10](#); for trees or other plants [A01G 17/16](#); placing posts [E04H 17/26](#))}**
- 7/02 . Placing by driving {([E02D 7/18](#) - [E02D 7/24](#) take precedence)}
- 7/04 . . Hand {(acted)} pile-drivers
- 7/06 . . Power-driven drivers {(tamperers [E02D 3/061](#))}
- 7/08 . . . Drop drivers with free-falling hammer {([E02D 7/10](#) takes precedence)}
- 7/10 . . . with pressure-actuated hammer, {i.e. the pressure fluid acting directly on the hammer structure ([E02D 7/12](#) takes precedence; vibrating drivers [E02D 7/18](#))}
- 7/12 . . . Drivers with explosion chambers
- 7/125 . . . . {Diesel drivers}
- 7/14 . . . Components for drivers {inasmuch as not specially for a specific driver construction}
- 7/16 . . . . Scaffolds {or supports} for drivers {(guide frames for the elements to be driven per se [E02D 13/04](#); supports of the artificial island type [E02B 17/00](#))}
- 7/165 . . . . . {of variable length, e.g. foldable or telescopic}
- 7/18 . Placing by vibrating {(vibrators for soil compacting [E02D 3/046](#))}
- 7/20 . Placing by pressure or pulling power
- 7/22 . Placing by screwing down {(screw piles per se [E02D 5/56](#))}
- 7/24 . Placing by using fluid jets {(prefabricated concrete piles with arrangements therefor [E02D 5/32](#))}
- 7/26 . Placing by using several means simultaneously
- 7/28 . Placing of hollow pipes or mould pipes by means arranged inside the piles or pipes {([E02D 13/08](#) takes precedence)}
- 7/30 . . by driving cores
- 9/00 Removing sheet piles bulkheads, piles, mould-pipes or other moulds {or parts thereof} (for both placing and removing [E02D 11/00](#))**
- 9/005 . {removing the top of placed piles of sheet piles ([E02D 9/04](#) takes precedence)}
- 9/02 . by withdrawing
- 9/04 . by cutting-off under water
- 11/00 Methods or apparatus {specially adapted} for both placing and removing sheet pile bulkheads, piles, or mould-pipes (features relating to placing only [E02D 7/00](#), to removing only [E02D 9/00](#); placing apparatus which without special provisions, can be operated to remove, e.g. vibrating drivers [E02D 7/00](#))}**
- 13/00 Accessories for placing or removing piles or bulkheads{, e.g. noise attenuating chambers}**
- 13/005 . {Sound absorbing accessories in piling}
- 13/02 . specially adapted for placing or removing bulkheads
- 13/04 . Guide devices; Guide frames {(as parts of the driver scaffold [E02D 7/16](#))}
- 13/06 . for observation while placing
- 13/08 . Removing obstacles
- 13/10 . Follow-blocks of pile-drivers or like devices
- NOTE**
- The IPC wording is replaced by the following wording: Devices adapted to, e.g. interposed on, the top of the pile to be driven, e.g. follow-blocks or the like caps, rings
- 15/00 Handling building or like materials for hydraulic engineering or foundations ({soil-shifting [E02F](#); conveying or working-up concrete or similar masses in general [E04G 21/02](#))}**
- 15/02 . Handling of bulk concrete specially for foundation {or hydraulic engineering} purposes {(lining canals [E02B 5/02](#); banks of the bodies of water [E02B 3/121](#))}
- 15/04 . . Placing concrete in mould-pipes, pile tubes, bore-holes or narrow shafts
- 15/06 . . Placing concrete under water {(for surfacing the bottom of bodies of water [E02B 3/121](#))}
- 15/08 . Sinking workpieces into water or soil {inasmuch as not provided for elsewhere}
- 15/10 . Placing gravel or light material under water {inasmuch as not provided for elsewhere}
- 17/00 Excavations; Bordering of excavations; Making embankments (soil-shifting apparatus [E02F](#); earth drilling [E21](#))**
- 17/02 . Foundation pits
- 17/04 . . Bordering {surfacing} or stiffening the sides of foundation pits
- 17/06 . Foundation {trenches} ditches or narrow shafts
- 17/08 . . Bordering or stiffening the sides of ditches {trenches} or narrow shafts for foundations
- 17/083 . . . {Shoring struts}
- 17/086 . . . {Travelling trench shores}
- 17/10 . . Covering trenches for foundations
- 17/12 . . Back-filling of foundation trenches or ditches {(apparatus therefor [E02F 5/12](#), [E02F 5/22](#))}
- 17/13 . Foundation slots {or slits}; Implements for making these slots {or slits}
- 17/16 . Loosening of soil or rock, under water (for correcting streams [E02B 3/02](#); by dredgers or excavators [E02F](#))
- 17/18 . Making embankments, {e.g. dikes, dams} ([E02D 17/20](#) takes precedence; {foundations for dams [E02D 27/40](#))}

