

Fire system for commercial center

Team Members	
Mohamed Abdullah Baqader	2021200011
Rayan Mohammad Alhashmi	2021202526
Adel Metgan Al-Mohammadi	22021202954
Adnan Metgan Al-Mohammadi	2021200680
Tarek Essa Hakkami	2021203741
Mira Hassan Hamed Ali	2021200201
Fawzia Sowailim Almotari	2021200860
Bandar Talal H.Alhashmi	2021200701

Advisor: Dr. Waleed Suliman
2021- 1442



Table Of Content

Contents	Page No.
Strategy	6
Governance, structure and process	10
Compliance, standards and regulations	13
Power And Interest	15
Culture and Values	19
Self-reflection and self- management	20
Personal integrity and reliability	21
Personal communication	23
Leadership	31
Teamwork	34
Conflict and crisis	35
Resourcefulness	42
Negotiations	44
Project Design	46
Requirements and objectives	52
Scope	54
Time	61
Quality	66
Finance	68
Resources	69
Procurement	70
Plan and control	73
Risk and opportunities	80
Stakeholder	86

List of Tables

No.	Table Name	Page
1	SMART	7
2	Lead and Lag	8
3	Project Charter	9
4	Check List	14
5	Project Stage	14
6	Stakeholder Register	16
7	Power and Interest	17
8	Communication matrix	29
9	Stakeholder Assessment Matrix	30
10	RACI	34
11	Negotiation	44
12	The relationship between the sections of the project management triangle	48
13	Collection	53
14	Check list	53
15	Stakeholder engagement	88

List of Figures

No.	Figures Name	Page	No.	Figures Name	Page
1	Lead And Lag	8	23	PBS	60
2	Organization Structure	10	24	Critical Path	64
3	PMO Model	13	25	Gant Chart	65
4	Power/ interest	17	26	Quality	66
5	Stakeholder logical	18	27	SIPOC	67
6	Logical check progress	18	28	ISHIKAWA	68
7	Organization culture	20	29	Cost	69
8	SWAT	21	30	Procurement	72
9	Behavioral impact	22	31	Change request	78
10	Communication Management Plan	24	32	Change request	80
11	Communication process	28	33	Heat Map	85
12	Leadership Style	32	34	Lessons learned	85
13	Scenario 1	38			
14	Scenario 2	38			
15	Scenario 3	39			
16	Crushing/ Fast tracking	43			
17	Constraint	46			
18	Triple constrain	47			
19	WBS	50			
20	WBS Illustrate	51			
21	Transability Matrix	52			
22	Hierarchical structure	54			

Introduction

The fire systems help save lives as they act as a formulated and potential system to ensure support and security for the departments. Fire systems offer tremendous service to severe situations to save life and property (Hurley et al., 2015). The present investigation formulated the strategy, governance structure, compliance power and interest, self-reflection and management, personal integrity, personal communication, leadership, conflicts, negotiations, project design, scope, quality, resource, plan control and stakeholders for FireSafetySystem. The potency of the system is smart to prevent fire from starting and security against loss of life in case a fire does start, in addition, to extinguish fire service with alarm plan.

1.Strateg

1.1 Project mission: To build and construct new fire systems to meet civil defense requirements in Saudi Arabia by providing reliable and sustainable integrated fire systems.

1.2 Project vision: The Fire System and Installation works with a vision to promote stakeholders and others to have perfect fire installation systems with infusion of innovation tech.

1.3 SMART Objective:

S SPECIFIC	Implement fire system in Commercial Center
M MEASURABLE	The goal is to improve the fire system inside Commercial Center
A ACHIEVABLE	-Install and commission Fire sprinklers -Fire detection and alarm -Special hazards systems, such as clean agents, water mist, or CO ²
R RELEVANT	Eliminate the incident and reduce the loss to the minimum
T TIME-BOUND	By December 2022 the project will be finished

Table 1 (SMART)

By December 2022, implement fire system in Commercial Centre by identifying the top reasons of causing a fire that will eliminate the incident and reduce the loss to the minimum with improving the fire system inside Commercial Centre.

1.4 Key Performance Indicators (KPI's):

The KPIs for the project are Safety, Quality, Schedule and Cost Strategies are given below:

- i. Safety – Zero Loss Time Injury (LTI)
- ii. Quality – To approach and make sure project follow NFPA and Saudi code standard
- iii. Time – To make sure the project schedule task listed and aligned with actual
- iv. Cost – project shouldn't exceed the budget and monitor and control expenses through project phases



Figure 1 lead and lag (KPI)

KPI's	Lead	Lag
Safety	Safety Committee meetings are held every quarter	Total lost work days and restricted work days
Safety	Effective safety training and refresher training for all employees.	Injury and incident investigations increase
Safety	Emergency Drill conducted on a Monthly basis.	Safety violation numbers increase
Quality	"RFI" Request for inspection for all equipment received and all document	Nonconformity report
Quality	Engineering stage plans for each Quality milestone check to be comply with actual project work	Quality Observation number increase
Time	"WPR" Weekly progress report	Payment not given to the contractors for certain milestone.
Time	"MOM" after each weekly meeting for follow up	Goal not achieved with in planned time

Table 2 lead and lag (KPI)

1.5 Project Charter:

Project Name	Fire system for commercial center			
Project Sponsor	BAM Properties	Project Manager	Mohammed Baqader	
Date of project Approval	15/09/2021	FCC Date	30/12/2022	
Project Description	Equipping the building with safety equipment and preventive requirements			
Scope	Equipping a commercial building with safety and fire-fighting equipment in accordance with the requirements of the Civil Defense of the Kingdom of Saudi Arabia			
Business Case	- Improve workplace and center safety - Applying civil defense conditions and requirement for Malls and centers - Overall create a healthy workplace.			
Constraints	Time – Dec 2022			
	Cost – 10,000,000 SAR			
	Scope – restricted			
	Quality – Civil Defense Standard			
Project Deliverables	- Functional Fire Fighting System - License of Civil Defense - Closing Documents - Lesson and learn repository			
Key Stockholder	Name	Title	Name	Title
	Adnan Alharbi	Operation Director	Rayan AL Hashmi	Procurement Director
	Adel Alharbi	Finance Director	Fouzia Almutairi	Project Director
	Bander AL Hashmi	Facility Director	Mira Hamed	Quality Director
	Tarek Hakimi	Project Director	Mohamed Baqader	CEO
Risk	1.injuries 2.delay 3. Shortage in resource 4. Not Matching CD requirement 5. Exceed the budget			
Project Manager	Development Director	Project Director	Finance Head	CEO
Sign:	Sign:	Sign:	Sign:	Sign:
Date:	Date:	Date:	Date:	Date:

Table 3 (Project Charter)

2. Governance Structure and Processes

2.1 Organizational structure:

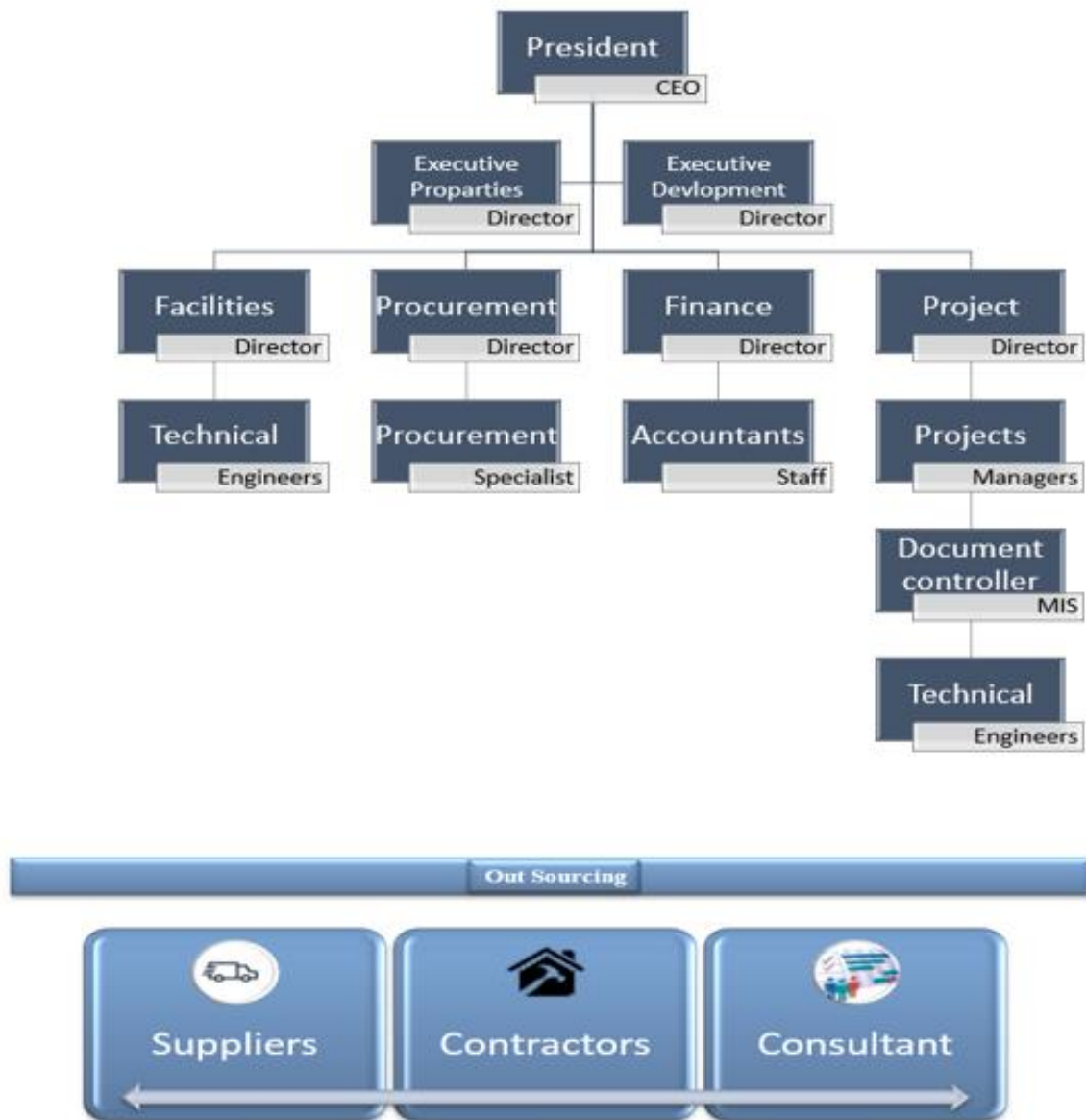


Figure 2 (Organizational Structure)

2.2 Practical and scientific bases

The structure defines the relationships among members of the project management and the relationships with the external environment. The structure defines the authority by means of a graphical illustration called an organization chart. A properly designed project organization chart is essential to project success. We are using a hierarchical structure in (name of our company/ project) organizations. It relies on having different levels of authority with a chain of command connecting multiple management levels within the organization.

The decision-making process is typically formal and flows from the top down. This creates a tall organizational structure where each level of management has clear lines of responsibility and control. As the organization grows, the number of levels increases, and the structure grows taller. This structure gets wider as you move down - usually with one chief executive at the top, followed by senior management, middle managers and finally workers. Employees' roles are clearly defined within the organization, as is the nature of their relationship with other employees.

The below is practical and scientific conditions will meet by using A hierarchical structure.

1.It can provide benefits to businesses. For example, it can help establish:

- Clear lines of authority and reporting within the business
- A clearer understanding of employee roles and responsibilities
- Accountability for actions or decisions at different management levels
- Clear career paths and development prospects which can motivate employees
- Opportunities for employees to specialize and develop expertise in their field
- Close supervision of employees through a narrow span of managerial control
- a culture of loyalty towards teams, departments, and organization.

