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| **ASSIGNMENT COVER SHEET** | |
| ***Programme*** | **MBA (NQF9)** |
| ***Module Name*** | PROJECT MANAGEMENT |
| ***Assignment Number*** |  |
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Table of Contents Page

Question 1.1 …………………………………………………………………………… (3-8)

Question 1.2……………………………………………………………………………. (9-14)

Question 1.3……………………………………………………………………………. (15-20)

Question 2.1……………………………………………………………………………. (21-25)

Question 2.2……………………………………………………………………………. (26-27)

Question 2.3……………………………………………………………………………. (28)

Question 3………………………………………………………………………………. (29-41)

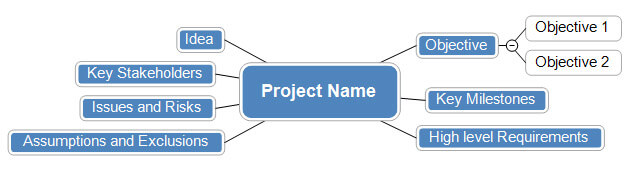
Question 4 ……………………………………………………………………………… (42-44)

1.

1.1a A project scope statement, is a tool used to describe the major deliverables of a project including the key milestones, high level requirements, assumptions, and constraints. The project scope statement is a useful tool for future decision making when new change requests are considered to modify the project scope.

This is document that provides the foundation ofmaking future decisions such as scope changes. The purpose of the document is to ensure that all stakeholders have common knowledge of the project scope. The scope statement contains the objectives, description of deliverables, end results and justification of the project. The scope statement seeks to address seven questions: who, what, when, why, where, how and how many. The document validates the project scope against the statement of work provided by the customer.

It also defines the boundaries of a given project and clarifies what deliverables are in and out of scope. The following sections describe a project scope statement and shows how to use Mind View to create a project scope statement.



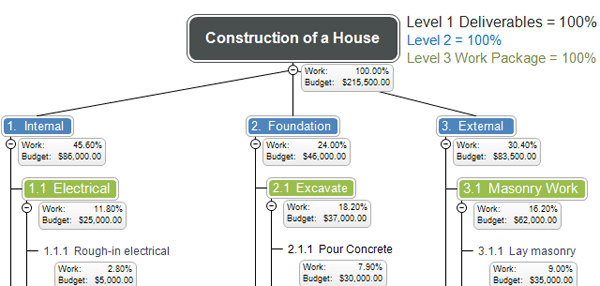
The scope statement is an agreement among the project team, the project sponsor and the key stake holders. It represents a common understanding of the project for the purpose of facilitating communication among the stakeholders and for setting authorities and limits for the project manager and team. The scope statement in RGI includes relating the project to business objectives and defining the boundaries of the project in multiple dimensions including approach, deliverables, milestones and budget.

**RGI effective project scope includes the following items:**

1. The key project objectives
2. Key deliverables
3. Key milestones
4. High level requirements
5. Assumptions and Exclusions
6. Any known issues or risk
7. Stakeholder review and approval

1.1b A Work Breakdown Structure (WBS) of RGI is a key project deliverable that organizes the team's work into manageable sections. The Project Management Body of Knowledge defines the work breakdown structure as a "deliverable oriented hierarchical decomposition of the work to be executed by the project team." The work breakdown structure visually defines the scope into manageable chunks that a project team can understand, as each level of the work breakdown structure provides further definition and detail.

Figure 1(below) depicts a sample work breakdown structure with three levels defined.



A work breakdown structure starts with the project as the top-level deliverable and is further decomposed into sub-deliverables. The project team of RGI creates the project work breakdown structure by identifying the major functional deliverables and subdividing those deliverables into smaller systems and sub-deliverables. These sub-deliverables are further decomposed until a single person can be assigned. At this level, the specific work packages required to produce the sub- deliverable are identified and grouped together. The work package represents the list of tasks or "to-dos" to produce the specific unit of work. If you've seen detailed project schedules, then you'll recognize the tasks under the work package as the "stuff" people need to complete by a specific time and within a specific level of effort.

From a cost perspective of RGI, these work packages are usually grouped and assigned to a specific department to produce the work. These departments, or cost accounts, are defined in RGI organizational breakdown structure and are allocated a budget to produce the specific deliverables. By integrating the cost accounts from the RGI organizational breakdown structure and the project's work breakdown structure, the entire organization can track financial progress in addition to project performance.

The successful accomplishment of both contract and corporate objectives requires a plan that defines all effort to be expended, assigns responsibility to a specially identified organizational element, and establishes schedules and budgets for the accomplishment of the work.

The preparation of this plan is the responsibility of the project manager, who is assisted by the project team assigned in accordance with project management system directives.

The detailed planning is also established in accordance with company budgeting policy before contractual efforts are initiated. In planning a project, the project manager must structure the work into small elements that are:

* Manageable, in that specific authority and responsibility can be assigned
* Independent, or with minimum interfacing with and dependence on other ongoing elements
* Integratable so that the total package can be seen
* Measurable in terms of progress

The first major step in the planning process after project requirements definition is the development of the work breakdown structure (WBS). A WBS is a product-oriented family tree subdivision of the hardware, services, and data required to produce the end product. The WBS is structured in accordance with the way the work will be performed and reflects the way in which project costs and data will be summarized and eventually reported. Preparation of the WBS also considers other areas that require structured data, such as scheduling, configuration management, contract funding, and technical performance parameters.

The WBS is the single most important element because it provides a common framework from which:

* The total program can be described as a summation of subdivided elements.
* Planning can be performed.
* Costs and budgets can be established.
* Time, cost, and performance can be tracked.
* Objectives can be linked to company resources in a logical manner.
* Schedules and status-reporting procedures can be established.
* Network construction and control planning can be initiated.
* The responsibility assignments for each element can be established.

The work breakdown structure acts as a vehicle for breaking the work down into smaller elements, thus providing a greater probability that every major and minor activity will be accounted for.

1.1c When planning a project in RGI, it is necessary to assign the work on the project to the project team so that there will be one person responsible for each part of the project and it is clear who performs the work, with whom it should be consulted, and who is to be informed of this activity.

**The responsibility matrix** is a tool used to define the powers of individual project team members for various parts of project works (work packages). In professional literature, it is referred to as RAM (Responsibility Assignment Matrix) or RACI matrix, according to the English abbreviated names of responsibility relations.

We break down the project into work packages when preparing the WBS (Work Breakdown Structure see WBS form) breakdown of work.

The following basic relations are distinguished:

**A –Accountable:** Person authorised to approve the outcome of the concerned activities. Outputs from each activity (work package, areas) are subject to approval by the person who is actually responsible for it. Each activity must only be approved by one person. It is an error if this type of responsibility is not assigned or if the responsibility for a specific area is assigned to multiple persons, and it usually results in a situation when no one is responsible for the concerned matter, or everyone thinks the work will be done by someone else. On the other hand, a situation when no one is responsible for the concerned work does not lead to any result either.

**R –Responsible:** Person tasked with the performance of the concerned activities. It is the member of the team who is authorised to perform or responsible for performance of those activities. There may be several persons with this relationship in one package. At the same time, it is possible to combine

**C –Consulted:** Person with whom the progress of work shall be consulted. It is usually a person closely related to this are a despite not being responsible for it, an expert in the given field who may be invited to consult key aspects. There may be several persons with this relationship in one package.

**I –Informed:** Person kept informed of the progress and outcomes from the concerned area. These are in particular those team members who need to be familiar with the progress of work. The way of "informing" should be set within the communication plan (regular reports, meetings, etc.). There may be several persons with this relationship in one package.

1.1d In project management, **a schedule** is a listing of a project's milestones, activities, and deliverables, usually with intended start and finish dates. A schedule is commonly used in the project planning and project portfolio management parts of project management.

Those items are often estimated by other information included in the project schedule of resources allocation, budget, task duration and linkages of dependencies and scheduled events. A schedule is commonly used in the project planning and project portfolio management parts of project management. Elements on a schedule may be closely related to the work breakdown structure (WBS) terminal elements, the statement of work, or a contract data requirement list.

Effective project scheduling at RGI plays a crucial role in ensuring project success. To keep projects on track, setting realistic time frames, assigning resources appropriately and managing quality to decrease product errors. This typically results in reduced costs and increased customer satisfaction. Important factors include financial, documentation, management and quality assurance.

Project scheduling is one of the critical management tasks as it dictates the time frames in which

the project will be completed, the budgets/costs in terms of resource requirements and the

sequence of tasks to be completed. Project scheduling is defined as the process of determining

when project activities will take place depending upon defined durations and precedent activities.