- 17/20 . . Securing of slopes or inclines {(by soil [E02D 3/12](#); protection against snowslides or avalanches [E01F 7/04](#), [E01F 15/00](#); securing banks or like surfaces facing on bodies of water [E02B 3/12](#))}
- 17/202 . . {with flexible securing means}
- 17/205 . . {with modular blocks, e.g. pre-fabricated}
- 17/207 . . {with means incorporating sheet piles or piles}

### 19/00 Keeping dry foundation sites or other areas in the ground (sheet piles or bulkheads [E02D 5/02](#))

- 19/02 . Restraining of open water
- 19/04 . . by coffer-dams {, e.g. made of sheet piles (permanent sheet piling boxes [E02D 27/30](#))}
- 19/06 . Restraining of underground water
- 19/08 . . by employing open ditches arranged below the level of the water
- 19/10 . . by lowering level of ground water {(installation for obtaining or collecting drinking water [E03B 3/00](#))}
- 19/12 . . by damming or interrupting the passage of underground water
- 19/14 . . . by freezing the soil (in connection with sinking shafts [E21D 1/12](#))
- 19/16 . . . by placing or applying sealing substances {(E02D 19/18 takes precedence); consolidating by placing solidifying or pore-filling pore-filling substances in the soil [E02D 3/12](#); improving soil by chemical substances [C09K 17/00](#))}
- 19/18 . . . by making use of sealing aprons, {e.g. diaphragms made from bituminous or clay material} {(concrete diaphragms [E02D 5/18](#)); sealing or joints for {hydraulic} engineering work [E02B 3/16](#))}
- 19/185 . . . . {Joints between sheets constituting the sealing aprons}
- 19/20 . . . by displacing the water, e.g. by compressed air {(pneumatic caissons [E02D 23/04](#))}
- 19/22 . Lining sumps in trenches {or other foundation pits}

### 23/00 Caissons; Construction or placing of caissons (tunnels submerged into or built in open water [E02D 29/063](#); moles, piers, quays, breakwaters incorporating caissons [E02B 3/06](#); foundation formed by caissons [E02D 27/18](#) - [E02D 27/22](#); caisson-like artificial islands [E02B 17/00](#))

- 23/02 . Caissons able to be floated on water and to be lowered into water *in situ* {(floating caisson foundations [E02D 27/06](#))}
- 23/04 . Pneumatic caissons {(sinking of same [E02D 23/10](#))}
- 23/06 . . Bringing persons or material into or out of compressed air caissons {(air locks in mines [E21F 1/14](#))}
- 23/08 . Lowering or sinking caissons {(sinking mine shaft [E21D 1/00](#))}
- 23/10 . . Caissons filled with compressed air {(E02D 23/06 takes precedence)}
- 23/12 . . Inclined lowering
- 23/14 . . Decreasing the skin friction while lowering
- 23/16 . Jointing caissons to the foundation soil, specially to uneven foundation soil

