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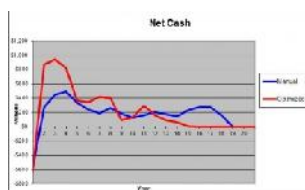
BUSINESS OPTIMISATION FOR THE MINING INDUSTRY

2. Money has a time value: a dollar is worth more now than in 10 years' time. Opportunity cost and risk increase with time so the sooner cash is generated the better. That is why net present value (NPV), the sum of discounted cash flows, is used by many mining companies as the primary measure of economic value. It is not a perfect measure, and there are issues to do with determining the discount rate, but it is a good fundamental starting point.

This leads us to focus on developing optimised life-of-mine plans which bring cash generation forward in time. Mining business optimisation is therefore an economic engineering exercise – a study of what influences cash flow, and in particular how to deal with or work within the constraints and bottlenecks that slow down the generation of cash.

The techniques for NPV optimisation are now so far advanced (which is the subject of the training course) it is possible to make substantial improvements to the economics of almost any mining operation. We quote a 5% to 35% increase in NPV from a comprehensive application of these techniques, but the truth has been more like 15% to 85% or more from our first-hand experience over the past 12 months in actual cases.

I realise this is quite a statement. In many cases we are talking about doubling the cash flow in the first few years of operation (see below). These results come from of a coordinated approach involving simultaneous optimisation of pit and phase (or underground) mine design, mine schedule, cut-off grade, stockpiling, processing plant calibration, product specification, logistics and capital sizing of all parts of the operation. If we accept that money has a time value (and if you don't then you can send me all your money now – just for a while, I promise) then the red line plan is significantly superior to the blue line plan. This thinking is proving highly popular with a growing list of mining companies: the security, flexibility and options created by early cash flow are compelling to management.





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Sounds fantastic, but now the fun starts! A consequence of making economic performance the focus (subject to safety, environmental, social and political considerations of course), is that many other well-meant and commonly stated operational objectives need to be re-examined. It can be demonstrated that the usual mantra of maximising reserves, minimising costs, maximising recovery, maximising equipment utilisation, maximising mine life, minimising capital expenditure are often (usually!) inconsistent with maximising economic value. This list sounds ok, but they are organisational silo-based proxies for the real objective of the company, which is to maximise economic value.

Oh dear, does that mean that all the work we have put into this list was misguided? Unfortunately, yes – or to be more accurate, it has been misguided to the extent that these objectives have been pursued in isolation rather than as part of an organisation-wide program that puts them in perspective: the economic perspective.

These statements are 'hot potatoes' and can and should provoke a wide range of discussions, and that would be welcome, but what I would like to raise at this point is one particular aspect that keeps coming up in the discussion groups. When looking at a plan which has been optimised according to these principles we tend to see a wonderful cash flow profile but often somewhat lower mineral reserves, or at least a smaller proportion of the reserves that you plan to mine and recover (not wanting to debate the definition of reserves). This makes even the most robust and headstrong mining CEO quake in his boots. "The analysts won't like it!" is the cry. "If we reduce our reserves, our share price will go down!"

Part of the economic optimisation process – that is, the focus on the rate at which the business can generate cash – is to stop occupying the bottlenecks in the system with material that is generating lower cash flow than the other material that is available. Better to leave low (albeit positive) cash flow material in the ground, in the waste dump, in tailings or at least in a stockpile – put it anywhere except in the plant/infrastructure which has cost us precious capital to build. This is a different mindset than the usual process of finding more and more creative ways of getting marginal material over the line so it can be counted as reserves.



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What is needed today is an open discussion about the way mining projects and enterprises are valued by financial markets – by analysts. How does an NPV optimised plan compare with that devised to suit present stock market analysts' methods? Would a mining stock face a markdown if its project NPV went up by over 30% and the cash flow was substantially improved, but the reserves fell by, say, 10%? And if so, why?

Are we missing something, or has the investor been missing out?

**Gerald Whittle is managing director of Whittle Consulting, an Australian-based specialist mining enterprise optimisation firm.*