BRITISH STANDARD

BS 3618-6: 1972

Glossary of

Mining terms —

Section 6: Drilling and blasting

Confirmed January 2011

Co-operating organizations

The Mining and Quarrying Requisites Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government department and scientific and industrial organizations:

Association of Mining Electrical and Mechanical Engineers*
British Electrical and Allied Manufacturers' Association
British Steel Industry
Council of Underground Machinery Manufacturers
Department of Trade and Industry*
Engineering Equipment Users' Association
Federation of Manufacturers of Construction Equipment and Cranes
Institute of Quarrying
Institution of Mechanical Engineers
Institution of Mining Engineers*
National Coal Board*

The Government department and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:

Institution of Mining and Metallurgy
University of Birmingham
University of London
University of Nottingham

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Contents

Foreword

This glossary has been prepared, under the authority of the Mining and Quarrying Requisites Industry Standards Committee, in order to standardize and to co-ordinate the technical terms in current use in mining in the United Kingdom. Although the majority of the terms defined in the original edition of this glossary were primarily concerned with coal mining, account has been taken of terms used in other forms of mining and of quarrying.

The need for this glossary arose from the widely varying interpretation of terms used within the industry, and the prevalent use of more than one synonym, some purely local in origin, to indicate specific meanings.

The glossary has been issued in a number of sections, according to subject matter, as follows:

— *Section 1: Planning and surveying;*

— *Section 2: Ventilation;*

— *Section 3: Boring and exploration;*

— *Section 4: Drainage;*

— *Section 5: Geology;*

— *Section 6: Drilling and blasting;*

— *Section 7: Electrical engineering and lighting;*

— *Section 8: Winning and working;*

— *Section 9: Shafts and associated equipment;*

— *Section 10: Transport;*

— *Section 11: Strata control.*

In the normal process of periodical review of the BS 3618 publications it was seen that a number of modifications and additions were desirable to Section 6, "Drilling and blasting"; therefore, since the edition was dated 1964, it was decided to publish a revision incorporating these changes.

In compiling the glossary account has been taken of the fact that terms primarily associated with coal are separately defined in BS 3323, "*Glossary of coal terms*", and terms relating to coal preparation are defined in BS 3552, "*Glossary of terms used in coal preparation*". The following factors also have applied in the statement, selection and definition of terms:

1) Where two or more terms are grouped together, the term which is favoured is printed first and in heavy type. It is hoped that such preferred terms will gradually displace the non-preferred terms. The non-preferred terms of a group are printed in small capital letters. Where the use of any term is considered to be undesirable it is marked *deprecated*.

2) Generally, only terms which have a specific meaning in this field have been included. Where a technical term has an accepted meaning in other fields of engineering it has been omitted; the few exceptions are terms which are of particular importance in mining.

3) Purely local terms are not defined, but those of sufficient importance are included as non-preferred terms.

4) Obsolete terms are excluded.

The subject of soil mechanics is not covered by this standard and, for terms in that field, reference should be made to CP 2001, "*Site investigations*", and CP 2003, "*Earthworks*".

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 14 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.

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Glossary

Term	Definition
air blasting	A method of blasting in which compressed air at very high pressure is piped to a steel shell in a shothole and discharged.
airleg	A device, incorporating a pneumatic cylinder, providing support and thrust for a jackhammer.
ANFO	A mixture of ammonium nitrate and fuel oil in such proportions that the mixture can be detonated with a suitable initiator.
base charge	1. The detonating component in a detonator, initiated by the priming charge. 2. The bottom charge in a deep borehole in quarry blasting.
battery	*See exploder*.
bench	A part of the face of a large excavation which is not advanced as part of the round but as a separate operation.
bit	1. A cutting tool which is detachable from the drill rod. 2. The end of a drill stem that forms the actual cutting edge.
black blasting powder	See *black powder*.
black powder BLACK BLASTING POWDER BLACKPOWDER GUNPOWDER, *deprecated*	A low explosive composed of sodium or potassium nitrate, charcoal and sulphur.
blasting gelatine	A high explosive; the most powerful commercial explosive, taken as the standard of explosive power.
blown-out shot	A shot which has expended its force outwards down the line of the shothole without doing any appreciable blasting work.
break detector	A tool used to detect breaks or fissures intersected by a shothole. (Usually combined with a scraper.)
bulk strength	The strength of an explosive per unit volume expressed as a percentage of the value for blasting gelatine as a standard.
burden	The distance between an explosive charge and a free face which is a measure of the work to be done by the charge.
burn cut	A cut consisting of a number of holes drilled parallel and close together, some (which may be of larger diameter than the shotholes) remaining uncharged to provide a free face. (See Figure 1.)
burster	An hydraulic mechanism which, when inserted into a large diameter shothole, breaks down the strata by means of pistons operating transversely.
bursting time	The total time interval between the application of current to an instantaneous detonator and its explosion.
cap	See *detonator*.
capped fuse	A detonator fitted with a length of safety fuse.
Cardox	A method of blasting using the discharge of high pressure gaseous carbon dioxide from a steel shell.
cartridge	An individual unit of explosive, usually wrapped in the form of a cylinder.
chamber	An excavation to accommodate an explosive charge.
chambering	See *springing*.
charge	The quantity of explosive in any particular shothole.
chisel bit	A percussive bit having a single cutting edge.
circuit tester	An instrument used to test series-circuits in electrical shot-firing for continuity and resistance.