2. Centralization of power and taking decisions via commanding hierarchy.
3. Hierarchy dimension: It shows relative ranks of organizational units by similar method of organizational chart according to the study of Schine (1971, 1988) regarding the identification of three dimensions.
4. Bureaucracy is linked with Hierarchy structure: Generally, determining criterion, forming, unifying the work methods as called standardization is key concept or foundation of machine bureaucracy. If you're visit banks, chain stores, tax offices, health office, firefighting, these institutions, and offices rely on standardization of methods and work methods for coordination and good supervision. The features of machine bureaucracy are as:
 - High volume of uniform and continuous executive works.
 - Dealing with regular and formal regulations.
 - The presence of separated units with definite classified duties.
 - Centralization of power and taking decisions via commanding hierarchy.
 - Having complete administrative structure by defining the boundary between staff and queue activities

2.3 Project Office Model

There are many types of PMOs (fig.3) that vary in how much they control and influence projects within the institution, its role also changes from providing support to direct administration of the projects. The best choice for your institution depends on the size and nature of the work as well as the existing culture. Based on the organizational structure implemented. The PMO type is directive that known for its high control on projects, or even fully managing projects with providing needed resources and support. The office defines managers to run it directly after contacting for the PMO project. This type also provides high professionalism in managing projects, where every manager has to write periodic reports for the office which guarantees a high level of consistency in work on projects level.

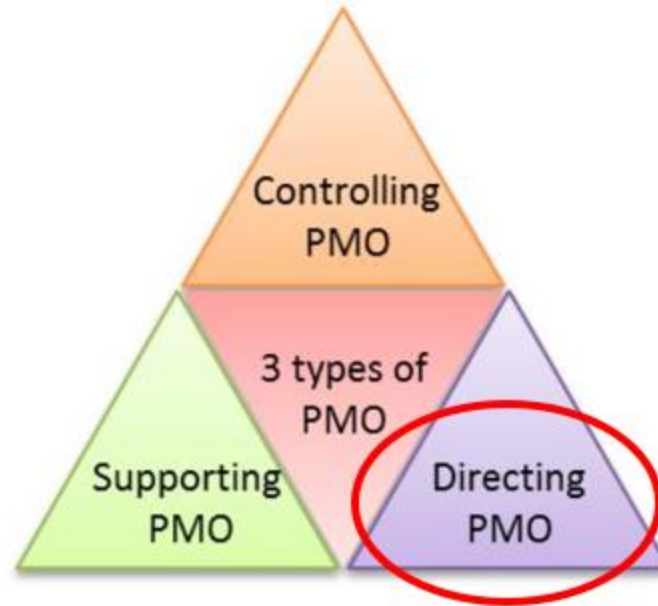


Figure 3(PMO Model)

3. Compliance and Standards Regulations

3.1 Check Compliance Model

The check compliance model will review the major lines of the plan in use, it will apply the model of confirmation in the current trends that the training output will be the success of the projects (Jevtić, 2014). It will ensure that the fire installation plan is reaching in time to offer a promising service to the areas of fire spread. The fire alarm and other spaces are surely in action with Fire System and Installation.

S.No.	Description	Status
1	Is project scope clear?	Open
2	Are the stakeholders functional?	Close
3	What is the support of relevant departments?	Open
4	Has the sponsor functionals?	Open
5	Are there more than 3 sponsors?	Open
6	What is the criteria for growth available?	Close
7	Stakeholders are potential, or no?	Open
8	What is exact cost of project?	Pending
9	How is the project affording the costs?	Open
10	What are supports available for the project costs?	Close
11	The employees' function is OK?	Open
12	The vision is possible and in action?	Open
13	The objectives are working in streamline?	Close
14	Approval is done or not?	Open
15	What is future cost support resource?	Open

Table 4 (Checklist for Fire system and installation compliance)

3.2 Check list for project stages

Project Stages	Milestone list	Status	Date
Initiation	Project Start	completed	01-Sep-21
Initiation	Kick off Meeting	completed	01-Sep-21
Plan	Engineering Start	completed	11-Sep-21
Plan	Engineering Finish	completed	11-Oct-21
Plan	Procurement Start	completed	25-Oct-21
Plan	Procurement Finish	Not yet	TBA
Plan	Shop Fabrication Start	Not yet	TBA
Plan	Shop Fabrication Finish	Not yet	TBA
Plan	Mobilization Start	Not yet	TBA
Plan	Mobilization Finish	Not yet	TBA
Execution	Construction Start	Not yet	TBA
Execution	Construction Finish	Not yet	TBA
Closing	Testing Commissioning & Handover	Not yet	TBA
Closing	Project Finish	Not yet	TBA

Table 5(Check list for project stages)

As management guru Peter Drucker once said, “what’s measured, improves.” Key Performance Indicators provide valuable insights to an organization because they allow a business to track what is most important to its success. KPIs help businesses measure the effectiveness of their business strategies and whether you are achieving the results you are trying to achieve.

4. Power and Interest

It is essential to employ the power in the right direction so the company may grow better. The role of the stakeholders is not ignoring in this regard (Willi et al., 2016). They should be entered in the register and seen via relevant traits in the strength and influence networking and logical diagrams.

4.1 Stakeholder Register:

STAKEHOLDER REGISTER						
Company Name:		BAM				
Project Name		FIRE SYSTEM PROJECT				
Prepared By:		Project Manager				
Name	Project Role	Type of Stakeholder	Type of Communication	FREQUENCY	Project Interests and strategies	Contact Information
Mohamed Baqader	CEO	Internal	Face to face - Meeting, Emails	Monthly	To receive the project progress as per requirements.	
Adel Alharbi	Finance Director	Internal	Face to face - Meeting, Emails	weekly	To monitor and control project budget.	
Rayan AL Hashmi	Procurement Director	Internal	Face to face - Meeting, virtual meeting, Emails	weekly	To review and approve final project quotations and outsource contractors	
Adnan Alharbi	Operation Director	Internal	Emails	quarterly	To operate systems after project final acceptance	
Bander AL Hashmi	Facility Director	Internal	Emails	quarterly	To perform maintenance activity after operating fire systems	
Mira Hamed	Quality Director	Internal	Face to face - Meeting, virtual meeting, Emails	Daily	To check and ensure project is in progress as per quality requirements.	
Tarek Hakimi	Project Director	Internal	Face to face - Meeting, virtual meeting, Emails, progress reports.	Weekly	To monitor and control the progress of the project	
Fowzya Almetiri	Project manager	Internal	Face to face - Meeting, virtual meeting, Emails, progress reports.	Daily	To deliver the project in time and within the approved budget	

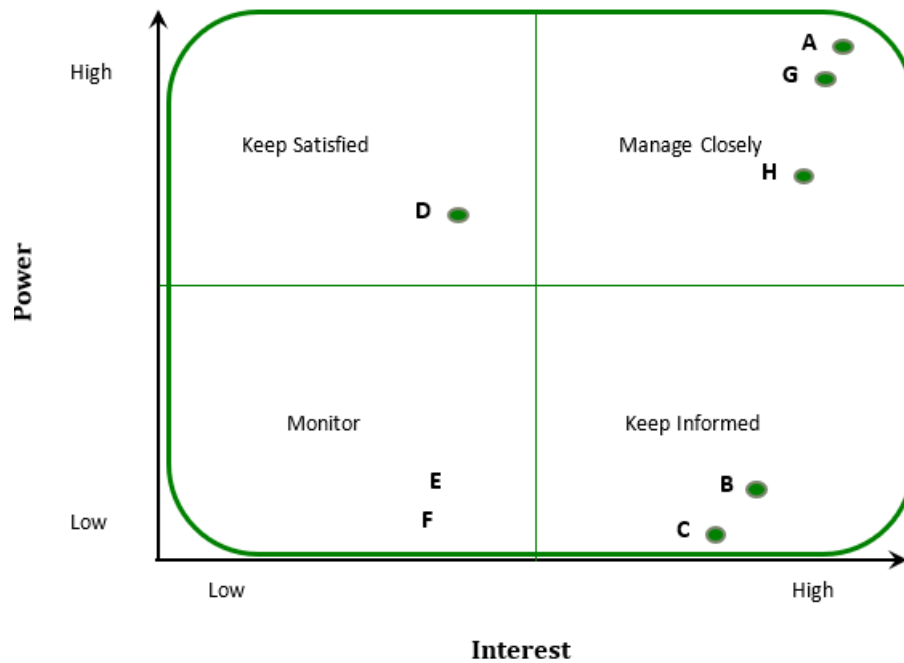
Table 6 (Stakeholder Register)

4.2 Networks:

	Project Role	POWER	INTEREST
A	CEO	High	High
B	Finance Director	Low	High
C	Procurement Director	Low	High
D	Operation Director	High	Low
E	Facility Director	Low	High
F	Quality Director	Low	High
G	Project Director	High	High
H	Project manager	High	High

Table 7 (Power and interest)

The Power/Interest diagram identifies the level of power and interest each stakeholder has within the project.



Stakeholders

- | | |
|-------------------------|-----------------------|
| A. CEO | D. Operation Director |
| B. Finance Director | E. Facility Director |
| C. Procurement Director | F. Project Director |
| G. Project Director | H. Project manager |

Figure 4 (Power/Interest)

4.3 Stakeholder logical diagram

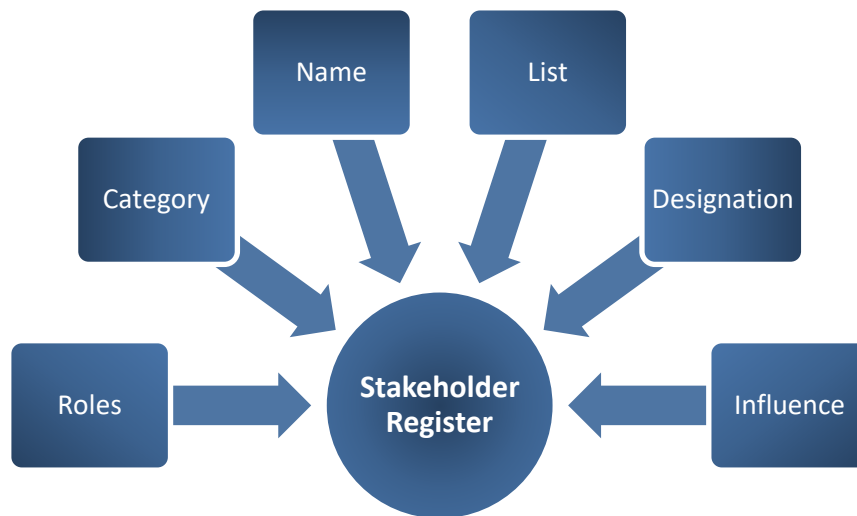


Figure 5 (Stakeholder logical diagram)

Fig. 6 shows the tasks of checking the stakeholder register. The first of these tasks deals with the identification of stakeholders. This identification is carried out for each project and for each phase of the project. The second task deals with the registration of stakeholders through their geographical area of influence, where it is checked whether the identified stakeholder is already registered. The third task deals with the categorization and classification that each stakeholder has in each phase of each project. The fourth deals with the catalogue of actions to be applied to each stakeholder in each phase of each project, and the fifth deals with the incorporation of stakeholder management.