Schedule constraints specify when an activity should start or end, based on duration, predecessors, external predecessor relationships, resource availability, target dates or other time constraints.

Project scheduling is a complex and iterative task which typically involves

1. Assigning resources to project tasks;
2. Balancing completion dates against the availability of the appropriate resources to complete all tasks within the available time;
3. Identifying dependencies between tasks so that they are scheduled in the correct sequence;
4. Identifying realistic start and end points (elapsed time) to accommodate the number of man- days’ work for each given task; and
5. Critical path analysis to identify those tasks which are critical to the success and timely

completion of the project.

The Project Schedule includes the planned dates for starting and completing activities in one or

more of the following forms:

1. Milestone;
2. Deliverable
3. Activity; and
4. Gantt

1.1e **Risk response** is the process of developing strategic options, and determining actions, to enhance opportunities and reduce threats to the project's objectives. A project team member in RGI is assigned to take responsibility for each risk response.

Risk response is the process of controlling identified risks. It is a basic step in any risk management process. Risk response is a planning and decision-making process whereby stakeholders decide how to deal with each risk.

The following are the basic types of risk response:

1. **Avoid:** Change your strategy or plans to avoid the risk.
2. **Mitigate:** Acting to reduce the risk. For example, work procedures and equipment designed to reduce workplace safety risks.
3. **Transfer:** the risk to a third party. For example, purchase fire insurance for an unfinished building.
4. **Accept:** Deciding to take the risk. Generally speaking, all strategies and plans involve some level of risk. Risk also has a relationship with reward whereby reducing risk towards zero can also reduce potential payback.
5. **Share:** Distributing the risk across multiple partners, teams or projects. For example, four projects each have a software architect and each identifies the risk that the software architect is a critical resource. They decide to share the risk by pooling the software architects into a team that provides a service to all four projects. If one architect quits, the service can be continued.
6. **Contingency:** Making plans to handle the risk if it occurs. For example, back-out procedures that can restore a system if a launch fails.
7. **Enhance:** Enhancement is a response for a positive risk. Project management methodologies may view finishing a task early or under budget as a positive risk. Enhancement is an action that is taken to increase the chance of the risk occurring.
8. **Exploit:** Another treatment for positive risks. Exploiting a risk is to make use of resources that become available if the risk occurs. For example, if a task finishes early, you plan to reassign the resource to more work.

1.2 P**roject quality management** is all of the processes and activities needed to determine and achieve **project quality**. At its most basic level, **quality** means meeting the needs of customers. This is also known as "fit for use."

The project manager must take note of the following core quality management concepts in ensuring a quality control plan for the project is achieved. As the project manager, there are three key **quality management concepts** that will help to achieve or deliver a high-quality project.

* Customer Satisfaction
* Prevention over Inspection
* Continuous Improvement

**3 Key Quality Management Concepts**

1. **Customer Satisfaction:** Customer satisfaction is a key measure of a project's quality. It's important to keep in mind that project quality management is concerned with both the product of the projectand themanagement of the project*.*

If the customer doesn't feel the product produced by the project meets their needs or if the way the project was run didn't meet their expectations, then the customer is very likely to consider the project quality as poor, regardless of what the project manager or team thinks.

As a result, not only is it important to make sure the project requirements are met, managing customer expectations is also a critical activity that you need to handle well for your project to succeed.

1. **Prevention Over Inspection:** The **Cost of Quality (COQ)** includes money spent during the project to avoid failures and money spent during and after the project because of failures. These are known as the **Cost of Conformance** and the **Cost of Nonconformance**.

|  |  |
| --- | --- |
| **Cost of Conformance** | **Cost of Nonconformance** |
| **Prevention Costs**   * Training * Document Processes * Equipment * Time To Do It Right | **Internal Failure Costs**   * Rework * Scrap |
| **Appraisal Costs**   * Testing * Destructive Testing Loss * Inspections | **External Failure Costs**   * Liabilities * Warranty Work * Lost Business |

The cost of preventing mistakes is usually much less than the cost of correcting them.

1. **Continuous Improvement:** Continuous improvement is a concept that exists in all of the major quality management approaches such as **Six Sigma** and **Total Quality Management (TQM)**. In fact, it is a key aspect of the last concept, prevention over inspection.

Continuous improvement is simply the ongoing effort to improve your products, services, or processes over time. These improvements can be small, incremental changes or major, breakthrough type changes.

From a project perspective, the project manager can apply this concept by analyzing the issues that were encountered during the project for any lessons learned for application to future projects. The goal is to avoid repeating the same issues in other projects.

The Project manager must ensure he utilizes the core quality management concept in forming the quality control plan for the project.

Project Quality Management has three key processes that Project manager should perform in his projects.

**1. Plan Quality**

**Plan Quality:** involves identifying the quality requirements for both the project and the product and documenting how the project can show it is meeting the quality requirements. The outputs of this process include a Quality Management Plan, quality metrics, quality checklists and a Process Improvement Plan.

**2. Perform Quality Assurance**

**Quality Assurance:** is used to verify that the project processes are sufficient so that if they are being adhered to the project deliverables will be of good quality. Process checklists and project audits are two methods used for project quality assurance.

**3. Perform Quality Control**

**Quality Control:** verifies that the product meets the quality requirements. Peer reviews *and* testingare two methods used to perform quality control.The results will determine if corrective action is needed.

Project Manager finds himself in a completely changing new world where wave after wave of quality and cost effectiveness demands are piling on him in tidal proportion. Reports from Business Roundtable, Quality Control professional bodies, the government and others are causing owners and management alike to add to the pressures for better quality and cost effectiveness in engineered projects.

Project Managers, have often deluded themselves into assuming that engineers, support people and contractors were all doing a good job and that the quality was built in. It was the easy thing to do. By virtue of the findings in the aforementioned reports, however, project managers are quickly realizing that they cannot assume quality is designed or built into the project. It must be **PLANNED INTO THE PROJECT AND CONSISTENTLY MONITORED.**

Planning Quality and Cost Effectiveness into the project must take place at the concept stage, well before the project is turned over to engineering and construction. In the two latter stages, quality must not only be managed, but also monitored into the project.

To assure that project managers are in the same vein of thinking regarding the nomenclature, definitions of quality and its ancillary phrases are defined below:

• **Quality** — “1. a characteristic or attribute of something: a property. 2. the natural or essential character of something. 3. excellence, superiority. 4. a degree or grade of excellence.” according to Webster.

• **Quality Management** — The planning, scoping, implementing, and monitoring of quality into all phases of the project from concept through the delivery aspects of the work. Quality Management involves the skill of forming and managing a team of people to achieve a qualitative goal within an effective cost and time frame, which will result in the production of a quality product or service. It entails selecting the specification parameters along with the systems and procedures needed to assure that quality is properly executed in all phases.

• **Quality Assurance** — This task begins with planning and proceeds to the drawing board in engineering, design, specifications and materials selection along with planning and scheduling. The quality planned into the project is implemented here, and there is no “passing the buck”.

• **Quality Control** — A process that starts in engineering, moves through procurement of materials for the field, and entails inspection upon receipt for damages and compliance to the purchase order specifications. It is ultimately monitored in the field with the contractors strictly adhering to installation specifications and the testing/inspection methods that are in effect as one of the controls in the project.

• **Cost Effectiveness** — This is a result of the quality built into the project. It involves not only the many facets of the project from concept through delivery to operations, but it must remain through the subsequent production operations. Without quality throughout the project, there is no cost effectiveness.

 In engineered projects, quality is the design, fabrication and installation of the project components to best serve the functional, safety, performance and endurance requirements within the realm of practicality and economics.

This involves the total life cycle cost of the components and includes not only the initial purchase cost but also the subsequent maintenance cost of that time in production or operations. Risk analysis and cost of breakdown in production are also included. This is a judgment call by the design engineers based upon vendor data, prior knowledge of the specific components, and the exercise of Value Engineering.

**The Project Manager's Perspective Toward Quality Management**

The foregoing definitions illustrate the implications of quality for Project Management in every phase of the project. As the main focal point in the project, the Project Manager has the responsibility for cost, schedule and performance, which boil down to quality and cost effectiveness.

The quality factor starts with the concept of the project (contract) and with the customer or client. The quality of the concept is reflected in the subsequent scoping, estimating, engineering, bid packages, contractor bids, construction or installation, startup, and delivery of the operation to the client and ultimately in the operation of the end product.

