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GLOSSARY OF TERMS AND CLASSIFICATION OF EARTH-MOVING MACHINERY

PART I GENERAL TERMS

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Indian Standard

GLOSSARY OF TERMS AND CLASSIFICATION OF EARTH-MOVING MACHINERY

PART I GENERAL TERMS

0. FOREWORD

0.1 This Indian Standard (Part I) was adopted by the Indian Standards Institution on 24 November 1969, after the draft finalized by the Construction Plant and Machinery Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 Earth-moving plant and machinery is being extensively used on all major irrigation projects, road construction, land reclamation and other tasks involving removal and shifting of earth. Earth-moving machinery has been in production in the country for over a number of years and the requirements have increased considerably in the last few years due to the overall increase in the development work and this has resulted in many manufacturers switching over their production to earth-moving plant and machinery. With the increasing use and manufacture of earth-moving machinery in the country it has been considered necessary by the Construction Plant and Machinery Sectional Committee to lay down the guide lines for present and future manufacture to ensure that there is standardization in the equipment under production or likely to be produced in future in the country.

0.2.1 As a first step towards this end, a glossary of terms relating to earth-moving machinery has been prepared with a view to unifying the various technical terms and expressions in connection with the manufacture and use of such machinery. This standard does not cover the requirements relating to design, manufacture and testing of equipment, which will be covered subsequently in separate standards.

0.3 For convenience of reference, the standard has been divided into five parts. This part covers the definitions for the terms applicable in general to all types of earth-moving machinery and not specifically to any one equipment.

0.3.1 The terms applicable to a specific type of machinery are covered in separate parts as below:

IS : 4988 (Part II)-1968 Glossary of terms and classification of earth-moving machinery: Part II Dozers

IS : 4988 (Part III)-1968 Glossary of terms and classification of earth-moving machinery: Part III Motor and towed scrapers

IS : 4988 (Part IV)-1968 Glossary of terms and classification of earth-moving machinery: Part IV Excavators

IS : 4988 (Part V)-1968 Glossary of terms and classification of earth-moving machinery: Part V Motor graders

0.3.2 The general terms covered under Part I have been further sub-divided into functional terms and mechanical terms. An index (*see* Appendix A) giving reference to the definitions covered under Parts I to V is also given at the end of Part I to facilitate reference to these parts.

0.4 In the formulation of this standard, due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country.

0.4.1 While formulating this standard, due consideration has also been given to the type of equipment on the future plan of production by various manufacturers. In deciding the size and output of different types of machinery, for example, dozers, scrapers, motor graders and excavators, it has been kept in view that the power for prime mover required for different categories of equipment is similar. It has been endeavoured that a prime mover which is used for light dozer would also be suitable to provide power for light motor grader or a light excavator.

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1. SCOPE

1.1 This standard (Part I) covers the definitions for the terms applicable in general to all types of earth-moving machinery. The terms applicable to a specific type of earth-moving machinery are not covered in this part, these being covered in Parts II to V.

2. FUNCTIONAL TERMS

2.1 Abutment — A foundation that carries gravity and also thrust loads.

2.2 Adhesion —The soil quality of sticking to buckets, blades, and other parts of excavators.

2.3 Aggregate — Crushed rock or gravel screened to sizes for use in road surfaces, concrete, or bituminous mixes.

2.4 Area of Ground Contact — It is the total area of the tracks of the tracked vehicle, which is in contact with ground at any time and it is measured in square centimetres.

2.5 Back Blading — It is the process of moving a dozer, grader or a similar blade-equipped machine, in reverse to achieve a smooth levelling of loose soil already disturbed by excavation.

2.6 Backfill — The material used in refilling a ditch or other excavation, or the process of such refilling.

2.6.1 *Backfilling* — It is the process of filling enclosed excavations such as ditches and drains.

2.7 Ballast — Heavy material, such as water, sand or iron, which has no function in a machine except increase of weight.

2.8 Bank — Specifically, a mass of soil rising above a digging or trucking level. Generally, any soil which is to be dug from its natural position.

2.8.1 *Bank Gravel* — A natural mixture of cobbles, gravel, sand, and fines.

2.8.2 *Bank Measure* — Volume of soil or rock in its original place in the ground.

2.8.3 *Bank Yards* — Yards of soil or rock measured in its original position before digging.

2.9 Bedrock — Solid rock, as distinguished from boulders.

2.10 Bench — A working level or step in a cut which is made in several layers.

2.10.1 *Bench Mark* — A point of known or assumed elevation used as a reference in determining and recording other elevations.

2.10.2 *Bench Terrace* — A more or less level step between steep risers, graded into a hillside.

2.11 Berm — An artificial ridge of earth.

2.12 Binder — Fines which hold gravel together when it is dry.

2.13 Borrow Bit — An excavation from which material is taken to a nearby job.

2.14 Boulder — A rock which is too heavy to be lifted readily by hand.

2.15 Burden — The distance from a drill hole to the face, or the volume of rock to be moved by the explosive in a drill hole.

2.16 Cairn — A pile of stones used as a marker.

2.17 Capacity

2.17.1 *Capacity Heaped* — The capacity or volume measure of a bowl, or bucket when the material filling the same is heaped up at its angle of repose.

2.17.2 *Capacity Struck* — The capacity or volume measure of a bowl, or bucket, when the material filling the same is struck level from the edges of its open end.

2.18 Centre of Mass — In a cut or a fill, a cross-section line that divides its bulk into halves.

2.19 Channel Terrace — A contour ridge built of soil moved from its up-hill side, which serves to divert surface water from a field.

2.20 Clay — A heavy soil composed of particles less than 1/256 mm in diameter.

2.21 Clean — Free of foreign material. In reference to sand or gravel, means lack of binder.

2.22 Cleavage Plans — Any uniform joint, crack, or change in quality of formation along which rock will break easily when dug or blasted.

2.23 Clinometer — A hand instrument for measuring grades by sighting.

2.24 Cobble — Rounded stone with diameter of 100 to 300 mm.

2.25 Cohesion — The soil quality of sticking together.

2.26 Compaction — Reduction in bulk of fill by rolling, tamping or soaking.

2.27 Contour Line — A level line crossing a slope.

2.28 Corduroy — A road made of logs laid crosswise on the ground or on other logs.

2.29 Cross-Section — A profile taken at right angles to the centre line of a project.

2.30 Cut — To lower an existing grade.

2.30.1 *Cut and Cover* — A work method which involves excavation in the open, and placing of a temporary roof over it to carry traffic during further work.

2.30.2 *Cut Gross* — The total amount of excavation in a road or a road section, without regard to fill requirements.

2.30.3 *Cut Net* — The amount of excavated material to be removed from a road section; after completing fills in that section.

2.30.4 *Cut, Thorough* — Thorough cut.

2.30.5 *Cut, Through* — An excavation between parallel banks that begins and ends at original grade.

2.30.6 *Cut, Width Maximum* — The horizontal edge to edge width of the cutting edge of a machine, at its widest position.

2.31 Cycle, Digging — Complete set of operations a machine performs before repeating them.

2.32 Datum — Any level surface taken as a plane of reference in determining and recording other elevations.

2.33 Deadheading — Travelling without load, except from the dumping area to the loading point.

2.34 Density — The ratio of the weight of a substance to its volume.

2.35 Depth

2.35.1 *Depth of Cut* — The vertical depth achieved below the digging level, during a cutting operation. It is normally expressed in centimetres.

