

Appendix 1: HLP model versus Cadsmine results: BRPM 2003

HALF LEVEL PLANNING RESULTS VERSUS CADS MINE RESULTS: BRPM 2003				
Level	North Shaft 2003 (monthly m ²)		South Shaft 2003 (monthly m ²)	
	HLP Plan	Cads Mine Plan	HLP Plan	Cads Mine Plan
1	2665	2111	5646	5170
2	3036	3383	4168	3616
3	3364	3758	6645	6206
4	4784	4125	4067	3891
5			5124	6035
Total	13849	13377	25650	24918
Variance	HLP vs Cads mine		HLP vs Cads mine	
		3.5%		2.9%

Appendix 2: Mining optimisation phase 2: Rediscovery – group blast efficiency summary

Findings - Current Situation



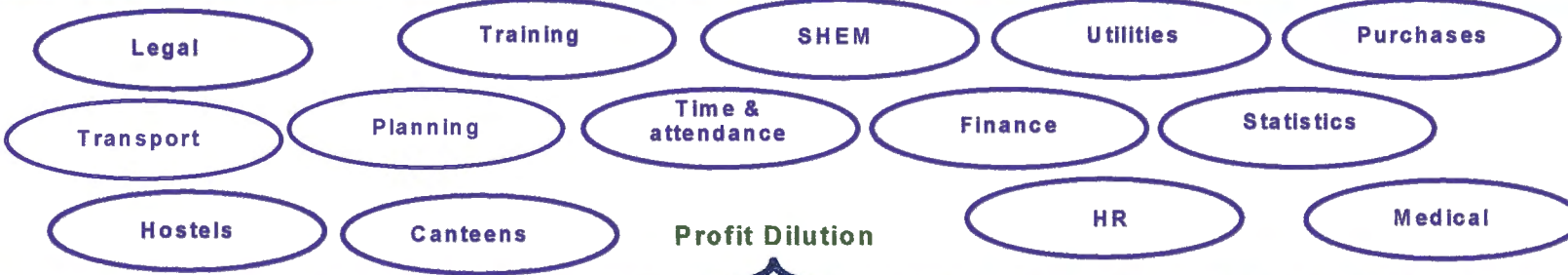
	Face Advance/Blast		Blasts Lost/Panel/Month		Blasting Efficiency
	Meters Advance/Blast	Efficiency	Number	Efficiency	%
Amandelbult	0,99	76%	3,73	84%	64%
Union	0,95	78%	5,93	74%	58%
Rustenburg	0,79	75%	4,87	79%	59%
Lebowa	0,73	63%	3,9	83%	61%
Group Blast Efficiency					60%

Appendix 3: Mining optimisation Phase 2: Rediscovery – blast cycle and functions

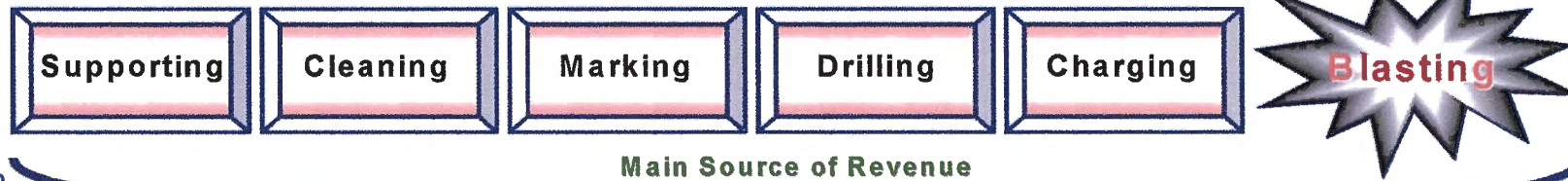
Purpose and Scope - The Phase II Re-discovery was thus introduced to identify and quantify further productivity and profit potential underground



