MEC MINING

DOZER PUSH

CAPABILITY STATEMENT

Mining consultancy | Mine planning | Onsite management | Technical services solutions

WE ARE MEC MINING

MEC Mining is a global mining consultancy specialising in mine planning, onsite management and technical services solutions for the international mining industry.

Since 2005, MEC has grown into a leading consultancy firm with an experienced team of consultants; specialising in both the open cut and underground coal and minerals sectors.

Through our teams' real-world experience, our engineers have an owner's point of view when executing a project.

We deliver high-quality work that enhances the value of our clients' assets and our experienced team of consultants bring a diverse range of knowledge to each project.

Importantly, we offer a flexible approach to all services and will gladly tailor our services to meet individual project or company requirements.

OPEN CUT COAL CONSULTING SERVICES

- Studies - conceptual, pre-feasibility and bankable feasibility
- JORC Resource and Reserve reporting
- Scheduling model builds
- Life of mine planning, long term planning, optimisation, design and scheduling
- Cost modelling and project optimisation
- Due diligence
- Tender/contract management

ONSITE OPERATIONAL SUPPORT

- Lead productivity improvement
- Projects and leadership training
- Technical service teams for full project support
- Operational design, planning and scheduling
- Operational review, cost modelling and operational improvement
- Training and mentoring of on-site personnel and systems development and review
- Short to medium term design, planning and scheduling solutions.
- Relief role coverage for Mining Engineers, Senior Mining Engineers and management positions such as Technical Services Superintendent and Operational Readiness Project Managers

METHODOLOGIES

Our team of established consultants and experienced in the following commodities across a range of mineralisation styles:

- Conventional open cut
- Strip mining
- Terrace mining
- Dragline
- Dozer Push
- Truck Shovel
- In-Pit systems (ie In Pit Crusher Conveyor)

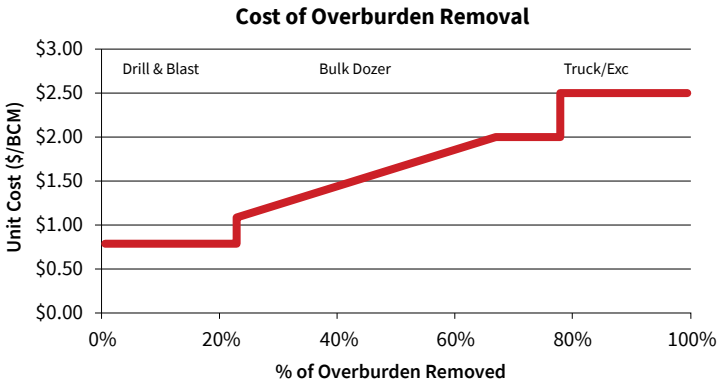
SOFTWARE

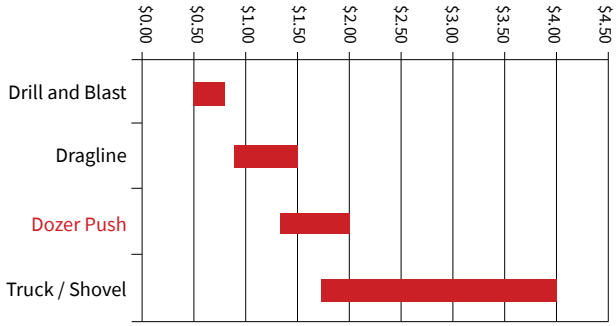
Our team members hold experience with a range of mining software packages including:

- Deswik
- XERAS
- XPAC/XACT
- Vulcan
- Minescape
- Minex
- ArcGIS
- DataVis
- Surpac
- Minesight
- AutoCAD

COST OF DOZER PUSH

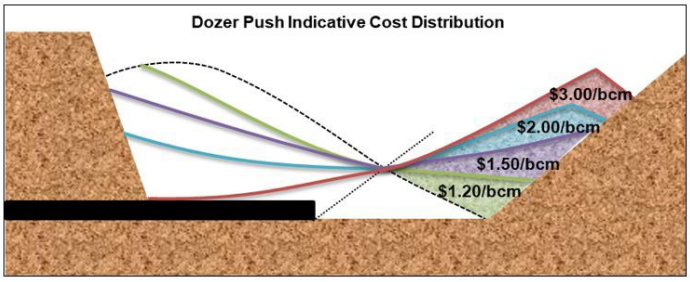
- Studies - conceptual, pre-feasibility and bankable feasibility
- Life of mine planning, long term planning, optimisation, design and scheduling
- JORC Resource and Reserve reporting
- Cost modelling and project optimisation
- Due diligence
- Tender/contract management
- Scheduling model builds

