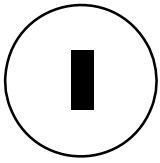

I (intensity) **1.** A measure of the average amount of power emitted by sound, solar radiation, or a light source. Measured in watts per square metre (W/m^2). *See also* LUMINOUS INTENSITY. **2.** A measure of the brightness of an object. **3.** The symbol used for *electric current.

I-beam *See* I-SECTION.

ice Frozen water; occurs when water cools to below 0^oC (32^oF) at standard atmospheric pressure. As it freezes, water expands by 9% and can cause damage to roads creating potholes, uplift of shallow foundations, etc.

ICE *See* INSTITUTION OF CIVIL ENGINEERS.

ICE Conditions of Contract An edition of *Conditions of Contract, sponsored jointly by ICE, the Civil Engineering Contractors Association (CECA), and the Association of Consulting Engineers (ACE). The full list of documents includes:

- Measurement Version
- Design and Construct
- Term Version
- Minor Works
- Partnering Addendum
- Tendering for Civil Engineering Contracts
- Agreement for Consultancy Work in Respect of Domestic or Small Works
- Archaeological Investigation
- Target Cost
- Ground Investigation
- Amendments to ICE Conditions of Contract

igneous rock (igneous stone) A rock type that has been formed from solidified *magma through either extrusive or intrusive processes. The character of igneous rock is affected by the chemical constitution of the magma and the rate at which the magma cools. The magma will have a molten temperature between 800^oC and 1200^oC. When solidified, it crystallizes into a mass of mineral crystals. The main minerals of igneous rocks are quartz, feldspar, muscovite, biotite, and mafics. Extrusive igneous rocks are formed when the magma flows out onto the surface of the land or into the sea, and cools very rapidly. The resulting rock (e.g. obsidian) will be glassy or have very fine crystal grains where minerals have crystallized. Intrusive igneous rocks are formed when the magma is injected into other rocks to form dykes, sills, batholiths, plutons, and stocks. The resulting rock (e.g. granite) is often very coarse-grained as cooling is slower, giving larger mineral crystals time to form.

ignitability The ability of a material to ignite.

ignition The process of lighting a material so that it begins to combust.

ignition temperature The lowest temperature at which a material will ignite.

illuminance (E) The *luminous flux density, or amount of light, incident on a surface. Measured in lux, where 1 lux = 1 lm/m^2. Also known as the **illumination value** or **illumination level**.

illuminated push A push button that *illuminates when operated.

illumination Lighting an area or object, usually artificially.

imbrex A curved roof tile laid over the joints between the tegula to provide a waterproof roof covering. Used in ancient Greek and Roman architecture. *See also* TEGULA.

imbricated Overlapped, layered, or woven in a regular pattern.

Imhoff cone A graduated one-litre conical vessel that is used to determine the amount of settled solids in a given time. It gives an indication of the volume of solids that can be removed from wastewater by settling in sedimentation tanks, clarifiers, or ponds.

Imhoff tank A two-storey tank that receives and processes raw sewage. The upper part of the chamber allows sedimentation to take place. Solids slide down the inclined surface of the upper chamber and enter the lower chamber. Anaerobic digestion of the sludge then takes place in the lower chamber. The lower chamber is vented and requires the digested sludge to be emptied periodically.

immersion heater A thermostatically controlled electric element installed within a tank or cylinder that is used to heat a liquid. Commonly found in hot water cylinders.

immiscible Solutions or materials that do not mix together—unmixable.

impact sound (impact noise) Sound that is generated by something impacting upon the structure of the building. Typical sources include footsteps, slammed doors and windows, noisy pipes, and vibrating machinery.

impact strength The strength of a material or structure to withstand stock loading.

impact test A standardized test that is used to determine the brittleness of a material; *see* CHARPY TEST.

impeller A rotor that transmits motion in a centrifugal or rotary pump, turbine, compressor, or fan.

imperial units Units of measurements that relate to foot, pound, and gallon. Superseded in the UK by the *SI units.

imperishable Does not decay.