### 25/00 Joining caissons, sinkers, or other units to each other under water

### 27/00 Foundations as substructures

- 27/01 . Flat foundations
- 27/013 . . {Shuttering specially adapted therefor}
- 27/016 . . {made mainly from prefabricated concrete elements}
- 27/02 . . Flat foundations without substantial excavation ([E02D 27/04](#), [E02D 27/08](#) take precedence)
- 27/04 . . in water or on quicksand
- 27/06 . . . Floating caisson foundations
- 27/08 . . Reinforcements for flat foundations {(E02D 27/48 takes precedence)}
- 27/10 . Deep foundations
- 27/12 . . Pile foundations
- 27/14 . . . Pile framings{, i.e. piles assembled to form the substructure}
- 27/16 . . . Foundations formed of separate piles
- 27/18 . . Foundations formed by making use of caissons
- 27/20 . . Caisson foundations combined with pile foundations
- 27/22 . . Caisson foundations made by starting from fixed or floating artificial islands by using protective bulkheads
- 27/24 . Foundations constructed by making use of diving-bells (equipment for dwelling or working under water [B63C 11/00](#))
- 27/26 . Compacting soil locally before forming foundations; Construction of foundation structures by forcing binding substances into gravel fillings (consolidating foundation soil in general [E02D 3/02](#) - [E02D 3/12](#); {for piles [E02D 5/02](#), [E02D 5/46](#))}
- 27/28 . Stressing the soil or the foundation structure while forming foundations
- 27/30 . Foundations made with permanent use of sheet pile bulkheads, walls of planks, or sheet piling boxes
- 27/32 . Foundations for special purposes {(for paving of roads [E01C 3/00](#))}
- 27/34 . . Foundations for sinking or earthquake territories (building constructions with protection arrangements against earthquakes [E04H 9/02](#))
- 27/35 . . Foundations formed in frozen ground, e.g. in permafrost soil
- 27/36 . . Foundations formed in moors or bogs
- 27/38 . . Foundations for large tanks, e.g. oil tanks
- 27/40 . . Foundations for dams across valleys or for dam constructions {(dams per se [E02B 3/10](#), [E02B 7/04](#))}
- 27/42 . . Foundations for poles, masts or chimneys {(sockets or holders for poles or masts per se [E04H 12/22](#))}
- 27/425 . . . {specially adapted for wind motors masts (wind motors per se [F03D 1/00](#))}
- 27/44 . . Foundations for machines, engines or ordnance (special layout of foundations with respect to machinery to be supported [F16M 9/00](#))
- 27/46 . . Foundations for supply conduits or other canals {(bridges for supporting conduits [E01D 18/00](#); elevated canals [E02B 5/005](#); penstocks [E02B 9/06](#))}
- 27/48 . . Foundations inserted underneath existing buildings or constructions {(making a new substructure subsequent to lifting or moving of buildings [E04G 23/06](#))}
- 27/50 . . Anchored foundations