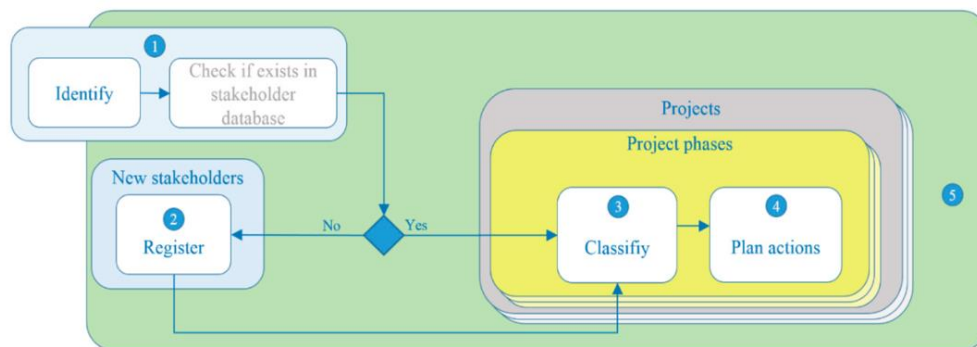


Figure 6 (logic check progress)

5. Culture and Value

5.1 Organizational Culture.

Organizational culture includes the organization's expectations, experiences, and philosophy, as well as the values that guide members' behavior, and are expressed in the member's self-image, inner workings, interactions with the outside world, and future expectations. Culture is based on common attitudes, beliefs, customs, written and unwritten rules that have been developed over time and are considered valid. Culture also includes the organization's vision, values, standards, systems, symbols, language, assumptions, beliefs and customs aspects of managing the operations of the company's work to target the outcomes of the Kingdom's vision, which includes saving lives and properties of people and be aware more about the losses due to fire in Saudi Arabia, by training the workers to warn and save people when fire or other fire-related emergencies are traced, providing firefighters and other physical aids in the shortest possible time.

5.2 Proposed Organizational Culture

The company has adopted a good organizational culture, but it can be improved by adding some support traits, these traits help keep the reverence of all. The policies should be strict than before so the rules and regulations could be visible in the company (Senarathna et al., 2014). Further, the role of applications of training sessions from the higher management should be increased with time.

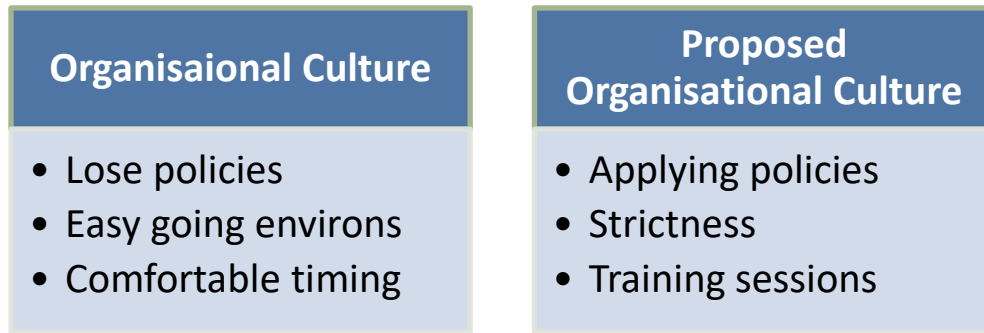


Figure 7(The organizational culture)

6. Self-Reflection and Self-Management

The growth must be a continuous process in the organizational support of the workforce. This is possible only if timely training will be offered.

6.1 Behavioral Impacts

The behavior is a direct trait that may impact a company and its participation, it is a personal trait that may change the things in the final space. The traits of easy support, lack of attention to work and leniency to the others may develop loopholes and people might lose interest in the firm with motivational trainings. And some of those behaviors are:

- 1-Communication.
- 2-Conflict Resolution.
- 3-Time Management.

6.2 Behavioral Analysis

The analysis of the behavior justifies that the company needs to review the individual behavioral impacts in the long term. This idealizes that the individual margins and space given to the workforce may give them ease and they are not following the rules. The training can check the employees by monitoring and SWOT during training sessions.

6.3 SWOT Analysis

The SWOT analysis is a wonderful support for the person or company to see the strengths and weaknesses and weigh them in the perspective of threats and opportunities. The company condition is highlighted in the SWOT analysis display, the behavioral traits need

to review for the progress of the company (Biancamaria et al. 2016). The applications of the policies may lead to change the scenario.

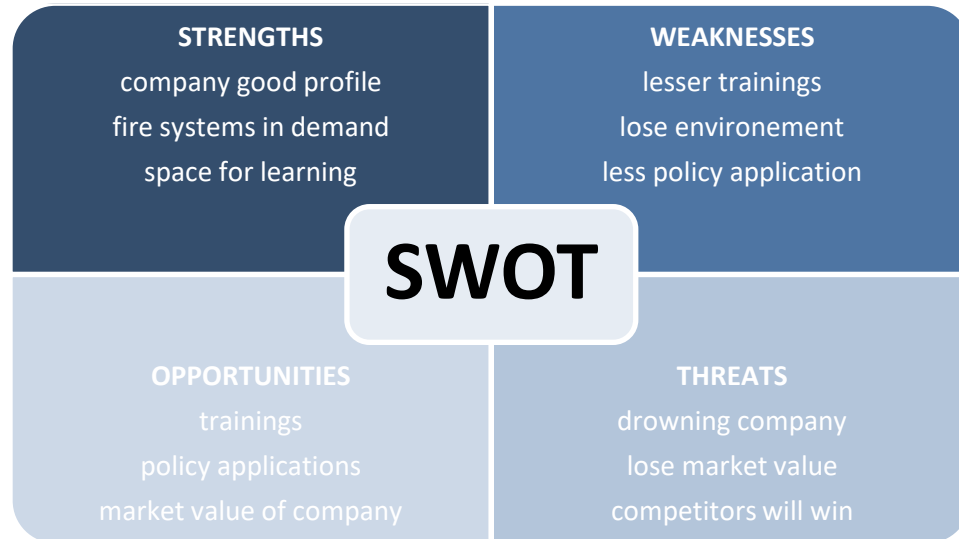


Figure 8 (SWOT Analysis)

7. Personal Integrity and Reliability

Personal traits have a direct impact upon the work trends, they may influence the process of the plan. The project team is seeking more attention by seeing the behavioral contradicts (Hurley et al., 2015). They may impact the financial, social, and technical grounds of the workplace.

7.1 Behavioral Contradict

The three traits as already discussed may be contradicting to the workplace for the worker. The behavioral contradicts may work as lose environment at the workplace, lack of interest of workers, and the downfall of the organization in the long term. The innovation approach in training may lead to changes in functioning.

7.2 Behavioral Impacts

The behavioral impacts may come in the three spaces, social, financial, and technical, so they will surely influence the whole concern worst way. The finances will be going down as the employees will be less eligible and getting more salaries for doing nothing. They need

to be trained for the purpose (Ooi et al., 2019). The social environment will be bad in the form of losing the organizational culture of the project team members. The last factor is technical, which demands the true pieces of training to manage innovation in the modern age. The improvement is possible by using training sessions on behavior and support in the organization.

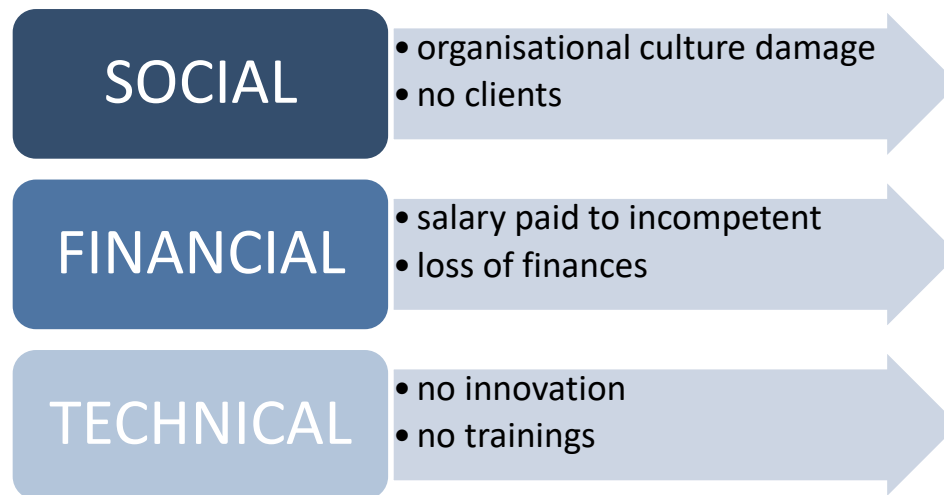


Figure 9 (Behavioral impacts)

8. Personal Communication

8.1 Stakeholder register

Refer to table 6 for the stakeholder register.

8.2 Personal and Effective communication:

Effective communication is a critical component of being a more effective and competent team and manager. It is critical for managers and their teams to learn how to interact effectively, as this will not only assist teams in completing tasks efficiently but will also allow organizations to achieve their goals and growth (Lee Froschheiser).

A project manager ensures that communication is maintained among all stakeholders, including team members, management, and the client, to name a few. The project will come to a halt if team members are not informed on what they are expected to do. This also works in the opposite direction. It will be practically hard to monitor and supervise the project's progress if team members do not keep the project manager informed about what they are doing and have done.

In order to ensure efficiency of communication, all formal communication shall be through document control. The document controller registers all incoming and outgoing documents, plans or whatsoever and distributes them as determined. All documents, plans or whatsoever must have a unique reference number. In case of multi-page documents, the number on each single page shall be repeated in the header or footer. Drawings will use a defined title block containing certain standard information. The title block will be determined by the respective department head. All documents shall be signed and stamped by the authorized person.

This section establishes the project's communication framework. It will act as a communication guide throughout the project's life cycle, and it will be updated as communication needs evolve. It identifies and defines project team members' roles in terms of communications. It also includes a Communications Matrix (Table 6,8), which maps the project's communication requirements as well as meeting and other kinds of communication conduct. The Project Manager will oversee ensuring that effective communication is maintained.

8.3 The project communication management consist of the main following process:

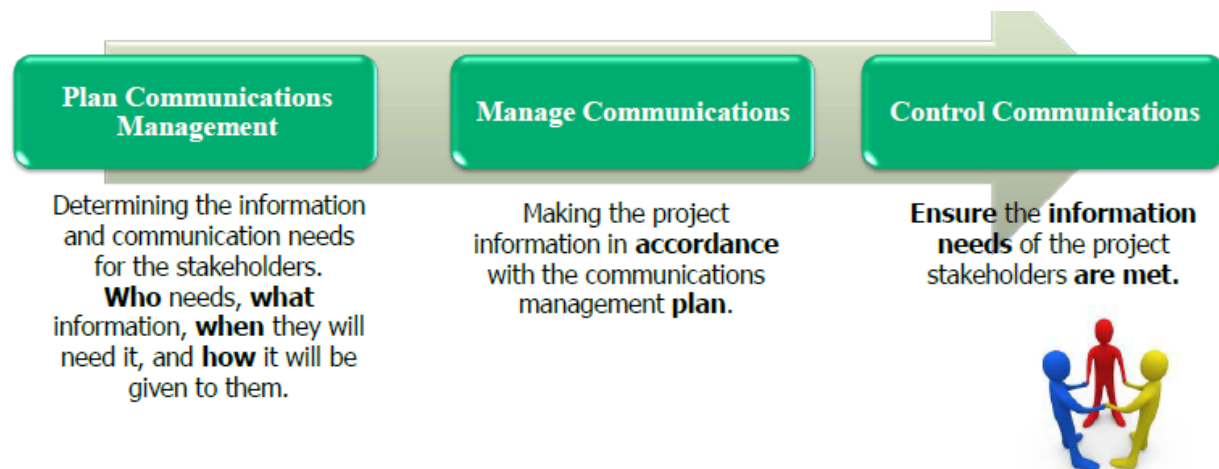


Figure 10 (Communication Management Plan)

A project's Communication Management Plan is an important component. The significance of this plan stems from the fact that communication is a critical component of project development. The strategy distinguishes between mandatory and optional communication. A project's failure can be catastrophic due to a lack of communication, while a project's success can be ensured through good communication. It is the project manager's obligation to guarantee that effective and frequent communication is maintained.