impermeable Does not allow a liquid or a gas to pass through. *See also* PERMEABLE and IMPERVIOUS.

impervious Does not allow a liquid to pass through. *See also* PERMEABLE and IMPERMEABLE.

impingement filter (viscous impingement filter) A filter that removes particles by forcing them to strike a sticky filter medium.

imposed load *See* LIVE LOAD.

improved nail (ringed shank nail) Fixing nail with raised rings around the shank to increase friction and improve its ability to hold itself within the wood.

improvement line A position from which development will take place in the future, e.g. a point from which buildings will be built and land developed.

improvement notice An order issued by the *Health and Safety Executive under Health and Safety legislation which enforces organizations to take corrective action to avoid serious risk to health. The notice is served when Health and Safety law has been broken and states a period required for improvement.

impulse **1.** A force acting briefly to drive something forward. **2.** A measure of momentum by the average force acting over a period of time.

inactive leaf The less frequently used opening leaf on a double door. *See also* ACTIVE LEAF.

incandescent lamp A type of lamp that produces light by passing an electric current through a thin tungsten wire (filament), which heats up. Inexpensive and easily dimmed but has low efficacy, short lifespan, and relatively high running costs.

incentive A factor that is used to provide motivation to increase performance or do something.

incentive scheme A financial reward system that provides extra money for specific and targeted performance.

incineration (soil incineration) High temperatures (up to 1200°C) are used to volatilize and combust organic compounds in contaminated soils, particularly those contaminated with explosives and chlorinated hydrocarbons such as *PCBs. Auxiliary fuels are used to initiate and sustain combustion. Air pollution control systems are employed to remove gases produced. Other combustion residues usually require treatment/disposal. Such gases and combustion residues may be highly toxic, so effective air-pollution control systems are essential. Combustion residues may not be suitable for re-use and may still require disposal to landfill. Contaminated soils may be treated on-site using mobile plant or taken off-site to a static plant.

incise To carve or cut into an object using a sharp implement.

inclement weather (unfavourable weather) Any type of weather, such as rain, snow, high winds, etc. that slows down or prevents work being undertaken on a building site.

inclinator (US) An inclined domestic stairlift.

inclined shore *See* RAKING SHORE.

inclinometer *See* CLINOMETER.

included angle The angle where two lines with a common *vertex meet.

inclusion **1.** Something that is embedded or trapped into something else, e.g. a gas or liquid trapped within a rock stratum. **2.** The relationship between two sets such that the second set is a subset of the first.

incombustible (non-combustible) Not able to be burnt.

incompetent strata *Ductile strata, which has a tendency to flow under loading rather than forming a *fault or *fold.

Incorporated Engineer An engineer who is registered with the Engineering Council, UK, and has gained the post-nominal letters 'IEng'. According to the Engineering Council, UK, 'Incorporated Engineers maintain and manage applications of

current and developing technology, and may undertake engineering design, development, manufacture, construction, and operation.' In doing so they carry out similar, but less conceptual and detailed work than a *Chartered Engineer.

SEE WEB LINKS

- The Engineering Council web site details the different professional qualifications that can be obtained and the citation to the above quotation.

increaser A pipe that tapers from one diameter to another allowing pipes of different diameters to be joined together. The pipe is usually fixed with the pipe increasing in size along the direction of the flow.

indefinite integral An *integral which when differentiated equals a given function.

indent A groove or recess that is cut in a material or component.

indented joint A joint that is formed from two matching indents.

indenting **1.** The process of cutting an *indent into a material or component. **2.** The grooves, tracks, or marks left in flooring from heavy loads and traffic.

indenture A written contract with two or more parties, typically used for an apprentice to serve a master.

independent float Time before or after an activity that provides some flexibility over when a task can be started or finished, without affecting subsequent tasks. Tasks with float can be started as soon as a preceding task finishes or the task can be started later, within the specified float time, without affecting the start or finish date of any subsequent tasks.