2.35.2 *Depth of Spread* — The vertical depth above the ground level, during a filling operation. It is normally expressed in centimetres.

2.36 Dip — The slope of layers of soil or rock.

2.37 Double Clutching — It is the practice of disengaging and engaging the clutch twice during a single gear shift, in order to synchronize gear speeds.

2.38 Draft — Resistance to movement of a towed load.

2.39 Drag — Pulling a bucket into the digging, or the mechanism by which the pulling is done or controlled.

2.40 Drawbar

2.40.1 *Drawbar Horsepower* — A tractor's flywheel horsepower minus friction and slippage losses in the drive mechanism and the tracks or tires.

2.40.2 *Drawbar Pull* — The pull a tractor can exert on a load attached to the drawbar. It depends on power, weight, and traction.

2.41 Elevation (Surveying) — The height of a point above a plane of reference.

2.42 Embankment — A fill whose top is higher than the adjoining surface.

2.43 Face — The more or less vertical surface of rock exposed by blasting or excavating, or the cutting end of a drill hole.

2.44 Factor of Safety — The ratio of the ultimate strength of the material to the allowable or working stress.

2.45 Feather — To blend the edge of new material smoothly into the old surface.

2.46 Fill — An earth or broken rock structure or embankment.

2.46.1 *Fill, Net* — In side hill work, the cubic metre of fill required at any station less the cubic metres of material obtained from the cut at that station.

2.46.2 *Fill, Net Corrected* — Net fill after making allowance for shrinkage during compaction.

2.47 Fines — Clay or slit particles in soil.

2.48 Finish Grade — The final grade required by specifications.

2.49 Frost Line — The greatest depth to which ground may be expected to freeze.

2.50 Grade — Usually the elevation of a real or planned surface or structure. Also means surface slope.

2.50.1 *Grade Stake* — A stake indicating the amount of cut or fill required to bring the ground to a specified level.

2.51 Gradient — Slope along a specific route, as of a road surface, channel or pipe.

2.52 Gravel — Rock fragments from 2 mm to 64 mm in diameter. Or a mixture of such gravel with sand, cobbles, boulders, and not over 15 percent of fines.

2.53 Ground

2.53.1 *Ground Clearance* — The vertical distance above the ground level, of the lowermost surface of the understructure of a machine, excepting the wheel and track assemblies.

2.53.2 *Ground Pressure* — The weight of a machine divided by the area of the ground directly supporting it.

2.54 Grouser— A ridge or cleat across a track shoe, which improves its grip on the ground.

2.55 Grubbing —Digging out roots.

2.56 Half Track — A heavy truck with high speed crawler track drive in the rear and driving wheels in front.

2.57 Hardpan — Hard, tight soil. A hard layer that may form just below plow depth on cultivated land.

2.58 Harrow — An agricultural tool that loosens and works the ground surface.

2.59 Haul

2.59.1 *Haul, Average* — The average distance a grading material is moved from out to fill.

2.59.2 *Haulaway* — An excavation method which involves hauling the spoil away from the hole.

2.59.3 *Haul Distance* — The distance measured along the centre line or most direct practical route between the centre of the mass of excavation and the centre of mass of the fill as finally placed. It is the distance through which material is moved.

2.59.4 *Haul, Free* — The distance every cubic metre is entitled to be moved without any additional charge for haul.

2.59.5 *Haul, Normal* —A haul whose cost is included in the cost of excavation so that no separate charge is made for it.

2.59.6 *Haul Station Metres of* — This is equal to the number of cubic metres multiplied by the number of 100 metre stations through which it is moved.

2.59.7 *Haul Over* — The distance in excess of that given as the stated haul distance to haul excavated material.

2.60 Heap — The soil carried above the sides of a body or bucket.

2.61 Height Clearance — The vertical distance between the uppermost surface of the superstructure of a machine and the lowermost surface of any permanent overhead obstruction.

2.62 High Wall — A face which is being excavated, as distinguished from spoil piles or undisturbed soil or rock bordering a cut.

2.63 Hoist — The mechanism by which a bucket or blade is lifted, or the process of lifting it.

2.64 Humps — Decayed organic matter.

2.65 Horsepower

2.65.1 *Horsepower, Brake* — The horsepower output of an engine measured at the flywheel or belt, usually by some form of mechanical brake, or a dynamometer.

2.65.2 *Horsepower, Drawbar* — *See* **2.40.1**.

2.65.3 *Horsepower, Indicated* — The horsepower developed in the cylinders, determined by use of indicator gauge. It does not include engine friction losses.

2.65.4 *Horsepower, Rated* — Theoretical horsepower of an engine based on dimensions and speed.

2.66 Idling — The process of running an engine, at no load and minimum full consumption.

2.67 Impervious — Resistant to movement of water.

2.68 Inclined Plane — A slope used to change the direction and speed-power ratio of a force.

2.69 Jackknife — A tractor and trailer assuming such an angle to each other that the tractor cannot move forward.

2.70 Jackleg — An outrigger or post.

2.71 Jib Boom — An extension piece hinged to the upper end of a crane boom.

2.72 Lift — A step or bench in a multiple layer excavation.

2.73 Liquid Limit — Minimum moisture content which will cause soil to flow if jarred slightly.

2.74 Load Factor — Average load carried by an engine, machine, or plant, expressed as a percentage of its maximum capacity.

2.75 Loam — A soft, easily worked soil containing sand, silt, and clay.

2.76 Loose Yards — Measurement of soil or rock after it has been loosened by digging or blasting.

2.77 Lugging Down — The process of slowing down an engine by increasing its load beyond its capacity.

2.78 Mass

2.78.1 *Mass Diagram* — A plotting of cumulative cuts and fills used for engineering computation of highway jobs.

2.78.2 *Mass Profile* — A road profile showing cut and fill in cubic metres.

2.79 Mechanical Efficiency — As applied to engines, it is the ratio of the useful horsepower available at the flywheel or power, take-off to the horsepower developed in the engine cylinders, expressed in percent.

2.80 Moldboard — A curved surface of a plough, dozer, or grader-blade, or other dirt mover, which gives dirt moving over it a rotary, spiral, or twisting movement.

2.81 Muck — Mud rich in humus.

2.82 Net Cut — *See* **2.30.3**.

2.83 Net Fill — *See* **2.46.1**.

2.84 Normal Haul — *See* **2.59.5**.

2.85 One on Two (One to Two) — A slope in which the elevation rises one foot in two horizontal feet.

2.86 Open Cut — A method of excavation in which the working area is kept open to the sky. Used to distinguish from cut-and-cover and underground work.

2.87 Overburden — Soil or rock lying on top of a pay formation.

2.88 Overhaul — The distance in excess of that given as the stated haul distance to haul excavated material.

2.89 Pass — A working trip or passage of an excavating or grading machine.

2.90 Peat (Humus) — A soft light swamp soil consisting mostly of decayed vegetation.

2.91 Plastic

2.91.1 *Plastic Limit* — The minimum amount of water in terms of percent of oven-dry weight of soil that will make the soil plastic.

2.91.2 *Plastic Soil* — A soil that can be rolled into 3 mm diameter strings without crumbling.

2.92 Platform — A wood mat used in sets to support machinery on soft ground. Also called a pontoon.

2.93 Profile — A charted line indicating grades and distances, and usually depth of cut and height of fill for excavation and grading work. It is commonly taken along the centreline.

