



Mining and complexity – paradigm, paradox or parody??
28 January 2010

I introduced the issue of complexity in my last article and stated that there is little evidence in open cut equipment production data that “complexity” plays any role in decreasing equipment productivity over time. This is a controversial view in the mining industry, particularly the large mining companies where increasing complexity has been used as an excuse for falling equipment productivity rates for some years now.

I stated in my last column;

It is my theory that the corporatisation of the mine site is to blame for the reduction in availability and consequent productivity. It is the focus on process and not the result. Managers are often judged on how they do their job, not the end result, and a declining result can be hidden behind exceptional processes. Part of that change is an increasing focus on safety but not the majority of it. Because most managers have little real natural management expertise they embrace the processes which are encouraged by corporatisation. Six Sigma or Lean are great because they provide the manager with a focus on process. You can actually point to what you have done. Unfortunately the performance metric is wrong.

I believe that the silent majority support this view but many just have to fit within the confines of the company that employs them. I received the following from someone running a mine this week after they read my last column (that makes two of us who read it).

You are so right about people getting hung up about the process of a process and the process of process improvement rather than the bottom line impact of the outcome it produces

You can extend this further by explicitly focussing on added value as the principle and proper measure of improvement. eg "For any given operational outcome, a process 'improvement' that does not measurably generate positive

Head Office
Brisbane Technology Park
Unit 2 / 53 Brandl St
Eight Mile Plains Q 4113
Australia
Ph: +61 7 3147 8300
Fax: +61 7 3147 8305
Email: gbi@gbimining.com
www.gbimining.com

South African Office
8 Corridor Crescent
Building B Ground Floor
Route N4 Business Park
Ben Fleur X11 Witbank 1035
South Africa
Ph: +27 13 6564114
Fax: +27 13 6564114
www.gbimining.com



added value or improve safety without negative impact on the firm's overall value is no improvement at all." No matter how exceptional it might be.

This industry needs to take more notice of Prof Michael Porter - the father of the value chain concept. He had it spot on. If it doesn't add measurable value, prune it. However, remember not all value is financial - reputation, employee wellbeing, and other "soft" forms of value also matter to different degrees in different companies.

Six Sigma and Lean do not cover the value chain concept well I reckon, and their experts too frequently have no wider business management training to know any better.

A few other personal operational observations for you;

- Pits do get more complex sometimes but usually just deeper and/or less "rich". Any complexity is mostly human induced.*
- You are right about availability being a function of age. BUT its more complicated and its only true beyond a certain age. There is a trade-off between depreciation of new equipment with age and repair with age on 2 axes vs availability with age on the third. If you map profit (or net value added) against these axes you will find here is a reasonable sweet spot for average fleet age where profit is maximised - and it's not at any of the extremes. Operational rosters (eg 4 days a week, 24*7 etc) change the sweet spot quite a bit. I've never seen any specific mining industry research on this and there are a lot of misconceptions out there.*
- Availability is an issue but not the only one. Cost saving pressures, lack of professional knowledge, managerial ignorance and inappropriate performance metrics are an even bigger part of it. Maybe some would argue this is the actual "complexity" causing most of the problems, eg... Payload and digging cycle time (esp truck shovel) are affected (often severely) by poor pit design (relative to deposit and equipment), poor road placement, poor matching of blast performance, poor dump design, but also limited communication between the engineers and mining supervisors - the*

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latter usually make the shift to shift decisions with no knowledge or understanding of the former's work (= poor decisions frequently).

There is more in the email which I will include next week. I will repeat my last paragraph from the last column. Commodity prices (maybe with the exception of gold) are going to decline. You won't be able to keep making money without focusing on the real reason you are in business. You need more of your commodity going out the gate at a lower cost, not a new business improvement process every week or month.

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