



Productivity prediction – fact or fantasy 2 ?
10 September 2009

It is no wonder our mines struggle with efficiency. Whose fault is it that equipment routinely falls short of predicted performance? It is no wonder mine schedules are often not worth the paper they are written on.

Last column I introduced a spreadsheet provided by a supplier with a prediction of performance of a 62.7 CuM shovel. Is it really the supplier's job to tell you how well the particular piece of equipment will perform on your minesite? Well..... yes and no. You would expect them to know how it performs on other sites and this would be valuable input for you to use and relate to your own minesite idiosyncrasies. Right or wrong they simply do not know how their equipment performs (and the fact that we do know is a major threat to them). As I said last week, in a perfect world our suppliers would take an interest in after-sales performance but over the last ten years most haven't. So long as it is running it is doing OK.

The productivity forecast by the shovel OEM was sent to the mine presumably for planning purposes and I wanted to run through this to show why mines routinely miss production targets. Last week I looked at the truck capacity and the dipper payloads. This week I want to look at hours and overall productivity.

The annual hours is an area where you would expect the supplier to have a good idea on performance and I suspect they do. The problem is that in many cases the hours worked are so low the supplier is never going to tell the truth. You see, if there are two suppliers in a tender for a loading tool and one decides to be honest and tell the mine what they really know then they will probably lose the tender. This is a simple fact. Most mines don't check information supplied by OEM's and just simply believe the lies and or guesses. The end result is that the mine receives two sets of fictitious performance predictions. Mines only have themselves to blame for this situation. The data exists and there are people around who do know how to analyse it.

Average work hours around the world for the particular model shovel are 4,599 per annum. The OEM predicted 5,098 (Op hrs * Job Efficiency * Truck Presentation). They either don't know (which makes them incompetent) or they are providing numbers they know are wrong.

500 hours in a year is a lot. I will look into the reasons why these

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hours are so low in a future article.

Given the poor performance the supplier is predicting for payload (although given what is happening elsewhere with truck loads being well below the nominated capacity, the average may need to be lower still) and the high hours (relative to other shovels) the end result of 21.8 MBCM places this shovel in the 83rd percentile of performance for this make and model normalised to 62.7 CuM. Now this is fine and I am sure the mine would love to use this number in their mine planning but if they plan for it and don't get it the repercussions may be significant. I understand that the OEM has not provided a guarantee but the mine really needs to know (with some degree of authority) whether the OEM thinks this shovel, working at the particular mine, loading the nominated trucks can perform consistently in the 83rd percentile.

Following on from this I revisited another OEM's calculations for a dragline bucket's performance this week and saw a much more professional approach to giving the mine something to work with. In this case the supplier had been given copious data by the mine. However, the supplier's understanding of minesite operational issues and a specific data issue still resulted in them arriving at the wrong answer for recommended bucket capacity. Now this doesn't seem too bad, except if the mine accepted the recommendation they would have purchased a bucket which was more than 10% too big for the machine.

I can't believe how difficult OEM's are making this for the mines!!! In this case we had told the supplier that the payloads from the monitor were flawed!! This is the main reason why we are encouraging mines to not just give their data out to anyone. You need someone who knows the data and the issues with it. You really want to come up with the right answers. We encourage mines to tell the suppliers to contract an independent third party to do the analysis. At least then the mine can have confidence in it.

Next week I am going to expand further on the issue about mine plans being wrong due to not using real data as their inputs.

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PRODUCTION ESTIMATES

DESCRIPTION	UNIT	System 1
Loading Unit		
Material Type		Overburden Waste
Truck Type	model	
Truck Nominal Payload	tonnes	327
	(US tons)	300
Tipper Volumes		
Tipper Capacity (Otruck)	bcm	62.7
Tipper Capacity (Heaped)	bcm	60.8
Material Characteristics		
Ave Bank Density	t / bcm	2.15
Ave Swell Factor		1.20
Ave Broken (loose) Density	t / bcm	1.79
In Tipper Compaction		1.00
Fill Factor		0.97
Shovel Parameters		
Tipper Load per Pass	bcm	60.82
	bcm	50.60
	tonnes	108.97
Tipper tare	tonnes	01.00
Shovel RSL	tonnes	190.50
Shovel Overload Condition	% of RSL	99.7
Truck Parameters		
Nominal Truck Capacity	tonnes	326.50
	bcm	162.20
No. of Passes (to fill nom trk to 100%)	passes	3.00
Even integer Passes		3
Actual Truck Payload	tonnes	327
	bcm	152.0
	bcm	182.5
Truck Overload Condition	% of RSL	100.1
Cycle Times		
Loading Technique		Double - side
Swing Angle	degrees	70
Time / Pass	sec	36
Sput Time	sec	20
Total Load Time (with sput)	sec	128
Truck Payloads		
Actual Truck Payload	tonnes	327
	bcm	152.0
	bcm	182.5
Max. Trucks / Hour		28
Ave Truck Cycle Time	mins	15.0
No of trucks req'd operating in fleet		7
Production		
Theoretical Potential Production	tonnes / hr	0,104
	bcm / hr	4,276
	bcm / hr	5,132
Job Efficiency - estimated	%	90.0%
Truck Proportion Factor	at shovel	95%
Actual Average Production	t / hr	7,034
	bcm / hr	3,271
	bcm / hr	3,926
Productivity		
Annual Scheduled Working Hours	Hr	8,712
Machine Availability - average	%	90.0%
Shovel available hours	Hr	7841
Utilisation - estimated	%	85.0%
Shovel Op Hrs	Hr	6,665
Annual Production		
Total Production	Million Tonnes	46.88
	Million bcm	21.80