2.94 Pusher — A tractor that pushes a scraper to help it pick up a load.

2.95 Range Pole — A pole marked in alternate red and white bands one foot high.

2.96 Rearing — Rising of the front of a tractor when pulling a heavy load.

2.97 Recovery — The process of pulling out a standard machine, with the help of another machine, or a winch fitted on the standard machine.

2.98 Rock — The hard, firm, and stable parts of earth's crust.

2.99 Root

2.99.1 *Root Buttress* — A root that is above ground where it joins the trunk.

2.99.2 *Root Hook* — A very heavy hook designed to catch and tear out big roots when it is dragged along the ground.

2.99.3 *Rooter* — A heavy duty ripper.

2.100 Rotary Tiller — A machine that loosens and mixes soil and vegetation by means of a high speed rotor equipped with tines.

2.101 Safety Factor — *See* **2.44.**

2.102 Sand — A loose soil composed of particles between 1/16 mm and 2 mm in diameter. Rock chips and other waste produced by drilling action.

2.103 Section — An area equal to 2·6 km^2.

2.104 Seize — To bind wire rope with soft wire, to prevent it from ravelling when cut.

2.105 Shoring — Temporary bracing to hold the sides of an excavation from caving.

2.106 Shoulder — The graded part of a road on each side of the pavement.

2.107 Shrinkage — Loss of bulk of soil when compacted in a fill. Usually is computed on the basis of bank measure.

2.108 Shuttle — A back and forth motion of a machine which continues to face in one direction.

2.109 Sidecasting — Piling spoil alongside the excavation from which it is taken.

2.110 Sidehill — A slope that crosses the line of work.

2.110.1 *Sidehill Cut* — A long excavation in a slope that has a bank on one side, and is near original grade on the other.

2.111 Silt — A soil composed of particles between 1/256 mm and 1/16 mm in diameter.

2.112 Skewed — On a horizontal angle, or in an oblique course or direction.

2.113 Skip — A non-digging bucket or tray that hoists material.

2.114 Slave Unit — A machine which is controlled by or through another unit of the same type.

2.115 Smoother Bar — A drag that breaks up lumps behind a levelling machine.

2.116 Snaking — Towing a load with a long cable.

2.117 Snatch Block — A pulley in a case which can be easily fastened to lines or objects by means of a hook ring or shackle.

2.118 Soil — The loose surface material of the earth's crust.

2.118.1 *Soil, Heavy* — A fine grained soil, made up largely of clay or silt.

2.119 Spoil — Dirt or rock which has been removed from its original location.

2.120 Stabilize — To make soil firm and to prevent it from moving.

2.121 Stake

2.121.1 *Stake, Side* — On a road job, a stake on the line of the outer edge of the proposed pavement. Any stake not on the centre line.

2.121.2 *Stake, Slope* — A stake marking the line where a cut or fill meets the original grade.

2.122 Strip — Removal of overburden or thin layers of pay material.

2.122.1 *Stripping* — Removal of a surface layer or deposit, usually for the purpose of excavating other material under it.

2.123 Subgrade — The surface produced by grading native earth, or cheap imported materials, which serves as a base for a more expensive paving.

2.124 Sump — A low spot to which water or oil is drained, and from which it is removed by a pump.

2.125 Toe — The project of the bottom of a face beyond the top.

2.126 Terrace — A ridge, a ridge and hollow, or a flat bench built along a ground contour.

2.127 Thorough Cut — *See* **2.30.4**.

2.128 Through Cut — *See* **2.30.5.**

2.129 Topsoil — The topmost layer of soil. Usually refers to soil containing humus which is capable of supporting a good plant growth.

2.130 Track

2.130.1 *Track Gauge* — In a tracked vehicle, the horizontal centre to centre distance between the two tracks.

2.130.2 *Track Width* — In a tracked vehicle, the edge to edge width of each track. It is normally expressed in centimetres.

2.131 Unladen Weight — The weight of a machine, when its blade, bucket or bowl is empty.

2.132 Waste — Digging, hauling and dumping of valueless material to get it out of the way; or the valueless material itself.

2.133 Width of Cut, Maximum — *See* **2.30.6.**

2.134 Wheel Base — In a wheeled equipment, the horizontal centre to centre distance between the wheel rims. It is normally expressed in centimetres.

2.135 Windrow — A ridge of loose dirt.

2.136 Working Cycle — A complete set of operations. In an excavator, it usually includes loading, moving, dumping, and returning to the loading point.

3. MECHANICAL TERMS

3.1 A-Frame — An open structure tapering from a wide base to a load-bearing top.

3.2 Adjuster, Hydraulic — A mechanism incorporated in a tracked machine for the purpose of adjusting the track tension, consisting of a piston in a tight cylinder that has a grease fitting. The piston rod is an extension of the idler yoke. Pumping the grease into the cylinder pushes the idler yoke forward and tightens the track; bleeding grease through the fitting or a reliever valve allows the idler to move back and release the track.

3.3 Adjustments — Optimum positioning of certain movable parts of belt, brake, chain, clutch, track or valve mechanism as recommended by the manufacturer for the purposes of correct operation.

3.4 Alemite Fitting — A type of fitting attached to machinery, at various lubrication points, to permit pumping grease.

3.5 Alignment — A term used for correct positioning of sprockets, clutch shafts, couplings, and wheels.

3.6 All Wheel Drive — A condition in wheeled earth-moving equipment, where power is transmitted to all wheels of the equipment.

3.7 Angle Dozer — A bulldozer with a pivoted blade, with freedom to cast its load on either side.

3.8 Annular — Ring-shaped.

3.9 Assembly Rod — An external bolt holding a machine together.

3.10 Auxiliary — A helper or standby engine or unit.

3.11 Avalanche Protector — Guard plates that prevent loose material from sliding into contact with the wheels or tracks of a digging machine.

3.12 Axis — A straight line around which a shaft or body revolves.

3.13 Axle — The centreline of a tunnel.

3.14 Axle, Dead — A fixed shaft functioning as a hinge pin. A fixed shaft or beam on which wheel revolves.

3.15 Axle, Live — A revolving horizontal shaft.

3.16 Babbitt — A soft antifriction metal composed of tin, antimony, and copper in varying proportions.

3.17 Bail — A hinged loope used for lifting.

3.18 Ball Joint — A connection, consisting of a tall and socket, which will allow a limited hinge movement in any direction.

3.19 Bearing — A part in which a shaft or pivot revolves.

3.19.1 *Bearing, Anti-friction* — A bearing consisting of an inner and outer ring, separated by balls or rollers held in position by a cage.

3.19.2 *Bearing, Needle* — An anti-friction bearing using very small diameter rollers between wide faces.

3.19.3 *Bearing, Pilot* — A small bearing that keeps the end of a shaft in line.

3.19.4 *Bearing, Throwout* — A bearing that permits a clutch throwout collar to slide along the clutch shaft without rotating with it.

3.20 Bell — An expanded part at one end of a pipe section, into which the next pipe fits.

3.20.1 *Bell Crank* — A lever whose two arms form an angle at the fulcrum, or a triangular plate hinged at one corner.

3.21 Blade — Usually a part of an excavator which digs and pushes dirt but does not carry it.

3.22 Bleed — To remove unwanted air or fluid from passages.

3.23 Block — A pulley and its case.

3.23.1 *Block Crown* — A sheave set suspended at the top of a derrick.