The importance of effective and regular communication cannot be undermined. It is essential for ensuring the success of a project and delivering to the expectations of the client. Preparing a communication plan is an important activity in communication planning. Communication starts at the very stage of the project when the project initiator communicates the need of the business. It is important that the stakeholders communicate their needs to the project manager and the team. It is also essential that the project manager communicates the achievable deliverables to the client as well as the management. A two-way communication between the project manager and team members is further very important.

While working on a communication plan, the following should be included:

Who is the communication to be addressed to?

When and how often to communicate?

What will be the mode of communication?

What details must be communicated and what details are to be omitted?

What will the frequency of team meetings and meetings with the stakeholders?

What will the scope and flow of communication?

Communication Model

There are two components of communication—sending and receiving. This sounds simple, one sends, and one receives. It occurs every day in regular conversations. However, understanding and implementing the process of sending and receiving is not quite that simple. The challenge is in the interference, or the noise introduced when communicating between multiple parties.

Knowing the following terms can be helpful:

- ☐ Sender: Person sending message
- ☐ Receiver: Person receiving message
- ☐ Encode: Sending thoughts that are understood by others
- ☐ Decode: Translation of message into thought process
- ☐ Message: The results of the encoding process
- ☐ Medium: Any form of conveying the message
- ☐ Feedback message: The results of the encode process sent by receiver

Sending model

Sending information, regardless of the type, can be tricky and needs careful handling. When sending a message, you need to put yourself in the place of the receiver and understand the information sent to try to avoid any miscommunication. Sometimes, sending the same message a couple of times in a slightly different format is beneficial. Other times, people may not clearly understand the message if it is only delivered in one format. As the project manager, ensure that you cater to more than one style of learning when sending your project messages. For example, if possible, add both

text and graphics to your messages to enhance not only the message but also the chances of your readers being able to comprehend the information. Project managers should be aware of the cultural differences and personal bias people may possess. Having that knowledge beforehand will allow you to tailor the message to that individual, and the chance of understanding the information is higher.

Receiving model

when you think you are communicating with a small number of people, behind the scenes you are dealing with a much larger group. Trying to communicate a specific message, when it must go through that many people, means it is going to go through several different filters. Everyone will be filtering it differently to some extent. It is amazing that any verbal communication accurately transmits at all when going through so many people

Communication Technology: how to communicate each item:

Face-to-Face, Telephony, Fax, email, or meeting.

Communication Methods:

- **Interactive Communication:** one person provides the information, other receive it and respond to the information.

(Conversation, meeting, and conference call)

- **Push Communication:** one way stream on Information. The sender does not expect feedback from receiver.

(Status Report, emailed updates, and company memos).

- **Pull Communication:** PM place the information in a central location, the recipients are then responsible for retrieving. (Large Documents).

Communication Channels: can be calculated with following formula:

$(N(N-1))/2$, where N equals the number of people.

There are 8 on a project team and it is necessary for them to communicate with each other,

$\text{Channels} = [8 \times (8 - 1)] / 2 = 56 / 2 = 28$.

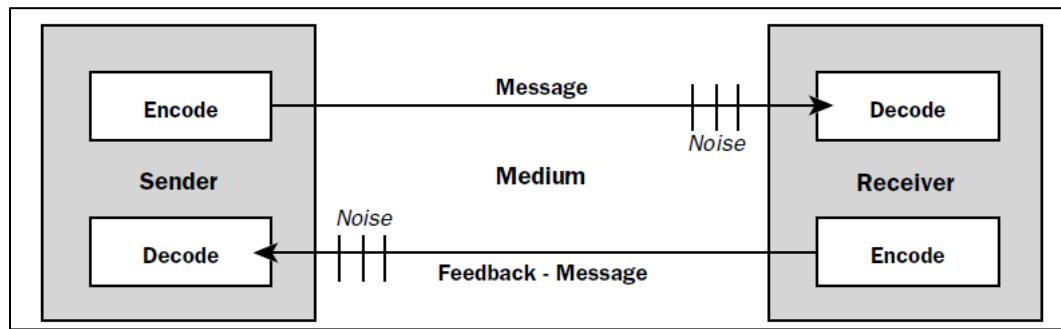


Figure 11 (Communication process)

The following is the communication policy for the Project:

Meetings:

A meeting agenda will be distributed by the Project Manager at least two days prior to any scheduled meeting, and attendees will be expected to examine it prior to the meeting.

During project meetings, the timekeeper will verify that the group sticks to the agenda's times, and the recorder will take notes that will be distributed to the team after the meeting is finished. To avoid distractions, participants should be on time to each meeting, and cell phones and blackberries should be turned off or put to vibrate mode. Meeting minutes will be distributed within 24 hours of the conclusion of each meeting.

Email:

All Project-related email should be professional, error-free, and provide concise communication. Based on the content of the email, it should be delivered to the appropriate project participants in accordance with the Communication Matrix. All attachments should be saved in one of the company's official software suite packages and follow the company's standard formats. If the email is intended to call attention to a problem, it should explain what the problem is, give a little background on the problem, and offer a solution. Any email relevant to the project should include the Project Manager.

Informal Communications:

While informal communication is an important element of every project and is required for its success, any issues, concerns, or updates that occur from informal team discussions must be addressed to the Project Manager so that appropriate action can be done.

8.4 Communication Matrix:

Communications Matrix						
Communication Type	Description	Frequency	Format	Participants/ Distribution	Deliverable	Owner
Status Report	Email summary of project status	Weekly	Email	Project Sponsor's Appointee, Project Team and Stakeholders	Status Report	Project Manager
Project Team Meeting	Meeting to review action register, status, issues, and changes	Weekly	In Person	Project Team	Updated Action Register, Change Control Log, and Issues Log	Project Manager
Project Review	Present metrics and status to team and sponsor	Bi-Weekly	In Person	Project Sponsor's Appointee, Team, and Stakeholders	Status and Metric Presentation	Project Manager
Contract Requirements, Costs and Project Progress	Review contract requirements, costs performance and status project	Bi-weekly or As Needed	In Person	Project Sponsor's Appointee, Campsie Glen City Business Manager, and Parks & Recreation Manager	Status Report	Project Manager
Milestone Reviews	Present completion of project milestones	As Needed	In Person	Project Sponsor's Appointee, Team and Stakeholders	Milestone Completion Report	Project Manager
Technical Design Review	Review of any technical designs or work associated with the project	As Needed	In Person	Project Sponsor's Appointee and Project Team	Technical Design Package	Project Manager

Table 8 (Communication Matrix)

On this project, the Project Manager will take the lead in ensuring effective communication. The Communications Matrix documents the communication requirements. The Communications Matrix will be used to determine what information should be communicated, who should convey it, when it should be communicated, and to whom it should be communicated.

8.5 Wrong Scenarios:

The company found the need to have effective verbal, non-verbal and written communication training when 3 incidents took place one after the other.

- Firstly, due to insufficient information sharing by the procurement manager, the fire safety equipment order was delayed.
- Secondly, the HR manager failed to respond to the finance manager about the release of the worker's compensation plan which resulted in the strike by the workers for delayed payments.
- Thirdly, the customer representative manager provided insufficient information to the client which resulted in a dispute. Thus, the company decided to develop a communication matrix to develop personal communication skills through training.

8.6 Stakeholder Assessment Matrix

For the above-mentioned tasks, the stakeholder assessment matrix is as follows.

C= Current engagement

D= Desired engagement

Stakeholder	Unaware	Resistant	Neutral	Supportive	Leading
CEO				C	D
Finance Director		C		D	
Procurement Director			C	D	
Operation Director	C		D		
Facility Director	C		D		
Quality Director	C			D	
Project Director				C	D
Project manager					C D

Table 9 (Stakeholder Assessment Matrix)

10. Leadership

The leadership style preferred to handle the project is a combination of different style of leadership styles. As the organization is directive it tends to deal by Autocratic or Commanding Leadership style. And Transformational or Visionary Leadership Style.

Autocratic Leadership style is centered on the boss. The leader holds all authority and responsibility. The leader centralizing decision making and limiting participation. leaders make decisions on their own without consulting subordinates. They reach decisions, communicate them to subordinates and expect prompt implementation. The advantage of this style is about achieve results and productivity quickly, the leader is the most knowledgeable member in the group, focused target, close supervision, maintain order and discipline, and good for emergencies/crisis situations.

The other Leadership style is Visionary Leadership Style. It is one of the most implemented styles. It has integrity, defines clear goals, encourages clear steps to communication and expressive. This type of leader inspires their team to work together towards a common target. The Visionary leaders combine the best practices and are leaders who are trusted and can motivate others. The Visionary style requires several different skills. And its primary focus is to make change happen in our self, others, groups, and organizations. The leader focuses on setting a positive vision for the future, team members are infused with a sense of purpose and excitement, and leaders who stimulate and inspire followers to achieve extraordinary outcomes. The advantage of Visionary style is about encourages, motivates and supports employees, often involves recognizing and rewarding people for their good work. Enhance innovation, and good for teams that have recently experienced failure.

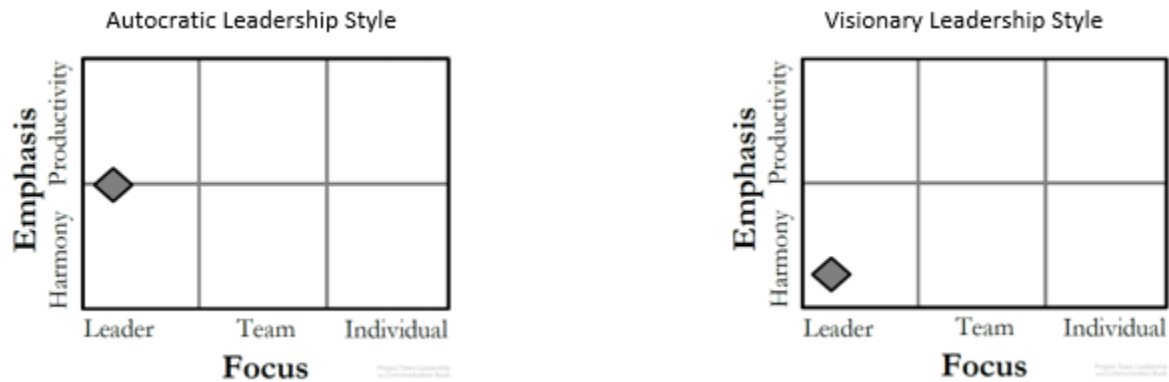


Figure 12(Leadership Style)

The reason of using Autocratic and Visionary is that the Autocratic strong, dominating leaders, can cause poor morale, and high stress. But its necessary as the organizational is directive. And to make a balance a Visionary style should be implemented to encouraging and motivating team. At the end both styles are focusing on leaders to achieve organization goals.

There are many factors that most often result in a increase of team motivation. By effectively managing these factors, Leaders can keep their team motivated and performing at a high level. Motivations are commonly separated into two different types based on the nature of the motivator: intrinsic (arising from internal factors) or extrinsic (arising from external factors). The proposed motivation for this project as the following:

- Extrinsic Motivators
 1. Money / Power - Want to 'move up' in the organization or earn higher wages.
 2. Recognition - Often motivated most by acknowledgement of those in power.
 3. Interpersonal Relationships - Relationships with co-workers and a cooperative atmosphere are valued.