Term	Definition
collaring	The operation of starting to bore a hole.
column charge	A continuous charge in a quarry borehole (cf. *deck charge*.
compressed air blasting	See definition of *air blasting*.
cone cut	A cut in which a number of central holes are drilled towards a focal point and, when fired, break out a conical section of strata. (See Figure 2.)
cooling agent	Chemical added to an explosive during manufacture to suppress or inhibit the flame produced in blasting.
crimping	The action of squeezing the open end of a plain detonator, or a detonating relay, over a length of fuse.
cross bit	See *cruciform bit*.
cruciform bit CROSS BIT	A percussive bit having two cutting edges intersecting at right angles.
cuckoo shot	A shot fired in the roof of a longwall working, between the face and the waste, or in the waste.
cushion blasting	A method of blasting in which an air space is left between the explosive charge and the stemming, or in which the shothole is of substantially larger diameter than the cartridge.
cut SUMP	The group of holes fired first in a round to provide additional free faces for the succeeding shots.
cut-off shot	A shot in a delay round in which the charge has been wholly or partially exposed to atmosphere by reason of the detonation of an earlier shot in the round.
cut shots	Shots which initially break ground to provide a free face for subsequent shots.
deck charge	A charge which is divided into several separate components along a quarry borehole (cf. *column charge*).
deflagration	The burning of a detonating explosive subsequent to its failure to detonate.
delay detonator	A detonator in which there is a designed interval of time between the application of an electric current to the detonator and its detonation.
delay element	That part of a delay detonator interposed between the fusehead and the priming charge.
delay firing	The firing of several shots in sequence, at designed intervals of time, usually by means of delay detonators, detonating relays or sequence switches.
delay interval	The nominal period between the firing of successive delay detonators in a series of shots.
detonating fuse	A fuse containing a detonating explosive.
detonating relay	A device used intermediately in a detonating fuse circuit to obtain a short time delay.
detonation	The action of converting the chemicals in an explosive charge to gases at a high pressure, by means of a self-propagating shock wave passing through the charge.
detonator CAP, *deprecated*	A device for producing detonation in a high-explosive charge, and initiated by a safety fuse or by electricity.
diamond cut	See *pyramid cut*.
direct initiation	A method of blasting in which the primer cartridge is placed at the end of the explosives charge nearest the entrance to the shothole and the detonator is placed at the outer end of the primer cartridge.

Term	Definition
down-the-hole drill	A percussive drill in which the percussive mechanism is located immediately behind the drill bit.
drag cut	A cut in which groups of holes are drilled at increasing heights above floor level and at increasing angles from the free face. The shots are fired to break out successive wedges of strata across the width of the face. (See Figure 3.)
drifter	A heavy percussive drill requiring some form of rigid mounting.
drill boom	An adjustable arm projecting from a drill carriage to carry a drill and hold it in selected positions.
drill carriage	A vehicle on which one or more drill booms are mounted to permit the drills to be brought easily to their work and to be removed before blasting. (See also *jumbo*.)
drill cradle	The metal channel on which a heavy drill is fed forward as drilling proceeds.
drill rig DRILL STAND	Any means of supporting a rock-drill at its work.
drill stand	See *drill rig*.
drill steel	See *rod* and *stem* (1).
dynamite	A general term relating to explosives in which the principal constituent, nitro-glycerine, is contained within an absorbent substance.
easer	One of a number of holes surrounding the cut and fired immediately after it.
eq.s. explosive (*obsolescent*)	(Abbreviation of *equivalent-to-sheathed explosive*.) An unsheathed explosive incorporating cooling agents, which is equivalent in safety (relating to the ignition of methane/air mixture) on a charge weight basis to an explosive having a sheath of cooling agents around it.
excitation time	The minimum time for which electric current must flow in the fusehead of a detonator to ensure its ignition.
exploder BATTERY, *deprecated*	A device designed specifically for producing an electric current for firing detonators.
fan cut	A cut in which holes of equal or increasing length are drilled in a pattern on a horizontal plane or in a selected stratum to break out a considerable part of it before the rest of the round is fired; the holes are fired in succession in accordance with the increasing angle they form in relation to the face. (See Figure 4.)
firing	The process of initiating the action of an explosive charge or the operation of a mechanism which results in a blasting action.
fir-tree bit	A rotary bit in which a number of cutting edges are arranged behind a pilot bit to enlarge the hole to the required diameter.
flanking hole	1. A shothole drilled at an acute angle to the coal face for the purpose of trimming it. 2. Set *Drainage* section.
flush head	See *water swivel*.
foam injection	The injection of foam into shotholes and connecting breaks to displace any firedamp present and to minimize further firedamp emission into the shotholes, thereby reducing the risk of ignition of the gas during shotfiring.
free face	A surface in the vicinity of a shothole at which the rock is free to move under the force of the explosion.
fuse	See examples under *detonating fuse* and *safety fuse*.

