Vol 4 Issue 4 Jan 2015

ISSN No : 2249-894X

Monthly Multidisciplinary Research Journal

Review Of Research Journal

Welcome to Review Of Research

RNI MAHMUL/2011/38595 **ISSN No.2249-894X**

Review Of Research Journal is a multidisciplinary research journal, published monthly in English, Hindi & Marathi Language. All research papers submitted to the journal will be double - blind peer reviewed referred by members of the editorial Board readers will include investigator in universities, research institutes government and industry with research interest in the general subjects.

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Review Of Research
ISSN:-2249-894X
Impact Factor : 3.1402(UIF)
Vol. 4 | Issue. 4 | Jan. 2015
Available online at www.ror.isrj.org

SUSTAINABLE COST MANAGEMENT THROUGH BEST PRACTICES IN COAL MINING PROJECTS: NEED OF THE ERA

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Abstract:- Mining operations represent an economic activity with plenty of decision problems involving risk and uncertainty. As resources in such a sector are finite, mining project managers frequently face important decisions regarding the best allocation of scarce resources among mining ventures that are characterized by substantial financial risk and uncertainty.

This paper highlights coal mining industry best practice in the following areas of major capital project management for achieving sustainable cost:-

- ❖ Phased Project Planning
- ❖ Project Portfolio Management
- ❖ Frontage Loading
- ❖ Contracting Strategy and Management
- ❖ Incorporating Past Experience

This paper contributes best practices of mining projects to achieve sustainable cost and also describes an effective approach to improve capital productivity, which focuses on rigorously challenging project economics and detailed design solutions during the early stages of a mining project.

Keywords: Coal Mining Projects , economic activity , project management systems .

INTRODUCTION

Strategic management is a set of managerial decisions that determine the long term performance of mining projects. Project is planned set of interrelated tasks to be executed over a fixed period and within certain cost and other limitations. Whereas strategy is all about gaining a position of advantage over adversaries or best exploiting emerging possibilities. The term sustainable cost define as businesses can reduce their operational costs while helping the environment by using products, services and solutions that help reduce carbon emission, and thereby the effect of climate change.

Managers put financial controls into place to track performance and evaluate progress toward the financial

goals of the company. Strategic management is the process of deciding how to arrive at those goals. Managers make decisions in an uncertain environment and develop strategies to approach the uncertainties in a structured way. Once strategic management decisions have determined how the company will proceed, financial controls evaluate how well the company is following the strategic plans and how valid the strategic decisions were in the first place.

Management responsibilities fall into four categories. i.)Managers must develop strategic plans. ii.)They must implement them. iii.)They must track progress and; iv.) They must evaluate the results. If all four aspects of the managerial role are carried out optimally, the controls put in place to evaluate results will show that the strategic plans developed at the beginning were effective. The company will achieve the financial and strategic goals set out by its executives and directors. If the controls show that management did not meet the planned objectives, company directors and executives must make changes to the planning process, change the objectives or change management personnel.

Strategic management falls into the planning category and is the fulfillment of the first two management roles, the development and implementation of strategic plans. Managers draw on their experience, the results of past strategic plans and company operational data to develop models showing how the company will achieve the strategic objectives set by the directors and executives of the company. During this process, the strategic objectives are broken into operational objectives that must be met by individual departments. The strategic plan developed as part of strategic management sets out these objectives in a structured way that can be evaluated.

Financial controls are among the tools that managers use to satisfy the third and fourth aspects of their roles, tracking progress and evaluating results, and they fall into the controlling category. Other controls may show progress in other areas, such as market share or customer satisfaction, but financial controls are the most important for an objective measure of company performance. During strategic planning, management defined measurable objectives for operations. Financial controls report on these objectives and to what extent they have been met. During the reporting period, managers can impose corrective action if necessary and at the end of the reporting period, the results form part of the overall evaluation of the success of the strategic plan.Delivering major capital projects on schedule and to budget is an increasingly difficult challenge for many coal mining companies. In earlier study of global review found that major capital projects in the mining industry successful only 2.5%. When assessed across the four critical dimension of Scope, Cost, Schedule and Business benefits.

As the mining industry emerges from the Global competitiveness, many companies are already outlining plans for moderate to aggressive growth over the short to medium term. While production volumes will need to grow to meet an expected upswing in commodities demand, one of the largest opportunities for shareholder value creation is operating and capital cost reduction.