independent scaffolding Tubular support system, with two sets of parallel *standards providing vertical support independent of the building, that allows operatives to work at heights. The support system is made of individual poles and clips that are fastened together to suit the structure that they are tied into. All of the vertical support is provided by the vertical poles in the scaffolding, horizontal support is provided by *braces and ties into the building. The ties are normally fixed into window openings or around columns.

indeterminate structure Where the internal forces or reaction components cannot be calculated by using the equations of equilibrium alone—equilibrium must be combined with compatibility. Two classical approaches to solve such structures include the force method and the slope-deflection method.

index In mathematics, the notation used to state how many times a number is multiplied by itself.

indicating bolt A type of *privacy latch that when engaged indicates whether the door is locked or unlocked or if the room is occupied or vacant.

indicator A device that shows the status of something. It may take the form of a meter, a gauge, or a light (**indicator light**).

indicator panel (annunciator) A large panel comprising a number of different indicators.

indigenous Originating or belonging to a particular region or country.

indirect Not direct, not in a straight line, or not immediate.

indirect cold water system A cold water system where all of the appliances, except the cold water drinking outlets, are supplied with cold water indirectly from a cold water storage tank. All of the cold water drinking outlets are supplied with water directly from the mains.

indirect hot water cylinder A cylinder where the water is heated indirectly by passing hot water from the boiler through a coil within the cylinder. The water from the boiler does not mix with the water within the cylinder. Also known as a **calorifier**.

indirect hot water system A hot water system where the water that is heated by the boiler is not the water that is drawn off at the taps. Instead the water that is heated by the boiler, or other heat source, passes through a coil inserted into the hot water cylinder, where it heats the cold water that is fed directly into the cylinder. This heated water is then drawn off when the hot water taps are activated.

indirect lighting A method of lighting a space where the light has been reflected and diffused by a ceiling or wall, rather than falling on the space directly.

indoor pool A swimming pool that is located indoors.

induced siphonage The removal of water that forms a seal in a trap due to suction; it is caused by the pressure generated from water flowing through other parts of the drainage system.

inductance (L) The property of an electric circuit or device that relates the electromotive force to the current flowing through it or near it.

induction **1.** A progress of introducing information to someone at the start of something, e.g. a structured programme someone attends at the start of a new job. **2.** Conclusion based on logic. **3.** The production of electric or magnetic forces in a circuit by being in close proximity to (but not touching) an electric or magnetic field.

induction unit A type of air-conditioning unit where high velocity air is injected through nozzles to induce the circulation of room air over a coil to which heating or cooling is applied. These tend to have relatively high fan power and may result in a noise nuisance.

industrialized building Systemized construction using prefabricated building modules that are manufactured off-site for quick assembly on-site. Off-site manufacture reduces the time spent on-site constructing the building. When there is a high degree of standardization, the economics and speed of factory building methods are considerably better than traditional bespoke methods. For some years cladding systems, trussed rafters, steel frames, and service modules have been preassembled for construction. There is now a considerable movement to produce full buildings off-site.

industry The activity or employment in construction, trade, and/or manufacture.

inelastic Not stretchy or easily changed—not able to return back to its original shape after deformation; *see also* PLASTIC.

inert A solid, liquid, or gas that is not amenable to a chemical reaction, i.e. is unreactive.

inertia The property of a body such that it remains at rest or continues moving in a straight line unless acted upon by a force.

infectious The ability to spread something, typically related to the spread of diseases caused by bacteria and viruses.

infilling **1.** Units or panels of material placed between the structural frame to increase stiffness or provide weather protection. **2.** Material placed within the cavity to improve fire resistance or thermal insulation.

infill wall Non-loadbearing walling units, brickwork, or blockwork positioned between the structural frame.

infiltration **1.** The permeation of a liquid through a substance by filtration, such as rainwater entering into a soil's groundwater; *see also* RUN-OFF. **2.** The process where air enters a building through cracks, gaps, and other unintentional openings in the building envelope. It is driven by the wind and stack effect.

infinite (∞) Not measurable—having no limits.

inflammable A substance/material that is highly susceptible to ignition, describing the ease of ignition. Inflammable and flammable have the same meaning, inflammable may be misinterpreted as meaning not flammable, as this could be confusing, it is often suggested that the word flammable is used.

inflated structure *See* AIR INFLATED STRUCTURE.

inflection A change in curvature, e.g. from convex to concave.

inflow The action of flowing in, for example, the point where fresh water flows into a lake.

influent A fluid entering a system, for example, where a stream enters a lake, or where a stream loses its flow by recharging the groundwater, i.e. it does not have a *base flow.

information paper (IP) Paper published by the *Building Research Establishment (BRE).