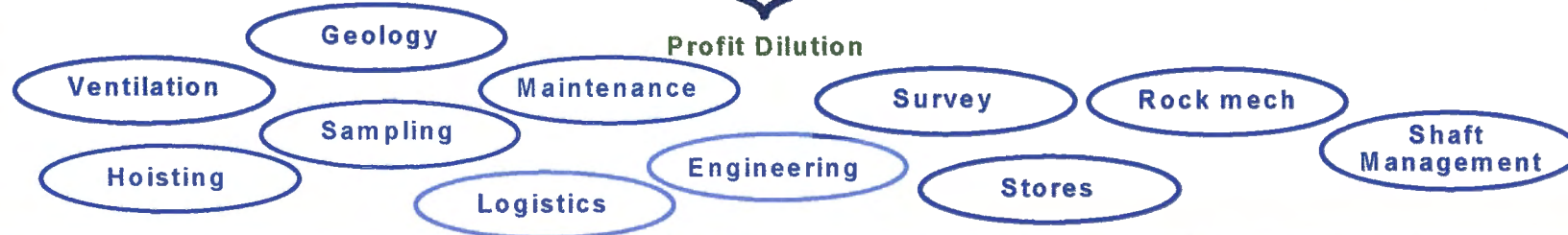
Service Functions



Focus Area - Blast Cycle



Support Functions



Appendix 4: Typical equipment requirement summary – breast at BRPM

North Shaft Breast Layout	1/2 Level Requirements@55% (3000ca/month)				Total 1/2 levels required (6 half levels)				Units required	Current units	Var.	Req.	Unit cost	Total cost
	164m	190m	212m	226m	164	190	212	226						
Backlength	164m	190m	212m	226m	164	190	212	226						
Total losses	30%	30%	30%	30%	30%	30%	30%	30%						
Item														
75hp Winches	27	29	29	29	3	1	1	1	168	185	17		R 65,000	R 0
50hp Winches	18	18	18	18	3	1	1	1	108	24	-67		R 52,000	R 3,484,000
5ton loco	0	0	0	0	3	1	1	1	0	3	3		R 0	R 0
10ton loco	2	2	2	2	3	1	1	1	12	16	4		R 0	R 0
10ton transfer loco														
5ton charger	0	0	0	0	3	1	1	1	0	4	4		R 0	R 0
10ton charger	2	2	2	2	3	1	1	1	12	18	6		R 0	R 0
10ton trans. charger														
Hoppers	20	20	20	20	3	1	1	1	120	130	10		R 24,000	R 0
10ton trans. hoppers														
5ton batteries	0	0	0	0	3	1	1	1	1	8	7		R 0	R 0
10ton batteries	4	4	4	4	3	1	1	1	24	27	3		R 0	R 0
10ton transfer bat.									0		0			
Loader	2	2	2	2	3	1	1	1	12	12	0		R 200,000	R 0
Timber cars	9	9	9	9	3	1	1	1	54	40	-14		R 8,100	R 113,400
Flat cars	2	2	2	2	3	1	1	1	12	11	-1		R 5,300	R 5,300
Ballast cars(cattle)	6	6	6	6	3	1	1	1	36	0	-36		R 8,100	R 291,600
Material cars	2	2	2	2	3	1	1	1	12	32	20		R 9,000	R 0
Sling bogeys	1	1	1	1	3	1	1	1	6	10	4		R 11,300	R 0
Explosive cars	4	4	4	4	3	1	1	1	24	31	7		R 10,500	R 0
Fuse cars	1	1	1	1	3	1	1	1	6	11	5		R 10,500	R 0
									0		0			
									0		0			
No new winches included														R 3,894,300

