LOSS ADJUSTING IN THE COAL MINING INDUSTRY

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Introduction

This brief covers the Coal Mining Industry and the Loss Adjuster's role in dealing with claims in this sector. As the mining methods discussed in this paper differ substantially from other mining sectors, you are referred to the brief by Lorne Montgomery dated September 2005 covering hard rock base metal mining.

For ease of reference a glossary of terms used is included as Part C of this brief.

PART A – GENERAL COAL MINING INFORMATION

Formed by burial of prehistoric forests, swamps and bogs, coal lies in relatively flat, tabular layers (seams) sometimes up to many tens of metres thick. It is relatively soft and straight forward to mine and then process to remove impurities, ready for sale.

There are two principal coal types:

- Thermal (also includes soft lignite/brown coal) which is used for heat generation (electricity and cement); and
- Metallurgical coal used to produce coke which is added to iron ore and other materials for steel making.

By-products of coal include key ingredients for chemicals, carbon fibre, activated carbon filters, silicon, fertilisers, etc.

In recent decades the mining of coal has experienced significant growth globally, in the order of 97% for hard coal (as opposed to soft / brown coal) over the last 25 years.

Total production for 2007 (the latest available global data, ref World Coal Institute 'Coal Facts 2008' www.worldcoal.org/coal info/coal statistics/coal facts) is as follows:

Hard coal (Coking & Thermal)	5,543 Mt (million tonnes)
Brown coal/Lignite	945 Mt (roughly 15% of total coal mined)

Whilst Europe has seen a decline in production over the last decade, the fastest growth has been in Asia. Coking coal comprises roughly 13% of total hard coal production, but attracts significantly higher commercial values. In most countries the coal mined is used domestically, with some notable exceptions (refer below).

Hard coal mined in 2007 by country is as follows:

	Production (Mt)	**Exported (Mt)**	**% Exported**
China	2,549	54	2 %
USA	981	53	5 %
India	452	Nil	Nil
Australia	323	244	76 %
South Africa	244	67	27 %
Russia	241	100	42 %
Indonesia	231	202	87 %

Germany was the largest Brown coal producer in 2007, followed by Australia, India, Indonesia and Turkey respectively.

The top coal importers in 2007 were (in Mt):

	Thermal	**Coking**	**Total**
Japan	128	54	182
Korea	65	23	88
Taiwan	61	8	69
India	31	23	54
United Kingdom	43	7	50
China	42	6	48
Germany	36	10	46

MINING METHODS

Coal is mined by two methods:

- Surface, also known as open cast or open cut mining
- Underground, or deep mining

The choice of mining method is largely determined by the geology of the coal deposit.
Roughly 60% of world's coal production is underground, with two notable exceptions being Australia (20% underground) and the USA (33%).

Open Cut Mining

This method is economic when the coal seam is relatively near the surface. The economic feasibility is determined by the overburden volume to coal tonnage ratio (known as the strip ratio).

In an open cut mine the predominant operation is the removal of overburden.

Soft overburden (soil and rock) is firstly dug off and the harder layers drilled, fractured by explosive and removed to an adjacent dump area using mechanical plant such as draglines, or shovel and haul trucks.

The exposed coal seam is broken by dozer, drilled and blasted or simply dug and hauled to stockpiles or handling/processing plants by truck. The coal is then crushed, screened to remove initial contamination and beneficiated/processed (when required) to remove contaminants which include rock (known as ash) and sulphur.

Blending may take place to meet a marketable contract specification during handling and transport to the customer via a combination of conveyor, barge, train or ships. In the case of thermal coal it can be transferred directly by overland conveyor belt from the mine to nearby power stations, or transported by road / rail to ports or customers.

Large open cut mines can cover an area of many square kilometres and use very large capital plant which includes:

- Drills
- Draglines to remove overburden
- Power shovels (either hydraulic or mechanical)
- Excavators, track and wheel loaders, diggers
- Fleets of large trucks (haul trucks) to transport overburden and coal
- Bucket wheel excavators (in common use for brown coal mining)
- Conveyors and other materials handling systems

Underground Mining

There are two main methods of underground mining:

- Room and Pillar (also known as *bord and pillar* mining)
- Longwall mining

Room and Pillar Mining

This method uses continuous miners to cut a network of *'rooms'* into the coal seam, leaving behind pillars of coal to support the roof of the mine. These pillars can be up to 40% of the total coal in the seam, and in many cases the pillars are removed as a final stage, allowing the roof to collapse in a controlled fashion.