Very important from the quality management perspective is the information derived from the concept meetings. Providing the base for the scope of the project, the information establishes the operational requirements of the customer/client. This base sets the tone of what is required to cost-effectively provide the customer/client with the necessities for an efficient and economical operation or production facility.

It is in this phase of planning that both the customer/client and the Project Manager must resist the temptation to build the proverbial “Solid Gold Cadillac.” Too much quality, or “overkill” on the quality required for an efficient operation, can eradicate project cost effectiveness just as quickly as too little quality.

Given that the concept planning is solidified and exact project parameters are established, quality management then comes to the fore. The Project Manager must devise, tailor and implement his quality program/systems for the specific project. The following are considerations that are essential for the management of quality and cost effectiveness in the project:

1. A quality function must be built into the project staff. This function, manned by an individual responsible only to management, must be dedicated to quality throughout the project and must be fully aware that in effectively doing his job, he isn't going to win many popularity contests. This function is responsible for implementing and monitoring quality systems and checks

throughout the entire project, to include planning and engineering, bid packages, procurement, construction/installation and start-up of the completed facility or operation.

2. The Project Manager has the responsibility to assure that:

a. The quality function is well organized and practical for the project.

b. The total project team, from engineering through the construction manager, contractors, and start-up group, are working in concert toward the common goal of quality and cost effectiveness in the project. This involves a constant education process, emphasizing and inspiring team work, communications, professionalism, pride of workmanship and the conscientious involvement of every member of the total team.

c. Each team member is involved in quality. Involvement is key to the success of the project because the more a person feels he is contributing to the success of a project, the greater will be his effort to assure that success.

**This can be achieved through:**

(1) Quality circles inspired by the quality person assigned to the project, where project personnel can offer their contributions for open-minded consideration and *action.*

(2) Providing a personnel suggestion system where contributions of constructive suggestions toward the betterment of the project will be openly received, considered and acted upon.

(3) Assuring that all suggestions for structural change are received by the architect, engineer, and project construction managers to assure no loss in structural or operational integrity. No arbitrary changes can be made without first approval of the aforementioned individuals. Present and future safety still remains the prime requisite.

(4) Recognition and appreciation of an individual's contribution is essential to the contributor and will keep him involved regardless of whether the suggestion or contribution is or is not used in the project. Note that a negative reply can still produce a positive attitude.

Quality management is the process for ensuring that all project activities necessary to design, plan and implement a project are effective and efficient with respect to the purpose of the objective and

its performance.

**Project quality management (QM)** is not a separate, independent process that occurs at the end of an activity to measure the level of quality of the output. It is not purchasing the most expensive material or services available on the market. Quality and grade are not the same, grade is characteristics of a material or service such as additional features. A product may be of good quality (no defects) and be of low grade (few or no extra features).

Quality management is a continuous process that starts and ends with the project. It is more about preventing and avoiding than measuring and fixing poor quality outputs. It is part of every project management processes from the moment the project initiates to the final steps in the project closure phase.

QM focuses on improving stakeholder’s satisfaction through continuous and incremental improvements to processes, including removing unnecessary activities; it achieves that by the continuous improvement of the quality of material and services provided to the beneficiaries. It

is not about finding and fixing errors after the fact, quality management is the continuous monitoring and application of quality processes in all aspects of the project.

Quality has been defined as "the totality of characteristics of an entity that bear on its ability to satisfy stated or implied needs."

1. The stated and implied quality needs are the inputs used in defining project requirements from the donor and the beneficiaries. It is also defined as the “Conformance to requirements or fitness for use”
2. Which means that the product or services must meet the intended objectives Project Quality Management of the project and have a value to the donor and beneficiaries and that the beneficiaries can use the material or service as it was originally intended. The central focus of quality management is meeting or exceeding stakeholder’s expectations and conforming to the project design and specifications.

The ultimate judge for quality is the beneficiary and represents how close the project outputs and deliverables come to meeting the beneficiaries’ requirements and expectations. How a beneficiary

defines quality may be completely subjective, but there are many ways to make quality objective; by defining the individual characteristics and determine one or more metrics that can be collected to mirror the characteristic.

**Example:** For instance, one of the features of a quality product may be that it has a minimum amount of errors. This characteristic can be measured by counting errors and defects after the product is used.

Quality management is not an event - it is a process; a consistently high-quality product or service cannot be produced by a defective process. Quality management is a repetitive cycle of measuring

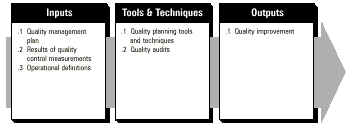
quality, updating processes, measuring, updating processes until the desired quality is achieved.

The Purpose of Management of Quality The main principle of project quality management is to ensure the project will meet or exceed stakeholder’s needs and expectations. The project team must develop a good relationship with key stakeholders, specially the donor and the beneficiaries of the project, to understand what quality means to them. One of the causes for poor project evaluations is the project focuses only in meeting the written requirements for the main outputs and ignores other stakeholder needs and expectations for the project.

Quality must be viewed on an equal level with scope, schedule and budget. If a project donor is not satisfied with the quality of how the project is delivering the outcomes, the project team will need to adjust scope, schedule and budget to satisfy the donor’s needs and expectations. To deliver the project scope on time and on budget is not enough, to achieve stakeholder satisfaction the project must develop a good working relationship with all stakeholders and understand their stated or implied needs.

1.3 **Outputs from Quality Planning Phase of a Project1. Quality management plan:**The quality management plan should describe how the project management team will implement its quality policy. In ISO 9000 terminology, it should describe the project quality system: "the organizational structure, responsibilities, procedures, processes, and resources needed to implement quality management".  
  
The quality management plan provides input to the overall project plan and must address quality control, quality assurance, and quality improvement for the project. The quality management plan may be formal or informal, highly detailed, or broadly framed, based on the needs of the project.  
  
**2. Operational definitions:**An operational definition describes, in very specific terms, what something is, and how it is measured by the quality control process. For example, it is not enough to say that meeting the planned schedule dates is a measure of management quality; the project management team must also indicate whether every activity must start on time, or only finish on time; whether individual activities will be measured or only certain deliverables, and if so, which ones. Operational definitions are also called *metrics* in some application areas.  
  
**3. Checklists:** A checklist is a structured tool, usually industry- or activity-specific, used to verify that a set of required steps has been performed. Checklists may be simple or complex. They are usually phrased as imperatives ("Do this!") or interrogatories ("Have you done this?"). Many organizations have standardized checklists available to ensure consistency in frequently performed activities. In some application areas, checklists are also available from professional associations or commercial service providers.  
  
**4. Inputs to other processes:**The quality planning process may identify a need for further activity in another area.

Quality assurance is all the planned and systematic activities implemented within the quality system to provide confidence that the project will satisfy the relevant quality standards. It should be performed throughout the project. Prior to development of the ISO 9000 Series, the activities described under *quality planning* were widely included as part of quality assurance.  
  
Quality assurance is often provided by a Quality Assurance Department or similarly titled organizational unit, but it does not have to be. Assurance may be provided to the project management team and to the management of the performing organization (internal quality assurance) or it may be provided to the customer and others not actively involved in the work of the project (external quality assurance).

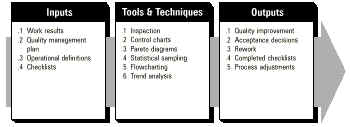


**Inputs to Quality Assurancea. Quality management plan**  
***b.*  Results of quality control measurements*.***

***c.* Operational definitions.   
  
Tools and Techniques for Quality Assurance1. Quality planning tools and techniques**  
  
**2. Quality audits.** A quality audit is a structured review of other quality management activities. The objective of a quality audit is to identify lessons learned that can improve performance of this project or of other projects within the performing organization. Quality audits may be scheduled or random, and they may be carried out by properly trained in-house auditors or by third parties such as quality system registration agencies. **Outputs from Quality AssuranceQuality improvement*.*** Quality improvement includes acting to increase the effectiveness and efficiency of the project to provide added benefits to the project stakeholders. In most cases, implementing quality improvements will require preparation of change requests or taking of corrective action and will be handled according to procedures for overall change control.

Quality control involves monitoring specific project results to determine if they comply with relevant quality standards and identifying ways to eliminate causes of un-satisfactory results. It should be performed throughout the project. Project results include both *product* results such as deliverables and *management* results such as cost and schedule performance. Quality control is often performed by a Quality Control Department or similarly titled organizational unit.  
  
