



UNIVERSITY
OF WOLLONGONG
AUSTRALIA

University of Wollongong
Research Online

Coal Operators' Conference

Faculty of Engineering and Information Sciences

2009

How We Can Help and Improve

M. Velzeboer
ArcelorMittal

Publication Details

This conference paper was originally published as Velzeboer, M, How We Can Help and Improve, in Aziz, N (ed), Coal 2009: Coal Operators' Conference, University of Wollongong & the Australasian Institute of Mining and Metallurgy, 2009, 13-15.

Research Online is the open access institutional repository for the University of Wollongong. For further information contact the UOW Library:
research-pubs@uow.edu.au

HOW CAN WE HELP AND IMPROVE

Maarten Velzeboer¹

The world has changed in a matter of six months. Last year the sky was the limit, today there are many companies living from hand to mouth. Bungee jumping is a recreational activity and now senior management is forced to enjoy the ride as part of day to day business.

Even the Australian mining scene is affected and we are again a "cyclical" industry. This is a worry, as the economic returns pay our wages and generate the investments necessary to maintain a safe and vigorous industry. Over time as the easier deposits are being depleted, the technical and geo-environmental challenges call for greater efforts. Not only in the shape of mine operational initiatives, but also services, equipment and novel applications from other disciplines.

Fortunately during the good times, the physical and intellectual investments in Australia have been high and some of the good "ideas" and initiatives have made it into the production environment. During the period Australia has become a major source of Mining Manpower to the world. Australian expertise has become the backbone of many of the new projects. This has been made possible by the strong and vibrant domestic industry, educational system and service/equipment manufacturing capability.

The current downturn, I like to describe as a breathing space, should allow us to reflect, take stock and determine what is important for the future. Chasing ones tail all the time, may be dynamic, but does this yield BEST results? I am certainly not suggesting that we do nothing, and wait for things to improve. We should use the opportunity to position ourselves for the future upturn, in what form and when this will happen we do not know. What we do know is that the world will be different. As a person who is based and operates in a non Australian environment I am grateful for your contribution on a global scale. It hurts when you also dominate on the sports field, but that at least gives us something different to talk about.

Thank you for allowing me to address you on this occasion. Wollongong and the Australian mining community in particular, bring back fond memories. Also sad ones. I was doing my underground time for my ticket, at Appin when they had the explosion. I did early work on "gassiness" at South Bulli, with lots of help from both Allan Hargraves and Ripu Lama. Both gas pioneers. I am grateful for my early career in Australia, now I am back to learn from the Australian industry, to assist our overseas operations.

I would like to use our ArcelorMittal operations as an example of some of the basic challenges and as a mirror as to some of the future needs of the underground coal industry. In this context I am not only referring to the technical requirements, but increasingly there is a social dimension and responsibility to all we do. This social aspect not only covers environment and being a good neighbour, but also has a strong human focus. Mining always has been a "people" business. I am not only referring to SAFETY but also employee development and community awareness.

ArcelorMittal are the leading steel producer and operate on a global scale. We also strive to become significantly self sufficient in relation to our main inputs. Outside the obvious iron ore, coking coal is a major component in making steel. ArcelorMittal currently operates several surface and underground mines in West Virginia (US), three underground coal mines in Kuzbass, Siberia (Russia) and the Karaganda coalfield in Kazakhstan. Currently the total local service companies are part of the ArcelorMittal establishment. The mines operate multi annual production capacity is some 20 odd Mt. The Karaganda coalfield consists of 8 underground shaft mines, with an annual capacity of 12 Mt. Each mine currently produces some 1.5-2 Mt (ROM) with an average complement of 2,000 people. In addition many of the seams, with at least one thick one of 5-7 m, some of which have significant dips. The key technical issues are gas, outbursts, spontaneous combustion and past operational history.

¹ GM Coal Operations, ArcelorMittal

This last aspect relates to the Soviet era where a prescriptive form of management was practiced linked with a strong "blame" culture. This usually results in the accident victim being considered the root cause of the incident. That all is not well is reflected in the safety statistics, which are characterised by major events resulting in multiple deaths.

