



METHODOLOGY APPLICATION

APPLICATION NO: VM001

APPLICATION TITLE: Reduce Operational Cost

INDUSTRY: Gold Mining

VALUE METHODOLOGY APPLIED: Value Management

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INTRODUCTION

The Value Methodology was applied to turn around a Gold Mine in South Africa with the main purpose of reducing operational costs without sacrificing the safety, sustainability and employees rights.

In an example of good leadership the first step was to determine why such an intervention was necessary.

What would be the reason for such a change?

The answer was explained by the General Manager of the Mine:

The current operational costs are too high and will continuously increase. It is necessary to create a new way of doing things where we manage the mine together with our employees and optimise operational costs, improve efficiencies and extend the mines life to ensure sustainability for many years to come. This will have an implication on how we operate our business and we are aware that we have to come up with a new way of thinking. To achieve this we need to involve management and our employees, ensuring that our people do know where we waste money and where our in-efficiency is.

PROCESS EXPLAINED

The initial change process took place within a facilitated workshop environment with the Management Team (MANCO - horizontal representation of organisational structure), where the Vision and Mission of the company was reviewed and confirmed.

After that the Purpose Statement of the Turn Around initiative was created.

It must be noted that the whole management team had the opportunity to be exposed to the principles of Value Management, therefore understanding the process and the benefits associated with it.

To establish clear strategies to reduce operational costs by 15% by (a given date), without compromising sustainability of the mine.



The major strategies identified were:

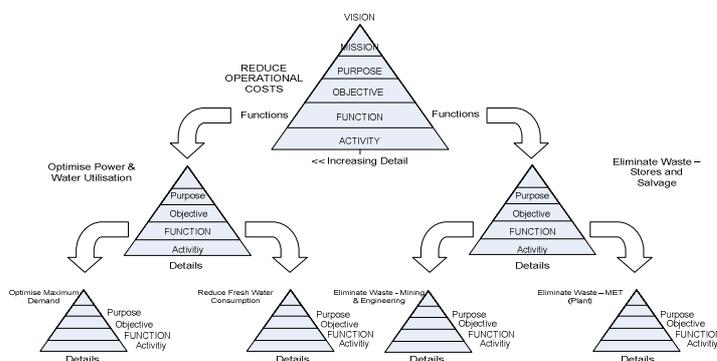
01.)	Ensure correct Ore Resource Management
02.)	Optimise Power & Water Utilisation
03.)	Eliminate Waste – Stores and Salvage
04.)	Align Labour Costs (Bonus & Overtime)
05.)	Eliminate Shrinkage, Theft and Fraud
06.)	Introduce Value Adding Blasting
07.)	Ensure Quality Health Services
08.)	Manage Contractors & Service Agreements
09.)	Reduce Equipment Abuse
10.)	Resolve Grading Inconsistency of Panel Crew
11.)	Ensure Optimum Grind

Cascading Strategies:

It was also agreed that each of the strategies established will be “cascaded” into the organisation, responsibility would be allocated to a MANCO member to manage detailed investigations and workshops with representation from the relevant stakeholders (vertical representation of organisational structure).

Since the strategy included the empowerment aspect of employees all the consequential workshop activities included the implementation of Value Management Principles with the objective of creating an environment of continuous improvement initiated by all employees.

Find below an example of how some of the major strategies were cascaded down into more detailed activities utilising the same process principles applied in the initial VM workshop: From Reduce Operational Costs to Optimise Power & Water Utilisation to Optimise Maximum Demand and Reduce Fresh Water Consumption etc.





Another way to show the systematic approach of addressing all the requirements is shown below.