3.23.2 *Block, Sling* — A frame containing two sheaves mounted on parallel axles, so that they will line up when pulled from opposite directions.

3.23.3 *Block Snatch* — A sheave in a case having a pull hook or ring.

3.23.4 *Block, Travelling* — A frame for sheave or a set of sheaves that slide in a track.

3.24 Bogie (Tandem) — A two axle driving unit in a truck. Also called tandem drive unit or a tandem.

3.25 Boom — In a revolving shovel, a beam hinged to the deck front, supported by cables. Any heavy beam which is hinged at one end and carries a weight-lifting device at the other.

3.25.1 *Boom Crane* — A long, light boom, usually of lattice construction.

3.25.2 *Boom Jack* — A boom whose function is to support sheaves that carry lines to a working boom.

3.25.3 *Boom, Lattice* — A long, light shovel boom fabricated of criss crossed steel or aluminium angles or tubing.

3.25.4 *Boom, Live* — A shovel boom which can be lifted and lowered without interrupting the digging cycle.

3.26 Booster — An auxiliary device that increases force or pressure.

3.26.1 *Booster, Hydraulic* — A hydraulic mechanism provided to assist the manual operation of clutches, brakes and other machinery controls.

3.26.2 *Booster Mechanical* — A mechanical provision to assist the manual operation of clutches, brakes and other machinery controls.

3.26.3 *Booster Pump* — A pump that operates in the discharge line of another pump, either to increase pressure, or to restore pressure lost by friction in the line or by lift.

3.26.4 *Booster, Vacuum* — A vacuum operated mechanism to assist the manual operation of clutches, brakes and other machinery controls.

3.27 Bottom Pump — An earth-carrying equipment which is capable of unloading itself by opening the floor of the body.

3.28 Box

3.28.1 *Box Grider* — A hollow steel beam with a square or rectangular cross section.

3.28.2 *Box Thread* — The female side of API* tapered thread.

3.29 Bowl — The bucket or body of a carrying scraper.

3.30 Brake

3.30.1 *Brake, Air* — A brake operated by vacuum, through a mechanical linkage used in conjunction with hydraulic brake, the system is known as 'Air over hydraulic'.

3.30.2 *Brake, Automatic* — A braking system in which clutch and brake are interconnected so that the brake is released automatically when the clutch is engaged and set when the clutch is released.

3.30.3 *Brake Clutch* — A braking system when the brake is incorporated in the clutch, and brake and clutch action is simultaneously obtained, as in a planetary gear set with a fixed ring.

3.30.4 *Brake, Disc* — A brake which utilizes friction between fixed and rotating discs, or between discs and shoes.

3.30.5 *Brake, Drum* — A rotating cylinder with a machined inner or outer surface upon which a brake band or shoe presses.

3.30.6 *Brake, Friction* — A brake operating by friction between two surfaces rotating or sliding on each other.

3.30.7 *Brake, Horsepower* — *See* **2.65.1**.

3.30.8 *Brake, Hydraulic* — A braking system where energy is transmitted through hydraulic pressure. A hydraulic brake system includes a master cylinder, with a built in reservoir, sometimes, called a compensation; levers and whee are acting cylinders.

3.30.9 *Brake, Self Energizing* — A brake that is applied partly by friction between its lining and the drum.

3.30.10 *Brake, Tooth (Jaw Brake)* — A brake used to hold a shaft by means of a tooth or teeth engaging with fixed sockets. Not used for slowing or stopping.

3.31 Bridle Cable — An anchor cable which is at right angles to the pull.

3.32 Brinell Test — A method of determining the hardness of metal by the indentation of a standard steel ball of known hardness under a definite load.

*American Petroleum Institute.

3.33 Bucket — A sturdy container, capable of being operated by controlled movement, mechanically or hydraulically, fitted to various types of earth-moving equipment, to collect and convey earth. In an excavator, it digs, lifts and carries earth.

3.34 Bull

3.34.1 *Bull Gear* — A toothed driving wheel which is the largest or strongest in the mechanism.

3.34.2 *Bull Wheel* — A large driving wheel or sprocket.

3.35 Bulldozer — A tractor equipped with a front pusher blade.

3.36 Bushing Split — A bushing made in two pieces for ease for insertion and removal.

3.37 Buttonhead Fitting — A type of lubrication fitting which has a flat surface across which the coupling slides. It is close-coupled, more rugged than the hydraulic fitting and has a larger grease passage.

3.38 Cab

3.38.1 *Cab Guard* — On a dump truck, a heavy metal shield extending up from the front wall of the body and forward over the cab.

3.39 Cable Control Unit — A high speed tractor winch having one to three drums under separate control; used to operate dozers and towed equipment.

3.40 Cage — A circular frame that limits the motion of balls or rollers in a bearing.

3.41 Capstan (Cat Head) — A non-winding winch used with soft rope.

3.42 Carbon Steel — Usually a hardened steel not alloyed with other metals.

3.43 Carriage — A sliding or rolling base or supporting frame.

3.44 Caster — A wheel mounted in a swivel frame so that it is steered automatically by movements of its load. In an automotive vehicle, the toe-in of the front wheels.

3.45 Catalytic Exhaust — A replacement muffler incorporating exhaust conditioning, mainly for the purpose of converting poisonous carbon monoxide into relatively safer carbon dioxide. Different catalytic agents are used in different proprietary exhausts.

3.46 Catwalk — A pathway, usually of wood or metal, that gives access to parts of large machines.

3.47 Centralized Lubrication — A system by which a single reservoir or humb of hand, air or electric type supplier, a large number of fittings through tubing and metering valves, or injectors can be used to avoid lubrication of individual points.

3.48 Centrepin (Centre Pintle) — In a revolving shovel, a fixed vertical shaft around which the shovel deck turns.

3.49 Cetane Number — An indication of diesel fuel ignition quality. The cetane number of a fuel in the percentage by volume of cetane in a mixture of cetane and alpha-methylnaphthalene which matches the unknown fuel in ignition quality. American diesel oil usually varies from 30 to 60 cetane.

3.50 Chain

3.50.1 *Chain, Breakway (Safety Chain)* — A chain that holds a tractor and a towed unit together if the regular fastening opens or breaks.

3.50.2 *Chain, Roller* — Generally, any sprocket-driven chain made up of links connected by hinge pins and sleeves. Specifically, a chain whose hinge sleeves are protected by an outer sleeve or roller that is free to turn.

3.50.3 *Chain, Silent* — A roller-type chain in which the sprockets are engaged by projections on the link side bars.

3.50.4 *Chain, Stud Type* — A roller chain in which the inner (block) links are connected solidly by non-rotating bushings.

3.51 Chanfer (Chamfer) — To bevel or slope an edge or corner.

3.52 Chassis — The basic understructure of a machine, which may include the frame, bumper, springs, dead axles, wheels, tyres, or tracks.

3.53 Chatter — Noise made by brakes and clutches, under certain conditions, often when only partially engaged causing crystallization and early failure of shafts, cases and brake parts.

3.54 Check Valve — Any device which will allow fluid or air to pass through it in only one direction.

3.55 Check — A block used under and against an object to prevent it from rolling or sliding.

3.55.1 *Choker* — A chain or cable so fastened that it tightens on its load as it is pulled.