In this study, we are advocating, coal mining companies should have robust capital project management processes in place and organisation should move further to the forefront of emerging best practice over the past few years as they look to manage larger project portfolios in a time of volatile market conditions.

CURRENT ISSUES ASSOCIATED WITH COAL MINING PROJECTS

The greatest concern on the use of coal as the future source of energy is its negative impact on the environment. Its effect on the environment is based on its recovery method and how it is used. Coal is considered as the economical energy source in the developing country like India and others. Its negative environmental impact is more so when it is burned to release energy. On burning, it releases pollutants that include mercury, sulfur, nitrogen and carbon dioxide. Issues related to its mining include contamination of water, pollution of the air through coal dust and destruction of ecosystem in areas where coal deposits are found. This occurs mostly in surface mining where the covering vegetation is destroyed and the displacement of wildlife and the habitat.

- Need for a Sustainable Development of Coal
- Process of Environmental Impact Assessment of a Project that Impact on Coal
- Role of Government and/or the Private Sector in Managing the Sustainability of This Natural Resource
- Challenges Facing Sustainable Development of Coal
- Strengths of Sustainable Development of Coal
- Flaws of Sustainable Development of Coal

APPROACH FOR ACHIEVING SUSTAINABLE COST

Integrating sustainability into strategic initiatives is especially important because these issues play out over the long term. It's easier for companies where they are core concerns to understand trends and make strategic bets in advance of consumer preference, stakeholder pressure, or government regulation. Achieving sustainable cost management within a mining company is not a goal that can be achieved within one year time prospect. The good cycle of sustainable cost reduction is a process that typically takes several years to embed and requires the day-to-day mentality of all staff to be firmly focused on continuous improvement and cost consciousness. While targeted cost reduction projects can yield substantial results, mining executives need to take immediate actions to move their companies towards the goal of cost-efficient operations as the industry re-emerges from the economic downturn:

- ❖ Establish an environment for cost reduction
- ❖ Agree on cost ownership
- ❖ Challenge the financial plan
- ❖ Look for contract leakage
- ❖ Gauge performance by measuring results
- ❖ Rigorously control spending Stabilize cost controls

In the mining industry, spending capital effectively is a critical lever for improving shareholder returns. While mining projects have the potential to be enormously earnings accretive, the combination of long term planning horizons, volatile commodity markets and significant up-front capital requirements make the risk of substantial shareholder value destruction a distinct possibility. As capital projects mature in their development life cycle, the degree of influence that mining companies have over project costs reduces dramatically, particularly after construction commences. For these reasons it is imperative that the business need and detailed design of mining projects be rigorously challenged early in the project development life cycle, particularly during the concept, pre-feasibility and feasibility project phases.

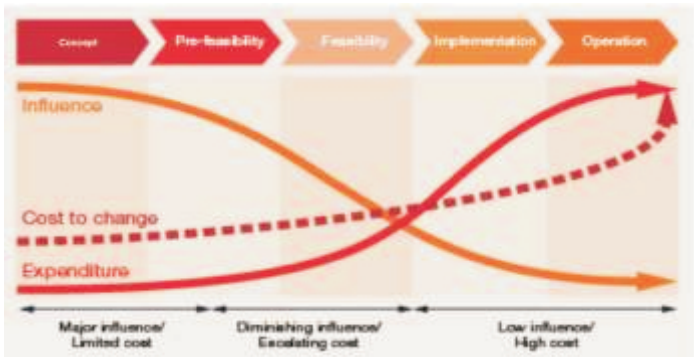

Figure-1: Mining project lifecycle

Three Primary Levers Exist for Managing Capital Effectively

Asset intensive industries such as mining have three levers at their disposal to effectively manage their capital spend:

1.Manage the demand for capital
2.Reduce capital costs
3.Manage project execution

In-house development teams and engineering consultants are typically aware of each of these levers; however "project familiarity" and "big project excitement" often shifts the focus away from these business imperatives to detailed engineering design challenges. Further, in "just trying to get the project over the line" business needs and design solutions are often insufficiently challenged before moving to the next project phase.

From our experience there is almost always significant potential for improvement in the capital productivity of mining investment projects through the optimization of these levers. We have observed that this value is most likely to be realized when capital projects are comprehensively reviewed and challenged in a systematic manner by multi-disciplinary teams with fresh eyes, a sound commercial grounding and a strong belief that incremental value can be extracted from the proposed solution.