Longwall Mining

When the geology of a coal seam favours this method, this usually results in the most cost effective underground mining method. However, it requires significant capital outlay to purchase a *longwall face*, comprising numerous hydraulically powered supports (chocks) to temporarily hold up the roof whilst the coal is extracted, a shearer and crushers and conveyors.

After development (preparation of blocks of coal that may be 100-350 metres wide and up to 3 km long) the mechanical longwall face is installed and begins operations. As the shearer removes the coal taking a slice of up to one metre at a time, the hydraulic supports advance continuously, allowing the roof to collapse behind the chocks.

In this way over 75% of the coal in a deposit can be extracted and seam heights can be mined from just over 1.5 metres up to 4 metres height.

The choice of mining technique is site specific, but always based on economic considerations. As a mine develops, both methods may be used at the same mine site.

PART B – COAL MINING LOSSES

HAZARDS

There are various hazards which are specific to the coal mining industry. These differ between open cut and underground mining methods. The most common coal mining hazards are listed below.

Flooding

The design of both open cut and underground mines incorporates water collection systems and pumps to de-water working sections of the mines. Ingress of water may be from ground water, external sources or weather-related issues. Water ingress from aquifer and ground sources is relatively predictable and pumps, catchment facilities and associated systems are sized accordingly.

However, the surface area of an open cut mine results in a large catchment area which may cut existing water courses. In adverse weather (such as cyclones, consistent heavy downpours, etc.) the systems in place may not cope, resulting in flooding of the working areas and failure of surface dams.

This causes interruption to mining operations caused by slippery conditions, damage to haul roads and other mine improvements, filling of drill holes and covering exposed coal, and failure slips of dumped overburden.

In the case of underground coal mines flooding can occur due to failure of containment structures built to hold water away from the entrance, or the accidental breaching of water-containing faults, aquifers, structures or dams.

Collapse / Rockfall

Open cut mines may be 200 m deep with 60 m benches. High walls (un-blasted earth and rock) are subject to collapse due to geological features such as faults, weak strength material or undermining / weakening by excessive rain. Spoil dumps have also been known to collapse.

Underground operations spend a considerable portion of their overall mining costs in supporting roofs above working areas

by installation of mechanical or chemical roof bolts, steel mesh or concrete spraying.
On occasion, particularly in areas geologically susceptible to roof fall, sections of the mine's roof or roadway walls can collapse, trapping or damaging plant and equipment, conveyors, blocking ventilation paths, destroying services and other property. This can result in lost production and fatalities.

Fire & Explosion

Most coal seams contain flammable/explosive gases such as methane, which is also toxic in certain concentrations. In enclosed spaces (as found in underground mines) the management of these gases is critical to the mine operation, and has a major influence on the type and nature of the plant used. Flame-proof electrical enclosures can significantly increase the initial cost of the capital plant and ongoing maintenance expenses over the life of the mine.

In general, motorised plant and equipment in coal mines is diesel-driven. Electrical enclosures are designed to contain sparks and internal gas explosions without igniting any potentially flammable or explosive ambient atmosphere.

Ventilation of underground mines is critical, and in some cases the coal seams have to be drilled and drained of the majority of its gas ahead of any mining operations. It is vital to avoid the build-up of a flammable or explosive gas atmosphere, as an underground explosion is devastating to a mine's operations and to the lives of the miners.

When exposed to water and oxygen, coal spontaneously combusts. Longwall mining is particularly prone to spontaneous combustion due to unmined coal being left in the broken goaf as the longwall face passes through.

Mining plant is exposed to fire risks from hydraulic oil leaks, overheating brakes etc. and normally has on-board fire protection systems fitted to minimise this risk.

Open cut brown coal mines in particular are susceptible to spontaneous combustion, and fires in brown coal can be extremely difficult to extinguish as the coal burns metres below the surface.