Term	Definition
fusehead	That part of an electric detonator consisting of twin metal conductors bridged by fine resistance wire and surrounded by a bead of igniting compound which burns when the firing current is passed through the bridge wire.
fuse lighter (igniter)	A hand-held device for lighting safety fuse.
gel ampoule	A fire-resistant plastic container of gel which is used as a safety precaution in the stemming of shotholes.
gelatines	A general term relating to explosives in which a principal constituent, nitro-glycerine, is given a gelatinous consistency by mixing it with nitro-cotton.
gelignite	A general term relating to explosives of the gelatine type in which there is a proportion of woodmeal and oxygen-containing salts.
group	A number of shots sufficiently close together to be treated in common in respect of preparation for firing.
gunpowder	See *black powder*.
hammer drill	A percussive drill.
heading blast TUNNEL BLAST	A quarry blast in which the explosive charge is located in one or more chambers excavated behind the quarry face.
high explosive	Explosive which requires to be detonated.
high tension detonator (*obsolescent*)	A detonator requiring an electrical potential of about 50 volts for firing.
hollow drill rod/stem HOLLOW DRILL STEEL, *deprecated*	A drill rod or stem having an axial hole for the passage of flushing water or compressed air to remove cuttings from a drill-hole, or for the extraction of cuttings by suction.
hollow drill steel	See *hollow drill rod/stem*.
hydra-leg	A device, incorporating a hydraulic cylinder, providing support and thrust for a jackhammer.
Hydrox	A method of blasting using the discharge of chemically-produced gases at a high pressure from a steel shell.
igniter cord	A cord which passes an intense flame along its length at a uniform rate to light safety fuses in succession.
indirect initiation	See *inverse initiation*.
induction time	The interval between the bursting and lag times of a detonator.
inert primer	A cylinder of inert material which enshrouds a detonator, but which does not interfere with the detonation of the explosive charge.
infusion shotfiring PULSED INFUSION	A technique of shotfiring in which an explosive charge is fired in a shothole which is filled with water under pressure and in which the strata around the shothole have been infused with water.
instantaneous detonator	A detonator in which there is no designed delay period between the passage of an electric current through the detonator and its bursting.
insulating sleeves	See *jointing sleeves*.
integral steel	See *stem* (*1*).
inverse initiation INDIRECT INITIATION, *deprecated* REVERSE INITIATION, *deprecated*	A method of blasting in which the primer cartridge is placed at the end of the explosives charge farthest from the entrance to the shothole and the detonator is placed at the inner end of the primer cartridge.
jackhammer	A light percussive drill used in the hand or with some light support.
jointing sleeves INSULATING SLEEVES	Insulating thimbles placed over the connected ends of detonator leads coupled in large rounds of shots, and also over the connections between the detonator leads and the shotfiring cable.

Term	Definition
jumbo	1. A drill carriage. 2. A mobile scaffold to assist drilling in large headings.
lag time	The total time between the initial application of current and the rupture of the circuit within the detonator.
leading wires	See *leads*.
leads LEADING WIRES	The wires, forming part of an electric detonator, to which the shotfiring cable is attached.
licensed store	A place or building licensed by the Local Authority for the storage of explosives. (See also *magazine* and *registered premises*.)
lifters	Holes drilled at floor level.
line drilling	A technique involving a single row of closely spaced, uncharged, small diameter holes drilled along the required excavation line, thereby providing a plane of weakness to which the primary blast can break.
line oiler	A device for lubricating a drill by feeding oil gradually into the compressed air supply.
low density explosive	An explosive having a relatively low specific weight compared with that of blasting gelatine.
low explosive	Explosive which can be ignited by safety fuse, but cannot be detonated.
low tension detonator	A detonator requiring a current of about one ampere for firing and having a resistance of about one ohm.
magazine POWDER HOUSE, *deprecated*	A building for the storage of explosives licensed under Government authority to provide for circumstances where the more usual licensed store is inadequate or inappropriate. (See also *licensed store* and *registered premises*.)
mains firing	The firing of a round of shots by means of current supplied by a transformer fed from a mains power supply.
millisecond delay detonator	See *short-delay detonator*.
misfire MISS-FIRE, *deprecated*	A shot which has failed to explode.
multiple shot firing	See *multi-shot firing*.
multi-shot firing MULTIPLE SHOT FIRING, *deprecated*	The action of firing several shotholes either simultaneously or by delay firing.
non-permitted explosive	An explosive which is not approved in law for use in permitted light (safety-lamp) mines.
parallel firing	The firing of detonators in a round of shots by dividing the total supply current between the individual detonators (cf. *series firing*).
percussive drilling	A method of drilling whereby repeated blows are applied by the bit, which is repositioned by intermittent rotation.
permitted explosive	Explosive of a type which has been tested and approved under Government authority for use in mines where permitted lights (safety-lamps) are statutorily required (i.e. loosely, where there is a risk of ignition of firedamp). Permitted explosives are divided into groups P1, P2, P3, etc., each explosive being classified according to the tests it has passed.
plain detonator	A detonator for use with safety fuse.
plaster shooting	A form of secondary blasting in which explosive is detonated in contact with the rock without the use of a shothole.
pop shot	1. In mining, a shot fired for trimming purposes. 2. In quarrying, a method of secondary blasting.