SEE WEB LINKS

- BRE provide publications, research, and consultancy on various aspects of building and construction.

infrared The portion of the invisible electromagnetic spectrum that consists of radiation with wavelengths between about 750 nm and 1 mm.

infrastructure The physical public systems, services, and facilities of a country that are necessary for society and economic activity. These include buildings, roads, bridges, and utilities (electricity, gas, water, sewers, and telecommunications).

ingenious Clever, imaginative, and original.

inglenook A seated area built into a recess next to a fireplace.

ingo (ingoing Scotland) A window or door *reveal.

ingo plate (Scotland) A *reveal lining.

inherent Something that exists as a permanent or existing feature, for example, *knots are an inherent defect in timber.

initial ground levels The level of the natural ground before any construction operations have taken place.

initial rate of absorption The *absorption rate.

initial set The very early stages of concrete maturity where bonds between the cementious materials have started to form; concrete should not be worked once initial bonds have started to form.

initial surface absorption test (ISAT) A test to determine the *porosity of concrete as defined in BS 1881 part 5. The test employs a plastic cap, which is sealed to the concrete surface. The cap has a water area of 5000 mm^2 and a head of water of 200 mm. The absorption of water is measured by observing the movement of water in a connecting capillary tube over a fixed time period.

injection A method of introducing a liquid to something under pressure, e.g. spraying fuel into an engine.

injection damp course (chemical injection damp course) A damp-proof course that is formed by injecting a chemical into a wall at regular intervals under pressure. Various chemicals can be used to form the damp course including silicone resins, aluminium stearate, or methyl siliconate. Used where there is no existing damp-proof course (old properties), or if the existing damp-proof course is no longer functioning correctly.

inlaid parquet Parquet *flooring that is set flush within a decorative border.

inlay The process of decorating the surface of a material or component by inserting another material into prepared indentations. The result is a decorative flush finish.

inlet **1.** A narrow indentation in a coastline or lake. **2.** A narrow stretch of water between adjacent islands. **3.** An opening through which a liquid or gas passes to enter another device.

innings Land that has be reclaimed from the sea or other waterlogged areas.

innovation To develop something new and originally, rebuild or modify, to create something different from the old that represents a noteworthy development or change to the item or process.

inorganic **1.** Formed from minerals rather than matter originating from living things. **2.** Compounds that contain no carbon, however, oxides of carbon, carbon disulphide, cyanides, and associated acids and salts are also considered to be inorganic. *See also* ORGANIC.

input system A type of mechanical ventilation system that supplies fresh air to a building using a fan. In dwellings, if fresh air from the roof space is supplied via a small fan, it is known as **positive input ventilation**.

insect attack (on timber) A common form of degradation mechanism for timber material. Within the UK insect attack is limited to a small number of species of insect and tends to be less serious than fungal attack. Outside the temperate climate regions, including the tropics, termites or white ants cause more damage than all other insect attacks put together. The main damage in the UK comes from beetles, which lay their eggs on timber, and then during the larval stage, bore through the timber, eating the organic material—mainly the sapwood, and cause loss of mechanical strength. Strength is lost because the cellulose cell walls are cut through; this can be very serious if the wood becomes badly infested.

insect screen (fly wire screen) A fine mesh screen used to prevent insects entering a building.

inset The process of placing a material or component within the boundary of another. For example, a kitchen sink will be inset within the kitchen worktop.