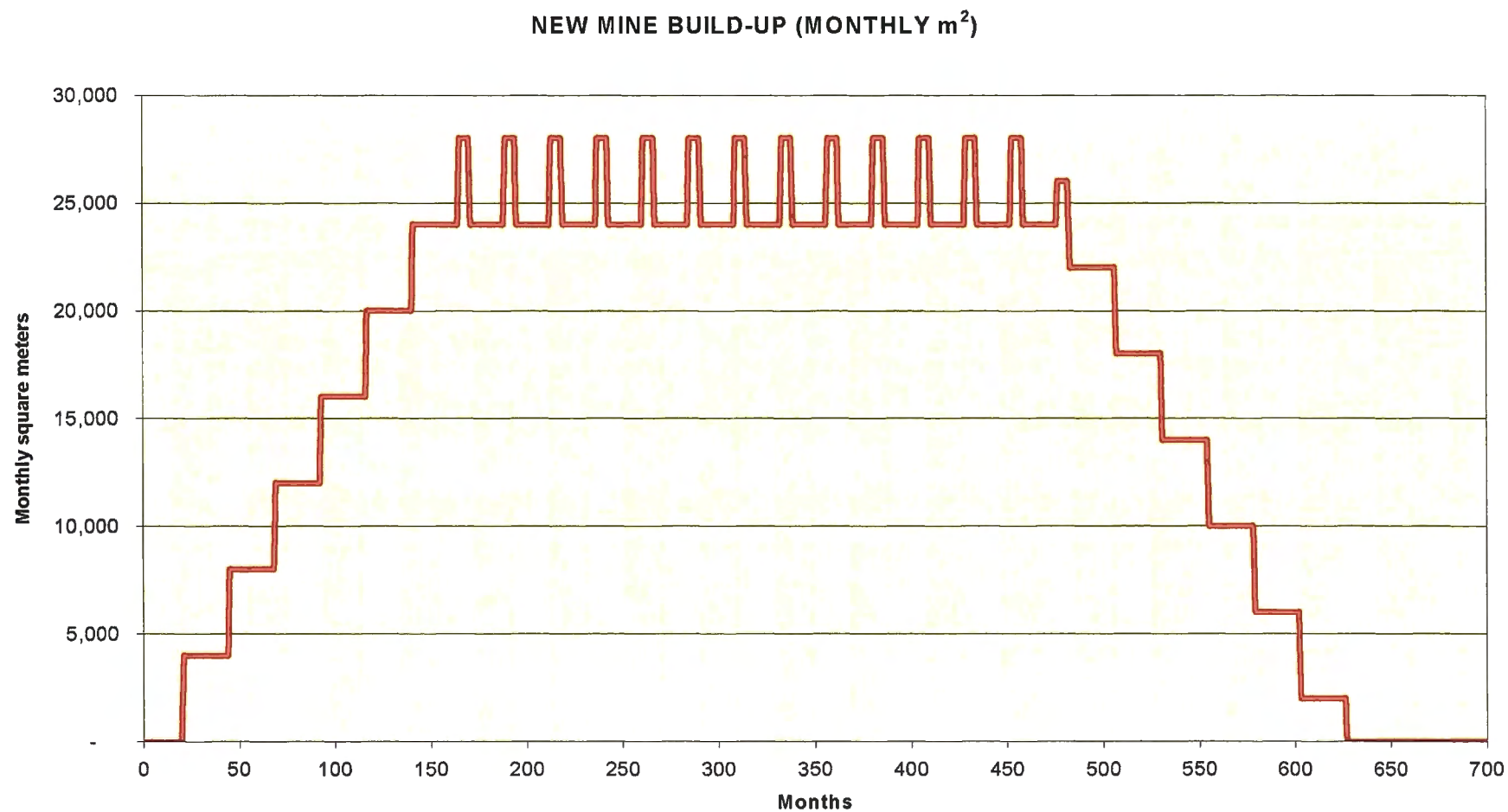
Appendix 5: Typical layout comparison summary – breast versus up-dip