Term	Definition
powder house	See *magazine*.
preshearing	See *presplitting*.
presplitting PRESHEARING	A blasting technique in which charges of low concentration are used in closely spaced holes of significantly greater diameter than the diameter of the charge, to create in a solid mass of rocks a plane of weakness which will determine the limit of breakage from subsequent blasting.
pricker	A non-ferrous tool for making a hole in the primer cartridge to receive the detonator.
primary blasting	The breaking out of stone or ore from its natural state by means of explosives.
primer PRIMER CHARGE	A boosting charge placed in contact with a detonator or detonating fuse to ensure detonation of the main charge.
primer cartridge	The explosive cartridge into which the detonator has been inserted.
primer charge	See *primer*.
pull	The linear advance resulting from the firing of a round of shots.
pulsed infusion	See *infusion shotfiring*.
pyramid cut DIAMOND CUT	A cut in which four central holes are drilled towards a focal point, and when fired break out a tetrahedral section of strata. (See Figure 5.)
registered premises	Premises registered with the Local Authority for the storage of not more than 60 lb of explosive. (See also *licensed store* and *magazine*.)
relieving shot	A shot fired to dislodge or expose a misfire.
reverse initiation	See *inverse initiation*.
rod DRILL STEEL	A bar, the end of which is slotted, tapered or screwed for the attachment of a drill bit.
rotary drilling	A method of drilling in which rotation and thrust are applied to the bit, producing a continuous cutting action.
rotary-percussive drilling	A method of drilling in which repeated blows are applied to the bit which is continually rotated under power.
round	A number of shots intended to be fired either simultaneously or with delay periods between shots.
safety fuse	A fuse with a black powder core, having a prescribed covering and designed to burn at a specified speed.
scraper	A tool designed to remove drill cuttings from a shothole before the insertion of the explosive charge. (Usually combined with a break detector.)
scroll	A helical projection on a drill rod or stem to remove the cuttings from the hole.
secondary blasting	The use of explosive to break into smaller pieces rock already blasted. (See also *plaster shooting* and *pop shot*.)
series firing	The firing of detonators in a round of shots by passing the total supply current through each of the detonators (cf. *parallel firing*).
series parallel firing	The firing of detonators in a round of shots by dividing the total supply current into branches, each containing a certain number of detonators wired in series.
shank	The end of the drill rod or stem that engages with the chuck of the drilling machine.
shell	A steel tube from which air or other gas at high pressure is discharged with explosive force in a shothole. (As used with Cardox, Hydrox, air blasting.)
shoot	To break down by air blasting.

Term	Definition
shooting valve	The control valve provided for the purpose of admitting compressed air to an air blasting shell and of venting residual air, in the shell and hose, to atmosphere.
short-delay detonator MILLISECOND DELAY DETONATOR	A detonator in which the interval of time delay is expressed in milliseconds.
shot	An explosive charge contained within a shothole.
shotfiring	The action of detonating or igniting a charge of explosive, usually in a drilled hole.
shothole	A hole drilled for the purpose of shotfiring.
simultaneous shotfiring	The firing of a round of shots using instantaneous detonators.
slurry explosives	Waterproof colloidal explosives of medium power, based upon reduction oxidation reactions and used in fluid form.
smooth blasting	A delay blasting technique for cutting clean walls in excavations, in which closely spaced peripheral holes are fired simultaneously one delay period after the last charges of the main blast.
socket	The back of a shothole which remains after the firing of a shot.
springing CHAMBERING	A quarry blasting method in which a succession of charges is fired in a borehole to open up a chamber.
squib	A thin tube filled with black powder, forming a slow-burning fuse to explode a stemmed charge of black powder.
stem (1) DRILL STEEL INTEGRAL STEEL	A bar, to the forged end of which is brazed a hard metal tip for drilling.
stem (2) TAMP	To insert and pack stemming in a shothole.
stemming	Inert material packed between the explosive charge and the outer end of the shothole, or between adjacent charges in deck charging.
stemming rod STEMMING STICK TAMPING ROD TAMPING STICK	A non-metallic rod used to push explosive cartridges into position in a shothole and to ram tight the stemming.
stemming stick	See *stemming rod*.
stoper	A light percussive drill incorporating a pneumatic cylinder to provide support and thrust while drilling steeply upward.
sump	See *cut*.
tamp	See *stem* (2).
tamping rod	See *stemming rod*.
tamping stick	See *stemming rod*.
tipped bit	A drill bit in which the cutting edge is made of specially hard material.
toe hole	A horizontal or upwardly inclined shothole placed at the foot of a quarry face.
trimmers	Shots, at the periphery of an excavation, fired to give the excavation its final outline.
tunnel blast	See *heading blast*.
velocity of detonation	The velocity with which the shock wave traverses an explosive charge on detonation.
volley firing	See *Winning and working* section.
wagon drill	A drilling machine mounted on a light, wheeled carriage.

Term	Definition
water ampoule	A fire-resistant plastic container of water which is used as a safety precaution in the stemming of shotholes.
water coupling	See *water swivel*.
water swivel FLUSH HEAD WATER COUPLING	A means by which flushing water can be fed into a hollow drill rod or stem as it rotates.
wedge cut	A cut in which the central holes are positioned to break out a wedge-shaped section of strata when fired. (See Figure 6.)
weight strength	The strength of an explosive per unit weight, expressed as a percentage of the value for blasting gelatine as a standard.