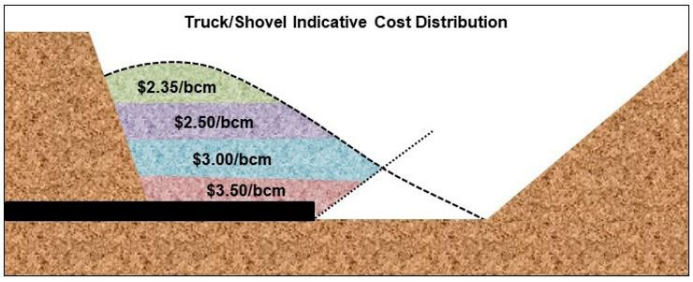




UNDERSTANDING THE COST OF DRIVERS

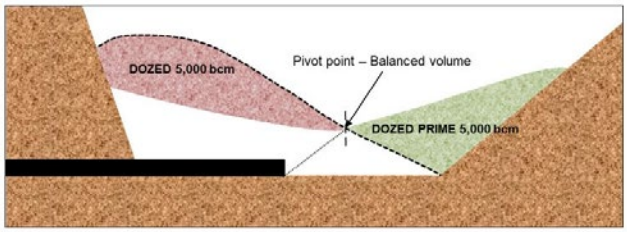
- **Dozer Push**
  - **Push Distance** – Dozers are more cost-effective over shorter push distances
  - **Push grade** – Downhill push uses gravity assist, uphill push reduces carry capacity
  - **Material** – material swell is variable throughout the blast profile
- **Truck/Shovel**
  - **Haul distance –** Increased fuel consumption, increased number of trucks required to maintain excavator productivity
  - **Elevation –** Increased fuel consumption, wear and tear on the truck, reduced travel speed productivity

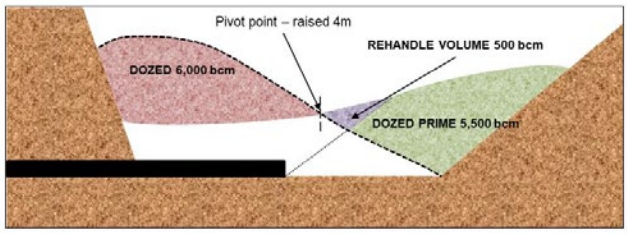




OPTIMISING THE PIVOT POINT

- The point where the blast profile intersects the final lowwall.
- Dozers aim to cut on highwall side of the pivot point and fill on the lowwall side.
- Dozing below the pivot point means additional handling of dozer material and less spoil room for bulk doze.
- Raising the pivot point increases the spoil room available for bulk dozer push but introduces dozer rehandle.
- Even with the inclusion of the rehandled dozer material, increasing the volume of prime dozer to reduce truck and shovel movement may be the most cost-effective solution.





Cost Impact of Raising Pivot Point									
Prime Volume (bcm)	600,954								
	Quantities					Costs			
Description	Push Distance (m)	Blast Prime to Final (bcm)	Dozer Push Prime (bcm)	Dozer Rehandle (bcm)	Truck/Shovel Prime (bcm)	Blast Prime ($)	Dozer Push ($)	Truck/Shovel ($)	Total Cost ($)
Pivot point at intersection	65	114,181	153,244	0	333,529	$ -	$177,529	$800,470	$977,999
Pivot point 1m above intersection	70	114,181	166,928	465	319,844	$ -	$205,109	$768,743	$973,852
Pivot point 2m above intersection	74	114,181	181,530	1,863	305,243	$ -	$235,850	$737,052	$972,903
Pivot point 3m above intersection	79	114,181	197,046	4,191	289,726	$ -	$269,962	$705,402	$975,365
Pivot point 4m above intersection	83	114,181	213,480	7,525	273,293	$ -	$307,641	$673,964	$981,604
Pivot point 5m above intersection	88	114,181	230,827	11,642	255,945	$ -	$349,047	$642,210	$991,257
Pivot point 6m above intersection	92	114,181	249,092	16,765	237,681	$ -	$394,402	$610,670	$1,005,073
Pivot point 7m above intersection	97	114,181	268,271	22,820	218,501	$ -	$443,932	$579,171	$1,023,103
Pivot point 8m above intersection	101	114,181	288,368	29,806	198,405	$ -	$497,789	$547,706	$1,045,495
Pivot point 9m above intersection	106	114,181	309,378	37,722	177,394	$ -	$556,185	$516,280	$1,072,464
Pivot point 10m above intersection	110	114,181	331,306	46,571	155,467	$ -	$619,296	$484,891	$1,104,187

OPTIMISING THE MATERIAL ALLOCATION

- Under the right operational conditions, it would be more cost-effective to reallocate a higher percentage of prime material to be moved by dozer push rather than truck and shovel excavation.

		← More Diggers / Less Doze			Same Diggers / More Doze →	
		10% Less Doze	5% Less Doze	Base Case	5% More Doze	10% More Doze
Product Coal	tonnes	2,000,000	2,000,000	2,000,000	2,250,000	2,500,000
Total Prime Waste	bcm	28,571,429	28,571,429	28,571,429	32,142,857	35,714,286
Dozer %	% prime	25%	30%	35%	40%	45%
Truck/Excavate %	% prime	50%	45%	40%	35%	30%
Dozer Cost	$/bcm	$1.50	$1.65	$1.80	$2.05	$2.50
Truck/Excavate Costs	$/bcm	$3.50	$3.50	$3.50	$3.50	$3.50
Mining Cost per ROM tonne	**$/ROM tonne**	**$44.64**	**$43.86**	**$43.29**	**$43.50**	**$45.36**
Variable Product Costs	$/prod tonne	$24.07	$24.07	$24.07	$24.07	$24.07
Total Fixed Costs	$/prod tonne	$14.50	$14.50	$14.50	$13.39	$12.05
Total FOB Cost per Prod Tonne		**$83.21**	**$82.43**	**$81.86**	**$80.96**	**$81.48**