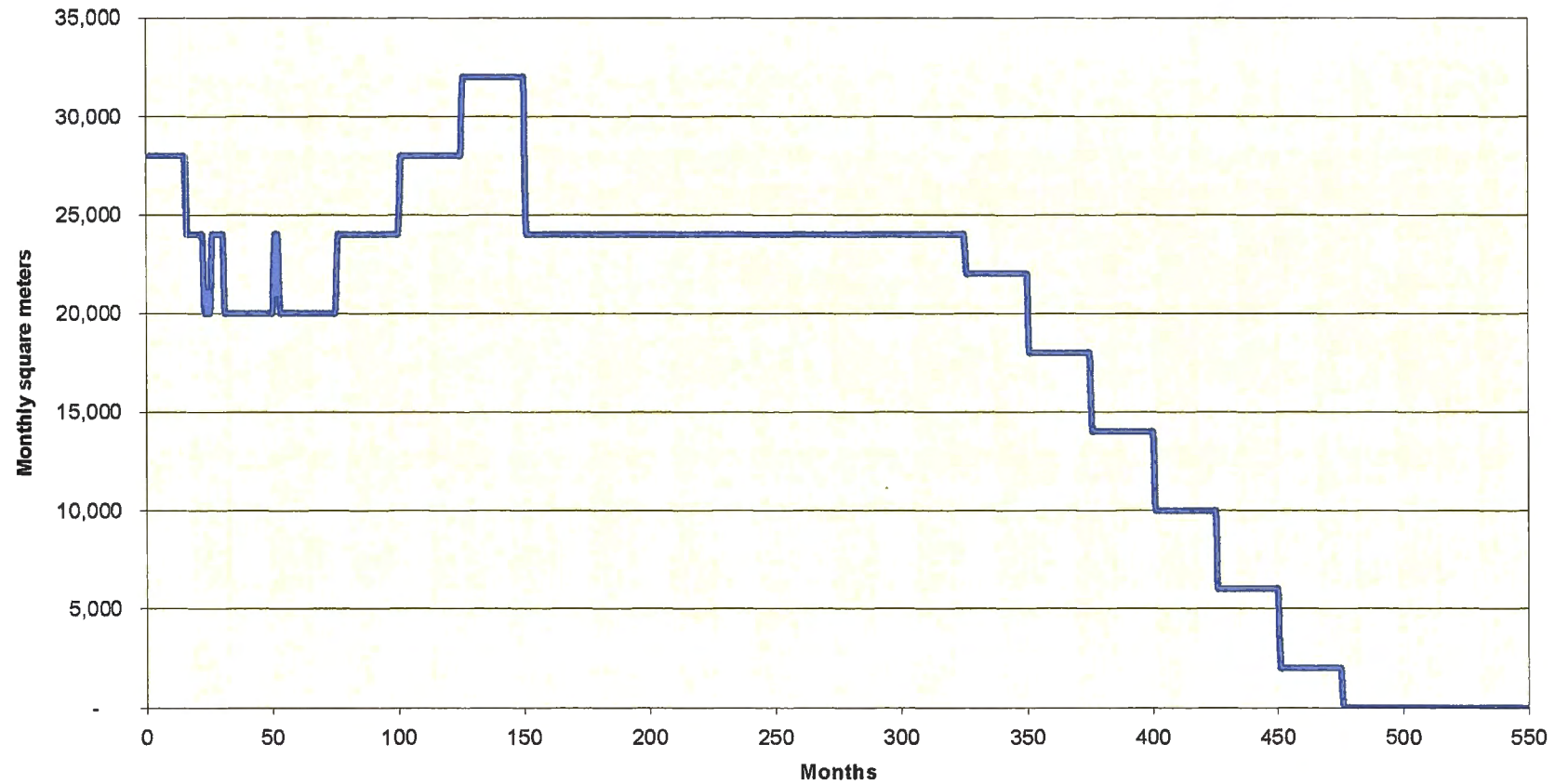
	10 half levels @ 3000ca each		Breast		Updip	
	Half levels	Backlength	Max ca.	Max dev.	Max ca.	Max dev.
	4	164m	3524	88	2631	115
	2	190m	3572	80	3048	115
	1	212m	3986	83	3401	115
	3	255m	4786	88	4091	115
Totals	10		39584	859	32294	1150
Budget			29445		29445	
Variance			10139		2849	

Eq. panels required/halflevel	9	10
Eq. panels available/halflevel	10+	8
Current half levels available	10	