Creep/Heave

This is a phenomenon in underground workings where the ground pressure causes the floor to rise, or the roof and walls to move inwards. In extreme cases this can adversely affect mining operations, and many policies exclude losses arising from creep and heave as they are known hazards that must be managed by the mine.

Breakdown

Mechanised mining relies on complex and high cost capital machines to drill, load and convey heavy materials such as soil, broken rock and coal. In addition, breaking plant (crushers) and process plant associated with washing plants are subject to breakdown.

Open cut mining is less exposed to Business Interruption losses arising from breakdown of individual plant items, as a typical open cut operation has fleets of truck and shovels but may only have one or two draglines. As draglines are typically on the critical path for production scheduling, any lost production arising from breakdown of a dragline usually translates into a delay to the mine's output due to delayed coal exposure.

An underground Room and Pillar operation may rely on one or more continuous miners with a common materials handling/conveyor system. Again, breakdown of any of these components would normally translate into a loss of production.

The Longwall is most exposed to breakdown risk, being an in-line series of equipment / machines operating concurrently with no spare capacity or redundancy should one of the machines break down.

Accident

Haul trucks used in open cut operations are particularly prone to accident damage, caused by operator error (collisions between haul trucks, slipping on wet haul roads) or whilst tipping (by reversing over the berm, collapse of the dump/ tip, etc).

Draglines can be damaged by incorrect operation (bucket collisions with boom) or incorrect construction of dragline pads causing the dragline to slide into the workings.

BUSINESS INTERRUPTION

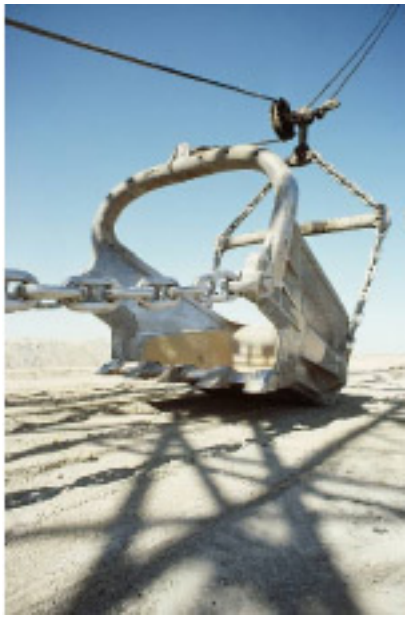
Apart from the cost of repairing or replacing property damaged by an Insured Peril, many coal mining incidents cause production losses which result in Business Interruption claims. Mining operations are complicated, and many variables influence the tonnage produced, grade of the end product and/or selling price of the coal produced.

In the case of thermal coal, sales are normally via long term supply contracts at a fixed or agreed rate. However, in the case of coking (and to a lesser degree, thermal) coals, sales may be on the spot market where the price can vary considerably depending on demand and other commercial factors.

As a good example, the 2008 calendar year saw significant volatility in the price of coal aligned with a dramatic movement in some exchange rates relative to the US$ which is used in international coal trade.

The mine plan and pre-loss mining activities have to be considered in detail and an understanding gained by the Loss Adjuster and team assisting the Adjuster to arrive at an estimate of the theoretical production (and hence sales) that would have been achieved had the incident or accident not occurred.

In the case of open cut mining this normally takes production forecasts, scheduling and availability of drilling and earth moving plant, site conditions and the detailed mine plan for this section of the operation into consideration.



In the case of an underground mine, detailed consideration of the mine development, roof conditions, planned/budgeted outputs etc must be considered. In the case of losses calculated on a revenue basis (as opposed to an output basis) stock on hand, work in progress and various inventories are taken into consideration and any variable costs (power, diesel, transport costs etc) are deducted from the value of the theoretical sales to adjust the claim, subject always to the policy terms and conditions.

In all cases the initial focus is on mitigation of the consequential loss. This can be achieved by buying in coal from within the group or from competitors to meet orders, delaying deliveries, adjusting washing processes to either increase or decrease the grade of coal, blending, changing the short-term mine plan and other techniques.

The importance of establishing the impact of a particular incident on the mine's output is critical to the investigation.