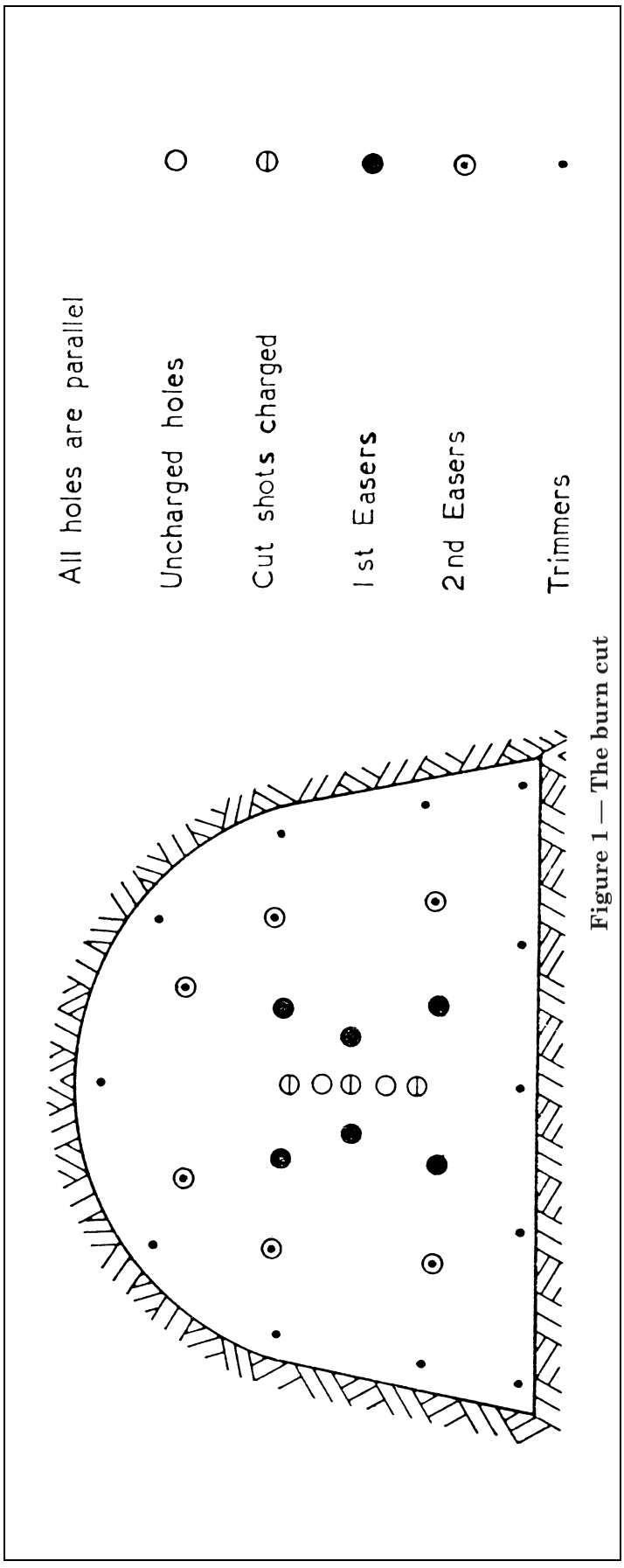

Figure 1 — The burn cut

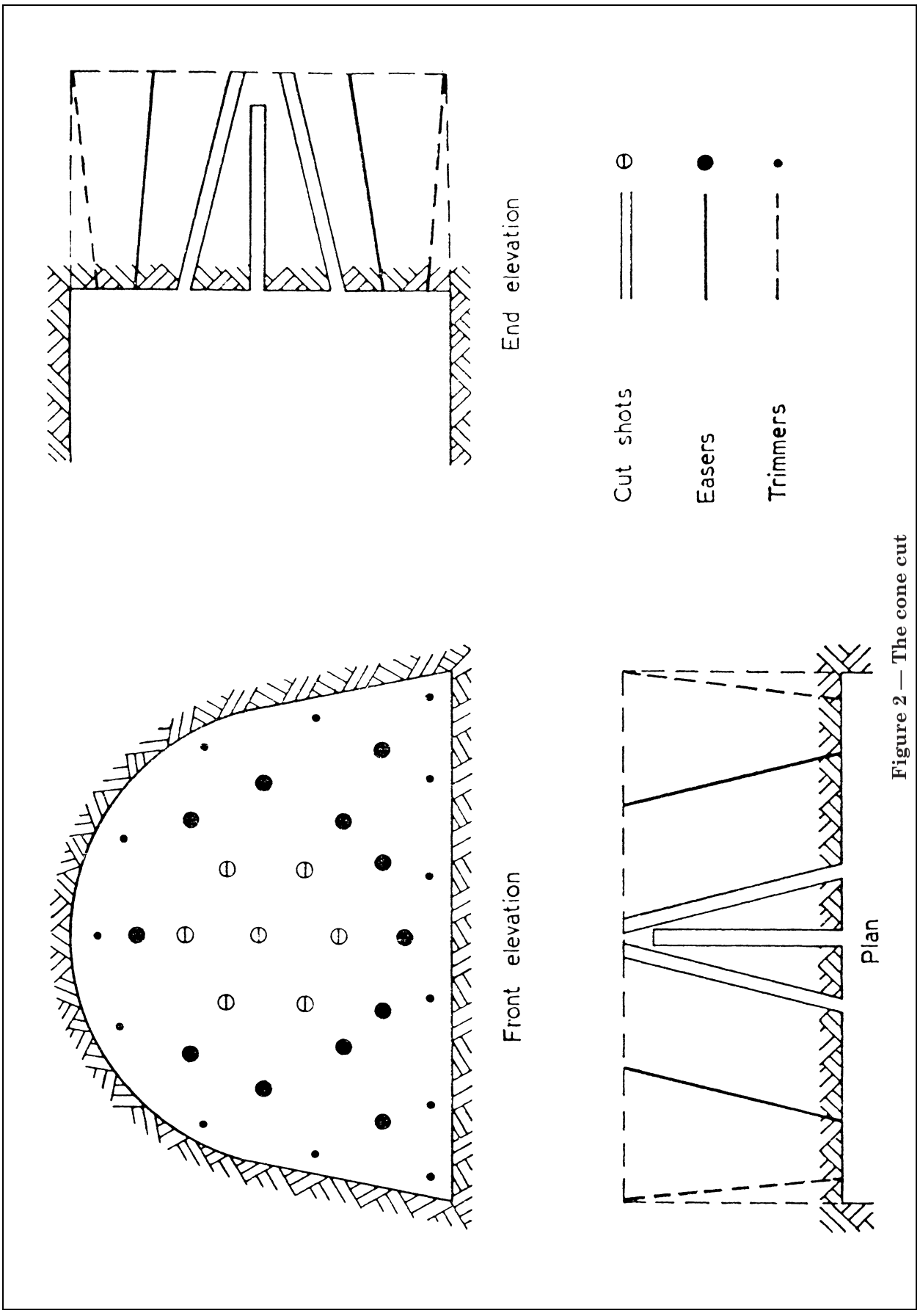