3.56 Clod Buster — A drag that follows a grading machine to break up lumps.

3.57 Clutch — A device which connects and disconnects two shafts which revolve in line with each other.

3.57.1 *Clutch, Automatic* — A clutch whose engagement is controlled by centrifugal force, vacuum, or other power without attention by the operator.

3.57.2 *Clutch Brake* — *See* **3.30.3**.

3.57.3 *Clutch Centrifugal* — A clutch that is kept in engagement only by centrifugal force, so that it automatically disconnects the power train when the engine idles.

3.57.4 *Clutch, Denture* — A jaw clutch.

3.57.5 *Clutch, Disc* — A coupling that can be engaged to transmit power through one or more discs squeezed between a back-plate and a movable pressure plate, and that can be disengaged by moving the plates apart.

3.57.6 *Clutch, Fluid* — A fluid coupling other than a torque convertor.

3.57.7 *Clutch, Jaw* (*Positive or Denture Clutch*) — A toothed hub and a sliding toothed collar that can be engaged to transmit power between two shafts having the same axis of revolution.

3.57.8 *Clutch, Lock-up* — A clutch that can be engaged to provide a non-slip mechanical drive through a fluid coupling.

3.57.9 *Clutch, Overrunning* (*Free Wheeling Unit*) — A coupling that transmits rotation in only one direction and disconnects when the torque is reversed.

3.57.10 *Clutch, Slip* (*Safety Clutch*) — A friction clutch that protects a mechanism by slipping under excessive load.

3.57.11 *Clutch, Wet* (*Oil Clutch*) — A clutch that operates in an oil bath.

3.58 Cocking — Tipping sideward or running off centre.

3.59 Cockpit — The part of a tractor or grader containing the operator's seat and controls.

3.60 Collar — A sliding ring (often used in clutches and transmissions) mounted on a shaft so that it does not revolve with it or the open end of a drill.

3.61 Compensating Drive — In a four wheel drive truck, a free wheeling unit in the front propeller shaft that allows the front wheels to go farther than the rear on curves.

3.62 Countershaft — A shaft which receives power from a parallel mainshaft, and transmits it to another part of the mainshaft or to working parts.

3.63 Counterweight — A dead or no working load attached to one end or side of machine to balance weight carried on the opposite end. A working part attached or positioned partly for the purpose of improving machine balance.

3.64 Coupling, Fluid — The fluid or hydraulic coupling consists of an oil chamber, containing a set of pump vanes driven by the engine, and a turbine set connected to the driven machinery. Rotation of the pump vanes by the engine driven input shaft causes the oil to spin which rotates the turbine in the same direction as the pump.

3.65 Crawler — One of a pair of roller chain tracks used to support and propel a machine, or any machine mounted on such tracks.

3.66 Creep — Very slow travel of a machine or a part. Unwanted turning of a shaft due to drag in a fluid coupling or other disconnecting device.

3.67 Crimp — A tight bend in metal made under pressure.

3.68 Crosshead — A connection between a connecting rod and a piston rod which is guided so as to move in a straight line.

3.69 Crowd — The process of forcing a bucket into the digging, or the mechanism which does the forcing. Used chiefly in reference to machines which dig by pushing away from themselves.

3.70 Cylinder — In hydraulic systems, a hollow cylinder of metal, containing a piston, piston rod and end seals, and fitted with a port or ports to allow entrance and exit of fluid.

3.70.1 *Cylinder Slave* — A small cylinder whose piston is moved by a piston rod controlled by a larger cylinder.

3.71 Diaphragm — A flexible partition between two chambers.

3.72 Differential — A device that drives two axles and allows them to turn at different speeds to adjust to varying resistance.

3.72.1 *Differential, Two Speed* — A differential having a high-low gearshift between the drive shaft and the ring gear.

3.73 Dip Lubrication — A system in which transmission, gearboxes and similar totally enclosed assembly casing are partly filled with oil or fluid grease.

3.74 Diversion Valve — A valve which permits flow to be directed into any one of two or more pipes.

3.75 Dog — A heavy duty latch.

3.76 Dolly — A unit consisting of draw tongue, an axle with wheels, and a turntable platform to support a trailer gooseneck. A small wheeled carriage designed to support heavy machines.

3.77 Donkey — A winch with two drums which are controlled separately by clutches and brakes.

3.78 Dooe — A viscous liquid put on pipe threads to make a tight joint.

3.79 Double Clutching — Disengaging and engaging the clutch twice during a single gear shift, in order to synchronize gear speed.

3.80 Drawbar — In a tractor, a fixed or hinged bear extending to the rear, used as a fastening for lines and towed machines or loads.

3.81 Draw Pin — A removable pin that attaches a load to a drawbar.

3.82 Draw Tongue — A bar hinged to a towed machine, fitted with some device for attaching it to a tractor.

3.83 Drive

3.83.1 *Drive Positive* — A driving connection to two or more wheels or shafts that will turn then at approximately the same relative speeds under any conditions.

3.83.2 *Drive Final* — A set of reduction gearing, close to or inside of a drive wheel.

3.83.3 *Drive Fluid* — A connection between two shafts that transmits torque through a fluid.

3.84 Drum — A rotating cylinder with side flanges, used for winding in and releasing cable.

3.85 Dynamic Balance — A condition of rest created by equal strength of forces tending to move in opposite directions.

3.86 Eccentric — A wheel or cam with an off-centre axis of revolution.

3.87 Exhaust Condition — An attachment for converting the poisonous gases of exhaust with relatively safer gases, to obviate exhaust poisoning.

3.88 Fairlead — A device which lines up cable so that it will wind smoothly on to a drum.

3.89 Ferrule — A short unthreaded tube or bushing shrunk or soldered on-to a tube or line.

3.90 Fifth Wheel — The weight-bearing swivel connection between high-way-type tractors and semi-trailers.

3.91 Flail — A hammer hinged to an axle so that it can be used to break or crush material.

3.92 Flange — A ridge that prevents a sliding motion.

3.93 Fleet Angle — The maximum angle between a rope and a line perpendicular to the drum on which it winds.

3.94 Flotation — Separation of minerals by floating the lighter ones in a fluid.

3.95 Follower — A piston that maintains a light pressure against a variable amount of fluid in a container.

3.96 Fork — A two-pronged rod or yoke used to slide shifting collars along their shafts.

3.96.1 *Fort Head* — A wheel-guiding frame with a swivel connection to the machine or vehicle that rests on it (A caster frame).

3.97 Four by Four (4 × 4) — A vehicle with four wheels or sets of wheels, all engine driven.

3.98 Gantry — An overhead structure that supports machines or operating parts.

3.99 Gear

3.99.1 *Gear, Bevel* — A gear made of teeth out in the surface of a truncated cone.

3.99.2 *Gear, Bull* — A gear or sprocket that is much larger than the others in the same power train.

3.99.3 *Gear, Gluster* — Two or more gears of different sizes made in one solid piece.

3.99.4 *Gear, Helical* — A gear with straight or curved teeth, cut at an angle of less than 90° to the direction of rotation.

3.99.5 *Gear, Herringbone* — A gear with V-teeth.

3.99.6 *Gear, Idler* — A gear meshed with two other gears that does not transmit power to its shaft. Used to reverse direction of rotation in a transmission.

3.99.7 *Gear, Pinion* — A drive gear that is smaller than the gear it turns.

3.99.8 *Gear Planetary Set* — A gear set consisting of an inner (sun) gear, an outer ring with internal teeth, and two or more small (planet) gears meshed with both the sun and the ring.