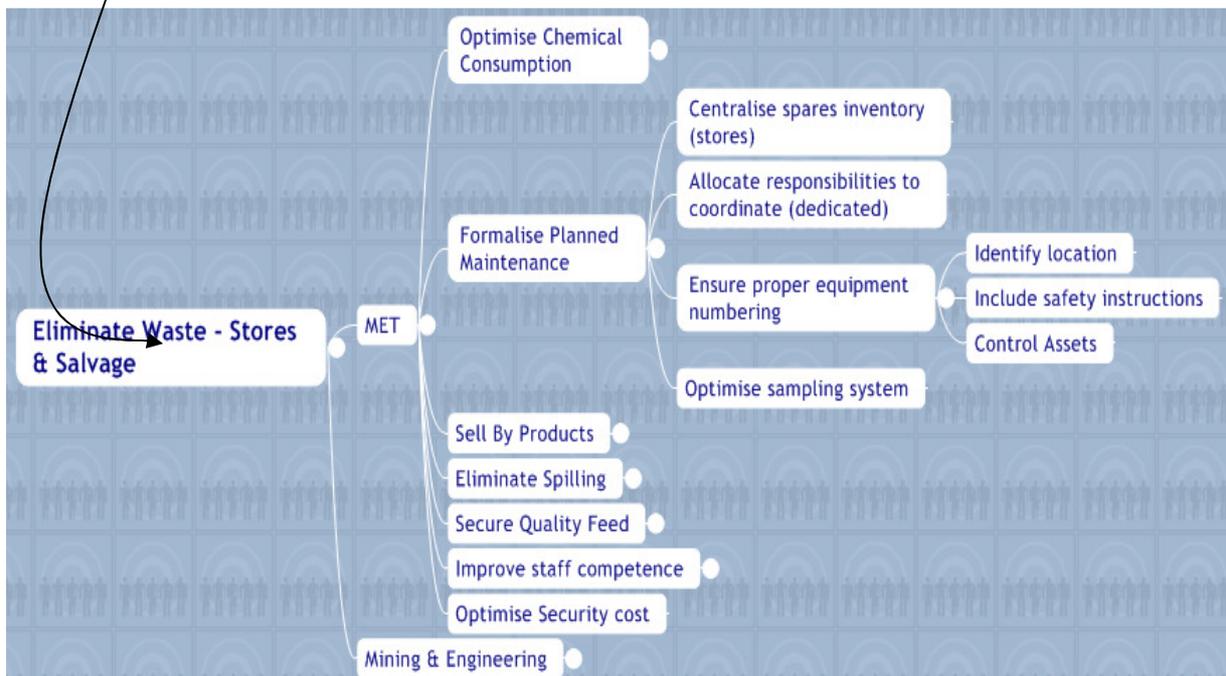
THE EXAMPLE SHOWS THE “ELIMINATE WASTE – STORES & SALVAGE” STREAM OF INVESTIGATION

The stream was divided into MET and Mining & Engineering.

The example shows the cascading of MET to “Formalise Planned Maintenance” to “Ensure Proper Equipment Numbering” to the details of “Identify Location”, “Include Safety Instruction” and “Control Assets”.

Each area was managed by a senior person of the mine and opportunities identified with the relevant participation of employees and external experts.

Note the definitions of the functional requirements, they are all expressed in verb / noun to clearly state WHAT has to be done.





PROCESS STEPS

Each of the project streams included the basic Value Management principles. To understand the various principles an example with explanation of one of these interventions is shown below:

(VM Output in italic)

As an example we selected one of the functional requirements obtained from the VM study Optimise Power & Water Utilisation.

Establishing a Purpose

This refers to the purpose of the study.

Clearly scope the area of investigation thus ensuring a focused approach when selecting appropriate technology for the project & determine how many days the workshop / study will take.

Reduce power and water cost at XY Mine

Selection of Participants

The next step is to select the correct participants for the workshop. Below are some of the characteristics you may have to consider

- Ideal group size: 8 – 16.
- Those with information
- Those directly affected
- Those who if not involved may later “sabotage”
- The “outsider” an out-of-the-box-thinker
 - Diversity of disciplines will benefit the effort. Remember also – you may not have a choice so don’t judge, just bring them in.



Listing Issues and Concerns

List all the Issues & Concerns applicable to the project.

Include real & perceived Issues & concerns.

- *Leaks in compressed air pipes*
- *Leaks in water pipes*
- *Excessive use of equipment:*
- *Fans (too many)*
- *Pumps (too many)*
- *Pipes (pressure)*
- *Winders (unnecessary trips)*
- *Wrong schedule of pumping hours (peak periods)*
- *Unnecessary stops of mills and unscheduled start ups (peak period)*
- *Lack of knowledge on power / water business*
- *Open valves (lack of control)*
- *Lights burning at night / day*
- *Air conditioners / heaters*

Establishment of a clear Objective

Establish an objective with measurable target and being time bound.

Include "Results to Achieve". "Results to Prevent", Available Resources" & "Constraints"

Environmental complexity of scope is referenced in terms of current risks and available support.

Objective: Reduce current average power cost by 15% and reduce Water cost by 5% (with improvements in operational conditions) before the end of June 200x



Objective Matrix:

<i>RESULTS TO ACHIEVE</i>	<i>RESULTS TO PREVENT</i>
<i>Measure unit consumption</i> <i>Optimise maximum demand</i> <i>Reduce compressed air consumption</i> <i>Rationalise equipment use</i> <i>Reduce water consumption</i> <i>Schedule effective start-up of equipment</i> <i>Educate user on power and water savings</i> <i>Improved power factor</i> <i>Reduce choking of pumps / pipes</i> <i>Reduce smelting cost</i> <i>Revisit 3^d party user</i> <i>Correct cost allocation</i>	<i>Production loss</i> <i>Retrenchment</i> <i>Prevent flooding</i> <i>Closure of mine</i> <i>In-adequate supply of power and water</i>
<i>AVAILABLE RESOURCES</i>	<i>CONSTRAINTS</i>
<i>Maximum demand controllers & equipment</i> <i>(4 #)</i> <i>Mine water (dolomite)</i> <i>Skilled people</i> <i>Other miner (experience) i.e. Western Deep</i> <i>Levels)</i> <i>Environmentalist</i> <i>Planned maintenance</i> <i>Equipment</i>	<i>Capital</i> <i>Time</i> <i>Actual mine plan (resources)</i> <i>Government / legislation</i> <i>Unions</i> <i>Lack of education</i> <i>Lack of motivation</i> <i>Ignorance (power / water cost)</i> <i>RC factor</i>