- Intrinsic Motivators
 1. Autonomy / Interesting Work - Prefer the excitement of new and innovative endeavors.
 2. Purpose - Need to feel that their work is beneficial to the causes they care about.
 3. Mastery / Exploration - Personal achievement, problem solving opportunities, and creative endeavors are sought.

The following motivation strategies and techniques, can be used to manage these key factors

1. Gain Top Management Support
2. Manage Team Conflict
3. Control Project Management Scope
4. Praise Every Victory
5. Don't Punish Failure

Remember!! It's hard for a team to be motivated and excited about a project if the project's manager is not.

11.Teamwork

The matrix below identifies roles and responsibilities (within the internal structure i.e., those who are actually involved with planning and running the show). The keys show the different types of responsibilities.

S. N.	Process description	Originator	CEO	Finance Director	Project Director	Project Manager	Procurement Director	Quality Director
1	Origination of documents-New	I	A C	R	A	I	I	A
2	Review documents-NEW	I	A C	I	A	R	I	I
3	approval of documents	I	A C	I	C	A	I	
4	Modification/ Revising the document	I	A C	C R	A	R	I	A
5	Control of documents – Internal	I	A C	I	C	R	I	I
6	Control of documents – External	I	A C	I	C	R	I	I
6	Document availability at point of use	I	A C	I	I	R	I	R

Table 10 (RACI)

Terms: -

R- Responsible (Those responsible for the task, who ensure that it is done as per the approver)

A- Approver (The person/function ultimately answerable for approval)

C- Consulted (Those who give input for the process to be completed)

I- Informed (Those who are kept up to date of the task usually after completion)

12. Conflict and crises

12.1 Definition.

The conflict is divided according to what has been studied in the subject of leadership into a good conflict and a bad conflict, which is a natural element and is able to occur in every environment or project and most importantly the occurrence or the possibility of it is the mechanism to deal with it (conflict management) in case of dealing with good conflict will lead to benefits on the course of the project and if we do not deal well with the conflict it will inevitably affect the project and the project team.

In good conflict, new ideas are produced, problems are constantly solved, people are given opportunities to expand their skills, creativity is given a presence, so performance improves. In a bad conflict, morale among the team is affected and poor performance on the project path is resolved because productivity is reduced, and overall behavior is incompatible.

12.2 Predicted scenarios:

First Scenario

Differences in financial resources, project expenses, and activity budget management are further causes of conflict, which can arise as a result of poor planning or a desire to supply some resources and activities to compensate for other resources that have depleted an unanticipated budget.

Second scenario:

There may be conflict in the workplace due to a lack of clarity in some actions, which is one of the sources of conflict due to a lack of clarity in policies and procedures, which can lead to conflicts of interest or overlap between tasks, as well as a reluctance to make the rig

ht decision or make the wrong decision. If the OPM team rejected the request to change the time of one of the tasks and the reason was not clear and expected and there was no effective communication between the applicant and the rest of the stakeholders present in the approval processes, causing disagreement and bad conflict and the failure of the project and not proper updating on the course of the project and when analyzing the matter it was discovered that the rejection is logical due to the failure to mention the details of the reason for the change and the justifications and its impact on the project.

Third scenario:

Conflict can occur when human resources are not distributed effectively, causing a group to be pushed to work overtime. Out-of-time is a cost, and if it is not granted, it may result in physical and psychological fatigue of workers as a result of irregular working hours and a violation of employee rights, so planning must be considered and followed up on a regular basis to ensure that reorganization is not required.

12.3 Strategy to deal with each conflict and determine the cause of preference:

Strategies for dealing with conflict are many, most notably those studied in the leadership curriculum using Thomas Kleiman's conflict method tool.

- 1-Competition
- 2-Cooperation
- 3- Bargaining
- 4- Avoidance
- 5-Adjustment

In previous scenarios, let's take the **first scenario**.

If the imbalance is due to inadvertent misplanning, the situation must be corrected, and the risk or error must be adjusted to avoid any influence on overhead costs, which is the best strategic adjustment in this conflict process.

However, if the error is due to misuse or corruption, then coercion is the appropriate means of resolving the disagreement. While some may view coercion as a negative method, when the error is in this manner, it is legitimate behavior and handling.

The second scenario:

The best method is cooperation because it is a mutually convenient method that ensures listening and accepting opinion and results in a lack of procedures and agreement on them so that the project is not affected. If the avoidance method is chosen, it will break up the team's meet and create gaps in modernization and performance processes. The continuity of proper documentation of the project.

The third scenario:

The adaptation approach cannot be used if the administrator determines that the employees will adapt to overtime under the guise of a necessity to work rather than sitting down with the planning team to re-examine the human resource problem. You should also sit down with the affected team and agree, by mutual consent, that they will be given financial and moral benefits as a result of the project's necessity. The circumstances are revealed to them, and they are the ones who make the decisions about working extra by motivating, communicating, and estimating, guaranteeing that the project is completed on time.

Root cause analysis (fish method).

First Scenario:

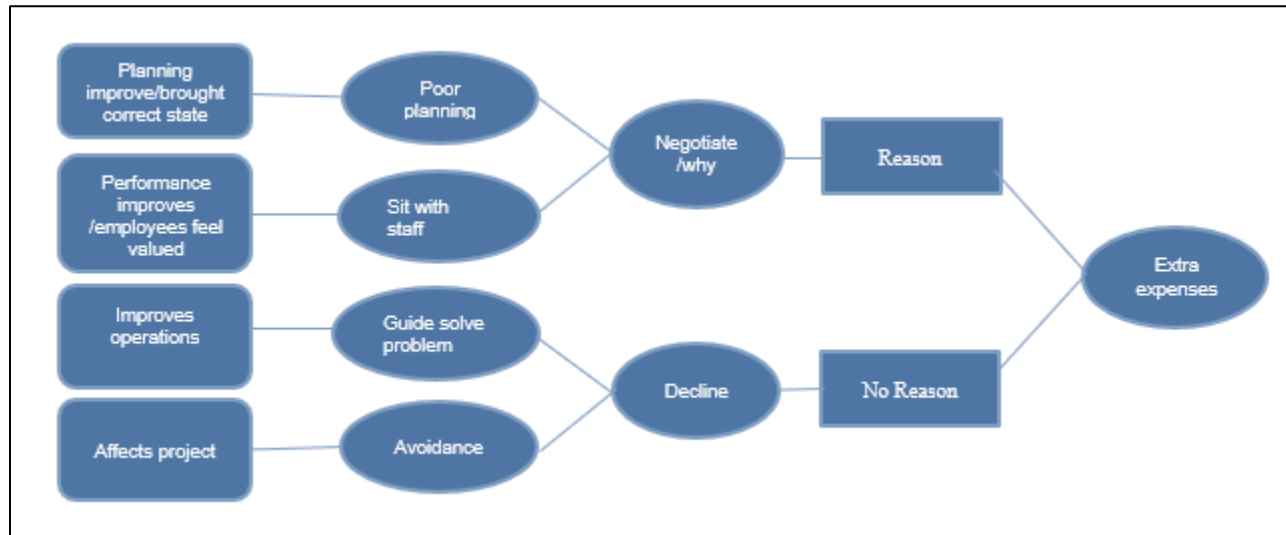


Figure 13

Second Scenario

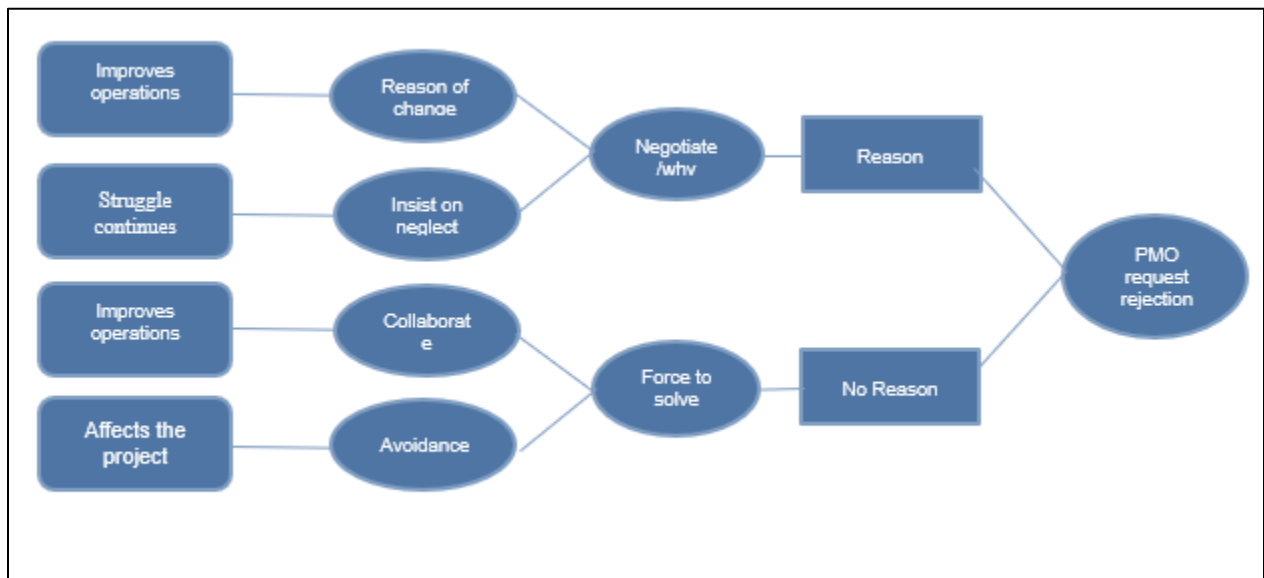


Figure 14

Third Scenario:

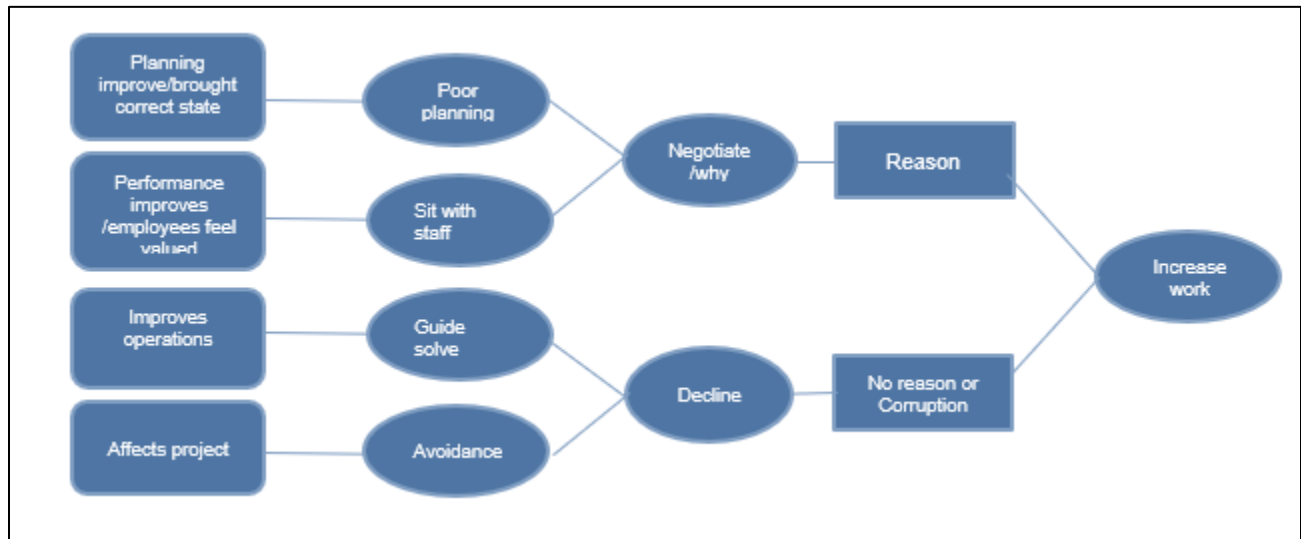


Figure 15

12.4 Root cause analysis:

Scenario 1:

Why did he get extra cash on the project?