The project management team should have a working knowledge of statistical quality control, especially sampling and probability, to help them evaluate quality control outputs. Among other subjects, they should know the differences between:

* Prevention (keeping errors out of the process) and inspection (keeping errors out of the hands of the customer).
* Attribute sampling (the result conforms or it does not) and variables sampling (the result is rated on a continuous scale that measures the degree of conformity).
* Special causes (unusual events) and random causes (normal process variation).
* Tolerances (the result is acceptable if it falls within the range specified by the tolerance) and control limits (the process is in control if the result falls within the control limits).

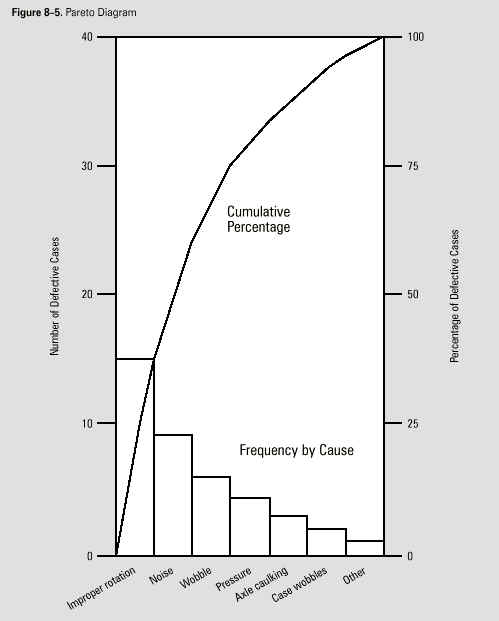


**Inputs to Quality Control1. Work results** include both *process* results and *product* results. Information about the planned or expected results (from the project plan) should be available along with information about the actual results.  
  
**2 Quality management plan.**  
  
**3. Operational definitions.**  
  
**4. Checklists*.***

**Tools and Techniques for Quality Control1. Inspection:** Inspection includes activities such as measuring, examining, and testing undertaken to determine whether results conform to requirements. Inspections may be conducted at any level (e.g. the results of a single activity may be inspected or the final product of the project may be inspected). Inspections are variously called reviews, product reviews, audits, and walk-throughs; in some application areas, these terms have narrow and specific meanings.  
  
**2. Control charts:** Control charts are a graphic display of the results, over time, of a process. They are used to determine if the process is "in control" (e.g. are differences in the results created by random variations or are unusual events occurring whose causes must be identified and corrected). When a process is in control, the process should not be adjusted. The process may be changedin order to provide improvements but it should not be adjusted when it is in control.  
  
Control charts may be used to monitor any type of output variable. Although used most frequently to track repetitive activities such as manufactured lots, control charts can also be used to monitor cost and schedule variances, volume and frequency of scope changes, errors in project documents, or other management results to help determine if the "project management process" is in control.

**3.Pareto diagrams:**A Pareto diagram is a histogram, ordered by frequency of occurrence, that shows how many results were generated by type or category of identified cause. Rank ordering is used to guide corrective action—the project team should act to fix the problems that are causing the greatest number of defects first. Pareto diagrams are conceptually related to Pareto’s Law, which holds that a relatively small number of causes will typically produce a large majority of the problems or defects.

**4. Statistical sampling:**Statistical sampling involves choosing part of a population of interest for inspection (e.g., selecting ten engineering drawings at random from a list of 75). Appropriate sampling can often reduce the cost of quality control. There is a substantial body of knowledge on statistical sampling; in some application areas, it is necessary for the project management team to be familiar with a variety of sampling techniques.  
  
**5. Flowcharting*.*** Flowcharting is used in quality control to help analyze how problems occurs. The flowcharting techniques in quality management generally include cause and effect diagrams and system or process flow charts. Flowcharting can help in anticipating probable quality problems and thus helps to develop approaches for dealing with them.



**6. Trend analysis:** Trend analysis involves using mathematical techniques to forecast future outcomes based on historical results. Trend analysis is often used to monitor:

* Technical performance—how many errors or defects have been identified, how many remain uncorrected.
* Cost and schedule performance—how many activities per period were completed with significant variances.

**Outputs from Quality Control**

**1. Quality improvement:** Quality improvement includes taking action to increase the effectiveness and efficiency of the project to be able to provide added benefits to the stakeholders of that project. In many cases, the implementation of quality improvements will require preparation of change requests or taking corrective actions and will be handled according to procedure for overall change control.

1. Recommended corrective actions
2. Organizational process assets updates
3. Project management plan updates.

**2. Acceptance decisions*.*** The items inspected will be either accepted or rejected. Rejected items may require rework.  
  
**3. Rework.**Rework is action taken to bring a defective or non-conforming item into compliance with requirements or specifications. Rework, especially unanticipated rework, is a frequent cause of project overruns in most application areas. The project team should make every reasonable effort to minimize rework.  
  
**4. Completed checklists.**When checklists are used, the completed checklists should become part of the project’s records.  
  
**5. Process adjustments.** Process adjustments involve immediate corrective or preventive action as a result of quality control measurements. In some cases, the process adjustment may need to be handled according to procedures for overall change control.

**2.1** **ECONOMIES OF SCALE (EOS)**

Economies of scale refer to economic efficiencies that result from carrying out a process on a larger scale. In a simple microeconomics nature, neoclassical theory is used to illustrate economies and diseconomies of scale.

Economies of scale happens due to size, output, or operation’s scale for an enterprise which give them cost advantages, where fixed costs are spread out over more units of output thus lowering down their cost per unit of output as the scale is increasing. In addition, Pukeliene and Maksyytiene, have stated that economies of scale are return of increasing production factors enabling to form competitive advantages in decreasing average fixed costs.

There are several factors directly involved in providing benefits to a company, especially in

term of EOS. The result shows that the contractors are still lacking in the awareness of its relationship towards the particular theory.

Factors of capital are given the major spotlight by the respondents. Besides the convenience of

using very own machineries, it can also able to be rented back to other contractors in need (as

services). Apparently, the similar trend might not visualize toward factor of buying material in bulk. Fixed price of the said materials and buying single handedly (alone) might not go well with the EOS. Perhaps and advisable that the smaller contractors can corporate with others to bulk-buy the materials in order to, get a discounted price. It is due to the fact that the benefit from the bulk buying is able to bring the advantage to the contractor as the material itself have their cost of service and certain percentage of scale buying.

On the other hand, surrounding industries which frequently supported the operational of contractors’ works in term of providing services and expertise were found to be significant towards achieving EOS. Although its’ positive impact comes rather indirectly (as according to the respondents), nevertheless the inclusion of those exacting factor is really helping the contractors to accomplish their job in timely manner (to a certain extent earlier than schedule) and further securing another job. This occasion was somewhat adhered to the underlying philosophy of EOS, which increasing output while lowering cost of project. Separately, for the division of labour, it was found that most contractors were adopting those factors.

Besides ensuring the smoothness of on-going construction projects, removing redundancy of labours and eliminating multiple works done by a single labour at the same time was paramount. The similar approach can be seen across different level of contractors’ grades, since it provides a positive impact on the company in terms of time and cost.

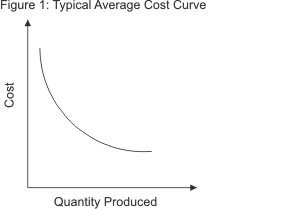
Apart, undoubtedly, research and development became one of the most considered factor by the contractors, albeit their difference in grade. They were strongly believed that in order for them to stay competitive and keep securing new jobs is through the particular factor. For a small contractor, maybe a small scale of research and development would suffice, but it is the other way round for a bigger contractor. To a certain magnitude, helping hand is required from expert persons (i.e. researchers), but it is not always an equivalent playing level especially for smaller contractors, where their plight is mostly being considered as minority. Last but certainly not least, the factors of administrative economy and loan facility. Those two factors were considered beneficial towards larger sized of contractors, although most of the respondents did not outweighs its contribution towards EOS. For instances, administrative economy needs helps from someone who are able to appreciate economy from the micro perspectives, and loan facilities basically rely on assets as collaterals. For majority of smaller contractors, these became their burdens as overheads were concerned.

In a nutshell, the results obtained were appropriately apprehended the issue that being forwarded in the research, as a preliminary observation. Since there are quite a number of shortcomings (e.g. the distributional number of respondents, and the research’ scopes), at least the findings from the research might shed some light pertaining the issue and paved the way for subsequent research, in order to find collective solution especially for our indigenous contractors (at all levels) through the EOS’s theory.