Lever to manage capital:	Effective capital managers do the following:
Manage the demand for capital	□ Ensure standardized, rigorous financial justifications for capital projects. □ Avoid non-financial justifications of projects (e.g. "strategic considerations"). □ Rigorously prove the need for the capital outlay. □ Is there sufficient capacity already within the system? □ Are there alternative options that do not require capital?
Reduce capital costs	□ Analyze the total cost of the project, rather than focusing on incremental components. □ Analyze risk/reward and Ups/downs tradeoffs. □ Seek multiple design options and actively debate the merits of "out-of-the-box" alternatives. □ Seek "fit for purpose" rather than gold-plated capital solutions to the business problem.
Manage project execution	□ Develop and nurture strong project management disciplines with rigorous controls around project costs and scope. □ Mandate rigorous financial justifications for changes in scope.

Sustainable cost management is a process that identifies and implements lasting reductions to a company's cost structure. It avoids the pitfalls of commonly adopted approaches by developing a strong and sustainable foundation built on effective planning. Management and staff must understand the value drivers of their mining operation and the direct impact that day-to-day decisions have on operating costs. Sustainable cost management focuses on instilling a well-controlled spend culture where cost baselines are clearly understood and the ownership for cost outcomes is assigned to management and staff who have the power to affect lasting change. Central to achieving sustainable improvements are the systematic quantification, tracking and monitoring of the benefits realized by initiatives and feedback mechanisms to continually improve cost management practices.

In the case of mining companies, sustainable cost reduction initiatives typically focus on minimizing the cost per unit of output at the operational level, while seeking to reduce total cost at the corporate level. Cost reduction initiatives at a mine site should not only focus on reducing total cost, but should place a high level of importance on improving operational effectiveness, asset utilization and production volumes. The most successful sustainable cost reduction initiatives in the mining sector have also had a significant impact on top line revenues. In effect, mine site "cost reduction" is really mine site "margin improvement". The driver tree below highlights the key drivers of unit costs within a mining operation.

Achieving a state of sustainable cost management is a journey that typically takes several years to fully embed. Key steps along this journey almost always include:

- ❖ Reducing non-essential spending
- ❖ Clarifying business cost drivers and improving accountability
- ❖ Taking control of third-party spends
- ❖ Tackling the company's cost culture and behaviors

Targeted Cost Reduction Projects are an Important Subset of a Company's Sustainable Cost Management Initiative

Targeted cost reduction programs typically form an important sub-set of a sustainable cost management initiative. From various companies experience cost reduction projects can be of particularly high value to mining companies exhibiting any of the following symptoms:

- ❖ Operations are consistently underperforming relative to corporate targets, internal and industry peers (e.g. higher cost per unit of output, lower utilization and productivity)
- ❖ Costs are rising significantly faster than production volumes over the medium-term
- ❖ Controllable costs are increasing as a percentage of fixed costs over the medium-term

- Acquisitions have not fully realized synergy savings
- Divestments have left behind "orphaned" costs
- Savings from previous initiatives are not being realized

Keeping in view of all control levers in mining projects, we are here focuses about manage project execution through effective strategies of coal mining projects for achieving sustainable cost with best practices.

PHASED PROJECT PLANNING

Mining companies must have strong frameworks in place for the evaluation and prioritization of their projects. A structured approach to assessing projects ensures rigorous evaluation with investment decisions made on sound financial, social, environmental and sustainable development analysis.

By their nature, capital projects are not part of day-to-day operations. Whether related to infrastructure, construction of a new plant, buildings or systems. Capital projects require separate financing, management, governance and assurance. Mining companies undertaking regular capital projects also need to ensure that their capital management processes are kept current to continue to support the delivery of the capital project portfolio.

The recent environment of opportunity in the Indian as well as global mining sector has resulted in an escalating number of capital projects. In India, many of the major mining companies have a growing portfolio of major capital projects which puts pressure on those organizations without robust capital project management processes in place.

To ensure more effective planning and evaluation of projects, a number of Australian coal mining companies have introduced a phased development process which is commonly described as a "stage gate" or "toll gate" process. This step-by-step approach enables companies to move their projects through the development pipeline and achieve a standardized way of evaluating project risks and opportunities.

Stage Gating

A "stage gate" or "fee payment stage" is the entry or approval point for the next project evaluation stage i.e. stage-I and stage-II in case of project planning. A key component of stage gating is to clearly assign accountabilities at each stage for Pre-feasibility, Feasibility and Implementation. At the end of each stage an acceptance or approval process, such as a stage gate meeting, should be held where key stakeholders or "custodians" sign off on their respective study areas, enabling the project to move forward into the next stage of evaluation. It is a formal process that ensures all stakeholders clearly understand the impact of approving funds and resources to the next evaluation stage, and ultimately, the project.