Appendix 6: HLP model – monthly variance summary per end/area

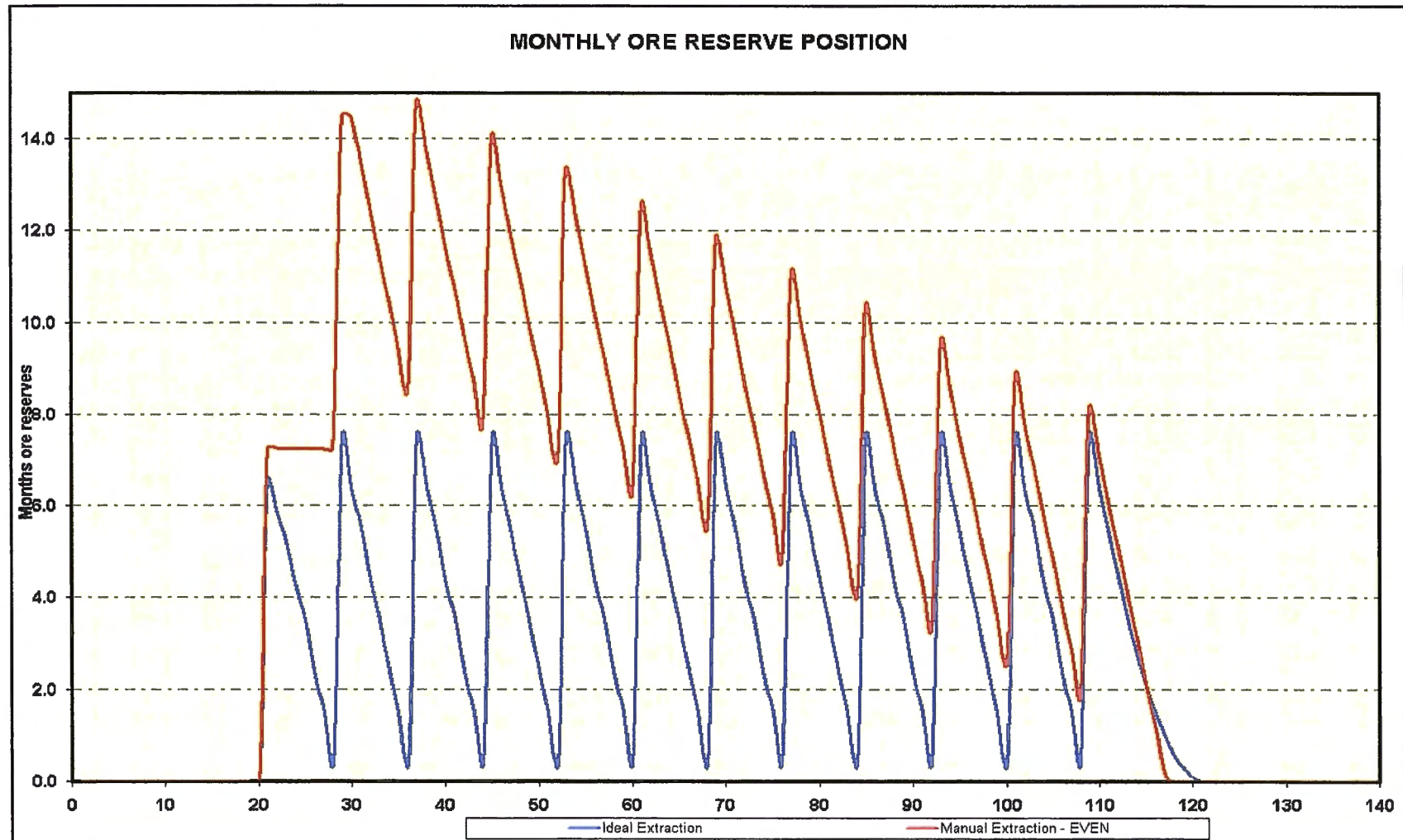
DEVELOPMENT	TOTAL HALF LEVEL	IDEAL	ACTUAL	VAR %	VAR
Haulage	1,608	670	402	-40%	-268
X/cut	432	180	108	-40%	-72
Timber Bay	120	50	30	-40%	-20
Travelling way	432	174	108	-38%	-66
S/over	60	20	15	-25%	-5
Box 1	300	125	75	-40%	-50
Box 2	300	125	75	-40%	-50
Box 3	300	125	75	-40%	-50
Box 4	300	100	75	-25%	-25
SPD Btm	1,608	536	402	-25%	-134
		-			
Raise 1	2,040	680	510	-25%	-170
Raise 2	2,040	661	510	-23%	-151
Raise 3	2,040	601	510	-15%	-91
Raise 4	2,040	540	510	-6%	-30
Explosives cubby	120	50	30	-40%	-20
Sub station cubby	84	35	21	-40%	-14
		-			
		-			
sub development	360	150	90	-40%	-60
STOPING + LEDGING	217,813	44,467		-100%	44,467
Current EXTRACTION factor m ² /m	15.36	9.22	0.00	-100%	