Due to an error in the planning process and change of some expenses

Why wasn't the planning good?

Some circumstances changed and supply was delayed so the supplier had to change, and prices were higher

Why wasn't this risk recorded in the challenges records?

This risk has not been properly reviewed and the circumstances that have occurred have been exceptional.

Why has it not been cooperated with procurement and budget departments?

The procedure will be improved, and they will be involved in budget reserves

Why hasn't a backup budget been allocated?

YogD currently does not need an additional budget and the corrective action is currently under control.

The Solutions:

- 1- An emergency budget plan
- 2- Update the risk record
- 3- Involve the budget and procurement team in financial planning processes.

Scenario 2:

Why did the OFFICE of Project Management reject the application?

Because the justification for the request and its impact on the project are not accurately mentioned.

Why did the user file the change request without justification?

Some employees say they haven't been properly trained in change requests.

Why is this happening again?

There is no weekly meeting between the office and project managers and tasks.

Why wasn't awareness properly provided?

Some workshops were held, but not all the employees showed up.

Why wasn't the change student directly connected to the OPM team?

Because there's no clear-cut.

The solution will be:

- 1- Intensifying workshops and raising data quality
- 2- Regular meeting between the Office and the task forces
- 3- Publish the requirements of all procedures through the electronic portal of the system used clearly.

Scenario 3:

Why have working hours been increased?

Due to delays in the completion of operations and tasks

Why did the delay occur?

Due to poor planning and lack of actual compatibility between tasks, implementation, and available resources

Why was the planning process not good?

Because the former manager wasn't very efficient and because of the lack of a review.

Why wasn't a review provider provided?

A consultant has been hired to review all plans and this will be avoided, and all matters will be corrected.

Why weren't employees informed of the reasons for the overtime?

They have recently been sitting with them, apologizing, and making them aware of the importance of their presence and that their efforts will not be lost and will be compensated financially and morally.

Solutions:

- 1- Hiring a consultant to review plans
- 2- Hold a regular meeting with the team to listen to them and motivate them
- 3- Holding training courses in areas that need to be rehabilitated and matured, such as planning.

13. Resourcefulness

13.1: Distribution the human resource on the function

Based on our project we must define all tasks and distribute them to the people. Mainly we have project management then legal, document control and development.

A- Project management task:

This task is managed by the project manager and he handles all relative issues like scope management, quality management, time management and integration management. So, by the right management, the scope must be achieved without any creep and this process should be done with respect to the time. The project manager needs to control this process and facilitate all resources to deliver at the decided time. Moreover, all processes need to be done without any quality defect which can be done under good management by the project manager. At the end, project integration is achieved by defining all project processes and aligned deliverables to meet the project scope requirements.

B-Document Control Task:

This task representative handles all documents and makes sure no mistakes occur during project phases based on all documents he controls. He should be known all processes and standards of the organization that he works for to succeed.

C- Business Development and Planning: -

Usually, this representative has strategic skills to drive the organization to the ultimate goal and they manage and follow-up the plans they settled.

D-Legal Management Task: -

all issues that related to the legal it came under human resources responsibility. They handle all legal and consultant issues according to the government law and aligned with company policy. They also create the company policies with respect to the government law and do all the arrangement the contracts based on that.

13.2 Crushing and Fast Track Process

It is common for people to want to shorten project duration. It may be the project is behind schedule or the scheduled project deadline has been moved forward. By knowing the critical path, the project manager and his or her team can use several duration compression techniques to shorten the project schedule.

- Fast Tracking: this process approved because it is applicable to reduce the time of the project and did not affect on the scope and the project task accept this kind of over lapping to accelerate the time.
- Crushing: process not applicable with this project because of the one of the budgets is not enough to cover these expenses moreover the stakeholder will not accept any request to increase the budget.

Below schedule explain how it can be implemented and improve the project time if we compare with the original schedule.

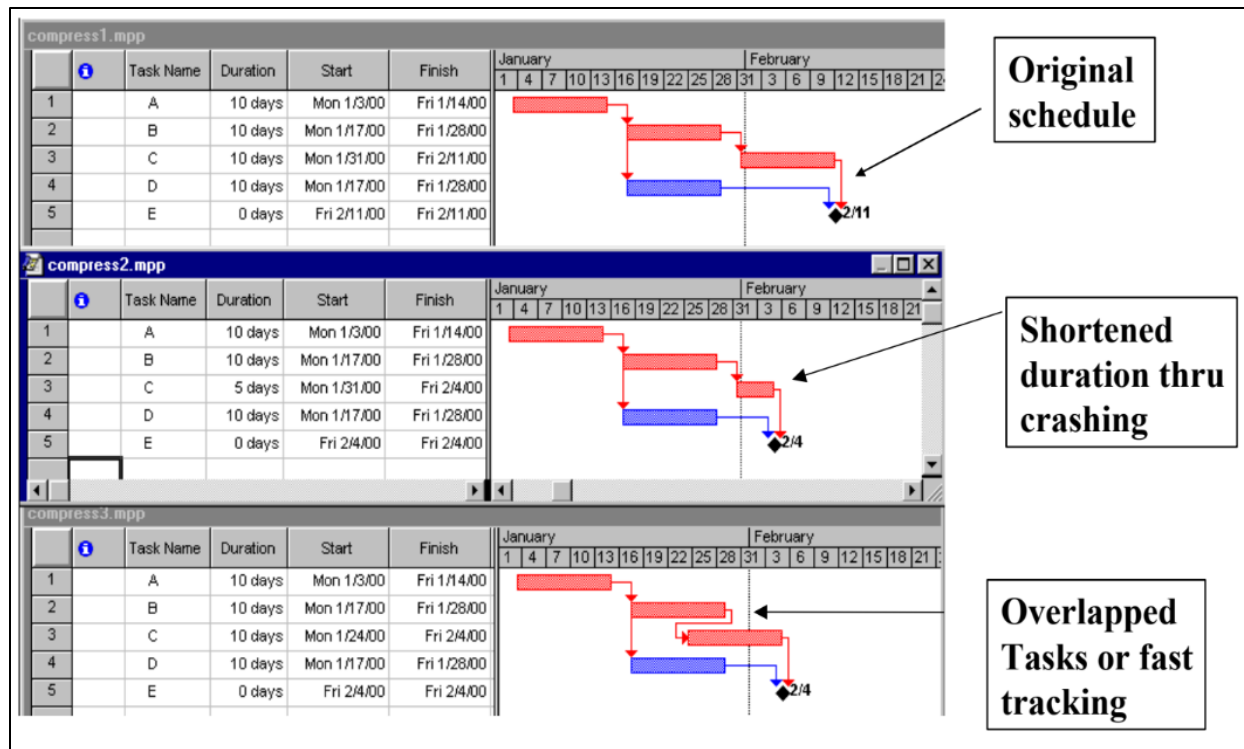


Figure 16 (Cursing/Fast tracking)

14. Negotiations

14.1 General Rule of negotiations

The general rule of negotiation is to increase communication among the departments. It has been anticipated that creating intra-departmental bonding with increased worker representation through leaders is a means to achieve the higher organizational goals. Thus, the ultimate benefit lies with the company. When employees and workers have a higher correspondence, they will be able to deliver the best services and the company will earn a good name in the market.

14.2 Negotiation Plans

The negotiations plans will clarify the communication medium for the organization, so below will list two negotiation plans that followed.

Plan	Execution	Medium of negotiation
Develop intra-departmental bonding	the negotiations will take place between the HODs of all departments to clear the goals and increase participation	- Physical channel (face-to-face interaction) - Online medium (social media, Skype, company website/ portal)
Create workers union	the workers would be allowed to create their union and propose a leader who will report to the HR manager in case of any issue or concern	Physical (face-to-face interaction)

Table 11(Negotiation)

15. Project design

15.1. Triple Constraint

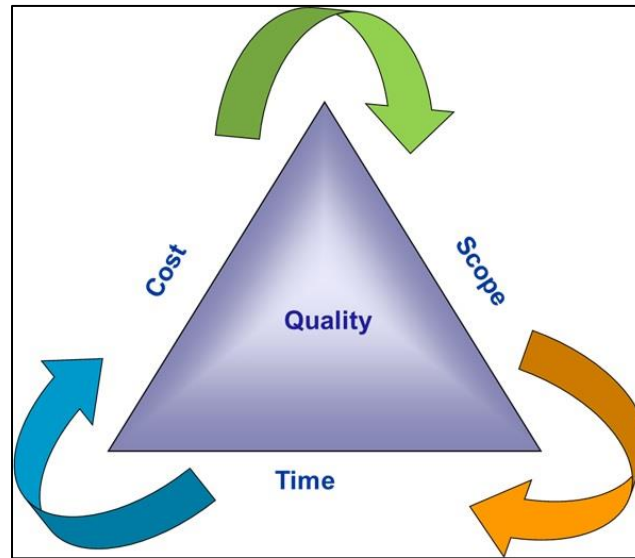


Figure 17 (Constraint)

It is one of the most important concepts in project management and may be the only one. It has many well-known names, including the project management triangle, which is one of the models that illustrate the consequences of change on the triple constraint that falls on the main stakeholders in the project. The triangle reflects the fact that the three constraints and the existence of an essential relationship are interconnected and apply to relationships and trade-offs. It is not possible to change one side of the triangle without affecting the other elements.

Time (timetable):

It is the time period for the implementation of the project.

Cost (budget):

It Is the budget specified for the implementation of the project

Scope (Project size):

What the project wants to achieve.

