Reply to F. Essrich 'Quantitative rockburst hazard assessment at Elandsrand Gold Mine'

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by J.F. Curtis*

In the synopsis, the author concludes that 'high levels of seismicity do not coincide with high rockburst rates'.

Implicit to an appreciation of this statement is the necessity of a common understanding of what is understood by the terms:

'high level of seismicity' and

'high rockburst rates'.

With respect to the former term there is no difficulty in that the level of seismicity is traditionally measured in terms of the Richter Scale.

The latter term however presents a problem in that the author defines it as a particular sort of seismic event—viz: "Rockburst' is understood as a seismic event that causes damage to an underground excavation with subsequent injury, loss of material/equipment or production shifts" (p. 322). No scale is given of the amount of:

- excavation damage
- level of injury
- material/equipment loss
- production shifts lost

whether separate or cumulative, for a particular seismic event to be classified as a rockburst. A further difficulty arises in that in common usage the words 'rockburst', 'seismic event' and 'earthquake' are all used to describe the same event.

Richter, a pioneer in the study of seismology, is explicit that 'a rockburst is a true earthquake'[1]. The identity of the phenomena of 'earthquake' and 'seismic event' is explicit in the Greek word 'seismos', translated into English as 'earthquake'[2].

The nature of a rockburst was confirmed by Denkhaus H.G.; Hill F.G.; and Roux A.J.A. who affirmed that, 'the characteristic feature of a rockburst is a sudden failure, as a result of which energy is almost instantaneously released'[3].

In Table III the author has used the term 'seismicity related damage'; it better describes the negative effects of seismic activity than the misleading 'rockburst'. The revised conclusion would then read:

'high levels of seismicity do not coincide with high levels of seismicity related damage'.

In his 'conclusions', the author states that 'by implementing the Seismic Hazard Assessment procedure on Elandsrand as a planning tool, a contribution was made to the reduction of large 'seismic events on the mine'.

This should be read together with the statement: 'while the number of events associated with the mining faces dropped over the past three years...the number of large geology and pillar-related events remained relatively stable'. (p. 322).

In explanation of this division of seismic events into 'mining-related' and 'non-mining-related' the author states;

'in the sequential grid mining environment (geological) structures are usually bracketed with clamping pillars and are not extracted. This allows, in most cases, a clear distinction based on event location between large events associated with an active mining face and events on structures'.

To contend that seismic events occurring on '(geological) structures and pillars' are not mining-related is to contend that, 'had mining not taken place, the seismic events would still have occurred'; this is an untenable argument.

The relationship between mining and seismic event/rockburst activity was confirmed as long ago as 1946 in respect of the deep-level gold mines at Kolar in India where it was noted that: 'the magnitude and nature of rockbursts that occur in mines are related to the shape and sizes of the excavations, the physical properties of the rock and the stresses in the rocks whether gravitational, tectonic or induced by the excavation or other causes'.[4]

References

1. Richter, C.F. Elementary Seismology (San Francisco. W.H. Freeman 1958). p. 366.
2. The Concise Oxford Dictionary of Current English (Oxford Clarendon Press 1964). p. 1147.
3. Denkhaus, H.G., Hill, F.G., and Roux, A.J.A. *A review of recent research into rockbursts and strata movement in deep-level mining in South Africa*. Pap. Discuss. Ass. Mine Manager S. Afr. 1958–1959. pp. 245–68.
4. Jeppe, C.B. Contribution to (Barenburg A.W.T. *Mining at depth in the Kolar Gold Fields, Mysore, South India*. Pap. Discuss. Ass. Mine Mgrs. S. Afr. 1946–1947. p. 249. ◆

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International accreditation for the University of the Witwatersrand's Welding Engineering course*

South Africa's only postgraduate welding engineering course, at the University of the Witwatersrand, has received international accreditation from the European Welding Federation.

The welding engineering course, which gives students an MSc qualification, was established two and a half years ago in a joint venture between the School of Process and Materials Engineering at the University of the Witwatersrand and the South African Institute of Welding.

It is believed to be the first engineering postgraduate degree in the country to receive international recognition. South Africa is only the third country outside Europe to have its welding engineering course accredited by the European Welding Federation, which will give the University of the Witwatersrand welding graduates recognition almost anywhere in the world.

Course co-ordinator Dr Andre van Bennekom, says, 'We are delighted by the accreditation. South Africa needs more welding engineers to compete internationally and we envisage our enrolment doubling from the present 13 within the next year.'

The welding engineer is responsible for the specifications of welding procedures, methods and techniques, as well as the weld design.

The University of the Witwatersrand comprises 12 modules, of which six can be completed in a year. On successful completion of any six modules, the student receives a graduate diploma in welding engineering (GDE). An MSc from the University of the Witwatersrand and an EWS degree in Welding Engineering can be awarded on successful completion of all 12 modules and the required exam, ie. can be completed within a minimum period of two years.

Each module requires self study and comprises a full week of formal lectures followed by an exam. The modules are self standing and are spaced through the year, giving students the flexibility to leave the course at any point. Entry into the course is in January and July.

There is also flexibility in terms of entrance requirements, which are either a BSc/BSc (Eng) degree, a Btech degree with three years' experience, or a T4 diploma with six years of relevant experience. This means that suitably qualified people who have not obtained a first degree can use their industrial experience to obtain a masters qualification.

Some 30 lecturers are involved in the training, including staff of both the University of Witwatersrand and the Welding Institute, as well as recognised specialists and experts from industry locally and abroad.

'Our quest for recognition by the European Welding Federation and the use of a wide range of experts as lecturers are evidence of our commitment to providing world class education,' says Bennekom. 'The students currently enrolled in the welding course come from all the major centres in South Africa and represent all race groups.'

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