



Productivity and mine planning 3
16 November 2009

Mining companies don't have the equivalent of the magic pudding (with apologies to Norman Lindsay for the analogy). They have limited resources with which to create a return for their shareholders and as they are mined they deplete. For all mining companies there is continual pressure to turn resources into a financial return. This is one side of the issue which sees productivity rates and costs used in mine plans almost always optimistic. I suspect the old saying, "Don't let the truth get in the way of a good mine", or something like that, is pretty apt. The other side of this problem is that despite what most mine planners (consultant or company) say they don't have enough data to provide (statistically) credible inputs. The decision-making process by executive management and many Boards of Directors is at best doubtful, usually flawed, and in some cases, just downright dishonest.

This week I will use a topical example of a job we are doing at present for a mine planning consultant as a demonstration of how the mine plan goes seriously pear shaped. I should emphasise that in this case the consultant is using real inputs; they do understand the issues; and will be using the information correctly. Thank God for that!!

The request was for benchmark information for an RH 340 hydraulic excavator with 34 CuM bucket capacity. The first point to note is that in the particular application being looked at the worldwide, 2008 average annual output for these machines was 12.6 million tonnes while best practice (average of the top 10%) was 23.1 mt. Just a small difference there. Can you believe a best practice RH340 moves twice as much as the average? The natural tendency for the mine is to think, "of course we are good" and for the consultant to want to provide the best outcome. More often than not a rate somewhere in the vicinity of, or above best practice performance is used. However, you have to be realistic. Only about 5% of mines using the RH340 will achieve 23 mt or higher and maybe you are one of the 19 out of 20 who won't. If you have always had average performance then why would it suddenly improve?

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



The second issue is why do some people believe that a piece of equipment will move well over best practice? This example provides the perfect demonstration. The request from the mine planning consultant was for a benchmark of availability, utilisation and dig rate. That is, they wanted 25th percentile, median, 75th percentile and best practice of these three KPI's. The availability, utilisation and dig rate combine to produce the annual output. The problem is that there is no mine in the world using this loader where they achieve best practice availability, utilisation and dig rate. In fact if you take best practice for these three KPI's the output is in excess of 27 mt compared with the actual best practice output of 23 mt.

A number of human factors are at play here. Firstly, different companies have different definitions of the KPI's. Availability for one company is not availability for another company. So for mine X to say they achieve 90% availability and that makes them good is wrong. Worse still is the executive who just simply applies numbers without understanding what they mean or what is included in them. Secondly, people use results achieved for short time frames and apply them to longer timeframes. Availability or utilisation achieved over one to three good months normally bears no semblance to what is achieved over 12 months. A third problem is people extrapolate rates in a straight line up from smaller equipment and this is often not correct. There are a range of factors at play as sizes get bigger. For example, a best practice 218 tonne truck will carry 208 tonnes (95.4%) while a 327 tonne truck will carry 301 tonnes on average (92.0%). Another example is draglines. An M8050 with 50 CuM bucket will carry 107.5 tonnes of payload (2.15 t/CuM) on average and an M8750 with 100 CuM bucket will carry 200 tonnes at best (2.00 t/CuM). Add to this the fact that bigger equipment operates for less hours and you will understand why you can't just extrapolate up. A fourth mistake which people make is to apply results from one manufacturer and say that the same equipment from another manufacturer will be the same. It isn't. As an example the difference in actual annual output between different manufacturers' hydraulic excavators in 2008 with 22 CuM buckets was up to 31%. (Oh by the way, which one did you buy?)

At the end of the day we are interested in what the equipment will move in a defined time. The defined time will depend on the level of accuracy required of the plan. If it is a really short term plan (next shift or day) we might use the dig rate, (what is moved per operating hour). As the

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



time frame goes up more and more operational factors come into play.

I have a real issue with what some mine planners (company and consultants) are doing. They don't have sufficient data nor knowledge about performance but tell you they do. I simply ask that if they have the information then why are mine plans continually wrong?

OK, some companies don't want the truth but some do. They will continue to get away with producing poor plans until we as an industry plus shareholders and stock exchanges hold them accountable; now, 3 years, 5 years, etc into the future.

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