- 27/52 . . Submerged foundations{, i.e. submerged in open water ([E02D 27/12](#) - [E02D 27/24](#) take precedence)}
- 27/525 . . . {using elements penetrating the underwater ground (sinking work pieces [E02D 15/08](#), sinking caissons [E02D 23/02](#))}
- 29/00 {Independent} underground or underwater structures** (underground tanks [B65D 88/76](#); hydraulic engineering, e.g. sealings or joints, [E02B](#); underground garages [E04H 6/00](#); underground air-raid shelters [E04H 9/12](#); burial vaults [E04H 13/00](#)); **Retaining walls**
- 29/02 . Retaining or protecting walls (piers or quay walls [E02B 3/06](#))
- 29/0208 . . {Gabions}
- 29/0216 . . {Cribbing walls}
- 29/0225 . . {comprising retention means in the backfill}
- 29/0233 . . . {the retention means being anchors (details of anchors [E02D 5/80](#))}
- 29/0241 . . . {the retention means being reinforced earth elements}
- 29/025 . . {made up of similar modular elements stacked without mortar}
- 29/0258 . . {not used, see subgroups ([E02D 29/0208](#) - [E02D 29/025](#) take precedence)}
- 29/0266 . . . {made up of preformed elements}
- 29/0275 . . . {cast *in situ*}
- 29/0283 . . . {of mixed type}
- 29/0291 . . . {made up of filled, bag-like elements}
- 29/04 . {Making large underground spaces, e.g. for underground plants, e.g. stations of underground railways; Construction or layout thereof ([E02D 29/10](#) takes precedence; water-supply or sewerage plants [E03](#); layout of water power plants [E02B 9/00](#); making large underground chambers by underground methods only [E21D 13/00](#))}
- 29/045 . Underground structures, e.g. tunnels or galleries, built in the open air or by methods involving disturbance of the ground surface all along the location line; Methods of making them
- 29/05 . . at least part of the cross-section being constructed in an open excavation or from the ground surface, e.g. assembled in a trench
- 29/055 . . . further excavation of the cross-section proceeding underneath an already installed part of the structure, e.g. the roof of a tunnel
- 29/06 . {Constructions, or methods of constructing, in water ([E02D 15/00](#) takes precedence; submerged foundations [E02D 27/52](#))}
- 29/063 . Tunnels submerged into, or built in, open water (construction or placing of caissons in general [E02D 23/00](#); joining caissons to each other under water, in general [E02D 25/00](#))
- 29/067 . . Floating tunnels; Submerged bridge-like tunnels, i.e. tunnels supported by piers or the like above the water-bed (pontoon or floating bridges [E01D 15/14](#))
- 29/07 . . Tunnels or shuttering therefor preconstructed as a whole or continuously made, and moved into place on the water-bed, e.g. into a preformed trench
- 29/073 . . Tunnels or shuttering therefor assembled from sections individually sunk onto, or laid on, the water-bed, e.g. in a preformed trench (caisson-type sections lowered onto the water-bed [E02D 29/077](#))
- 29/077 . . Tunnels at least partially built beneath the water-bed characterised by being made by methods involving disturbance thereof all along the location line, e.g. by cut-and-cover or caisson methods
- 29/08 . {Siphons (for sewerage [E03F 5/20](#); siphon weirs [E02B 7/18](#); siphons in general [F04F 10/00](#))}
- 29/10 . {Tunnels or galleries specially adapted to house conduits, e.g. oil pipe-lines, sewer pipes (for pressure water conduits [E02B 9/06](#); for cables [H02G 9/02](#); layout of tunnels or galleries in general [E21D 9/14](#); road kerbs with housings for pipes or the like [E01C 11/222](#)); Making conduits *in situ*, e.g. of concrete (combined with digging of trenches or ditches [E02F 5/10](#); making or lining tunnels or galleries [E21D](#); constructing tunnels or galleries in open excavations [E02D 29/045](#); in open water [E02D 29/063](#)); Casings, i.e. manhole shafts, access or inspection chambers or coverings of boreholes or narrow wells (wells for drinking water [E03B 3/08](#); boreholes or wells formed by deep drilling [E21B](#); shafts [E21D](#))}
- 29/12 . Manhole shafts; Other inspection or access chambers; Accessories therefor (for underground tanks [B65D 90/10](#); for sewerage [E03F 5/02](#); climbing irons or ladders [E06C 9/00](#))}
- 29/121 . . {characterised by the connection between shaft elements, e.g. of rings forming said shaft}
- 29/122 . . {Steps or handrails for shafts}
- 29/124 . . {Shaft entirely made of synthetic material}
- 29/125 . . {characterised by the lining of the shaft}
- 29/127 . . {with devices for impeding fall or injuries of persons}
- 29/128 . . {Repairs of manhole shafts}
- 29/14 . . Covers for manholes or the like; Frames for covers {(gully gratings [E03F 5/06](#))}
- 29/1409 . . . {adjustable in height or inclination}
- 29/1418 . . . {with implements to assist in lifting, e.g. counterweights, springs (lifting devices for covers [B66F 19/005](#))}
- 29/1427 . . . {Locking devices (of bayonet type [E02D 29/14](#))}
- 29/1436 . . . {with overflow or explosion control means, e.g. check or relief valves}
- 29/1445 . . . {Tools for positioning or removing cover frames}
- 29/1454 . . . {Non-circular covers, e.g. hexagonal, elliptic}
- 29/1463 . . . {Hinged connection of cover to frame}
- 29/1472 . . . {Cover entirely made of synthetic material}
- 29/1481 . . . {Security devices, e.g. indicating unauthorised opening ([E02D 29/1427](#) takes precedence)}
- 29/149 . . . {Annular gaskets}
- 29/16 . Arrangement or construction of joints in foundation structures ({for hydraulic engineering [E02B 3/16](#)); sealing joints not restricted to foundation structures [E04B 1/68](#))}