Appendix 7: Ideal shaft ore extraction profile – new mine (ongoing capital replacement)

Appendix 8: Typical shaft ore extraction profile – existing mine (ongoing capital replacement)**EXISTING MINE BUILD-UP (MONTHLY m²)**

Appendix 9: Up-dip ore reserve profile

(The blue line is ideal and the red line represents a manual delay with an increased extraction rate thereafter)

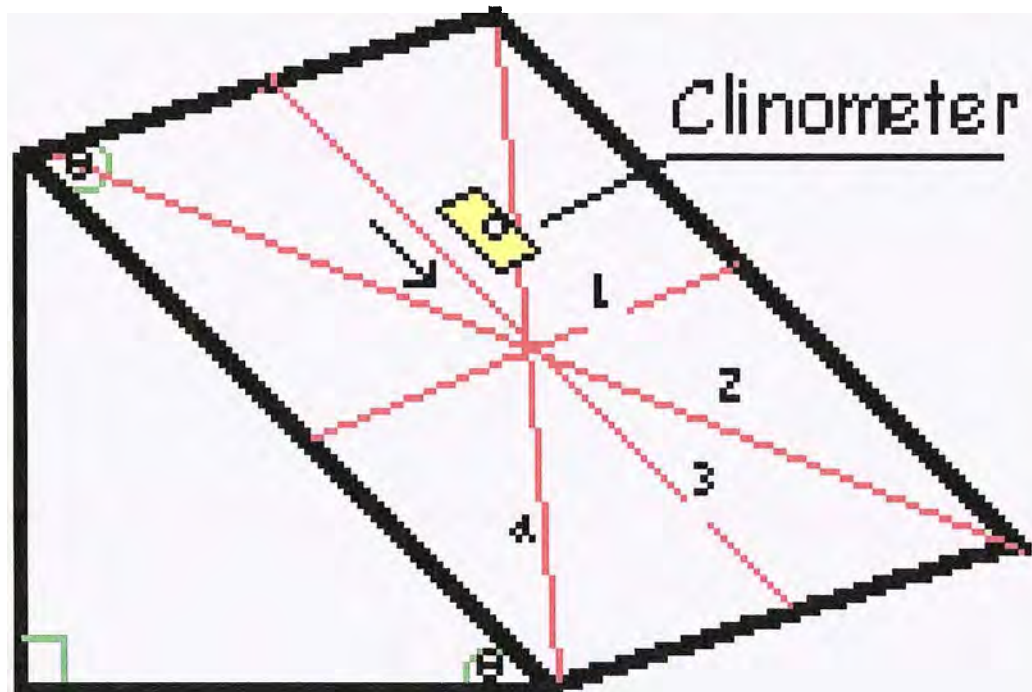


Appendix 10: Common block of the Tonnage factory layout

Development end name	Length (m)	Width (m)	Height (m)	Max possible adv/blast	Max adv/month
MAIN BELT	220	6.5	3	5	115
BOTTOM DRIVE	220	4.5	3	5	115
TOPDRIVE	220	4.5	3	5	115
BELT TO TOP CONNECTION 1	5	5	3	3	69
BELT TO TOP CONNECTION 2	5	5	3	3	69
RAISE	300	4	3	5	115
BELT TO BOTTOM CONNECTION 1	5	5	3	3	69
BELT TO BOTTOM CONNECTION 2	5	5	3	3	69
DIP T/WAY 1	300	2	1.2	10	230
DIP T/WAY 2	300	2	1.2	10	230
STEP OVER					
Explosives cubby - length = sum of total					
Sub station cubby - length = sum of total	4	3.2	3	2	46
Sub Development - all ends in block	50	1.5	2.4	2	46
Block dimensions	Width (m)	BACK Length (m)	Height (m)	Area (m ²) pre-losses	Area (m ²) available
	220	323	0.8	71060	55711
Average stoping panel	Length (m)	Width (m)	Height (m)	Max possible adv/blast	Max adv/month
	40	(N/A)	0.9	1.2	27.6

Appendix 11: The Tonnage factory layout compared to a normal breast layout