Terminology of stage gating varies from organizations to organizations. Most of the major mining companies' use the terms Concept, Pre-feasibility, Feasibility and Implementation to as describe in figure-1. In India many mining company uses similar stages but slightly different terminology for each stage of evaluation. In Indian coal mining sector also recently established terminology is intended to clarify the end goal of each stage.

Influencing Project Success

The ability to influence project success and enhance value is greatest at the start of project evaluation and rapidly declines as a project advances towards implementation in the same instance, the cost of change dramatically increases throughout each project evaluation stage. This suggests that the quality of decision making in the early stages of project evaluation is critical to an optimal project outcome.

RISK MANAGEMENT

Risk management is tools very useful to manage the development of both growth and sustaining projects. In this technique explains the key to understanding project evaluation methodologies, "Project evaluation in its first instance is a risk management process. When people understand this, they understand the processes". In coal mining sector, risk practitioners and project evaluation practitioners work closely together using a number of problem-framing techniques, including meetings and strategy table deliberations. A number of risk management activities should occur at each stage of project evaluation:

- Enhancing the consideration and quantification of risk into standard commercial project evaluation methodologies (NPV, IRR etc)
- Identifying project options and impact on project design and value
- Reviewing uncertainty around project delivery parameters
- Review of Occupational Health & Safety (OH&S) compliance parameters and key Performance Indicators (KPIs)

EFFECTIVE CAPITAL MANAGEMENT

Large capital projects have the potential to create or destroy substantial shareholder value. Effective capital management is one of the largest levers that asset intensive companies can pull to extract enhanced shareholder value. Similarly, reducing the capital required to deliver a solution to an identified business requirement has an enormous potential impact on the return that the solution to an identified business requirement has an enormous potential impact on the return that the solution can generate. At each stage of project evaluation there are a number of key questions that should be posing to ensure effective assessment and capital management as shown in figure-2:

Figure-2: Capital effectiveness over the project lifespan

PROJECT PORTFOLIO MANAGEMENT

All too often, projects can be approved on the basis of project sponsorship by a stakeholder with the most sway or the largest budget. Project portfolio management (PPM) provides a structured method of decision making that enables a company to select and run an optimal set of projects. A standardized approach to investment evaluation enables projects to be compared on an equal basis and assigned a priority based on strategic fit and risk appetite of a company. A further level of complexity in PPM is that. Once approved, changes in the internal and external environment can negatively impact or even invalidate projects. Senior management therefore requires consistent information on which to assess the impact of such changes. A mature PPM approach is critical to project success and also previous study indicated that 75 percent of projects using a mature process delivered with superior project outcomes.

Key Benefits of PPM

The right projects are selected to achieve strategic outcomes and priorities.
Resources are deployed where they are required most
Projects are monitored against key outcomes
Projects are consistently delivered and successful

Similar to project evaluation, PPM is an exercise in risk management, to compare projects effectively, the risks involved with each project need to be compared at a number of different stages:

Stages

Stage-1: Define strategic objectives, strategic risks and risk appetite

Articulate corporate strategy into a clearly defined objectives hierarchy
Define key strategic risks that should be considered in project formulation
Articulate and define risk appetite, risk acceptance and its impact on proposed strategy and projects
Consider corporate risk culture and possible impact on project success

Stage-2: Stand along project evaluation

- Enhance the consideration and quantification of risk into standard commercial project evaluation methodologies (NPV, IRR etc.)
- Identify project optionally and impact on project design and value
- Review uncertainty around project delivery parameters
- Conduct project insurance programme design
- Review OH&S compliance parameters and KPIs

Stage-3: Project portfolio modeling and optimization

- ❖ Model cash flow at risk and assess project impact under probabilistic scenarios
- ❖ Consider risks versus return tradeoffs
- ❖ Model the portfolio diversification benefits
- ❖ Assess portfolio delivery capability and constraints – e.g. financial, skilled labour, management time 3rd party contracts
- ❖ Assess financial risk – hedging foreign exchange, commodities and fuel policy and strategy

Stage-3: Project delivery

- ● Validate project on an on-going basis against financial and other strategic objectives
- ● Communicate project progress and risks
- ● Ensure project governance and assurance
- ● Select third parties and review regimes
- ● Ongoing project risk management

FRONT END LOADING

To increase the likelihood of meeting a project's end goals, the variance of cost, schedule and operating methods have to be reduced to a minimum. This is a challenging task and requires a strategic approach to project evaluation from the very start of a project. Front End Loading (FEL) is a strategic methodology that takes a deliberate approach to major capital project planning and can have significant impact on the outcome of a project.