inside glazing Term used to describe external *glazing that has been installed from the inside of the building. *See also* OUTSIDE GLAZING.

in-situ In its original position. Refers to components or elements of a building that are formed on-site in their final position, for example in-situ concrete.

inspection The visual checking of work to ensure that operations have been carried out properly and established standards have been satisfied. Various professionals and authorities will be required to check the works as part of their job. Local authorities, clerks of works, architects, and the client's representative may all carry out visual inspections.

inspection certificate Written record that the works have been checked and have achieved the specified standard. The Building Authority will issue such certificates following inspections of drains and other works.

inspection chamber A chamber with a removable cover that enables access to be gained to an underground drain for inspection and maintenance. Also known as a **manhole**.

inspection cover The removable, usually flush-fitting cover over an *inspection chamber.

inspection door A door or panel located in a wall, floor, or ceiling that can be opened or removed to enable access to be gained to an installation or services. Also known as an **access door**.

inspection fitting (inspection eye) *See* ACCESS COVER.

inspection junction A short section of drainpipe with a removable cover that runs at a 45° angle from the main underground drain to the surface. Used to insert a drain rod. Also known as a **rodding point**.

inspection notice Notification given to the local authority to state that an area of works is complete or exposed, and is available for inspection. Certain building stages require the building inspector or nominated authority to inspect and certify that the works are satisfactory.

inspector Person employed to check the quality of the work.

instability The condition of being unstable or not in *equilibrium.

installation **1.** The act of installing equipment. **2.** A large building or facility, for example, a chemical installation.

instantaneous hot water heater (single point heater) A device designed to produce hot water instantaneously only when it is required. Usually only supplies hot water to a single point. Can be gas-fired or electric.

instant-start tube (rapid-start tube) A type of fluorescent lamp that can be switched on instantly. It incorporates a ballast that has a continuous input high enough to start an arc through the tube instantly.

institution An important professional or public body, or organization; *see* INSTITUTION OF CIVIL ENGINEERING.

Institution of Civil Engineering (ICE) An international membership organization, founded in 1818, which promotes and advances civil engineering around the world. The purpose is to qualify professionals engaged in civil engineering, exchange knowledge and

best practice, and promote their contribution to society. There are around 80,000 members worldwide.

SEE WEB LINKS

- The above web site details information about the Institution of Civil Engineering and is the reference source for the above text.

Institution of Electrical Engineers (IEE) Now called the Institution of Engineering and Technology, this is a leading professional society for engineering and technology, providing a global network to facilitate knowledge exchange and promote science, engineering, and technology.

SEE WEB LINKS

- Knowledge portal for the Institute of Engineering and Technology.

instructions to tenderers (US **notice to bidders)** Direction and guidance contained within the bills of quantities on how to include prices for materials, labour, and other items of work described

instrument **1.** A piece of equipment or tool used to aid performance. **2.** A legal document such as a statutory instrument.

insulate The process of reducing the rate of heat transfer, sound transmission, or the flow of electric current.

insulator (electric) A non-metallic substance that has very low electrical conductivity at room temperature.

intact clay A clay with no visible fissures; *see also* FISSURED CLAY.

intake An opening or structure through which fluid passes to enter a system, e.g. water intake to a treatment plant.

intake unit (house service cutout, fuse link) A device that contains the service fuse and connects the incoming electric service cable to the cables that in turn connect to the electricity meter. Usually located within the electricity meter box.

integer Something whole or complete, e.g. a whole number.

integral **1.** Important part of something to make it complete. **2.** Whole without missing parts. **3.** Concerning *integers. **4.** Concerning integrals or integration.

integral waterproofing The process of making concrete waterproof by adding the waterproofing component to the cement or the water.

integrity In *fire resistance, the length of time that a component will remain structurally intact in a fire without failing.

intelligent building (smart building) A building in which the control systems for the building, such as heating, lighting, ventilation, security systems, etc. are capable of automatically adapting to changing external conditions.

intelligent fire detector (smart fire detector) A fire detector that monitors a range of parameters in order to respond more quickly to the presence of a fire.