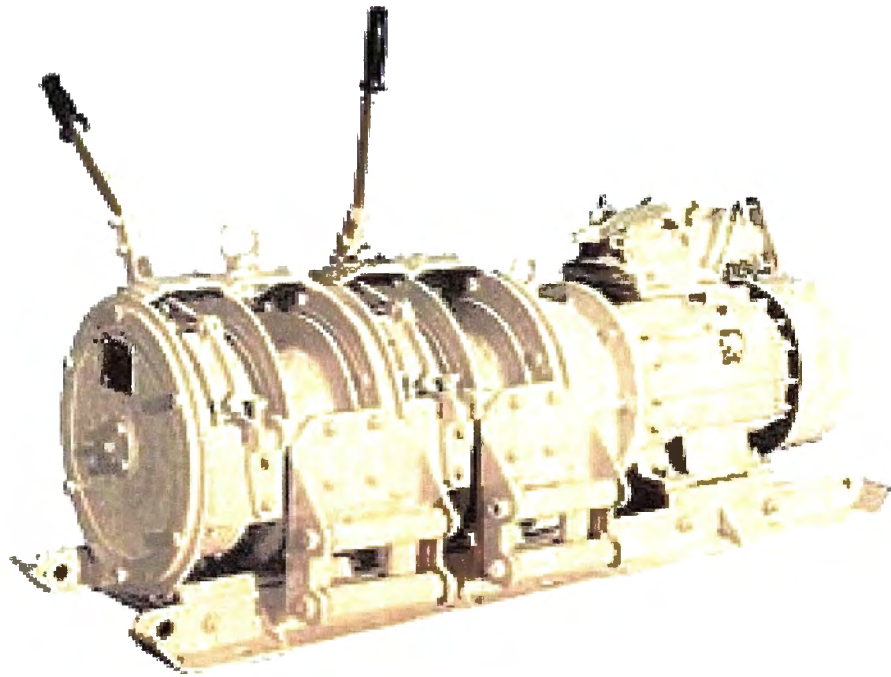
Steady State Summary		
Project name:	BASE	Tonnage Factory
Base description:	Scattered breast - 200m x 200m block	
Common block area post losses (m ²)	28,800	55,711
Primary development (m / month)	149	545
Primary development (m / shift)	6	24
Stoping (m ² / month)	4114	18570
Stoping (m ² / shift)	179	807
Monthly revenue ('R)	R 7,799,574	R 34,006,936
Monthly tons to REEF	18,339	81,641
Monthly tons to WASTE	1,725	-
Insitu grade (4e g/t)	5.46 g/t 4e	5.46 g/t 4e
Head grade (4e g/t)	4.25 g/t 4e	4.17 g/t 4e
Dilution %	22%	24%
Reef width (m)	0.8	0.8
Months to steady state condition	34	24
Primary development to steady state	3796	12541
Total primary development per common block (m)	1043	1634
Total half level primary development (m)	13559	32680
Total half level stoping (m ²)	374400	1114221
Maximum ore reserve (m ²) at steady state point	104818	427581
Replacement Factor (m ² /m)	28	34
Geological losses (%)	25%	20%
Other Losses (%)	4%	2%
Total Losses (%)	28%	22%
STOPING		
Blast frequency %	84%	80%
Advance efficiency %	83%	80%
Blast efficiency %	70%	64%
Face length (m)	30	40
Monthly square meters per panel (m ²)	480	707
Stoping width (m)	1.00	0.90
Panel advance per month (m)	16.00	17.66
DEVELOPMENT		
Blast frequency %	84%	90%
Advance efficiency %	83%	80%
Blast efficiency %	70%	72%