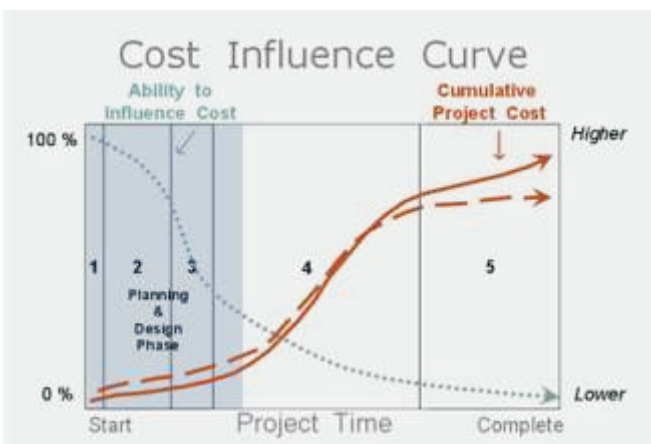

Figure-3: Cost Influence Curve

An independent project analysis group which benchmarks projects, both large and small in mining and utilities, found evidence that FEL contributed significantly to:

- ❖ Lower total investment costs,
- ❖ Faster project cycle times, and
- ❖ Enhancements in system/installation operability.

All of which resulted in enhanced safety and a larger Internal Rate of Return (IRR). At the core of the FEL approach is the use of industry's best technologies for integrated asset modeling, multidisciplinary teams that create the best project insight and a risk and optimization framework, Research from Independent Project Analysis and the US Construction Industry Institute indicates that effective FEL can decrease project costs on average by up to 20 percent compared with less effectively planned projects irrespective of project size. It has also been demonstrated that effective FEL can significantly reduce implementation time. FEL in the first two stages of project evaluation

will lead to a significant improvement in the focus of big capital projects.

FEL is a structured process that covers the tasks, activities and deliverables of the first three project phases to maximize the opportunity for project success. FEL consists of the following components shown in figure-4:

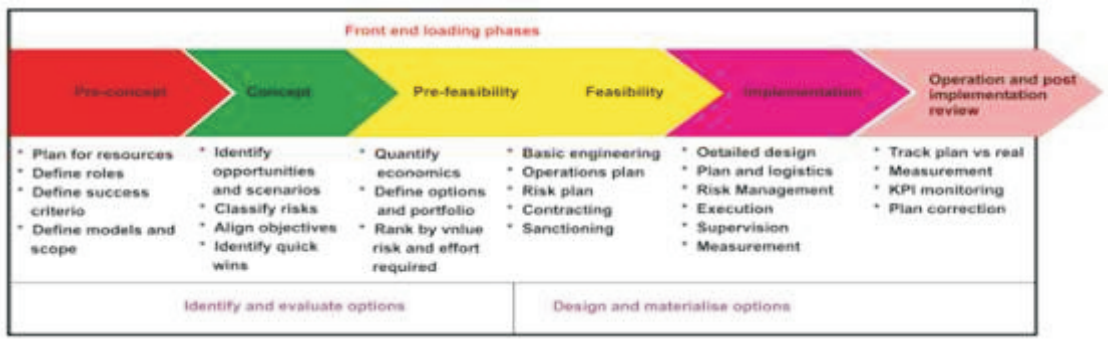

Figure-4: Front-end loading project phases

Front End Loading (FEL) Makes a Difference in Project Evaluation

The FEL approach requires extensive identification, evaluation and optimization of probable development scenarios. The benefits of detailed pre-project planning are fewer changes and surprises at later project stages, which directly translates into lower costs and less schedule variance,concept to project implementation.Some companies, particularly in the oil and gas industry prefer using the term FEED (Front End Engineering & Design). It is similar to FEL but as the initial cost estimates are dependent on the plant or infrastructure design, it is eminently important to focus on the design elements.

Pre-Concept Stage is gradually more Critical in Mining

The projects division of world leading coal mining company BHP Billiton has already designed the fundamental principles of FEL for mining projects. Company believes that project success is contingent on the quality of the information and strategic decisions made at the very start of the project evaluation process. Company should also take responsibility for this initial step involves scenario and strategy planning within its resource development and planning team.