Figure 2 — The cone cut

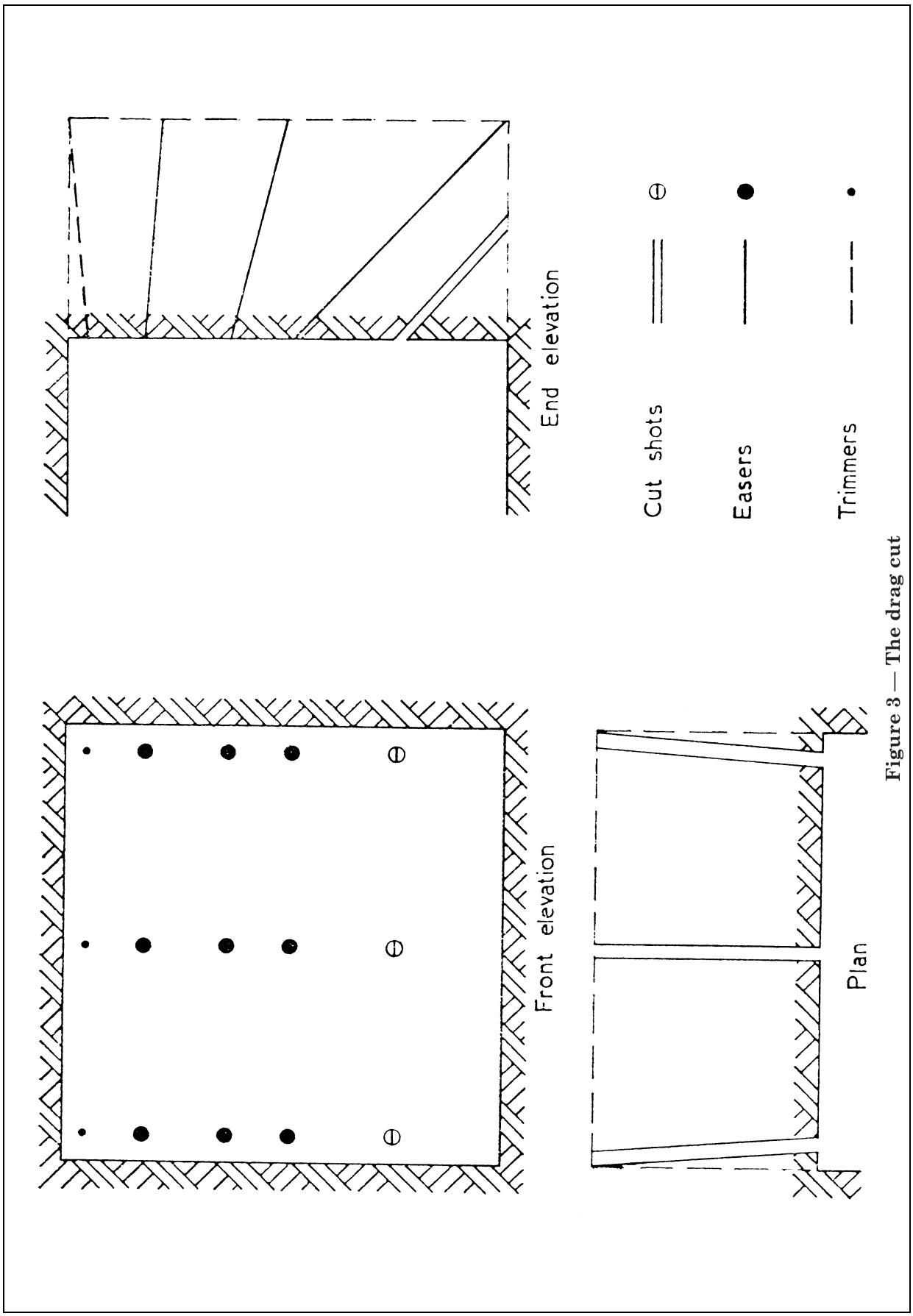

Figure 3 — The drag cut

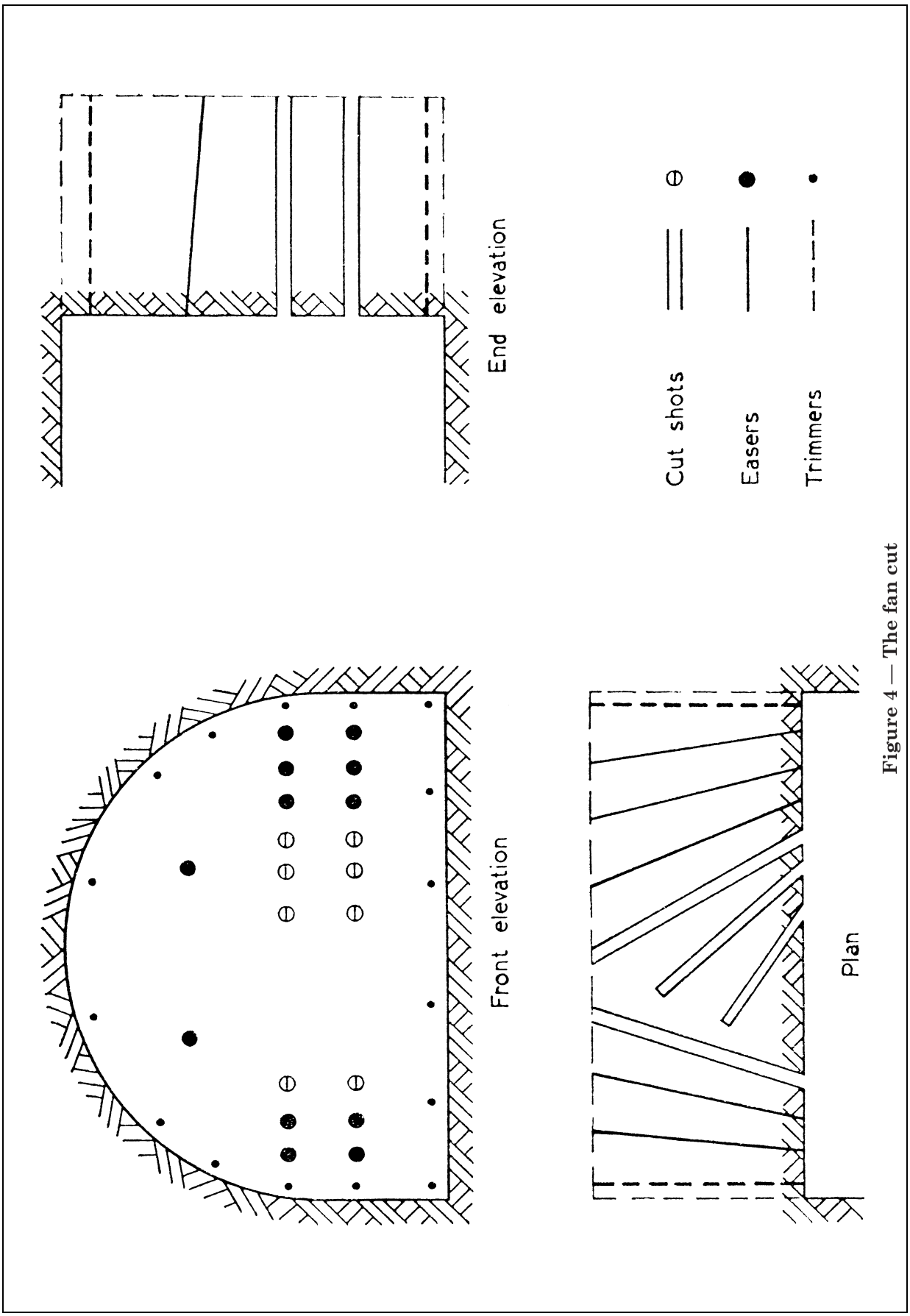