CLAIM TEAM

Role of Loss Adjuster:

It is essential that the appointed loss adjuster has knowledge and experience dealing with mining losses to enable effective management of a claim from the start. Mitigating steps taken initially can substantially reduce the final value of a claim as minor property damage can often lead to significant consequential losses.

The loss adjuster's initial role is to gain an overall understanding of the incident, the Insured's operations and the impact of the incident on the mine operations. A suitable claim team can then be established and guidance and assistance given to the Insured regarding mitigating its losses wherever possible.

Quantification of the various headings of the loss is essential, and acquisition of costing and other financial and planning data is needed to enable a final calculation of the indemnifiable loss to be undertaken.

The loss adjuster effectively project manages the claim from initial notification to its conclusion.

In many cases one or more of the following experts or consultants may be appointed on behalf of Insurers:

- ***Mining Engineer:*** A suitably qualified mining engineer is invaluable in investigating the cause of a loss and the impact on a mine's operations. It is important to match the background, experience and level of knowledge of the consultant to the individual claim, as mining consultants may have very narrow fields of expertise which may not be applicable to areas outside of their personal experience. Should the mining consultant have hands-on experience as a mine manager of a colliery, this should always assist the Adjuster in settling the Business Interruption aspects of a claim.

- ***Forensic Accountant***: It is important that the investigating accountant has extensive experience of mine operations, sales, marketing and industry norms to enable a detailed analysis to be performed regarding any Business Interruption claim arising from a mine incident. Crawford has experienced in-house forensic accountants who are able to respond immediately and to contribute as an important part of the claim team. A brief summary of the forensic accountant's role follows:

  During the initial stages of investigation following an incident the second question that Underwriters ask (after " what happened") is "how much will it cost?". If the Forensic Accountant is on site in the initial stages following an incident it is often the best time to obtain relevant Financial information direct from the site personnel who are acutely aware of the impact both in production terms and on cash flow. The early extraction of information often forms the basis of preliminary Reserves, after review of the Policy and determining Insured/Uninsured components of the loss.

  At the initial site visit the Forensic Accountant can view the types of documentation and information used at the mine site and can establish the initial Document Request list for financial information needed to further the matter.

Initial review of key financial records is carried out, including but not limited to the following:

- Budget for current , previous and future Financial Years
- Monthly Operating Statements
- Monthly Profit & loss Statements
- Daily , weekly , monthly Production Summaries
- Short and Long range Forecast Summaries
- KPI Reports
- Marketing Summaries

These are reviewed in conjunction with analysis of the various mine plans in place at the time to ascertain the financial impact at an early stage. After the initial review a preliminary report is produced. A more detailed analysis then takes place and a model is produced detailing the impact of the loss.

This can be done either independently or in conjunction with either the Insured, their appointed representatives, independent Forensic Accountants and/or any other appointed parties. The model must be able to withstand independent scrutiny, being based on information supplied by the Insured and tested by Crawford. The robust claim model must be capable of defining the financial impact of the incident on the Insured's operations, and the insured financial losses arising out of the occurrence.

- ***Geotechnical Engineer:*** In cases such as roof falls, collapse of high walls etc, a geotechnical engineer or consultant is employed to provide an opinion regarding cause and design/steps taken by the mine to deal with this known hazard.

- ***Legal Counsel:*** Due to the potential for significant claims and the complicated nature of the mine's management of known mining hazards, legal counsel may be appointed. Appointment of consultants is then undertaken on behalf of Insurers by legal counsel, with a view to ensuring that any expert reports or other documents may be subject to legal privilege, if needed.

- ***Marketing Consultant:*** In the current global market economy, it is sometimes beneficial to obtain the opinion of a marketing consultant to establish the likely sales values that would have been obtained, in particular where a mining loss may actually influence the value of the commodity itself.

About Crawford & Company

Based in Atlanta, Georgia, Crawford & Company (www.crawfordandcompany.com) is the world's largest independent provider of claims management and related solutions to the risk management and insurance industry as well as self-insured entities, with a global network of more than 700 locations in 63 countries.

Major service lines include property and casualty claims management; warranty inspections; integrated claims and medical management for workers' compensation; legal settlement administration, including class action and bankruptcy claims administration; and risk management information services.The Company's shares are traded on the NYSE under the symbols CRDA and CRDB.