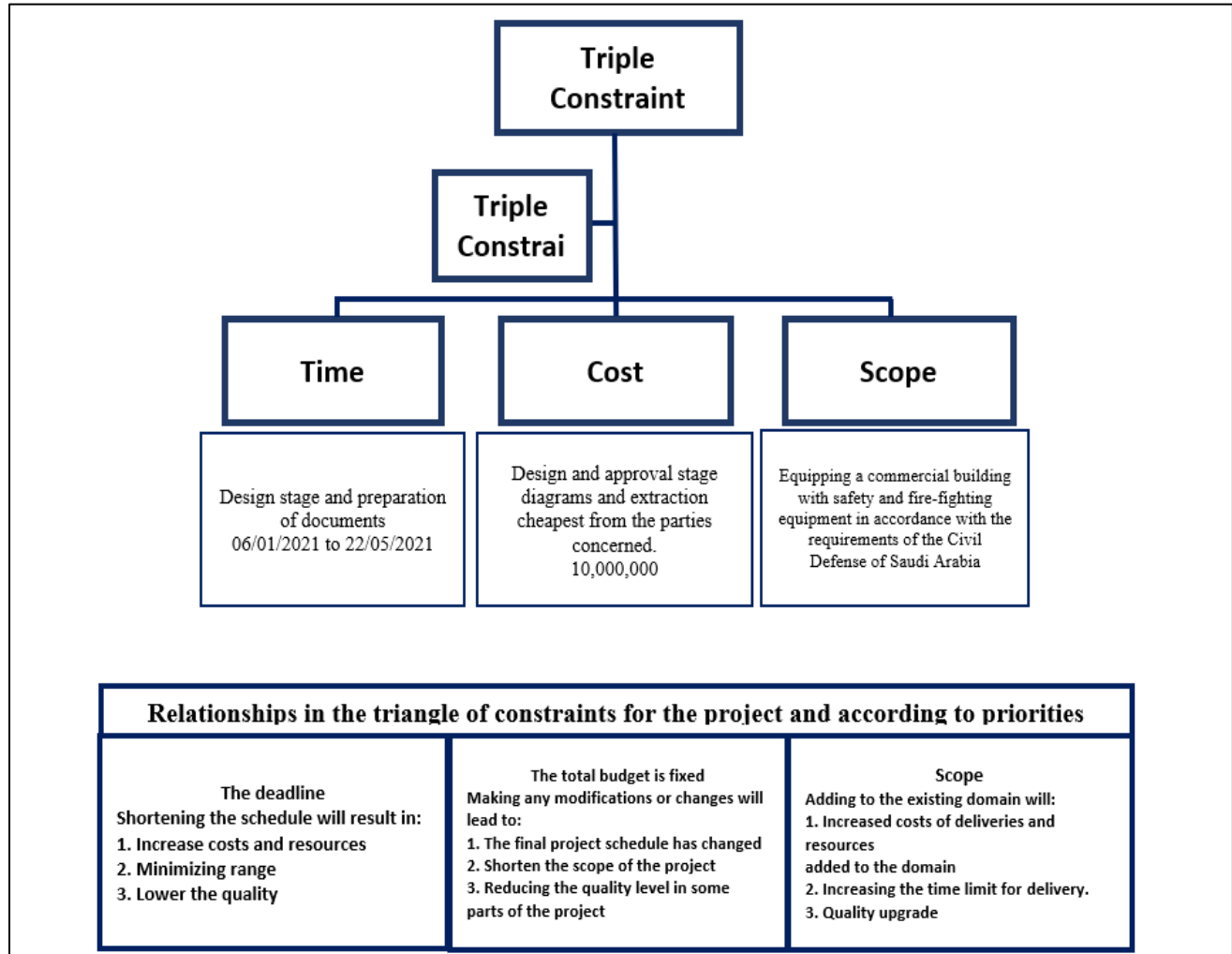


Figure 18(Triple Constraint)

The relationship between the sections of the project management triangle

The Field	Status	Corresponding field	Influence	Relation
Quality	High	Time	More	Direct
	Low		Less	
	High	Cost	High	Direct
	Low		Less	
Time	More	Quality	High	Direct
	Less		Low	
	More	Cost	Less	Opposite
	Less		High	
Cost	High	Quality	High	Direct
	Less		Low	
	High	Time	Less	Opposite
	Less		more	

Table 12

The relationship depends on the department focused on and represents the priority for the beneficiary, who is the owner or the executor that represents the company or contractor who implements the project.

15.2. List of the project success factors

1-Appropriate and specialized work team: Care must be taken and ensure that the team is properly selected in order to carry out the work according to its stages recognized by the quality, costs, time, and scope specified from the start of the project. It is also important to have and provide a set of the work team's expertise and skills to ensure their continuity of good performance to the project's end. Employees are a company's human capital and its only means of achieving success, but only if they are competent, hardworking, and enthusiastic at the same time.

2- Expert project manager: The professional project manager must refine his skills and experience by constantly reviewing and working to motivate his team members to perform the tasks, and tell them about their progress and achievement, and not about the negative aspects of their performance. It puts them on the correct track and strengthens their resolve.

3-Scientific and precise planning of project management: The importance of qualified management and effective planning of the project's responsibilities and administrative, financial, and marketing departments is a requirement for any successful project, and it must be known, taking into account deviations and working to rectify them as they occur, as well as work.

4-Risk management in a professional manner: unexpected changes expose any project to risks and challenges, which may disrupt one of the project phases. As a result, specific procedures must be included in the project plan to deal with any emergency situation, and they must be documented in a guide that can be referenced later to solve any problem as quickly as possible. This provides stability for the work team in terms of how to deal with it in the future, as well as increasing client confidence.

5-Effective Communication: Regardless of the project's objectives and scope of work, personal and effective communication is one of the most critical parts and prerequisites for its success.

6-Proficiency in project-related professional programs: Every activity, no matter how small, has its own secrets and designs, as well as programs and tools specialized in creating workflows and following them up in a professional manner.

7-Speed of development and increased competitiveness: One of the most important factors in keeping up with market changes in terms of the needs and desires of customers who benefit from the project's housing units is the flexibility and speed with which the product is developed. This allows the company to continue operating while also increasing its competitiveness.

8- Optimal use of available resources: Properly managing cash flows and human resources. It is one of the most significant variables for the company's existence and continuity, and it works to achieve a balance between the actual and planned budgets, indicating that the project is under control and that the involved authorities must enhance their support.

9-Follow-up and accurate guidance: Holding weekly meetings, assessing tasks on a frequent basis, expressing sound views on the expected plans and comparing them with the current achieved, and ensuring that the workflow does not diverge according to the scope, timeline, and cost are all examples of follow-up and accurate guidance.

10- Proper project closure: Upon completion of all preceding success elements, every successful project follows a specific sequence according to the project life cycle. Since a

result, it's crucial to close the project, as it's one of the most important decisions, and only successful projects that know what they'll have to do to get there will succeed.

15.3. WBS

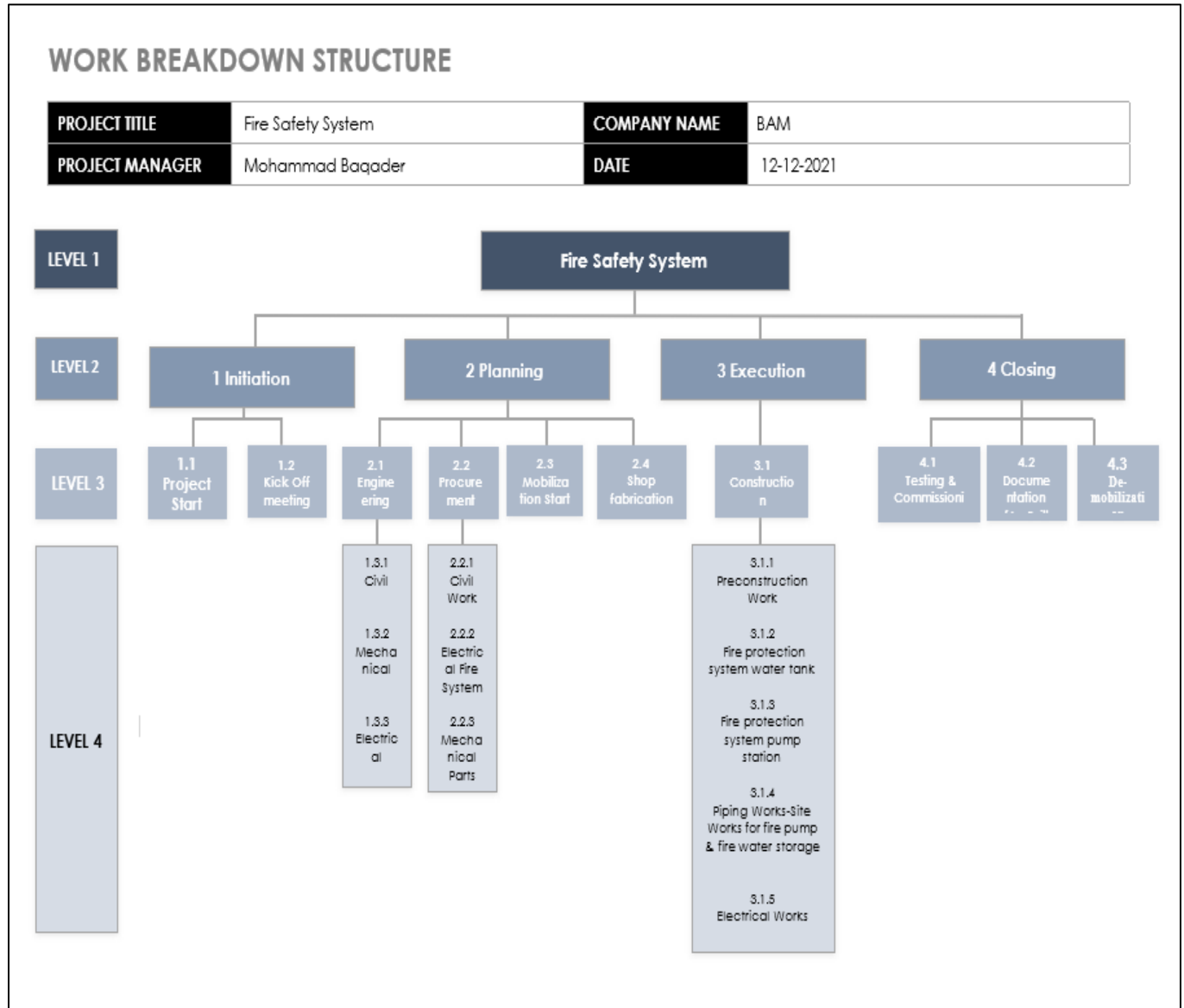


Figure 19 (WBS)

Activity Description	Budgeted Total	
Fire Safety System	Cost	%
Initiation		
Project Start		
Kick Off meeting		
Planing		
ENGINEERING	144000	2.40
Civil	48000	0.80
Mechanical	80000	1.34
Electrical	16000	-
PROCUREMENT	2,768,595.73	46.21
Civil Work	319,282.03	5.33
Electrical Fire System	951,029.00	15.87
Mechanical Parts		
Mobilization Start		
Shop fabrication		
Execution	1,498,284.70	25.01
CONSTRUCTION	2,945,119.20	49.15
Pre construcation Work	194,610.00	3.25
FIRE PROTECTION SYSTEM WATER TANK	959,352.10	16.01
FIRE PROTECTION SYSTEM PUMP STATION	750,252.50	12.52
Piping Works-Site Works For FIRE PUMPS & FI	576,061.08	9.61
Electrical Works	464,843.52	7.76
closing		
TESTING & COMMISSIONING	58,455.00	0.98
Documentation(As-Built Drawing and O&M)	27,000.00	0.45
De-mobilization	48652.5	0.81
Total	5,991,822.43	100.00

Figure 20 (WBS illustrate)

16. Requirements and objectives

16.1 Traceability Matrix

Requirments	Pumps	Sprinklers	Fire Hose Wall Cabinet	CO2 Sys.	FM-200 Sys.	Fire Detection Alarm Sys.
Test Case						
Basement	Pass			Not Executed	Not Executed	
Ground floor		Pass				
1st floor						
2nd floor			In Progress			
3rd floor						Fail
4th floor						
5th floor						
6th floor						
7th floor		Fail				
8th floor						
9th floor						Fail
10th floor						
11th floor		In Progress				In Progress
12th floor						

Test Execution: Not Executed  Pass  In Progress  Fail 

Figure 21 (Traceability Matrix)

16.2 Methods of Collection

Requirement Collection	
Quality	• Civil Defense standers • Material Specifications • Vendors & Manufacturing
Cost	• Price limitation, Upper and Lower Range (Desired Price) • Bidding
Time	• Deliverable should be Deliver within 3 to 5 weeks approximately from the payments

Table 13 (collection)

Requirement check list	Satisfied	Unsatisfied	N/A
Civil Defense standers.			
Material Specifications.			
Vendors & Manufacturing			
Desired Price			
Bidding			
Deliverable			

Table 14 (Check list)