World leading coal mining company believed that project success to the basic principle, if all other parts of the project evaluation process will proceed smoothly if a solid resource development plan, aligned to the business' strategy, is followed.

CONTRACTING STRATEGY AND MANAGEMENT

In an increasingly competitive business environment, a key part of the initial planning for capital investment is the formulation of an effective.

Procurement Strategy

While changing market conditions can influence the procurement approach, risk allocation and a number of factors including: project complexity, degree of scope clarity, owner and contractor capability and willingness to share risks and rewards, largely determine the chosen project delivery method.

Incorporating Contract Management into Stage Gating

One effective way to manage the complex contracting environment is to integrate an extensive contract management framework into the stage gate process. Enough time should be spent in the initial stages, fully assessing the risks of the legal and commercial aspects of the project delivery method and identifying the best time to go the market with a clear, concise and complete tender document.

The tender phase of major construction projects usually takes between four and six months. This time pressure forces companies to follow a rigorous sequence of well defined sub-phases, and carefully monitor progress on each of these, to ensure a complete, competitive and reliable offer can be submitted at the tender date. Contract

Manager, a leading provider of construction services to mining companies explains that "A thorough risk assessment and evaluation process carried out in parallel to pre-design, planning and cost estimating activities minimizes the errors made in the short time available."

Current Issues

Long-term practices and unprecedented levels of demand for design, construction and project management services have put pressure on projects' procurement strategies. Shortages of skilled professional and trade resources, and difficulties in retaining staff has meant that many organizations in Indian mining industry turn to contractors to relieve the shortage.

High levels of dispute have been a significant issue in recent years. Inappropriate risk allocation has been a major contributor to this trend. Project owners in India have transferred whatever risks they can to contractors, who in the past have accepted them and often passed them on to subcontractors, this practice passes risk down the supply chain to parties that are not equipped to manage this level of risk and when events do occur entire projects can be put in jeopardy.

Another common issue is that some organizations select contracting issue is that some organizations select contracting strategies that are inappropriate for the project concerned, Past experience is often relied upon with the same contracting strategies used as in previous projects, with little or no regard to project risks, scope or commercial relationship.

Selection an Appropriate Procurement Strategy

Recognizing that the formulation of the procurement strategy is a key business function is the starting point for an effective procurement strategy. At the bottom of some analyses of procurement and delivery options for a specific project risks and opportunities. This assessment must take into account which party can best manage these risks and realize potential opportunities, whether or not the risks are:

- retained by the organization itself,
- transferred to another party (designer or contractor),
- Defined by a risk-sharing agreement.

The procurement approach employed determines the way in which risk is managed. However, every project has its own particular set of needs and priorities around scope, scale and technical complexity. A well defined, low risk project will suit traditional tendering and contracting approaches where transferred risk can be readily quantified and competitively priced by the market. At the other end of the spectrum, relationship contracts suit projects of higher risk and complexity that require collaboration under risk reward sharing arrangements.

Incorporating Past Experiences

A focus on continuous quality improvement sets the stage for incorporating lessons learnt into standard practices. Learning from successes and mistakes, and ensuring these are documented and considered in future project is key to ensuring mistakes are not repeated, and capital is effectively used for value-adding activities. Every company has a level of cumulative intellectual capital and experience, often held either in employees' minds or ideally in organizational repositories. Frequently, however, these pools of knowledge are not properly utilized for continuous process improvement.

Gathering the lessons learnt can be a difficult task with the following common pit falls.

- Not all projects collect end-of-phase and/or end-of post implementation lessons learnt
- Collected lessons learnt lack appropriate categorization, context, problem definition and/or solution.
- Repositories lack easy access, good navigation, and/or sophisticated search and retrieve capability.
- Over time, the repositories grow to be too large, resulting in state information, slow searches, and even irrelevant results.
- Retrieving relevant information is too time consuming and thus people use the practices they are accustomed to.
- Lessons learnt are not incorporated into policies and procedures for continuous improvement, leading to future projects using outdated documents.

Confining and Institutionalizing Past Experience

To ensure past experiences are effectively passed on to future projects, leading organizations introduce

lessons learnt process that is clearly defined and integrated into the stage gate approach. For example under the guidance of Contract Manager, the organization new undertakes a review of the effectiveness of each stage and the suitability of the organizational processes and documents during that stage. This should occur at the end of each stage of the project evaluation process. Feedback is sought from a number of sources including employees, contractors and any other parties involved in the project stage. This is conducted through functional workshops and one-on-one interviews. The lessons are then compiled, assessed and where appropriate, formally incorporated into the stage gate process for use in future projects.