<b>31/00</b>	<b>Protective arrangements for foundations or foundation structures</b> {(protective casings for piles <a href="#">E02D 5/60</a> ); <b>Ground foundation measures for protecting the soil or the subsoil water, e.g. preventing or counteracting oil pollution (spillage retaining means for tanks <a href="#">B65D 90/24</a>)</b>	2200/1614	. . . made from single element
		2200/1621	. . . made from multiple elements
		2200/1628	. . rectangular
		2200/1635	. . . made from single element
		2200/1642	. . . made from multiple elements
31/002	. {Ground foundation measures for protecting the soil or subsoil water, e.g. preventing or counteracting oil pollution (not used, <a href="#">see subgroups and <a href="#">E02D 31/00</a></a> )}	2200/165	. . polygonal
		2200/1657	. . . made from single element
		2200/1664	. . . made from multiple elements
31/004	. . {Sealing liners}	2200/1671	. . helical or spiral
31/006	. . {Sealing of existing landfills, e.g. using mining techniques}	2200/1678	. . triangular
		2200/1685	. . cylindrical
31/008	. {against entry of noxious gases, e.g. Radon}	2200/1692	. . conical or convex
31/02	. against ground humidity or ground water {( <a href="#">E02D 31/06</a> takes precedence; arrangements other than according to <a href="#">E02D 31/04</a> ; against hydraulic pressure of groundwater <a href="#">E02D 31/10</a> )}	2200/17	. including an electric conductive element
		<b>2220/00</b>	<b>Temporary installations or constructions</b>
		<b>2250/00</b>	<b>Production methods</b>
31/025	. . {Draining membranes, sheets or fabric specially adapted therefor, e.g. with dimples}	2250/0007	. using a mold
		2250/0015	. using extrusion
31/04	. . Watertight packings for use under hydraulic pressure {(sealings for hydraulic engineering in general <a href="#">E02B 3/16</a> ; for building structures in general <a href="#">E04B 1/66</a> )}	2250/0023	. Cast, i.e. <u>in situ</u> or in a mold or other formwork
		2250/003	. Injection of material
31/06	. against corrosion by soil or water	2250/0038	. using an auger, i.e. continuous flight type
31/08	. against transmission of vibrations or movements in the foundation soil {( <a href="#">E02D 27/34</a> takes precedence; foundations for machines, engines or ordnance <a href="#">E02D 27/44</a> ; for road foundations <a href="#">E01C 3/06</a> )}	2250/0046	. using prestressing techniques
		2250/0053	. using suction or vacuum techniques
31/10	. against soil pressure or hydraulic pressure {(anchored foundations <a href="#">E02D 27/50</a> ; joint sealings for use under hydraulic pressure <a href="#">E02D 31/04</a> )}	2250/0061	. for working underwater
		2250/0069	. . Welding
31/12	. . against upward hydraulic pressure	2250/0076	. . Drilling
31/14	. . against frost heaves in soil	2250/0084	. . using pneumatical means
		2250/0092	. . using hydraulical means
<b>33/00</b>	<b>Testing foundations or foundation structures</b> (testing methods and apparatus, <a href="#">see the relevant subclasses of class <a href="#">G01</a></a> ; testing structures or apparatus as regards function, in general, <a href="#">G01M</a> ; testing or determining chemical or physical properties, in general <a href="#">G01N</a> )	<b>2300/00</b>	<b>Materials</b>
		2300/0001	. Rubbers
		2300/0003	. . Car tires
		2300/0004	. Synthetics
		2300/0006	. . Plastics
		2300/0007	. . . PVC
		2300/0009	. . . PE
		2300/001	. . . PP
		2300/0012	. . . recycled
		2300/0014	. . . PU
		2300/0015	. . . HDPE
		2300/0017	. . . thermoplastic
		2300/0018	. . Cement used as binder
		2300/002	. . . Concrete
		2300/0021	. . . Mortar
		2300/0023	. . . Slurry
35/005	. {Lowering or lifting of foundation structures}	2300/0025	. . Adhesives, i.e. glues
		2300/0026	. Metals
<b>37/00</b>	<b>Repair of damaged foundations or foundation structures</b> {(renewing piles <a href="#">E02D 5/64</a> ; roads <a href="#">E01C 11/005</a> ; bridges <a href="#">E01D 22/00</a> ; repairing buildings <a href="#">E04G 23/02</a> )}	2300/0028	. . Copper
		2300/0029	. . Steel; Iron
		2300/0031	. . . in cast iron form
		2300/0032	. . . in sheet form, i.e. bent or deformed plate-material
<b>2200/00</b>	<b>Geometrical or physical properties</b>	2300/0034	. . . in wire form
2200/11	. Height being adjustable	2300/0035	. . Aluminium
2200/115	. . with separate pieces	2300/0037	. Clays
2200/12	. corrugated	2300/0039	. . mixed with additives
2200/13	. having at least a mesh portion	2300/004	. . Bentonite or bentonite-like
2200/14	. resilient or elastic	2300/0042	. . . being modified by adding substances
2200/143	. . helically or spirally shaped	2300/0043	. . . with other ingredients
2200/146	. . Springs	2300/0045	. Composites
2200/15	. including at least a hinge	2300/0046	. Foams
2200/16	. Shapes	2300/0048	. . PU
2200/1607	. . round, e.g. circle		