List the Functional Requirements

The identification of the Functional Requirements to achieve the Objective and priorities are obtained from the "Results to Achieve" in the Objective Matrix.

List all the Functions that need to be addressed in Verb / Noun statements



Evaluate Functional Requirements

Evaluate all functional requirements against each other to define priorities and the cause and effect scenario. The application selected in this project was the Numerical Evaluation

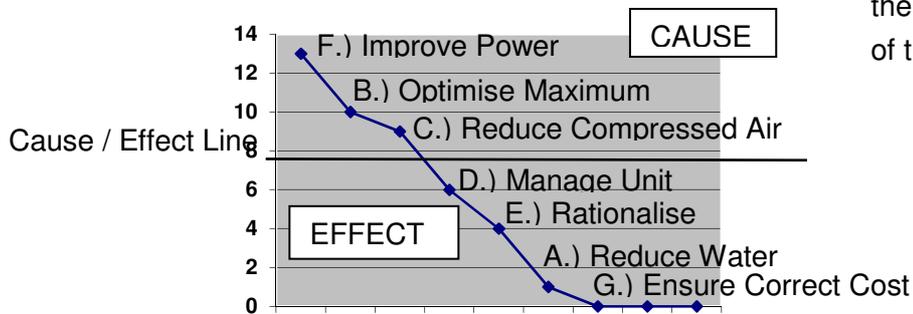
NUMERICAL EVALUATION

<i>Functions</i>							<i>Scr</i>	<i>Rnk</i>	
A	B3	C3	D3	E2	F2	A1	Reduce Rand Water Consumption	1	
	B	B1	B1	B2	F2	B3	Optimise Maximum Demand	10	2
		C	C2	C2	F2	C2	Reduce Compressed Air Consumption	9	3
			D	D1	F2	D2	Manage Unit Consumption	6	
				E	F2	E2	Rationalise Equipment Use	4	
					F	F3	Improve Power Factor	13	1
						G	Ensure Correct Cost Allocation	0	

Cause and Effect Scenario

From the score of the Numerical Evaluation we obtain a ranking reflected in the Cause and Effect Graphs. There is a high level function with a score of 13; followed by a "drop" in the scoring of two (or more) functions with similar scores (10 & 9) we draw a line before the next "drop" of the score occurs.

CAUSE AND EFFECT GRAPH



Address the functions above the line and 80% of the Objective



Listing and Evaluation of Recommendations

The team will then select the highest rated function and “brainstorm” possible alternative ways to accomplish this function and / or present recommendations and / or solutions to perform the functional Requirements.

Thereafter apply a “Star rating” to each recommendation, The 5 * rating indicating an excellent idea, 4 * is good, 3 * is Fair etc.

Finalisation of Action Plan with Responsibilities and Time Frames

Establish an action plan for all high rated recommendations for implementation, feasibility studies etc. (who and when)

FUNCTIONAL REQUIREMENT: IMPROVE POWER FACTOR

Recommendations:	Comments:	When:	Who:
01.) Obtain real power factor on all incoming supply: Utility Supplier Electrical Contractor	Some of the information will be available from XYZ	10/07/200X	HY
02.) Obtain Consultant report for potential savings (evaluate report)		15/08/200X	JP
03.) Finalise proposal / report for MANCO Approval		20/08/200X	KL
04.) Identify reactive power at each shaft / station & prioritise	Obtain assistance from Electrical Engineer and Shaft Boss	15/09/200X	JP

Note that the examples are only snippets of the actual outcome and are there for showing in principles how the process was applied.



CONCLUSION

During a period of 6 months over 200 people participated in over 17 VM workshops / studies, establishing strategies and solutions that reflected in a reduction of more than \$1million (>15%) of initial operating costs per month.

Not one person was retrenched. The Mine's life was extended by allowing for cost effective mining in less profitable sections.

All improvements were implemented by the Mine's Management and its Employees thus ensuring ownership of their actions and pride in their achievements.

At least 100 people obtained training in the VM Methodology instilling a culture of continuous improvements.

Special Note: The General Manager's role in this venture was crucial and had a major impact on the success of this turn around intervention.

None of the above would have happened without mature management thinking, able to question itself on its current position and future stance.