This is the idea that, as a company grows, it makes more of a product. The average cost of making each item then falls, so profits rise. Similarly, if a store buys more of an item, it can negotiate a discount from the wholesaler, and it can sell the item cheaper than its rivals. Economists call this "economies of scale."

Economies of scale are cost savings that occur as a result of making more of a product. The Economist defines them as, "Factors that cause the average cost of producing something to fall as the volume of its output increases."

In other words, a company can increase its profits by making its production processes more efficient, rather than by increasing the price of a product.



This basic principle has been the driving force behind many major economic developments, such as the industrial revolution and mass production. And it is why bigger companies are often more efficient and can deliver goods and services at a low price, yet still make a healthy profit.

Think of how Ford's assembly line changed the face of car manufacturing, for instance. And consider how Walmart's "everything under one roof" style and immense purchasing power allows it to beat its competitors on price.

**Internal Economies of Scale**

Internal economies of scale are cost-saving factors that are specific to organizations, regardless of the industry or environment that they operate in. There are five types of internal economies of scale:

**1. Technical**

You can achieve technical economies of scale through improving the efficiency and the size of your production process. Here are some examples:

* Dividing your production process
* Into separate tasks can increase productivity, and your workers will likely become more specialized and efficient. Also, you can slash unit costs by using mass production techniques, such as specialist machinery, despite the initial capital investment that's needed.
* Building on the experience of what you do. Processes become more efficient through greater knowledge and research and, as a result, your average costs of production fall.
* Taking advantage of the law of increased dimensions, or "cubic law." This promotes economies of scale in industries such as transport and logistics. If you double a container's length and height, for instance, its capacity increases 400 percent. Think of supertankers or Amazon's huge warehouses.

**2. Purchasing**

Bulk buying can cut costs dramatically, as in the brochure example, above. If you're a large manufacturer, for example, you have more bargaining power than your smaller competitors have to negotiate lower prices with your suppliers.

Bigger firms can also get better delivery rates, because they require more products to be moved. Efficient inventory and stock management is another way to reduce average unit costs, by not paying for, or unnecessarily holding on to, component parts in store.

**3. Managerial**

You can achieve managerial economies of scale by investing in expertise as your organization grows. Specialist managers who oversee and improve production systems can streamline processes and increase productivity, resulting in lower average unit costs and economies of scale.

**4. Financial**

Larger organizations often have better credit ratings than smaller ones, because they have more assets to use as collateral. This means that they can borrow more cheaply in order to finance investment and realize greater economies of scale. They then reap further rewards from their investment because the lower interest rates they are offered mean that it costs them less to borrow.

Companies that are quoted on the stock market have further access to new finance, and thus to even greater economies of scale through the sale of equities or shares.

**5. Risk-Bearing**

The more a company diversifies its activities and spreads its costs, the less overall risk it assumes in any one line of business and the lower its unit costs will be.

The ability to take the risk of carrying out complicated and expensive research is another benefit for large firms. Big pharmaceuticals companies, for example, are able to profit from this aspect of economies of scale. Bigger companies can also afford to market and advertise their products more effectively.

**External Economies of Scale**

External economies of scale occur where a company gains advantages as a result of events and developments in the industry as a whole, and in the external environment.

Here are some examples:

* Industry growth may allow you access to specialist or lower-cost suppliers.
* Low demand and large supply may bring down the cost of your supplies.
* Where many similar companies operate in the same area as you, there may be a bigger pool of pre-trained people to recruit from.
* Industry infrastructure may already be in place to support your organization's growth.
* Training facilities may be available.
* A good transportation network may be available.
* Improved technology may drive down all your costs.

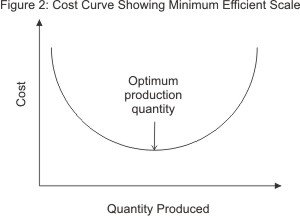
**Diseconomies of Scale**

All of these economies of scale can occur as your company grows, and increases its production. But what happens if it grows too much? Very large companies sometimes suffer from decreased efficiency. They may have once had efficient labor specialization, but now there are simply too many people doing the same thing.

Too many layers of management, too little control, too many locations, and too many products are all potential sources of "diseconomies" of scale. There's a point at which average costs stop falling as production increases, which may also be the point at which costs start to rise as a result of this inefficiency. This point is the company's Minimum Efficient Scale. No further economies of scale can be achieved beyond this point.

This is illustrated in the U-shaped curve shown in Figure 2, below.

The bottom of the curve is the optimal place to be. At production volumes higher than this, the company's size is no longer an advantage.



Companies can reduce their average unit costs and increase their profits by taking advantage of the opportunities that come from larger size and increased output.

They can also create many internal opportunities simply by growing. And sometimes the external environment also provides economies of scale, based on factors such as industry size or geographic location.

Organizations must be careful about outgrowing their economies of scale and getting too big. Average unit costs usually decrease with increased output, but only to a certain point. After that point, costs may begin to rise again as the company creates unwanted inefficiencies.

2.2 PV=R250,000 EV=R175,000

AC= R275,000 BAC=R600,000

2.2.1 **Schedule Variance (SV)** measures the schedule performance on a project. It is the difference between the EV and PV. The negative value is an indication that the project is behind schedule according to (Reiss 1992)

SV=EV-PV

SV= R175,000-R250,000 **SV=R-75,000** The Project is behind schedule since the variation is negative.

2.2.2 **Cost variance (CV)** measures the cost performance on a project. It is the difference between EV and AC. The negative answer shows that the project is over budget according to (Nicholas and Steyn 2008).

Cost Variance = EV-AC

CV=R175,000-R275,000 **CV=R-100,000** The project is over budget since the variation is negative.

2.2.3 **Schedule Performance Index (SPI)** measures schedule efficiency on a project. It is calculated as follows EV/PV X 100

When performance indexes are used: 100% means right on schedule; <100% means less efficient than planned; and >100% means more efficient than planned according to (Newton 2006) et.al)

Schedule Performance Index= EV/PV

SPI=R175,000/R250,000 X 100 =0.7X100 **SPI =70%**

The project is behind schedule since only 70% of what was planned was accomplished.

2.2.4 **Cost Performance Index (CPI)** measures cost efficiency on a project according to (Verzuh 199). It is calculated as follows: **EV/AC X 100**

CPI=R175,000/R275,000 X 100 **CPI = 63.64%**

The project is over budget since only R0.63 worth of results was received for every Rand spent.

2.2.5 **Estimate to complete (ETC):** refers to the expected cost required to complete the remaining work for the project (Kor and Wijnen 2007).

Assuming that the performance will have same efficiency as past performance, it is calculated as follows:

(BAC) -EV

CPI

(R600,000)-R175,000 X 63.64% =**R667,819**

2.2.6 EAC is the expected total cost of the project when thedefined scope of work will be completed. It is calculated as follows

= 275000+ 667819= **R94,2819**

2.3 **SV=R-75,000** The Project is behind schedule since the variation is negative.

**CV=R-100,000** The project is over budget since the variation is negative.

**SPI =70%**The project is behind schedule since only 70% of what was planned was accomplished

**CPI = 63.64%**The project is over budget since only R0.64 worth of results was received for every Rand spent.

**Estimate to complete (ETC):** The cost to complete the remaining work for the project is R667 819 which is even greater than the original cost of the entire project.

**Estimate at completion (EAC):** Since the cost efficiency is only about two thirds of the plan, unless there is greater efficiency, it can be expected that the company would have to pay just over 1½ times the original estimate.

**3.** Managing risks on projects is a process that includes risk assessment and a mitigation strategy for those risks. *Risk assessment* includes both the identification of potential risk and the evaluation of the potential impact of the risk. A *risk mitigation plan* is designed to eliminate or minimize the impact of the *risk events*—occurrences that have a negative impact on the project. Identifying risk is both a creative and a disciplined process. The creative process includes brainstorming sessions where the team is asked to create a list of everything that could go wrong. All ideas are welcome at this stage with the evaluation of the ideas coming later.

**Risk Identification**

A more disciplined process involves using checklists of potential risks and evaluating the likelihood that those events might happen on the project. Some companies and industries develop risk checklists based on experience from past projects. These checklists can be helpful to the project manager and project team in identifying both specific risks on the checklist and expanding the thinking of the team. The past experience of the project team, project experience within the company, and experts in the industry can be valuable resources for identifying potential risk on a project.