intelligent vehicle highway system (IVHS) A system that allows the interaction of vehicles, highway, and people to be monitored. It can be used to improve safety, reduce wear, and improve transportation times.

intensifier A device that increases the amount of something, e.g. the strength of a signal, the quality of an image, the pressure over the source pressure.

intensity The strength of something, e.g. the intensity of an earthquake (the strength of the quake rather than the magnitude, which defines the energy released).

interaction curves Graphical plots defining limiting conditions for structural members subjected to different forms of loading.

interactive Two-way responsive communication (for example, between user and computer).

interbearing angle The clockwise angle between two bearings.

interbedded Strata that have been laid down in sequence having distinctive beds.

intercept A point where a curve or line crosses an axis.

intercepting trap (interceptor) A *trap that prevents unwanted material entering a drain.

interceptor sewer A large sewer system that is designed to direct dry weather flow to the treatment plant and discharge wet weather flow into a receiving river when the sewer capacity is exceeded.

interchange A major road junction where vehicles pass without stopping, by means of slip roads, bridges, and underpasses.

intercom A device that allows communication between different parts of a building.

interdiffusion Diffusion of atoms of one metal into another metal. This usually occurs at elevated temperatures, for instance during welding of metal and metal alloys.

interface **1.** The point at which two or more components of a building meet. **2.** Where building operations come together, and different contractors or professionals have to coordinate and integrate their activities to ensure a joined-up service.

interference An unwanted disturbance that is a hindrance, for example, a signal that interrupts a radio broadcast.

intergranular fracture A failure mechanism in metals whereby the crack propagates along the grain boundaries. The grain boundaries are only visible at a microscopic level, especially in metals and alloys.

intergrown knot A live knot, a natural defect in wood formed where branches of the tree stem from the main trunk.

interim certificate Document that certifies the value of the works, normally issued on a monthly basis.

interim payment Instalments paid to the contractor or partial payment of the contract sum for works performed. Such payments are usually made on a monthly basis with retention money held back to ensure continuation of work, and that any defects can be made good before full payment is made.

interim valuation Calculation of the quantity of work performed and the value of that work so that an *interim payment can be made.

interior adhesive Substance used to stick fabric and building components together. The glue is of reasonable durability but not suitable for external use.

interlock **1.** The joining of two components together such that they are interconnected to one another. **2.** A mechanical device or arrangement of controls that prevents a device functioning unless other devices are functioning in a particular way. For example, a boiler interlock prevents the boiler from firing unless other devices (thermostats, programmers, time-switches, and TRVs) indicate that there is a demand for heat.

interlocking joint A joint where a projection in one component connects into a groove on another component.

intermediate joist A common *joist that runs from one wall to another.

intermediate rafter A common *rafter that runs at right angles from the wall plate to the ridge. *Jack rafters, which do not run the full slope of the roof, are not included within this classification

intermediate rail A horizontal *rail located between the top and bottom rail of a door.

intermediate rock *Igneous rock that has a chemical composition between *basic rock and acidic rock, for example, andesite.

intermediate sight A staff reading which is taken between a *backsight and a *fore sight.

internal angle The internal corner of a room.

internal diameter (ID, bore) The diameter of the inside of a pipe.

internal door A door located inside a building.

internal dormer A vertical *dormer window that does not project above the slope of the roof.

internal glazing Glazing that is located inside a building. *See also* EXTERNAL GLAZING.

internal hazard A fire *hazard that is located inside a building.

internal leaf The internal leaf of a cavity wall. *See also* EXTERNAL LEAF.

internally reflected component (IRC) The light received on an internal surface that is reflected from the surfaces inside a room. *See also* EXTERNALLY REFLECTED COMPONENT and SKY COMPONENT.

internal pipework (internal plumbing) Pipework located inside a building.

International Building Code (IBC) A model building code developed by the International Code Council (ICC) and used throughout the US. The code deals with regulations in regards to design and construction, structural stability, and health and safety.