For some time now, ArcelorMittal have been working on a focused programme to break the historic safety performance. Not only have we been concentrating on the human behaviour aspects, but also on a programme of modernisation. The basic technical issues associated with high gas levels, outbursts, improved ventilation practices and roof/rib support have been reviewed and are being addressed.

Let me explain:

- 1) The gas levels of some of the main seams are very high by anybody's standards. Recent measurements confirmed up to 25 m³/t for the D6 seam, which is also very prone to outbursts as the bottom section of the 6 m seam contains a shear zone of soft and very fine coal. It is interesting to note that 25 m³/t level is very similar to what the Russian exploration predicted some 40 years ago.

Our measurements also show that the top section of the seam may act as a significant gas reservoir, which possibly feeds the violent gas and fine coal release from the shear zone. In addition the permeability of the seam is low, which makes effective predrainage difficult and so far ineffective. Work on the size distribution and shape particles from the different seam sections may allow us to introduce a permeability enhancing methodology. It is also expected that by understanding the outburst mechanism, preventative measures and techniques can be developed to create a safe longwall panel development environment.

- 2) Currently stone drives are first driven below the seam, from which the future gate road positions are degassed, before in seam development is started. Even in such a controlled environment, regular discharges of several tonnes of fine coal and over 1,000 m³ of CH₄ still happen, when drilling the pre-drain holes.
- 3) During production gas make during mining is a major problem, as is management of the goaf gas. With background values at the face of 0.8 % CH₄, there is little room for any additional release during production. Recent trials of cross measure drilling and gas extraction are proving very positive, allowing a more controlled gas management to take place. Goaf edge values of 0.3 % and purity considerably in excess of the explosive limits within the vacuum range are some of the physical achievements. Success in this area will not only allow a better gas capture in the extraction infrastructure, but also enable the ventilation system to be simplified to manageable and operationally comprehensible proportions.

Two papers of my Kazakhstan colleagues describe the measures currently being adopted to allow safe operation in a high gas level environment. The mines are governed by local mine legislation, which finds its origin in the Soviet Legislation. Many of the rules and regulations are technically sound for the operating environment. Credit is due to the Kazakhstan inspectorate and the unions, for being open minded as to different approaches to methods of work, and the introduction of "western" techniques.

An example is the use of stonedust. Not an issue in Australia, but what you are used to, is not a standard practice in the very wet Donbass and Kuzbass coalfields. The Karaganda field is dry, so the wet standards may not necessarily be readily applicable. The liberal use of stonedust would be one.

I have always regarded the Inspectorate as a friend, who is competent and can advise and act as part of his legal duties. This, in my view, is a major advantage Australia has over the American system, where the recording of violations appears to be a kPa. I believe that the issues and problems are too complex to play a cat and mouse game. By all means the Inspectorate needs to be the stick, but the door also has to be open allow progress to be made.

- 4) In any longwall mining situation, meeting the development rates are the key. With all the stone drivage, this is a major operational challenge for us in Kazakhstan. We still use steel arches supplemented by roof bolts. When questioned, the argument is sometimes voiced that arches

are easier to put up than bolts. In a geotechnical benign environment there appears little justification for arches just to hang the pipes on. With some basic computer simulation the case for more bolting may readily be made.

In the "west" we take computer based mine planning for granted. It is difficult for mine management to make "best practice" decisions when relying on manual planning systems. Unfortunately few of the software tools are Russian language friendly. It is happening, which will assist in promoting decision making and result accountability.

WHAT DO WE ALL WANT TO ACHIEVE FROM THE CONFERENCE

Lets talk and exchange experiences, learn for one another and together push back the geohazards which are only getting more significant as we go deeper and demand higher productivities from what we are doing.

I encourage the free interchange of ideas, theories and experiences at the operational level. All of us in the Industry have a vested interest in promoting safe working and achieving manageable conditions of coal extraction. No Company has the right to keep this to themselves for short term commercial gain. The stakeholders are not only the shareholders and employees, but also the community, which no longer tolerates unduly hazardous working conditions anywhere.