Identifying the sources of risk by category is another method for exploring potential risk on a project. Some examples of categories for potential risks include the following:

* Technical
* Cost
* Schedule
* Client
* Contractual
* Weather
* Financial
* Political
* Environmental
* People

The people category can be subdivided into risks associated with the people. Examples of people risks include the risk of not finding the skills needed to execute the project or the sudden unavailability of key people on the project. David Hillson[1](https://pm4id.org/chapter/11-2-risk-management-process/#fn1) uses the same framework as the work breakdown structure (WBS) for developing a ***risk breakdown structure (RBS)***. A risk breakdown structure organizes the risks that have been identified into categories using a table with increasing levels of detail to the right.

**Risks in RGI**

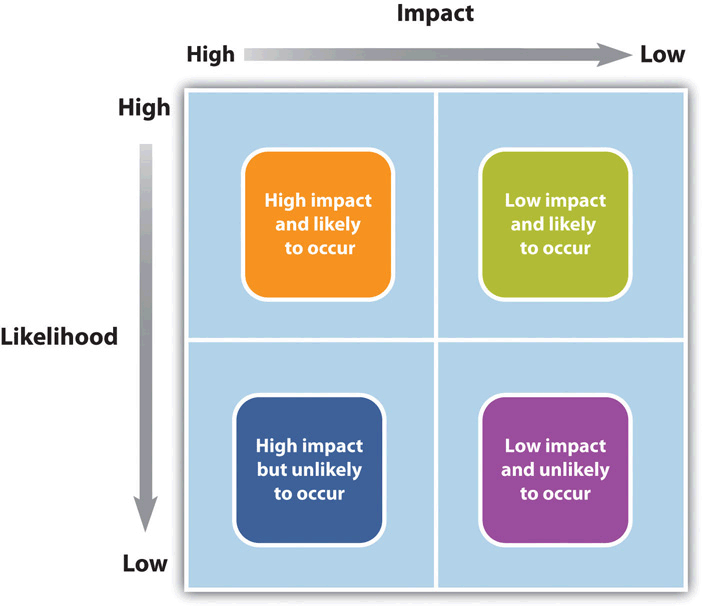
In RGI move, Blaine makes a list of things that might go wrong with his project and uses his work breakdown structure as a guide. The result is a clearer understanding of where risks are most concentrated. Blaine’s approach helps the project team identify known risks, but can be restrictive and less creative in identifying unknown risks and risks not easily found inside the work breakdown structure.

**Risk Evaluation**

After the potential risks have been identified, the project team then evaluates the risk based on the probability that the risk event will occur and the potential loss associated with the event. Not all risks are equal. Some risk events are more likely to happen than others, and the cost of a risk event can vary greatly. Evaluating the risk for probability of occurrence and the severity or the potential loss to the project is the next step in the risk management process.

Having criteria to determine high impact risks can help narrow the focus on a few critical risks that require mitigation. For example, suppose high-impact risks are those that could increase the project costs by 5% of the conceptual budget or 2% of the detailed budget. Only a few potential risk events met these criteria. These are the critical few potential risk events that the project management team should focus on when developing a project risk mitigation or management plan. Risk evaluation is about developing an understanding of which potential risks have the greatest possibility of occurring and can have the greatest negative impact on the project. These become the critical few.

**Risk and Impact**



There is a ***positive correlation***—both increase or decrease together—between project risk and project complexity. A project with new and emerging technology will have a high-complexity rating and a correspondingly high risk. The project management team will assign the appropriate resources to the technology managers to assure the accomplishment of project goals. The more complex the technology, the more resources the technology manager typically needs to meet project goals, and each of those resources could face unexpected problems.

Risk evaluation often occurs in a workshop setting. Building on the identification of the risks, each risk event is analyzed to determine the likelihood of occurring and the potential cost if it did occur. The likelihood and impact are both rated as high, medium, or low. A risk mitigation plan addresses the items that have high ratings on both factors—likelihood and impact.

**Risk Analysis of Equipment Delivery**

A project team analyzed the risk of some important equipment not arriving to the project on time. The team identified three pieces of equipment that were critical to the project and would significantly increase the costs of the project if they were late in arriving. One of the vendors, who was selected to deliver an important piece of equipment, had a history of being late on other projects. The vendor was good and often took on more work than it could deliver on time. This risk event (the identified equipment arriving late) was rated as high likelihood with a high impact. The other two pieces of equipment were potentially a high impact on the project but with a low probability of occurring.

Not all project managers conduct a formal risk assessment on the project. One reason, as found by phenomenological study of project managers, was a low understanding of the tools and benefits of a structured analysis of project risks. The lack of formal risk management tools was also seen as a barrier to implementing a risk management program. Additionally, the project manager’s personality and management style play into risk preparation levels. Some project managers are more ***proactive*** and will develop elaborate risk management programs for their projects. Other managers are *reactive* and are more confident in their ability to handle unexpected events when they occur. Yet others are ***risk averse***, and prefer to be optimistic and not consider risks or avoid taking risks whenever possible.

On projects with a low complexity profile, the project manager may informally track items that may be considered risk items. On more complex projects, the project management team may develop a list of items perceived to be higher risk and track them during project reviews. On projects with greater complexity, the process for evaluating risk is more formal with a risk assessment meeting or series of meetings during the life of the project to assess risks at different phases of the project. On highly complex projects, an outside expert may be included in the risk assessment process, and the risk assessment plan may take a more prominent place in the project execution plan.

On complex projects, statistical models are sometimes used to evaluate risk because there are too many different possible combinations of risks to calculate them one at a time. One example of the statistical model used on projects is the Monte Carlo simulation, which simulates a possible range of outcomes by trying many different combinations of risks based on their likelihood. The output from a Monte Carlo simulation provides the project team with the probability of an event occurring within a range and for combinations of events. For example, the typical output from a Monte Carlo simulation may reflect that there is a 10% chance that one of the three important pieces of equipment will be late and that the weather will also be unusually bad after the equipment arrives.

**Risk Mitigation**

After the risk has been identified and evaluated, the project team develops a risk mitigation plan, which is a plan to reduce the impact of an unexpected event. The project team mitigates risks in the following ways:

* Risk avoidance
* Risk sharing
* Risk reduction
* Risk transfer

Each of these mitigation techniques can be an effective tool in reducing individual risks and the risk profile of the project. The risk mitigation plan captures the risk mitigation approach for each identified risk event and the actions the project management team will take to reduce or eliminate the risk.

***Risk avoidance*** usually involves developing an alternative strategy that has a higher probability of success but usually at a higher cost associated with accomplishing a project task. A common risk avoidance technique is to use proven and existing technologies rather than adopt new techniques, even though the new techniques may show promise of better performance or lower costs. A project team may choose a vendor with a proven track record over a new vendor that is providing significant price incentives to avoid the risk of working with a new vendor. The project team that requires drug testing for team members is practicing risk avoidance by avoiding damage done by someone under the influence of drugs.

***Risk sharing*** involves partnering with others to share responsibility for the risk activities. Many organizations that work on international projects will reduce political, legal, labor, and others risk types associated with international projects by developing a joint venture with a company located in that country. Partnering with another company to share the risk associated with a portion of the project is advantageous when the other company has expertise and experience the project team does not have. If the risk event does occur, then the partnering company absorbs some or all of the negative impact of the event. The company will also derive some of the profit or benefit gained by a successful project.

***Risk reduction*** is an investment of funds to reduce the risk on a project. On international projects, companies will often purchase the guarantee of a currency rate to reduce the risk associated with fluctuations in the currency exchange rate. A project manager may hire an expert to review the technical plans or the cost estimate on a project to increase the confidence in that plan and reduce the project risk. Assigning highly skilled project personnel to manage the high-risk activities is another risk reduction method. Experts managing a high-risk activity can often predict problems and find solutions that prevent the activities from having a negative impact on the project. Some companies reduce risk by forbidding key executives or technology experts to ride on the same airplane.

***Risk transfer*** is a risk reduction method that shifts the risk from the project to another party. The purchase of insurance on certain items is a risk transfer method. The risk is transferred from the project to the insurance company. A construction project in the Caribbean may purchase hurricane insurance that would cover the cost of a hurricane damaging the construction site. The purchase of insurance is usually in areas outside the control of the project team. Weather, political unrest, and labor strikes are examples of events that can significantly impact the project and that are outside the control of the project team.

**Contingency Plan**

The project risk plan balances the investment of the mitigation against the benefit for the project. The project team often develops an alternative method for accomplishing a project goal when a risk event has been identified that may frustrate the accomplishment of that goal. These plans are called contingency plans. The risk of a truck drivers’ strike may be mitigated with a contingency plan that uses a train to transport the needed equipment for the project. If a critical piece of equipment is late, the impact on the schedule can be mitigated by making changes to the schedule to accommodate a late equipment delivery.