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PART C – GLOSSARY OF TERMS

Active workings	Any place in a mine where miners are normally required to work or travel.
Advance	Exploitation in the same direction or order of sequence as development is known as mining in advance.
Aquifer	A water-bearing bed of porous rock, often sandstone.
Ash	Inorganic residue after incineration of coal.
Berm	A pile or mound of material capable of restraining a vehicle. Or a horizontal interval between two benches in a high wall wide enough to contain any falling objects (also called safety berm or safety bench)
Bituminous coal	A general term descriptive of coal intermediate in rank between sub-bituminous and semi-anthracite and including coking coals. Bituminous coals may be either bright or dull and are usually banded in appearance.
Black coal	A general term for coal of either sub-bituminous, bituminous or anthracite rank.
Blast	A controlled explosion which is used to loosen the substance being mined.
Blends	A mixture of 2 or more coal types or brands. In the case of coke making, blending provides the manufacturer with the potential to mix lower cost poorer coking coals with higher cost hard coking coals and thereby reduce the overall cost of the coke oven feed.
Bord and Pillar	A continuous miner system of mining whereby a series of parallel roadways or headings are driven into the block of coal and interconnected by roadways known as cut-throughts to form solid coal blocks or pillars. Dimensions vary from 10 to 110 metres. In some cases, the pillars are removed in a concurrent or later operation.
Box-cut	The initial opening used to access coal seams in an open-cut operation.
Brown coal	Coal of the lowest rank, of a soft friable nature and high moisture in the air-dried sample.
Burden	The thickness or quantity of rock that a single number of shots is expected to move.
Canopy	A protective cab on a mining machine.
Chain conveyor	A conveyor on which the material is moved along -solid pans (troughs) by the action of scraper crossbars attached to powered chains.
Chain pillar	The pillar of coal left to protect the gangway or entry and the parallel airways.
Chock	(1) A roof support unit for use in large openings which consists of wooden or steel blocks stacked between the floor and the roof often filled with stone for added stability (2) An hydraulic support used with the longwall system of mining.
CHPP	(Coal Handling and Preparation Plant) A plant used to upgrade the quality of coal including crushing, sizing and drying - usually refers to the reduction of ash forming mineral in coal.
Clean coal	The coal product that has undergone processing (wet or dry).
Coal sizing plant	Plant used to size, crush or screen coal to market specifications.
Coal washery	A Coal Washery or Coal Handling and Preparation Plant (CHPP) is a plant which removes ash from the coal to improve its quality as a commercial product.
Coke	The end product of the carbonisation of coal. Generated from coking coal after being heated at high temperature in an atmosphere substantially devoid of oxygen, passing through a transient plastic stage in which the coal successively softens, swells and resolidifies into a coherent cellular coke ready for use in the steel making process.
Coking coal	Coal which is suitable for coke making and used in the production of metallurgical coke.
Continuous miner	The electric powered cutting machine used to remove coal from the face and load it into the shuttle car. It comes in a variety of makes and sizes. Also - a remote-controlled, tracked, electrically powered coal cutting and loading machine used to form mine roadways and extract coal pillars.