3.99.9 *Gear, Rack* — A toothed bar.

3.99.10 *Gear, Sprocket* — A gear that meshes with roller or silent chain.

3.100 Gooseneck — An arched connection, usually between a tractor and a trailer.

3.101 Grader — A machine with a centrally located blade that can be angled to cast to either side, with independent hoist control on each side.

3.102 Grouser — A ridge or cleat across a track shoe, which improves its grip on the ground.

3.103 Gudgeon — A reinforced bushing or a thrust absorbing block.

3.104 Hook

3.104.1 *Hook, Grab* — A chain hook that will slide over any one link, but will not slide along the chain.

3.104.2 *Hook, Pintle* — A towing bracket having a fixed lower part, and a hinged upper one, which when locked together make around opening that can hold a tow ring.

3.104.3 *Hook, Round* (*Slip Hook*) — A hook that has smooth inner surface, and will slide along a chain.

3.104.4 *Hook, Safety* (*Lockon Hook*) — A round hook with a hinged piece across the opening that allows a line to enter it readily, but requires special manipulation to remove it.

3.104.5 *Hook, Swivel* — A hook with a swivel connection to its base or eye.

3.105 Horsepower

3.105.1 *Horsepower, Drawbar* — *See* **2.40.1**.

3.105.2 *Horsepower Indicated* — *See* **2.65.3**.

3.105.3 *Horsepower Rated* — *See* **2.65.4**.

3.105.4 *Horsepower, Shaft* (*Flywheel or Belt Horsepower*) — Actual horsepower produced by the engine, after deducting the drag of accessories.

3.106 Housing — A heavy case or enclosure for rotating parts.

3.107 Hub — The strengthened inner part or mounting of a wheel or gear.

3.108 Hunting Tooth — A sprocket and roller chain combination in which one has an odd number of contacts and the other an even number, so that no tooth will contact the same pin twice in succession.

3.109 Hypoid — A pinion-and-ring gear set transmitting rotation through a right angle by means of teeth having structure intermediate between a bevel and a worm set.

3.110 Idler — A wheel or gear which changes the direction of rotation of shafts, or the direction of movement of a chain or belt.

3.111 Impeller — A rotary pump member using centrifugal force to discharge a fluid into outlet passages.

3.112 Injector — In a diesel engine, the unit that sprays fuel into the combustion chamber.

3.113 Intermediate Shaft — A shaft which is driven by one shaft, and drives another.

3.114 Jack — A mechanical or hydraulic lifting device. A hydraulic ram or cylinder.

3.114.1 *Jackshaft* — A short drive shaft, usually connecting a clutch and transmission.

3.115 Jaw — In a clutch, one of a pair of toothed rings, the teeth of which face each other.

3.115.1 *Jaw Clutch* — A clutch consisting of two toothed jaws, one of which slides along its shaft to engage or disengage from the other.

3.116 Journal — That part of a rotating shaft or axle which turns in a load-supporting bearing.

3.117 Key — A hard steel strip inserted in matching grooves (keyways) in a shaft and a hub to make them turn as a unit.

3.117.1 *Keyhole Slot* — A slot enlarged at one end to allow entrance of a chain or bolt that can then be held by the narrow end.

3.117.2 *Keyway* — A square edged lengthwise slot in a shaft or hub.

3.118 Kingpin — A vertical swivel or hinge pin, usually supported at both top and bottom.

3.119 Knife — The dirt cutting edge of a digging machine.

3.120 Lagging — The surface or contact area of a drum or flat pulley, especially a detachable surface or one of special composition.

3.120.1 *Lagging, Split* — Drum lagging made in two pieces to allow changing it without dismantling the drum.

3.121 Lapped — Overlapped and fitted together.

3.122 Lay — The direction of twist in wires and strands in wire rope.

3.122.1 *Lay, Lang* — A wire rope construction in which the wires are twisted in the strands in the same direction and the strands are twisted in the rope.

3.122.2 *Lay, Regular* — A wire rope construction in which the direction of twist of the wires in the strands is opposite to that of the strands in the rope.

3.122.3 *Lay, Shaft* — A fixed shaft supporting revolving drums.

3.123 Loader

3.123.1 *Loader Belt* — A machine whose forward motion cuts soil with a ploughshare or disc and pushes it to a conveyor belt that elevates it to a dumping point.

3.123.2 *Loader, Bucket* — A machine having a digging and gathering rotor, and a set of chain mounted buckets to elevate the material to a dumping point.

3.123.3 *Loader, Front End* — A tractor loader which both digs and dumps in front.

3.123.4 *Loader Paddle* — A belt loader equipped with chain driven paddles that move loose material to the belt.

3.123.5 *Loader, Reversed* — A front and loader mounted on a wheel tractor having the driving wheels in front and steering at the rear.

3.123.6 *Loader, Swing* — A tractor loader that digs in front and can swing the bucket to dump to the side of the tractor.

3.123.7 *Loader, Tower* — A front end loader whose bucket is lifted along tracks along a more or less vertical tower.

3.123.8 *Loader Tractor* — A tractor equipped with a digging bucket that can dump with hauling equipment.

3.124 Lug Down — To slow down an engine by increasing its load beyond its capacity.

3.125 Manifold — A chamber or tube having a number of inlets and one outlet, or one inlet and several outlets.

3.126 Mass Diagram — A plotting of cumulative cuts and fills used for engineering computation of highway jobs.

3.127 Mottic — A soft sealing material.

3.128 Mechanical Efficiency — As applied to engine it is the ratio of the useful horsepower available at the flywheel or power takeoff to the horsepower developed in the engine cylinders, expressed in percent.

3.129 Metering Pin — A valve plunger that controls the rate of flow of a liquid or a gas.

3.130 Moldboard — A curved surface of a plough dozer, or grader blade, or other earthmover which gives earthmoving over it a rotary, spiral or twisting movement.

3.131 Nipple — A short piece of pipe with male threads on each end.

3.131.1 *Nipple, Close* — A nipple so short that its two sets of threads meet in the middle.

3.132 Octane Number — Percent of iso-octane by volume in a mixture of iso-octane and normal heptane that has the same anti-knock character in a standard variable compression cooperative fuel research test engine as the fuel under test. Octane has anti-knock characteristics. A mixture having 75 percent octane and 25 percent heptane is said to have an octane rating of 75.

3.133 Outrigger — An outward extension of a frame which is supported by a jaw or block. Used to increase stability.

3.134 Overhead Shovel — A tractor loader which digs at one end, swings the bucket overhead and dumps at the other end.

3.135 Pad (Shoe or Plate) — Ground contact part of a crawler-type track.

3.136 Pawl — A tooth or set of teeth designed to look against a ratchet.

3.137 Pin

3.137.1 *Pin, Master* — The only pin in an integrated crawler track that will open the track when driven out.

3.137.2 *Pin, Taper* — A straight-sided pin that is smaller at one end than at the other.

3.137.3 *Pin, Track* — A hinge pin connecting two sections or shoes of a crawler track.

3.138 Pintle — A vertical pin fastened at the bottom that serves as a centre of rotation.

3.138.1 *Pintle Hook* — A towing device consisting of a fixed lower jaw, a hinged and lockable upper jaw and a socket between them to hold a tow ring.

3.139 Pivot — A non-rotating axle or hinge pin.

3.139.1 *Pivot Shaft* — A tractor dead axle, or any fixed shaft which acts as a hinge pin.