Contingency funds are funds set aside by the project team to address unforeseen events that cause the project costs to increase. Projects with a high-risk profile will typically have a large contingency budget. Although the amount of contingency allocated in the project budget is a function of the risks identified in the risk analysis process, contingency is typically managed as one-line item in the project budget.

Some project managers allocate the contingency budget to the items in the budget that have high risk rather than developing one-line item in the budget for contingencies. This approach allows the project team to track the use of contingency against the risk plan. This approach also allocates the responsibility to manage the risk budget to the managers responsible for those line items. The availability of contingency funds in the line item budget may also increase the use of contingency funds to solve problems rather than finding alternative, less costly solutions. Most project managers, especially on more complex projects, will manage contingency funds at the project level, with approval of the project manager required before contingency funds can be used.

* Risk management is a creative process that involves identifying, evaluating, and mitigating the impact of the risk event.
* Risk management can be very formal, with defined work processes, or informal, with no defined processes or methods. Formal risk evaluation includes the use of checklists, brainstorming, and expert input. A risk breakdown structure (RBS) can follow the work breakdown structure (WBS) to identify risk by activity.
* Risk evaluation prioritizes the identified risks by the likelihood and the potential impact if the event happens.
* Risk mitigation is the development and deployment of a plan to avoid, transfer, share, and reduce project risk. Contingency planning is the development of alternative plans to respond to the occurrence of a risk event.

**Risk Management Implementation Strategy**

**Objective**

To enable the RobustAm Global Industries (RGI) to identify, assess, treat, monitor and report on risks consistent with an

Agency -wide risk management approach.

**Strategies to achieve this objective are:**

1.To develop and implement an agency-wide risk management process for the identification and

management of risks.

2.To promote the RobustAm Global Industries (RGI) risk management approach through education and awareness

sessions.

3.To identify options for the ongoing management of risks throughout the agency.

**Background**

The primary purpose of a structured risk management approach is to have a transparent process which demonstrates management’s decision making regarding the acceptant/non-acceptance of risks. Risk is defined in AS/NZS ISO 3100:2009 as “The effect of uncertainty on objectives”. It is measured in times of likelihood and consequences.

Managers should consider the possibility of risks occurring and should apply risk treatment options to ensure that the uncertainty of their agency meeting its objectives will be avoided, reduced, removed or modified and/or retained.

Good risk management contributes to the achievement of RobustAm Global Industries (RGI) objectives through the

continuous review of its processes and systems. Risk management needs to be integrated with

RobustAm Global Industries (RGI) governance framework and become a part of its planning processes, at both the operational and strategic level.

**Steps in implementation**

**1.**

**Support of Senior Management:** The process of risk management assists decision makers to make informed choices, identify priorities and select the most appropriate action.

Development of an organizational risk management philosophy and awareness of risk at senior levels.

The Accountable Officer or Authority shall ensure that there are procedures in place for the periodic identification, assessment and treatment of risks inherent in the operations of the department or statutory authority, together with suitable risk management policies and practices, and that these are documented in the accounting manual or other relevant policy manuals.

Strategy

•**Leadership Commitment:** It is understood that he CEO has committed the agency to the implementation of risk management

•**Sponsor:** It is proposed that job title sponsor the initiative and that a Risk Management Coordinator assist him/her to facilitate the process.

The sponsor’s responsibilities are to ensure that an effective risk management system is established, implemented and maintained, and that the performance of the system is report to

RobustAm Global Industries (RGI) executive for review and as a basis for improvement.

•**Awareness:** A briefing will be provided to the corporate executive. This will be extended to include education and training to impart a good understanding of the risk management process, its rationale and program for implementation.

•**Executive Support**: Communication from the CEO will be requested to notify all executive members of his/her commitment and the need to provide their full support to the process to achieve Treasurer’s Instruction 825 compliance and other beneficial outcomes.

**2.**

**Development of the Risk Management Framework**

Strategy

•**Policy:** A suggested policy has been drafted and will be reviewed jointly by the sponsor and

Risk Management Coordinator for inclusion of:

* 1. Objectives and rationale for managing risk;
  2. Links with RobustAm Global Industries (RGI) strategic and operational plans;
  3. The extent and range of issues to which it applies;
  4. Guidance on acceptable risk;
  5. Responsibilities and accountabilities for managing risks;
  6. Support and expertise available;
  7. Documentation requirements;
  8. Performance review plans.

The final policy will need to be presented to the executive for consideration and endorsement

**Risk Cover Risk Management Guidelines**

•

**Risk Reference Tables**

Providing guidance on acceptability of risks will require development of risk reference tables

relevant to RobustAm Global Industries (RGI). They will address the rating of controls, likelihood, consequences

and level of risk for application in the risk management process throughout the agency.

Use of the risk reference tables is critical to provide uniform measuring standard for risk and the

means to aggregate and prioritize risks across the agency as a whole. The consequences and level of risk tables effectively provides executive and managers with risk acceptance guidance.

Risk reference tables will be developed by the parties reviewing the policy and will similarly be

presented to executive for consideration and endorsement.

**3.**

**Communication/Education**

Strategy

•**Risk Management Committee:** Formation of a Risk Management Committee, including the

sponsor and Risk Management Coordinator to develop, establish and implement arrangement to ensure that managing risk becomes an integral part of planning, management process and general culture of RobustAm Global Industries (RGI) and to ensure that desired outcomes are achieved.

The Committee will be responsible for:

* 1. Communicating the policy;
  2. Raising awareness about managing risks;
  3. Communications and dialogue about the practical issues in managing risks and application of the policy;
  4. The acquisition of risk management skills and their development throughout the agency;
  5. A performance management process;
  6. A process for recognition, rewards and sanctions;
  7. Development of the risk management documentation including manual templates, forms and risk register.

The committee will be instrumental in the next three phases.

**4.**

**Managing Risks at the Strategic Level**

Strategy

•**Program Development:** The committee will develop and establish a program for managing risks at the strategic level. This will include documentation of the strategic, agency and risk management context and the framework and timetable for the identification and ongoing management of strategic risks.

•**Risk Identification:** This step is to address strategic risks identified in the:

1. Strategic performance review
2. Stakeholder profile
3. External and internal environmental analysis
4. SWOT analysis
5. Strategy formulation
6. Strategy implementation

The identified risks will be assessed and evaluated using the risk reference tables

.

•**Risk Prioritization:** Identified risks will be listed and prioritized by level of risk for executive review and consideration.

•**Treatment of Risks:** Risks will be treated in accordance with priorities, existing management processes and by the officers indicated by the level of risk. Treatment plans will be developed and actioned according to priorities.

5.

**Managing Risks at Business Unit Level: Divisional, Program, Project and Team**

Strategy

•**Program Development:** The committee will develop and establish a program to manage operational risks, including insurable risks, at these levels following the same core process as above and integrating with

planning and management activities.

•**Risk Identification Workshops:** Workshops will be scheduled and facilitated by the agency, to identify, assess and evaluate risks using the risk reference tables.

•**Risk Aggregation and Prioritization:** Risks identified will be aggregated into prioritized lists according to agency structure and arranged in descending level of risk and adequacy of existing controls rating with risk acceptance decisions.

•**Treatment of Risks:** Risks will be treated in accordance with priorities, existing management processes and by the officers indicated by the level or risk. Treatment plans will be developed and actioned according to priorities.

•**Risk Register:** A register will be created to hold the risk listings, decisions and treatment summaries including strategic risks from Step 4.

6.

**Monitoring and Review**

**Strategy**

• **Development of Indicators:** The committee will develop and apply appropriate mechanisms

and indicators to ensure the ongoing review of risks to satisfy agency and Treasurer’s Instruction825 requirements. They will also ensure by monitoring and review that the risk management process is efficient and effective in meeting the objectives set out in the policy

Appropriate frequencies of monitoring will be determined.

•**Risk Reporting:** The committee will need to receive risk documentation and participate in the risk management process to ensure its efficiency and effectiveness. It will maintain the RobustAm Global Industries (RGI) risk register and ensure working papers and trails are preserved for audit purposes.

•**Whole of Agency Reviews:** The committee will recommend to executive appropriate frequencies for risk management reviews according to risk criteria, level of risk and possible consequences.

•**Loss Performance and Incident Reporting:** The committee will monitor and review any losses, however financed, or other incidents and make recommendations for improved risk treatment, where appropriate, through existing management structures.