Creep	(1) Upward movement of a relatively soft floor of a seam under pressure from adjacent coal pillars - can be called floor heave. (2) Sometimes used for widespread movement of the upper strata because pillars left for roof support were insufficient size over a relative large area.
Deputy	Supervisor in charge of a section or district of a mine, and all employees working therein. The statutory duties, responsibility and authority of a deputy are set down in the relevant mining regulations.
Development activities	The process of establishing a mining panel (pillars or longwall block).
Dip	The grade of the coal seam. It is usually expressed as I in X in a certain direction.
Dirt	Valueless rock (shale, sandstone) present within the coal seam or broken from the bottom or top of the seam during coal mining.
Drift	An inclined access from the surface to the coal seam or from coal seam to another coal seam. It often contains a conveyor belt or man-riding train.
Dusted	Term used to describe treatment of workings with powdered limestone to prevent the propagation of coal dust explosions.
Energy coal	Coal used to provide heat for steam raising as part of the electricity generation process.
Face	The inbye end of the mine roadway, usually the working place for coal extraction.
Fall	Collapse of roof material.
Fault	Break in the continuity of a coal seam or rock strata. There are many types of fault.
Fault and dyke structures	Discontinuities in the coal seam that may impact upon the mineability or quality of the surrounding coal.
Feeder	(1) A piece of equipment which aids the flow of coal from one location (perhaps a bin) to another (perhaps a conveyor belt); or (2) Breaker feeder which is a stationary but mobile piece of mining equipment which breaks large lumps of coal into smaller pieces and discharges coal onto a conveyor belt.
Fill	Any material that is put back in place of the extracted ore to provide ground support.
Flameproof (equipment)	Equipment within which an explosive mixture of gas can ignite without igniting explosive gases surrounding the equipment.
Flotation	Wet process for the separation of coal from waste rock. The coal particles are lifted or floated to the surface by air bubbles in a liquid medium.
Gas drainage	The system used to extract gas from the coal and remove it from the mine.
Gate	Roadway leading to a working place in longwall mining.
Gate roads	Access roadways connecting the longwall working face with the Main Roadways.
Goaf (voids)	The space left following extraction of the coal seam where the roof material is allowed to collapse.
Heading	(1) Roadways forming the openings in the direction of development of the panel. Heading direction parallel to cleavage direction. (2) A roadway driven in the solid. (3) A roadway driven in the direction of advance of a district, e.g. main headings, 2 s.w. heading, etc.
Heating	Self heating - outbreak of spontaneous combustion underground (or in surface stockpile).
Inbye	The direction along a roadway towards the face thus going away from the surface entry.
Inertisation	Injection of inert gas (nitrogen etc.) into a mine to extinguish a fire.
In-seam gas drainage system	A method of reducing the insitu gas content of the seam to within acceptable limits by drilling holes into the seam or surrounding strata ahead of mining.
Longwall	A system of working coal in which the seam is extracted on a broad front or long face.
Longwall changeover	The process of relocating longwall equipment from one panel to another, often coincides with major planned maintenance.

Longwall mining	A system of mining that involves the extraction of large blocks of coal, with the coal being mined on retreat in slices up to 1.0 metre thick from the longwall face. Key longwall mining equipment includes: • a Shearer, used to cut and load the coal from the face; • a steel chained armoured face conveyor, used to transfer the coal across the face; self advancing, high capacity, hydraulic longwall supports, used to support the immediate face area as the coal is mined; • a beam stage loader, used to transfer the coal from the face to the longwall panel conveyor; • a crusher, used to size the coal; and • the pantechnicon that incorporates the longwall services, including power supply.
Longwall panel/ block	A large contiguous block of coal, typically 100-300 metres wide and 1-3.5 kilometres long, suitable for longwall extraction.
Main and tailgate drives	High capacity motors, situated at either end of the longwall face, used to power the armoured face conveyor that removes the cut coal from the coal face to the main drift conveyor.
Main roadways Maingate/Tailgate	Roadways that are used as the means of primary access/egress, to supply materials, provide ventilation and enable coal to be conveyed to the surface.
Metallurgical coal	Coals, which are consumed in the production of pig iron, either via the coke oven process, direct injection (PCI) or by direct reduction.
Methane (CH_4)	A gaseous compound of carbon and hydrogen naturally emitted from coal that can be explosive when mixed with air or oxygen between certain limits. Lighter than air, it comes out of the coal or surrounding strata.
Mine roof	The layer of hardened clay, limestone, sandstone, or other material that lies over the coalbed; rock or other material above the coal seam.
Misfire	(1) The failure of a blasting charge to explode when expected. (2) A charge which has failed to explode.
Open-cut mining	A type of mining where the overburden is removed to expose coal seams and allow their extraction by surface means.
Outbye	(1) The direction along a roadway away from the face. (2) Locations between the face and surface.
Overburden	The material of any nature, consolidated or unconsolidated, that overlies a deposit, measured in cubic metres (or feet). Described as 'bank' cubic metres (BCM's) when unbroken. Top soil/strata overlying the coal seam.
Overwind	When the cage, skip or dolly car in hoisting is not brought to rest at the appropriate place.
Panel	A mine is broken up into a number of panels which are working places for each mining crew. (2) In mines liable to spontaneous combustion, panels are formed with a minimum number of roadways connecting them to the rest of the mine, to permit easy sealing in case of a fire.
Partial extraction	A continuous miner system of mining whereby some of the coal pillars in a panel, or parts thereof, are systematically extracted. the total recovery factor (coal extracted as a percentage of coal insitu) is generally in the range of 40-60%.
PCI coal	Coals, which are suitable for direct injection into the blast furnace in a pulverised state. PCI replaces oil and displaces some quantity of coke. Traditionally, The PCI coal price is closely linked to thermal coal which will allow the blast furnace operator to reduce the overall cost of raw material by reducing the volume of coke needed to produce each tonne of hot metal.
Pillar	A block of coal left to hold up the roof and formed by driving a connected series of headings/ bords and cut-throughs.
Pillar extraction panel	A continuous miner system of mining whereby coal pillars are systematically extracted allowing the roof to collapse. The total recovery factor generally exceeds 60%.
Portal	Entrance to tunnel
Return air	Air or ventilation that has passed through the workings and may contain gas or dust.
Rib	The name given to the coal walls of the roadway. These are the sides of the pillars.