Figure 4 — The fan cut

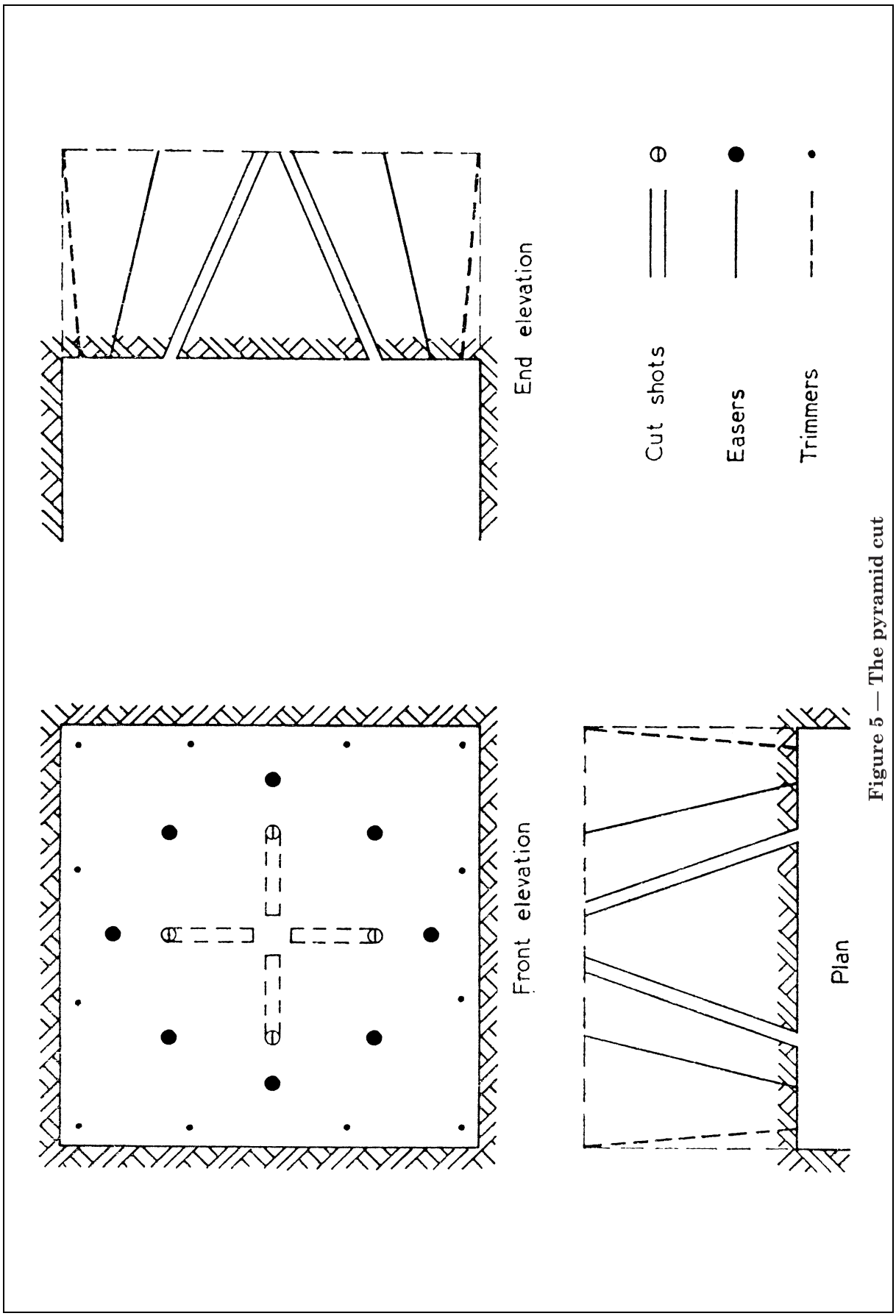

Figure 5 — The pyramid cut