BEST PRACTICES FOR MINING PROJECTS

The Best Practices for coal Mining Projects path is intended to provide managers with Best Practices and Skills that have been exposed to improve capital project effectiveness. The Best Practices for Mining Projects guidelines provide a strategy to analyze the factors that lead to competitive project outcomes. The strategy will identify effective strategies for the following:

- Defining coal mining project that best meet business needs
- Building an effective team
- Implementing contracting strategy
- Improving the business value
- Implementing technology improvements
- Understanding and managing risks
- Setting and achieving competitive targets
- Controlling a project as it progresses through execution
- Planning and scheduling projects

As the strategic development for achieving sustainable cost in coal mining projects, their company practices must project planning and execution that lead to superior outcomes with focusing on the development of tools and methods to improve capital effectiveness. Project planning group determined the major factors that directly affect the relative performance of capital projects. Most excellent project systems—those that deliver excellent returns on capital spent—incorporate the fundamentals of these key leading indicators into their work processes for projects. The project manager should knowledge in details the key indicators and achievement path for project planning. The following groundwork knowledge will provide the opportunities to drive their companies towards sustainable cost management:

- Key elements of team effectiveness.
- Project drivers that lead to successful completion of each phase of Front-End Loading (FEL), the critical project definition phase, including the key deliverables that are required at the end of each phase and the objectives of each phase
- Important elements of FEL for mining projects
- Deliverables of FEL, including a detailed discussion of key elements of site definition, engineering definition, and project execution planning
- The important elements of contracting strategy and the implications of contracting choices on project results
- Additional engineering Best Practices (Value Improving Practices [VIPs]) that Industry uses to leverage extra value from a solid project definition package
- Tools and techniques for identifying and mitigating risks
- Practices that are important in controlling projects as they proceed through the execution
- Investigation findings that can be used by owners to improve construction safety.

The Best Practices for Mining Projects guidelines content in total ten modules for effective coal mining project management and each one covering a specific topic important in the capital project delivery process. The modules include the following:

Module 1: The Business Stake

This module sets the stage for the entire path by identifying the place of projects in the business supply chain and the impact of project performance on business competitiveness, and also discusses the execution of projects in the current environment.

Module 2: Mining Project Pathway to Success

This module presents a pathway to Success for mining project asset development based on quantitative study. The key elements include Coal seam potential, mine complexity, technology selection, scope definition, appraisal strategy, project definition for mine and facilities, degree of team integration, target setting, and project execution discipline. These practices are then linked to effectiveness of all components of asset development.

Module 3: Team Effectiveness

Team effectiveness is an important driver of good project outcomes. This module focuses on the theory of teams and their use on capital projects. The module addresses the components of effective team and owner core competencies. This section also elaborates effective integration of contractors into the project team.

Module 4: Mine FEL – Coal seam potential /Stripping Ratio Definition

Projects and planning division review each element of the Mine FEL: Coal seam potential and Overburden Definition, Site Factors, Engineering Status, and Project Execution Planning. Key deliverables for each of these elements at the time funds are authorized, as they apply to the mine portion of a capital investment, will be presented. Examples of problems that occur when definition is incomplete will be communicated.

Module 5: Mine FEL – Site Definition

This module deals with aspects of project definition related to not only the characteristics of the project location, but more importantly also to land and coal deposit accessibility. We also explain how proper definition reduces project risks by clarifying assumptions, completing critical deliverables, and engaging local participants. Physical, regulatory and design issues are also covered.

Module 6: Mine FEL – Engineering Definition

In this module consists with aspects related to the status of mining method selection, equipment selection, mine design and planning using optimization tools. This section discusses how engineering definition can help develop specific production strategies to support downstream production (stockpiling and blending), considers status of specific engineering design deliverables and participation by key stakeholders, and reduces risks with proper definition because key engineering items are complete and provide a sound basis for the estimate.