## E02D

- 2300/005 . . PE
- 2300/0051 . Including fibers
- 2300/0053 . . made from glass
- 2300/0054 . . made from plastic
- 2300/0056 . . . PVC
- 2300/0057 . . . PE
- 2300/0059 . . . PP
- 2300/006 . . . being recycled
- 2300/0062 . . . . Shredded car tires
- 2300/0064 . . made from metal
- 2300/0065 . . made from textile
- 2300/0067 . . made from cellulose
- 2300/0068 . . made from carbon
- 2300/007 . Resins including glasfibers
- 2300/0071 . Wood
- 2300/0073 . Explosives
- 2300/0075 . Textiles
- 2300/0076 . . non-woven
- 2300/0078 . . woven
- 2300/0079 . Granulates
- 2300/0081 . Ceramics
- 2300/0082 . Cellulose
- 2300/0084 . Geogrids
- 2300/0085 . Geotextiles
- 2300/0087 . . woven
- 2300/0089 . . non-woven
- 2300/009 . . with multi-layer structure
- 2300/0092 . . . including a liquid tight layer
- 2300/0093 . . . . including bentonite
- 2300/0095 . . . . including a plastic membrane
- 2300/0096 . . with external friction enhancement features
- 2300/0098 . Bitumen

### 2450/00 {Gaskets}

- 2450/10 . Membranes
- 2450/101 . . permeable
- 2450/102 . . . for liquids
- 2450/103 . . . for gases
- 2450/105 . . impermeable
- 2450/106 . . . for liquids
- 2450/107 . . . for gases
- 2450/108 . . multi-layered

### 2600/00 Miscellaneous

- 2600/10 . comprising sensor means
- 2600/20 . comprising details of connection between elements
- 2600/30 . comprising anchoring details
- 2600/40 . comprising stabilising elements