Rock dust	Limestone dust sprayed over roof, rib and face, and throughout the mine to render exposed coal dust inert.
ROM (Run of Mine)	Raw coal as mined that has not undergone any screening, crushing or beneficiation.
Seal	(1) Permanent or semi-permanent closure of a roadway - usually a brick wall. (2) The concrete blocks used to build a seal.
Seam	Layer or bed (of coal).
Second means of egress	The alternative negotiable roadways from the working area of the mine which can be used in an emergency.
Self-heating	Occurs when coal (in a pillar, fall, goaf area or stockpile) oxidises and produces heat at a greater rate than can be dissipated by the strata or air current so that the temperature rises until eventually active fire results.
Self-rescuer	Worn by miners and used in the event of a suspected explosion. Used to remove lethal quantities of carbon monoxide from the breathed air.
Semi-soft coal	A type of coking coal that can be blended with a hard coking coal to produce an acceptable hard coke.
Shaft	An opening, usually vertical, connecting the surface with the underground workings.
Shear	(1) Vertical cut, about 17 cm wide, made in the coalface by the cutting machine. (2) In longwall operations it refers to the cut of coal taken along the complete longwall face (approx. 0.85,m thick). (3) Continuous miner cutting from roof to floor or floor to roof.
Shearer	A mining machine for longwall faces that uses a rotating action to “shear” the material from the face as it progresses along the face.
Shortwall	Method of mining using larger than normal pillars, but not as large as a longwall.
Shuttle car	An electrically or diesel-driven machine used to transfer the coal from the continuous miner to the start of a conveyor belt.
Steaming coal	Coal used to provide heat for steam raising as part of the electricity generation process.
Stone dusting	Operation of spraying finely ground limestone or other non- combustible and non-siliceous dust onto coal. The limestone particles mix with the coal dust and reduce the possibility of a coal dust explosion.
Stripping	(1) Removing coal. (2) Also used to describe the removal of overburden.
Strip Ratio	The amount of overburden that must be removed to gain access to a unit amount of coal.
Subsidence	In mining, the deformation of the ground mass surrounding a mine due to the mining activity.
Thermal coal	Normally used for the generation of heat for steam raising and other general industry applications. However, thermal coals can be used as PCI coals provided they have levels of ash, moisture, volatile matter and sulphur which make them suitable for the production of blast furnace pig iron.
Trackless mining	Use of mechanical equipment mounted on caterpillar tracks or rubber tyres and therefore not dependent on the laying of rail track.
Trailing cable	Heavily insulated electric cable used to bring power to an electrically operated machine, such as a shuttle car or continuous miner. The cable trails along the ground from a plug-in power load centre or receptacle, to the machine.
Underground	A type of mining where the coal seam is accessed by shaft or drift into underground workings.
Windrow	The berm of material on the edge of dumps for trucks to back to when dumping overburden. Also, material on each side of haul roads used when grading.