Module 7: Facilities Site Definition

As one of the major components of the FEL Index, site factors addresses aspects of project definition related to the characteristics of the project location, and considers physical, regulatory, and design issues. Proper definition reduces project risks by clarifying assumptions, completing critical deliverables, and engaging local participants

Module 8: Facilities Design Status

Another component of the FEL Index, Design Status addresses aspects related to the status of the process design (or conceptual design) and detailed design; considers status of specific engineering design deliverables and participation by key stakeholders; and reduces risks with proper definition because key engineering items are complete and provide sound basis for estimate

Module 9: Project Execution Planning

The Project Execution Plan (PEP) is the result of defining the approach to be followed in executing a capital project and answers some basic questions about the project, such as:

- Who will participate?
- When will they participate, and what roles will they take?
- How the mining team is integrated/interfaced with processing and other facilities teams?
- How will the project be contracted, sequenced, managed, and controlled?
- When will phase transitions and specific activities take place?

Module 10: Project Controls

This module covers the owner role in project execution and control. Topics include design, procurement, and construction management. Best Practices in project control are discussed. Because infrastructure represents as much as 80 per cent of a mine's cost, it should be a key consideration in the optimization process and not an afterthought.

SUSTAINABLE COST MANAGEMENT

The challenge for coal mine management is to achieve sustainable profits by simultaneously:

1.Creating an enterprise wide high performance culture
2.Increasing profit margins by fundamental cost reduction and operational performance improvement
3.Increasing shareholder value by optimizing Return on Invested Capital through structural cost reduction, and
4.Achieving these business objectives despite a critical skills shortage for professional staff, mine operators and contract service providers.

The starting point is to examine each of these four challenges in the context of core operational processes which generate revenue and support processes designed to enhance operational efficiency and effectiveness of the core processes. The cost structure of mine projects has changed dramatically. Adherence to traditional mine development methods could now be a situation where a small part is controlling the whole of something.

Mining executives have a number of immediate opportunities to drive their companies towards sustainable cost management. Achieving sustainable cost management within a mining company is not a goal that can be achieved within a 12-month time horizon. The virtuous cycle of sustainable cost reduction is a process that typically takes several years to embed and requires the day-to- day mentality of all staff to be firmly focused on continuous improvement and cost consciousness. While targeted cost reduction projects can yield substantial results, mining executives need to take immediate actions to move their companies towards the goal of cost-efficient operations as the industry re-emerges from the economic downturn:

Establish an Environment for Cost Reduction

Confirm cost reduction targets for each operation, agree on the in-scope cost base, and complete a preliminary reduction analysis.

Agree on Cost Ownership

Assign individual responsibilities at the mine site level. This will create accountability amongst those with the power to influence costs and will prevent any costs from falling through the cracks.

Challenge the Financial Plan

Promote a culture where operations and finance staff work together to clarify cost drivers, challenge operating cost assumptions, and reduce discretionary spend.

Look for Contract Leakage

A comprehensive review of supplier contracts will typically uncover recoverable claims, cost avoidance areas, and off-contract savings opportunities.

Gauge Performance by Measuring Results

Perform consequently by monitoring activities, capturing related spend results, and producing robust reports for site-based and corporate office management.

Rigorously Control Spending

Immediately establish a tighter span of control for spend approval to begin the "spend culture" transformation.

Stabilize Cost Controls

Complete a gap analysis of critical cost management controls to identify immediate actions required to stop the bleeding and create a culture of cost awareness and ownership.

CONCLUSIONS

Delivering major capital projects on time, to specifications and on budget is proving to be increasingly difficult for many mining companies in today's volatile environment. This paper has sought to highlight five areas of focus to improve the likelihood of project success:

- ❖ Implementing a phased project evaluation process ensures investment decisions are made based on sound financial, social, environmental and sustainable development analysis.
- ❖ Effectively managing project portfolios enables a company to Coal mining projects and ensures priority is based on strategic fit and risk considerations.
- ❖ Front end loading key elements of project evaluation reduces risk and decreases cost blow-outs at later stages.
- ❖ Determining a contracting strategy early in the project evaluation process, which incorporates a sound risk management approach, increases the likelihood of a successful outcome.
- ❖ Learning from successes and mistakes and ensuring these are documented and considered in future projects is key to continuous improvement.

ACKNOWLEDGEMENTS

The views reported are those of the authors and should not be taken to represent the position or policy of the companies involved to which they belong. First and foremost, we would like to thank to express my gratitude and indebtedness to Prof. (Dr.) Rajesh Shrivastava, Principal, Shri Sai Baba Adarsh Mahaviddhayala, Ambikapur for his kindness in allowing me to do work in the present topic and for his inspiring guidance, constructive criticism and valuable suggestion in this paper. Authors acknowledge the help extended by all the persons of related articles who are directly or indirectly associated to prepare this paper.

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