3.139.2 *Pivot Tube* — A hollow hinge pin.

3.140 Plate Pressure — A flywheel-driven plate that can be slid along a clutch shaft to squeeze a lined plate against the flywheel.

3.141 Plug Magnetic — A drain or inspection plug magnetized for the purpose of attracting and holding iron or steel particles in lubricant.

3.142 Poppet Valve — A value shaped like a mushroom, resting on a circular seat and opened by raising the stem. Standard automotive equipment.

3.143 Power

3.143.1 *Power Arm* — The part of a lever between the fulcrum and the point where force is applied to the lever.

3.143.2 *Power Control Unit* — One or more winches mounted on a tractor and used to manipulate parts of bulldozers, scrapper, or other machines.

3.143.3 *Power Takeoff* — A place in a transmission on engine to which a shaft can be so attached, so as to drive an outside mechanism.

3.143.4 *Power Train* — All moving parts connecting an engine with the points where the work is accomplished.

3.144 Pre-Selective — An arrangement by which a gear lever can be moved, but the resulting speed shift will not take place until the clutch or the throttle is manipulated.

3.145 Pressure Plate — In a clutch, a plate driven by the flywheel or rotating housing, which can be made to slide towards the flywheel to engage the lined disc or discs between them.

3.146 Prime Mover — A tractor or other vehicle used to pull other machines.

3.147 Propeller Shaft — Usually a main drive shaft fitted with universal joints.

3.148 Pusher — A tractor that pushes a scraper to help it pick up load.

3.149 Quill Shaft — A light drive shaft inside a heavier one, and turning independently of it.

3.150 Races — The inner and outer rings of a ball or roller bearing.

3.151 Rake Rock — A heavy duty rake blade.

3.152 Ram — A hydraulic cylinder.

3.152.1 *Ram, One Way or Single Acting* — A hydraulic cylinder in which fluid is supplied to one end so that the piston can be moved by power only one way.

3.152.2 *Ram, Two Way or Double Acting* — A hydraulic cylinder in which fluid can be supplied to either end, so the piston can be moved by power in two directions.

3.153 Ratchet — A set of teeth which are vertical on one side and sloped on the other, which will hold a pawl moving in one direction, but allow it to move in another.

3.154 Reeving — Threading or placement of a working line.

3.155 Relay — A valve or switch that amplifies or restores original strength to an air, hydraulic, or electrical impulse.

3.156 Relief Holes — Holes drilled closely along a line, which are not loaded, and which serve to weaken the rock so that it breaks on that line.

3.157 Relief Valve — A valve which will allow air or fluid to escape, if its pressure becomes higher than the valve setting.

3.158 Reverse Bend — To bend a line over a drum or a sheave, and then in the opposite direction over another sheave.

3.159 Reversing Clutch — A forward-and-reverse transmission which is shifted by a pair of friction clutches.

3.160 Revolving Shovel — A digging machine in which the superstructure can revolve independently of the supporting unit.

3.161 Rocker Arm — A lever resting on a curved base so that the position of its fulcrum moves as its angle changes.

3.162 Rocking — Pushing a resistant object repeatedly and backing or rolling back between pushes to allow it to reach or cross its original position.

3.163 Roller

3.163.1 *Roller, Hook* — In a revolving shovel, a roller attached by a bracket to the revolving section and contacting the lower face of a circular track on the travel unit.

3.163.2 *Roller, Support* — In a crawler machine, a roller that supports the slack upper part of the track.

3.163.3 *Roller Swing* — In a revolving shovel, one of several tapered wheels that roll on a circular turntable and support the upper works.

3.163.4 *Roller, Track* — In a crawler machine, the small wheels that rest on the track and carry most of the weight of the machine.

3.164 Safety

3.164.1 *Safety Chain* — *See* **3.50.1.**

3.164.2 *Safety Clutch* — *See* **3.57.10.**

3.164.3 *Safety Factor* — *See* **2.44.**

3.165 Scarifier — An accessory on a grader, roller, or other machine, used chiefly for shallow loosening of road surfaces.

3.166 Scavenge — To clean out thoroughly.

3.167 Scraper — A digging, hauling and grading machine having a cutting edge, a carrying bowl, a movable front wall (apron), and a dumping and ejecting mechanism. It is also known as carrying or pan scraper.

3.167.1 *Scraper, Bottom Pump* — A carrying scraper that ejects its load over the cutting edge.

3.167.2 *Scraper, Drag* — A digging bucket operated on a cable between a mast and an anchor, that is not lifted off the ground during a normal cycle. The term sometimes also describes a two wheel tractor towed scraper equipped with a bottomless bucket.

3.167.3 *Scraper, Rear Dump* — A two wheel scraper that dumps at the rear.

3.167.4 *Scraper Self Powered* — A scraper built into a single unit with a tractor.

3.167.5 *Scraper, Two Axle* — A full trailer type carrying scraper.

3.168 Seize — To bind wire rope with soft wire, to prevent it from ravelling when cut.

3.169 Semi-Grouser — A crawler track shoe with one or more low cleats.

3.170 Serrated — An edge cut into a line of teeth.

3.171 Shaft — A round bar that rotates or provides an axis of revolution.

3.171.1 *Shaft, Idler* — A shaft that carries a gear that reverses direction of rotation in a transmission.

3.171.2 *Shaft, Input* — The shaft that delivers engine power to a transmission or clutch.

3.171.3 *Shaft, Lay* — A fixed shaft supporting rotating drums or gears.

3.171.4 *Camshaft* — A shaft carrying cams which open and cloth valves.

3.171.5 *Countershaft* — *See* **3.62.**

3.171.6 *Crankshaft* — The main shaft of a piston-type engine, that converts reciprocating motion into rotation.

3.171.7 *Jackshaft* — *See* **3.114.1.**

3.171.8 *Mainshaft* — The transmission shaft forming a continuation of the input shaft.

3.171.9 *Shaft, Output* — A shaft that transmits power from a transmission or clutch.

3.171.10 *Shaft, Reversing* — A shaft whose direction of rotation can be reversed by use of clutches or brakes.

3.172 Shank (Standard) — The connecting bar between a ripper or scarifier tooth and the frame. The part of drill steel that fits into the drill.

3.173 Sheave — A grooved wheel used to support cable or change its direction of travel.

3.174 Shoe — A ground plate forming a link of a track, or bolted to a track link.

3.175 Slack Adjuster — In air brakes, the connection between the brake chamber and the brake cam.

3.176 Slide Coupling — A slip joint.

3.177 Sling Block — A frame in which two sheaves are mounted so as to receive lines from opposite directions.

3.178 Slip Joint — A splined connection loose enough to allow its two parts to slide on each other to change shaft length.

3.179 Smart Aleck — A limit switch that cuts off power if a machine part is moved beyond its safe range.

3.180 Spider Gear (Carrier Pinion) — A differential gear which rotates on its shaft in a rotating case.

3.181 Spline — A set of parallel grooves running lengthwise of a shaft.

3.182 Spool — The movable part of a slide-type hydraulic valve.

3.183 Spring Loaded — Held in contact or engagement by springs.

3.184 Sprocket — A gear that meshes with a chain or a crawler track.

3.184.1 *Sprocket, Split* — A two piece sprocket that can be assembled on a shaft without removing the shaft bearing.