International Standards Performance requirement established and set by the *International Standards Organization (ISO). The ISO works with the national quality standards organizations, such as the British Standards Institute, the European Committee for Standardization (CEN), etc. to coordinate and set international standards.

International Standards Organization (ISO) The organization that has the world's largest body of published standards. Based in Geneva, it coordinates international standards by working with the national standards organizations, enabling greater consensus between standards and operations.

SEE WEB LINKS

- A non-governmental organization providing a link between public and private sector standardization across many countries.

interpaver A paving brick that *interlocks with the other paving bricks and blocks.

interplate The boundary between two *tectonic plates. An **interplate earthquake** occurs at the boundary of two tectonic plates; *see also* INTRAPLATE.

interpolation The calculation of an intermediate point from surrounding information, for example, to obtain the value of a point somewhere between two other known points on a straight line.

intersection **1.** The point where two lines meet one another. **2.** The point where two roads meet one another.

interstitial condensation Condensation that occurs within and/or between the individual layers of the building envelope, when the temperature of some part of the building envelope equals or drops below the *dew point temperature. May occur on the surfaces of materials within a structure, particularly on the warm side of relatively vapour-resistance layers, within the material when the dew point and structural temperatures coincide throughout the material, or on more than one surface in a structure. This is because moisture may evaporate from one surface and recondense on a colder one.

interstitial level A level located halfway between two floors of a building that houses mechanical services, such as air conditioning or mechanical ventilation equipment.

intertie A horizontal intermediate member used in framed construction to help strengthen and stiffen the vertical members.

intraplate The interior of a *tectonic plate. An **intraplate earthquake** occurs in the interior of a tectonic plate; *see also* INTERPLATE.

intruder alarm system *See* BURGLAR ALARM.

intrusion Molten *igneous rock that has been injected into older pre-existing rock.

intumescent coatings A special type of protective coating, applied as a paint, offering fire protection to structural steel components. Intumescent coatings are typically 1 or 2 mm in thickness without any noticeable visual effect.

inundate Flooded or overwhelmed.

invar A non-ferrous alloy based on nickel and steel utilized for its low coefficient of thermal expansion.

inverse In mathematics, the opposite or reverse of something. For instance, minus is the inverse of plus and the inverse of multiplication is division.

invert To turn something upside down or reverse its position.

inverted roof (protected membrane roofing, US **inverted roof membrane assembly)** A type of flat roof where the insulation is applied on top of the weatherproof covering. An earth-sheltered (or turfed) roof is an extreme example of such a roof.

invertor An electrical device that converts *direct current to *alternating current.

investment casting A type of casting process used to mould metal alloys; also known as **lost wax** and **precision casting**.

invited bidder (US) *See* SELECTED TENDER.

in vitro Outside a living organism, e.g. a test carried out within a test tube; *see also* IN VIVO.

in vivo Inside a living organism; *see also* IN VITRO.

ion An atom or molecule that has either lost or gained electrons resulting in it being either positively or negatively charged.

ionic bonding A type of chemical bond involving metal atoms/ions, prevalent in metals and ceramics.

ionosphere The earth's upper atmosphere where ionizing radiation from space produces ions and free electrons that are able to reflect radio signals, thus allowing such signals to be transmitted around the globe.

iron (Fe) A heavy ductile magnetic metallic element, iron is silver white in pure form but readily rusts; it is used extensively in construction, mainly as an alloy in the form of steel. *See also* STEEL.

iron carbide (cementite) A compound found in non-ferrous alloys, i.e. steels and cast iron, chemical formula Fe_3C. The existence of this phase contributes to the hardness and tensile strength of the alloy.

iron fairy A small wheeled crane.

ironmongery A term used to refer to metal window and door fixtures and fittings, such as handles, locks, hinges, catches, etc. Originally, these would have all been made from iron.

irregular coursed rubble Wall built out of rock and stone that differs in thickness, meaning that each subsequent layer of stone has different depths. The bricklayer matches up the rocks on each level so that there is some consistency; however, the subsequent course will be of a different thickness matching the natural thickness of the stone selected.

irregular paving Irregular sizes and shapes of a material that has been laid as *paving.

irreversible Impossible to progress backwards, i.e. to its original state, shape, or place.

irrigation The supply of water via channels and pipes, particularly to enable crops and plants to grow.