•**Risk Auditing:** The risk management process is a management process which must be audited to verify compliance with Treasurer’s Instruction 825 and for reasons of governance and prudence. The agency auditors should perform and annual risk audit to check the application of the risk

management process, its adequacy, the treatment of identified risks and the maintenance of the

risk register.

**Implementation Schedule-example**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Step | What? | How? | | When? | Who? |
| 1. | Support of Senior  Management | •Produce briefing paper  And  implementation plan  •Briefing to executive  •Obtain executive sign  -off | | Sept 2016 | RM Coordinator |
| 2. | Development  of policy | Formation of Risk Management Committee  (including documented terms of reference)  •Draft policy  •Draft Risk  Reference Tables  •Determine roles and responsibilities  •Determine individual  and  corporate KPIs  •Obtain executive sign  -off | | Sept 2016 | RM Coordinator  and  RM Committee |
| 3. | Communicating  the Policy | •Arrange RM awareness sessions  •Distribute policy, procedure and  risk reference  tables  •Ensure all managers understand their  responsibilities in managing risk  –modify JDFs  where appropriate. | | Oct 2016 | RM Coordinator  and  RM Committee |
| 4. | Managing  Risks at  Strategic Level  (Agency) | Develop a program plan i.e. develop a framework  And procedure for identifying  And managing  strategic risks  and obtain executive sign  -off  • Identify, assess and prioritize risks as part of  strategic planning session.  • Treat risks  –develop risk reduction strategies as  part of strategic planning session.  • Monitor and review risks and risk reduction  strategies as part of regular strategic management  process | | 2016 | Executive with  assistance from RM  Coordinator |
| 5. | Managing risks  at Business  Unit level | •Develop a program plan ie develop and agree framework and procedure for identifying and managing operational risks and reporting  requirements | | Oct 2016 | Rm Coordinator  and RM Committee  endorsed by  Executive |
|  |  | Identify, assess and prioritize risks as part of  operational planning session or dedicated  workshop  •Treat risks –  develop risk reduction strategies as  part of strategic planning session | Oct 2016 | | Business Unit  management team |
| 7. |  | •Develop risk reduction strategies as part of regular  operational management process  •Monitor and review risks and risk reduction  strategies as part of regular operational  management process  •Report risks and treatment strategies quarterly to  RM committee as required by program plan | | From Oct  2016  monthly –  at management  meetings | Business Unit  management team |
|  |  | •Develop risk reduction strategies as part of regular  operational management process  •Monitor and review risks and risk reduction  strategies as part of regular operational  management process  •Report risks and treatment strategies quarterly to  RM committee as required by program plan | |  |  |
| 6. | Risk Auditing | Develop  And agree an audit plan to ensure the effectiveness of the RM process and the management of key risks | | 2016 | RM Coordinator/  Executive/Audit |
|  |  | •Implement the audit plan | | Annually | Audit Manager |

**Question 4.**

**Low Bidder Dilemma:** There is little argument about the importance of the price tag to the proposal. The question is, what price will win the job? The decision process that leads to the final price of your proposal is highly complex with many uncertainties. Yet proposal managers, driven by the desire to win the job, may think that a very low-priced proposal will help. But winning is only the beginning. Companies have short- and long-range objectives on profit, market penetration, new product development, and so on. These objectives may be incompatible with or irrelevant to a low-price strategy.

For example: A suspiciously low price, particularly on cost-plus type proposals, might be perceived by the customer as unrealistic, thus affecting the bidder’s cost credibility or even the technical ability to perform. The bid price may be unnecessarily low, relative to the competition and customer budget, thus eroding profits. The price may be irrelevant to the bid objective, such as entering a new market. Therefore, the contractor has to sell the proposal in a credible way, e.g., using cost sharing. Low pricing without market information is meaningless. The price level is always relative to (1) the competitive prices, (2) the customer budget, and (3) the bidder’s cost estimate.

The bid proposal and its price may cover only part of the total program. The ability to win phase II or follow-on business depends on phase I performance and phase II price.

The financial objectives of the customer may be more complex than just finding the lowest bidder. They may include cost objectives for total system life-cycle cost (LCC), for design to unit production cost (DTUPC), or for specific logistic support items. Presenting sound approaches for attaining these system cost– performance parameters and targets may be just as important as, if not more important than, a low bid for the system’s development. Further, it is refreshing to note that in spite of customer pressures toward low cost and fixed price, the lowest bidder is certainly not an automatic winner. Both commercial and governmental customers are increasingly concerned about cost realism and the ability to perform under contract. A compliant, sound, technical and management proposal, based on past experience with realistic, well-documented cost figures, is often chosen over the lowest bidder, who may project a risky image regarding technical performance, cost, or schedule.

**This Procurement Guidance relates to Abnormally Low**

Bids and Proposals. In World Bank (Bank) procurement, this means Abnormally Low Bids or Abnormally Low Proposals that arise when procuring Goods, Works or Non-consulting services funded through Bank Investment Project Financing (IPF). The purpose of this guidance is to provide a structured approach for Borrowers to identify, clarify, and treat ALBs. The Procurement Regulations provide the following definition: “An Abnormally Low Bid/Proposal is one in which the Bid/Proposal price, in combination with other elements of the Bid/Proposal, appears so low

that it raises material concerns with the Borrower as to the capability of the Bidder/Propose

r to perform the contract for the offered price.” Examples of how a Bid/Proposal (hereafter Bid) may appear Abnormally Low include:

a)When it is compared with the Borrower’s cost estimate for the contract if there is no ability to compare to market prices;

b) When it is compared with all other Substantially Responsive Bids;

c) When it does not appear to provide margin for profit; and

d) Where the low price cannot be explained by, for example:

I. The economy of the selected constructions method, or

II.The technical solution chosen.

For Goods, Works and Non-consulting services, the World Bank Standard Procurement Document (SPD) contains an ALB instruction to Bidder/proposer (hereafter Bidder). If the Borrower uses an SPD with the ALB instruction they shall check if the Bid price is Abnormally Low and make use of the ALB clauses in the SPD. While it is expected that in all contract award decisions, the Borrower will undertake reasonable due diligence to ensure the Bidder is capable of performing the contract, in the case of a suspected ALB, there is a requirement to undertake enhanced due diligence on the Bid. While an Abnormally Low Bid may appear to represent good value, it can result in greater overall costs, contract delays or even the collapse of a contract. In other terms, accepting ALBs has the potential to put the contract in jeopardy, as ALBs are often submitted by

contractors that may not be able to complete their work as priced or they may simply have made errors in their Bids and be unable to complete the work at that price. Public authorities must then spend time and money managing a poorly performing contractor, or finding a new contractor to complete the job.

A number of steps can be taken to reduce the potential for an ALB – these typically constitute

‘best practice’. The risk of receiving an ALB are reduced if the following have been adequately

addressed:

a) Adequate market research and planning through the Project Procurement Strategy for Development (PPSD);

b) High quality selection documentation (particularly adequate technical specifications and terms of reference);

c) Borrower engages with the market adequately to encourage a competitive response and to ensure clarity of the requirements;

d)A sufficient period is allowed for the preparation of Bids;

e) Borrower issues adequate and timely responses to clarification requests;

f) Borrower undertakes a prequalification phase, where appropriate;

g) Borrower ensures qualification criteria are adequate and appropriate; and

h) Borrower maintains an updated prices data base and prepares a realistic cost estimate.

However, even if all of the above have been satisfactorily addressed and/or considered, there still remains a possibility that a Bidder may, intentionally or inadvertently, submit an ALB.

The process of establishing whether a Bidder is capable to perform a contract within its total evaluated Bid price can be highly complex and subjective, particularly for design and build type

contracts, and in instances where Bank clients do not have the necessary in-house capability and expertise, clients may require the input of independent consultants with technical knowledge and experience relevant to the specification.

If the Bidder is unable to show they can complete the contract for the Bid price, then subject to the Banks Prior Review, the Bid must be rejected.

Bidders whose Bids are rejected due to an ALB will not forfeit their Bid security due to them

low Bid.

There are five stages to treatment of an ALB:

1.Identify: The Borrower identifies a potential ALB based on comparison with available prices from the market, or with the cost estimate;

2.Clarify: The Borrower seeks clarification from the Bidder/proposer (hereafter the Bidder);

3.Justify: The Bidder prepares a justification of their price based on the request from the Borrower;

4.Verify: The Borrower fully analyzes the Bidder’s justification to verify if it is an ALB; and

5.Decide: The Borrower fully documents the decision to accept or reject the Bid with the

Bank’s no-objection.