3.185 Stator (Reactor) — In a torque converter, a set of fixed vanes that change the direction of flow of fluid entering the pump or the next stage turbine.

3.186 Strut — An inside brace.

3.187 Stud — A bolt having one end firmly anchored.

3.188 Stuffing Box — A space around a shaft filled who soft packing to prevent fluids or gases from leaking along it.

3.189 Sun Gear — The central gear in a planetary set.

3.189.1 *Sun Gears* — A planetary gear set consisting of a central gear, an internal tooth ring gear and two or more planet gears meshed with both of them.

3.190 Supercharger — A blower that increases the intake pressure of an engine.

3.191 Sweat — To unite two closely fitting pieces by enlarging the outer one by heat.

3.192 Swing — In revolving shovels, to rotate the shovel on its base.

3.193 Switchback — A hairpin curve.

3.194 Synchromesh — A silent-shift transmission construction, in which hub speeds are synchronized before engagement by contact of leather cones.

3.195 Tandem — A double-axle drive unit for a truck or grader (a bogie).

3.195.1 *Tandem Drive* — A three-axle vehicle having two driving axles.

3.196 Tee — A pipe fitting that has two threaded openings in line, and a third at right angles to them.

3.197 Three Part Line — A single strand of rope or cable double pack around two sheaves so that three parts of it pull a load together.

3.198 Throwout Bearing — A bearing, sliding on a clutch jackshaft, that carries the engage and disengage mechanism.

3.199 Thrust

3.199.1 *Thrust Arm* — A cable-controlled bar that can slide by power in two directions.

3.199.2 *Thrust Washer* — A washer that holds a rotating part from sideward movement in its bearings.

3.200 Torque — The twisting force exerted by or on a shaft, without reference to the speed of the shaft.

3.200.1 *Torque Converter* — A hydraulic coupling which utilizes slippage to multiply torque.

3.200.2 *Torque Rod* — A bar having the function of resisting or absorbing twisting strains.

3.201 Track — A crawler track.

3.201.1 *Track Crawler* — One of a pair of roller chains used to support and propel a machine. It has an upper surface which provides a track to carry the wheels of the machine, and a lower surface providing continuous ground contact.

3.201.2 *Track Frame (Truck Frame)* — In a crawler mounting, a side frame to which the track roller and idler are attached.

3.201.3 *Track Roller* — In a crawler machine, the small wheels which are under the track frame and which rest on the track.

3.202 Traction — The total amount of driving push of a vehicle on a given surface.

3.203 Tractive Efficiency — A measure of the proportion of the weight resting on tracks or drive wheels which can be converted into vehicle movement.

3.204 Trailer (Full Trailer) — A towed carrier which rests on its own wheels both front and rear.

3.204.1 *Semi Trailer* — A towed carrier that rests on the tractor in front and on its own wheels in the rear.

3.205 Transfer Case — In an all-wheel drive vehicle, a transmission or gear set that provides drive to the front shaft.

3.206 Transmission — A gear set that permits change in speed-power ratio and or direction of rotation.

3.206.1 *Transmission, Clutch-shifted* — A constant-mesh transmission in which power is directed through gear trains by engagement of friction clutches.

3.206.2 *Transmission, Compound* — A gear set in which power can be transmitted through two sets of reduction gears in succession.

3.206.3 *Transmission, Reduction-Type* — A transmission whose output shaft (usually the countershaft) always turns more slowly than the input shaft.

3.206.4 *Transmission, Reversing* — A transmission that has only a forward and reverse shift.

3.207 Tread — The ground contact surface on a tire or track shoe.

3.208 Treadle — A foot pedal hinged to the floor at one end.

3.209 Trip — A release catch.

3.210 Trunnion (Walking Beam or Bar) — An oscillating bar which allows changes in angle between a unit fastened to its centre and another attached to both ends. A heavy horizontal hinge.

3.211 Turntable — A base that supports a part and allows it to rotate or swing.

3.212 TV or Take-up — A mechanism for adjusting belt or chain tension.

3.213 Two Part Line — A single strand of rope or cable doubled back around a sheave so that two parts of it pull a load together.

3.214 Universal Joint — A connection between two shafts that allows them to turn or swivel at an angle.

3.215 Volumetric Efficiency — In compressor, the relation of volume of free air delivered (reduced to intake volume) to the theoretical intake volume of the compression.

3.216 Walking Beam (Trunnion) — *See* **3.210.**

3.217 Walking Dragline — A dragline shovel which drags itself along the ground by means of side-mounted shoes.

3.218 Wedge — A piece that tapers from a thick end to a chisel point.

3.219 Winch — A drum that can be rotated so as to exert a strong pull while winding in a line.

3.219.1 *Winch, Capstan (Cat Head)* — A revolving spool that exerts a pull by friction with one or more loops of fibre rope.

3.219.2 *Winch, Oil Field* — An extremely powerful low speed winch on a crawler tractor.

3.219.3 *Winch, Power Control (Power Control Unit)* — *See* **3.143.2.**

3.219.4 *Winch, Towing (Logging Winch)* — A heavy duty winch mounted on the rear of a crawler tractor.

3.220 Work Arm — The part of a lever between the fulcrum and the working end.

3.221 Worm — A gear formed of a cylinder with spiral threads cut in its surface.

3.221.1 *Worm Wheel* — A modified spur gear with curved teeth that meshes with a worm.

APPENDIX A

(*Clause* 0.3.2)

INDEX OF DEFINITIONS COVERED IN PARTS II TO V OF IS: 4988-1968*

PART II DOZERS
PART III MOTOR AND TOWED SCRAPERS
PART IV EXCAVATORS
PART V MOTOR GRADERS

*Glossary of terms and classification of earth-moving machinery.

TERM	IS : 4988-1968, Part No.
22. Depth of cut	III
23. Depth of spread	III
24. Digging line	IV
25. Dipper shovel	IV
26. Ditch cleaner	V
27. Drag	IV
28. Dragline	IV
29. Dumping radius	IV
30. Efficiency	III
31. Elevator	V
32. Excavator	IV
33. Fixed time	III
34. Front blade	V
35. Gauge tractor	II
36. Grouser	II
37. Heaped capacity	IV
38. Hoist line	IV
39. Idler	II
40. Jack boom	IV
41. Jib boom	IV
42. Maximum digging depth	IV
43. Maximum digging height	IV
44. Maximum digging radius	IV
45. Maximum dumping height	IV
46. Maximum permissible slopes of tractor	II
47. Mould board	V
48. Motor grader	V
49. Optimum depth of cut	IV
50. Pitch	II
51. Power pump	II
52. Pusher	II
53. Retract line	IV
54. Ripper	II

TERM	*IS: 4988-1968, Part No.*
55. Rooter	II
56. Scarifier	V
57. Scraper bottom dump	III
58. Scraper rear dump	III
59. Scraper, tractor towed	III
60. Shoulder reach	V
61. Side casting	IV
62. Side casting angle	II
63. Snow plough	V
64. Skimmer	IV
65. Soil factor	III
66. Speed maximum	III
67. Sprocket	II
68. Struck capacity	III & IV
69. Swing angle	IV
70. Thrust on the levelling blade	V
71. Tilt dozer	II
72. Tilting	II & V
73. Transverse inclination	V
74. Trakelling time	III
75. Wheeled tractor	II
76. Winch	II

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Conversion*
Force	newton	N	1 N = 1 kg.1 m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

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