I-section A rolled steel section with a cross-section in the shape of an 'I'. *See also* UNIVERSAL SECTION.

island **1.** A piece of land surrounded by water. **2.** A small area which is surrounded by something else, e.g. a traffic island.

iso- Prefix meaning of equal.

isobar A line on a weather map connecting points of equal atmospheric pressure.

isochromatic Of equal colour.

isochrone A line on a map that joins points of equal time.

isoclinic line A line on a geological map joining points that have the same magnetic dip.

isohel A line on a map that represents the same average number of hours of sunshine in a course of a year.

isohyet A line on a map that represents the same average amount of rainfall in the course of a year.

isolated ceiling A type of false ceiling that is suspended from the floor above on special hangers or clips that are designed to limit the amount of sound transmission. Used to improve sound insulation between floors.

isolated column A column that is located in a different position away from the majority of the other columns.

isolated footing A foundation, such as a *pad, that is not connected to other foundations.

isolating membrane A separating barrier used in flat asphalt roofing to allow asphalt to expand and contract without being affected by the different thermal movement of the roof structure. Breaks and holes in the barrier allow a certain amount of adhesion of the asphalt to the roof. The resulting adhesion and friction ensure that the asphalt does not contract too much in cold weather nor slide off the roof structure.

isolating strip Length of expandable and compressible material that forms a break in the structure, allowing independent movement and preventing cracking.

isolating valve (stop valve) A mechanical device inserted within pipe lengths to enable the water supply to be completely closed off.

isolation Separate from something—remote.

isolator An electrical device that, when activated, ensures that a circuit cannot become live.

isomerism When polymers have the same chemical formula yet different arrangements resulting in different materials. Thus, due to isomerism, it is possible to have the same polymer yet with different mechanical properties.

isometric Equal in dimensions. An **isometric projection** is a three-dimensional drawing that has been produced such that the projected three planes are at equal angles to the three axes.

isopachyte A line on a map connecting points of equal stratum or sediment thickness.

isopleth A line on a map connecting points of equal value, e.g. a contour line.

isoseismal A line connecting points of equal earthquake intensity.

isostasy A state that denotes the equilibrium condition within the earth's crust.

isotach A line on a weather map connecting points of equal wind speed.

isotactic A type of polymer chain configuration where all side groups are positioned on the same side of the chain molecule. This is very important in polymer chemistry as through isotactic polymers it is possible to chemically modify a polymer to yield desirable properties for a specific application.

isotherm A line on a weather map connecting points of equal temperature.

isothermal When chemical reactions take place at a specific or constant temperature, especially in metals (alloys) and polymers.

isotope Two or more forms of a chemical element that have the same atomic number but different numbers of neutrons. Their chemical properties are similar, but their physical properties differ.

isotropic A term referred to materials that have the same mechanical properties irrespective of orientation, i.e. which direction it has been cut. Most metals and polymers, for example, are isotropic, however, timber is not isotropic—it is classed as anisotropic.

isthmus A narrow strip of land, surrounded by water, that connects two larger areas of land.

IStructE The Institution of Structural Engineers is a professional institution that has around 23,000 members worldwide. It promotes professional standards in structural engineering and public safety within the *built environment. Chartered members of this institution gain post-nominal letters 'MIStructE'.

SEE WEB LINKS

- The IStructE web site details further information about the institution and the different professional qualifications which can be obtained.

IWA (Inland Waterways Association) Organization that campaigns for the use, maintenance, and restoration of British canals.

SEE WEB LINKS

- Information on the use and restoration of canals.

IWO Institution of Water Offices is a professional body that is concerned with the water industry.

Izod test This type of test is commonly utilized in metallurgy to determine the ductile-to-brittle transition temperature for metals and alloys. *See also* CHARPY TEST.