Appendix 12: Dip and strike of a plane⁴¹

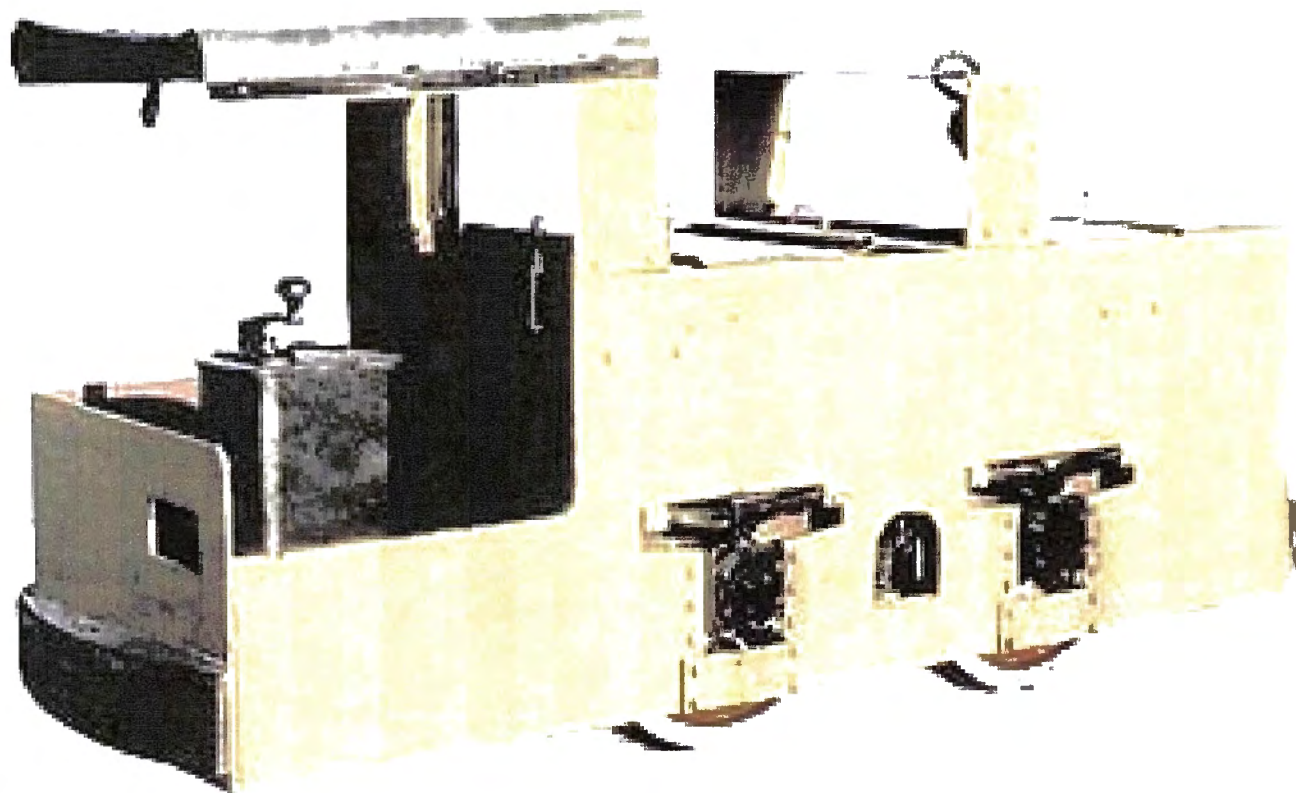
θ Is the dip angle



Appendix 13: Mining equipment: Winch⁴²



Appendix 14: Mining equipment: Locomotive ⁴²



Appendix 15: Shaft capacity with half level approach