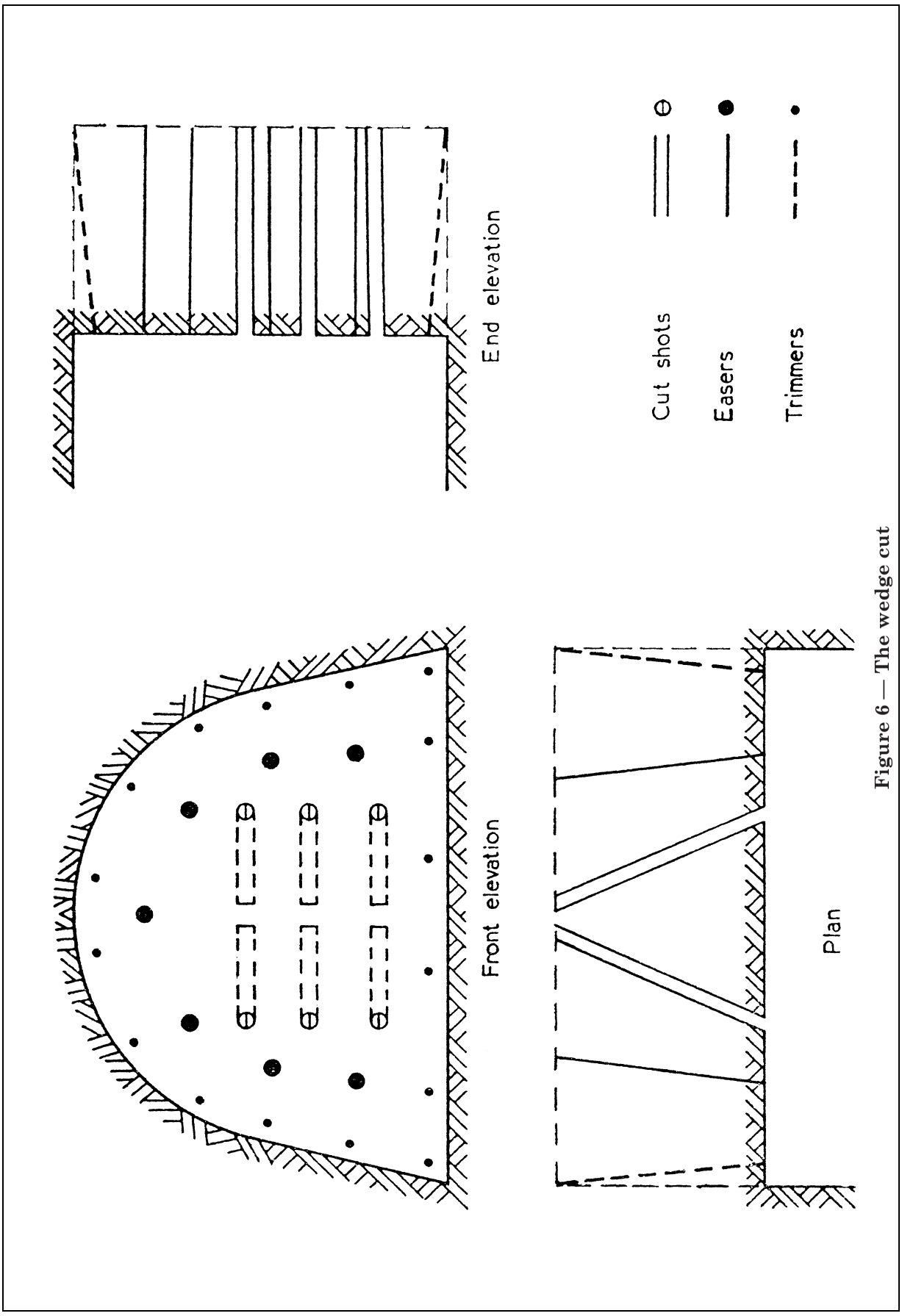

Figure 6 — The wedge cut

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W4 4AL