16.3 Hierarchical structure

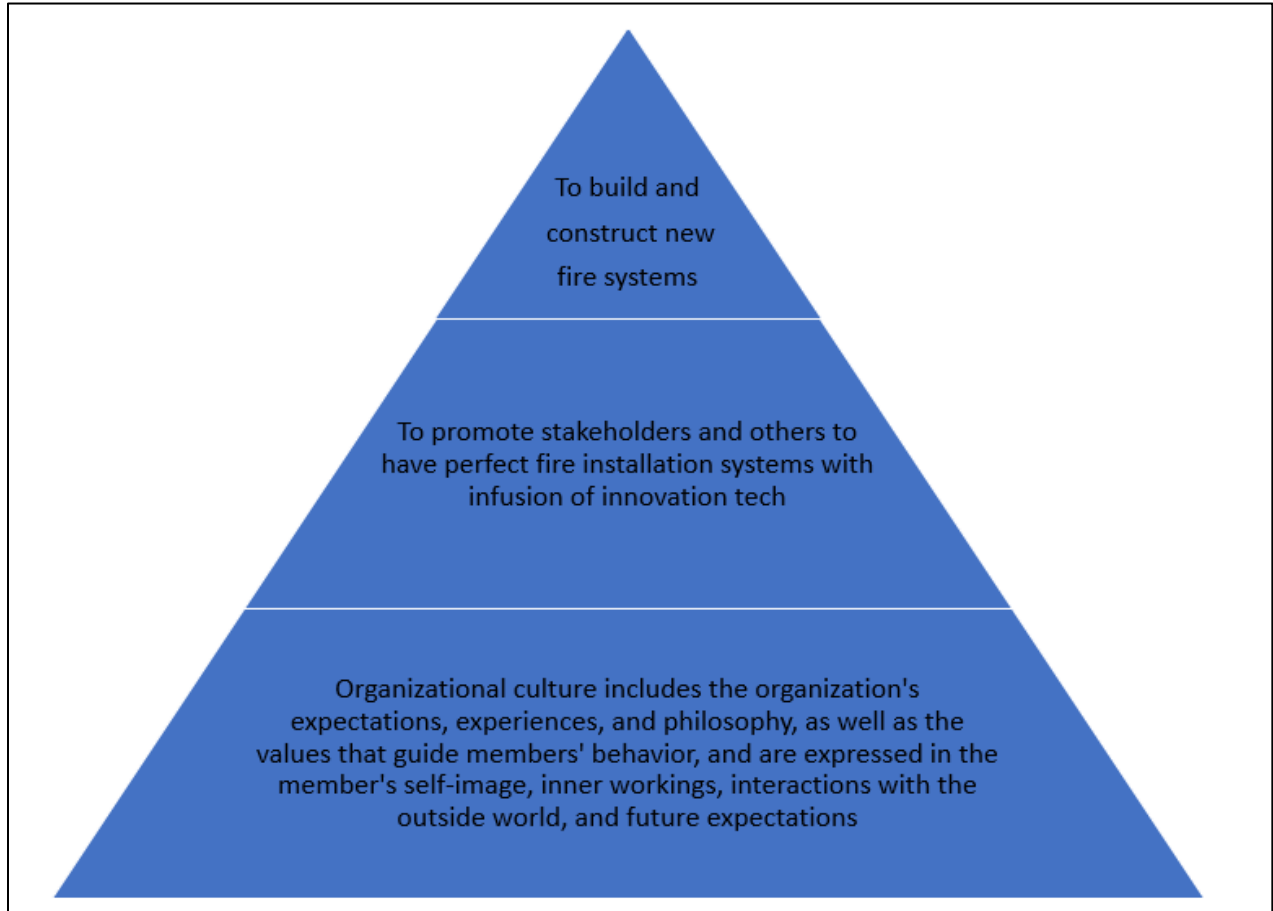


Figure 22 (hierarchical structure)

17. Scope

17.1 Project Scope Statement:

Equipping a commercial building with safety and fire-fighting equipment in accordance with the requirements of the Civil Defense of the Kingdom of Saudi Arabia, The work to be performed under this contract is EPC and consists of furnishing all labor, supervision, tools, equipment, technical and professional services, materials supplies and appurtenances necessary to perform work involved to build and construct new fire systems to meet civil defense requirements in Saudi Arabia by providing reliable and sustainable integrated fire systems.

PROGRAM REQUIREMENTS:

The program required to install and build new firefighting system at Jeddah building

PROJECT DESCRIPTION:

The work to be performed under this contract consists of furnishing all labor, supervision, tools, equipment, technical and professional services, materials supplies and appurtenances necessary to perform work involved to install and build latest Hardware/Software/Operating System and Network devices at Jeddah building.

PROJECT LOCATION:

The proposed project is located within the project location is in Heavy Industrial Area, KSA-Jeddah City

ENGINEERING AND DESIGN RESPONSIBILITIES:

- 1) The required professional services shall include complete design development, including the review of information provided in the contract documents, preparation of the final as-built drawings, and all necessary documents as required, upgrade of existing drawing/document/manuals reflecting the changes, and related other professional services in connection with, as specified herein, except as may be specifically excluded in the contract document.
- 2) The engineering and design responsibilities, under this contract, shall include obtaining, research, and applying design information on relevant existing fire system design documents/ drawings/manuals.

Works mainly comprise of the following major items:

Major elements of equipment supply, installation & commissioning of fire-fighting systems including to Operator workstations & servers with latest Hardware, Software and Operating System at BAM Properties facility includes but is not limited to following: -

- 3) Supply, installation, commissioning & Upgrade Operator Workstations for firefighting system with complete hardware and software licenses as a complete set.
- 4) Supply, installation, commissioning & Upgrade Servers (RACK Mounted & Tower Type) for fire-fighting systems with complete hardware and software licenses as a complete set,
- 5) Contractor shall perform engineering modification, installation, configuration, testing & commissioning of new fire-fighting systems

- 6) The displays, alarm and database configuration in the existing workstations shall be retained as is. New feature of the display software shall be added in site-specific O&M manual.
- 7) Contractor shall demonstrate successful Integration of fire-fighting systems and other Systems.
- 8) Contractor shall markup modification in the respective drawing & O&M manual and submit it as built drawing
- 9) Contractor shall provide display screens in a widescreen format that would fill a wide-screen monitor presentation.
- 10) Contractor shall verify any updates required to allow these fire-fighting systems to work properly with the existing controller code.
- 11) After successful new workstation & server installation, contractor shall complete all the below listed activities in all fire system building.
 - Control software upgrade to the latest control software version.
 - Perform testing & commissioning
 - The fire systems hardware and software shall be tested as an integrated system.
 - Documents (Network diagrams, O&M manual etc.) update & submission
 - Perform FAT & SAT
 - To performing work at the site shall be required to comply with and enforce strictly all the required Industrial Safety rules, regulation and practices.

Site, Raw Material and Utilities Availability Review

A. Site:

There is no requirement for any site for this project.

B. Raw Materials:

The project does not involve any raw materials. The EPC Contractor shall bring the new Hardware, server, software, required tools, equipment, and testing apparatus to install, check/ test and commissioning. For day-to-day operation after the completion of the project, no regular raw materials are required.

C. Utility requirements:

The install of fire systems will become integral part of operation & maintenance in BMA and does not require any utility for their operation. Accordingly, this project does not involve any utility requirements.

PROJECT PROCEDURES:

It shall prior to start of work on the project, prepare and submit project procedures package regarding; communication between all parties, schedule of activities, project documentation, record keeping, Safety and security requirements,

Project SCHEDULE:

1. shall submit a detailed project schedule showing the activities and sequence of operations needed for the orderly performance and completion of the work.
2. shall be obliged to complete entire site work of upgrade, installations, testing and commissioning within 120 working days as maximum.
3. shall prepare and submit for approval a cutover plan prior to commencement of any site work.
4. shall submit the above within 20 days after Notice to Proceed is given and shall ensure that during the cutover, there is no unscheduled data loss and operational emergencies to any of the equipment. The plan shall be in narrative form, describing the work sequence and the method of implementing of the entire activities with minimum services downtime.

COMMENCEMENT AND COMPLETION OF WORK:

1. Within 30-12-2022 as maximum, the project shall be obliged to complete the entire site work of upgrade, installations, testing and commissioning for upgradation work.
2. shall observe and exercise therein the professional standards of skill, care and diligence, adhering to by first-class contractors performing work of a similar nature. Unless otherwise expressly provided herein, all materials and equipment shall be new and shall conform to the specifications, drawings, samples and other descriptions set forth in this contract or provided by contractor; and where not specified, such materials and equipment shall be the most suitable grade of their respective kinds for their intended use.
3. During the performance of the work, shall be responsible for internal security and protection of all his equipment, materials and tools, etc.
4. shall at his own expenses provide boxes and / or store for all portable tools, equipment and material required or used in the work.

INITIAL ACCEPTANCE:

Upon completion of work and clearing the site from all debris, the contractor may give notice for inspection for initial acceptance of the work. If such inspection confirms that the work is completed in accordance with the contract and shall have satisfactorily passed functional test, then may issue a certificate of Initial Acceptance. In addition, the warranty period will start from the date of Initial Acceptance of the work.

Moreover, Initial Acceptance of the work shall be conditioned upon but not limited to the followings

WARRANTY:

The contractor shall warrant that all goods and services comply with the contract; are free from latent and patent defects in design, materials and workmanship; are suitable and adequate for the purposes for which they were designed, specified in the contract; and will give efficient and satisfactory service for the period of One (1) year herein under title “Warranty Period” from the date of initial acceptance of the work.

CLEANING UP AND REMOVAL:

The Contractor shall, at all times, keep the work site areas, under its use, in a neat, clean, and safe condition and shall dispose of all rubbish and other unwanted materials. Contractor shall also ensure that the entire project related labor and material employed by contractor are removed from the work site upon completion of the work.

PERFORMANCE TESTS AND ACCEPTANCE:

The contractor shall be responsible to carry out all the system performance tests as specified in scope, technical requirements, and system capabilities and approved functional specifications.

17.2 Scope creep

Scope creep is a dreaded thing that can happen on any project, wasting money, decreasing satisfaction, and causing the expected project value to not be met. Most projects seem to suffer from scope creep, and both project teams and stakeholders are consistently frustrated by it. Also, it means Adding additional features or functions of a new product, requirements, or work that is not authorized (i.e., beyond the agreed-upon scope)

There are many ways scope creep can occur on projects. Executives at the sponsor level frequently don't want to be involved in every decision. So, project teams make them. Some change requests are or appear to be small, so again, project teams act on them instead of following a formal change management process. An inflexible or cumbersome change control process may also contribute to unauthorized scope additions. the below are examples of scope creep may happen:

- Ambiguous or unrefined scope definition
- Lack of any formal scope or requirements management
- Inconsistent process for collecting product requirements
- Lack of sponsorship and stakeholder involvement
- Project length

How to avoid scope creep:

- Clearly Define Your Project Scope
- Involve Clients and Stakeholders
- Create A Change Management Process
- Collect Requirements In Layers
- Learn To Say “No”
- Avoid Gold Plating
- Keep Monitoring Your Projects

Scope creep is the phenomenon where a project's requirements and deliverables increase as the project progresses.

Example: Let's say you're developing an app. Your original project plan included developing three key features for this app. However, as your project moved along, an employee recommended that you add this new feature that everyone's raving about. There are no resources allocated for this extra work, but how much could it hurt? Then, your client comes in and says they need a last-minute feature added to your project. You'll now have to manage to work on these two new features – using the same limited resources you allocated. Your project's deliverables are steadily increasing without an increase in time and budget resources.

17.3 Product breakdown structure (PBS)

Product breakdown structure (PBS) is a tool for analyzing, documenting and communicating the outcomes of a project, and forms part of the product-based planning technique. The PBS provides “an exhaustive, hierarchical tree structure of deliverables (physical, functional or conceptual) that make up the project, arranged in a whole-part relationship”. This diagrammatic representation of project outputs provides a clear and unambiguous statement of what the project is to deliver.

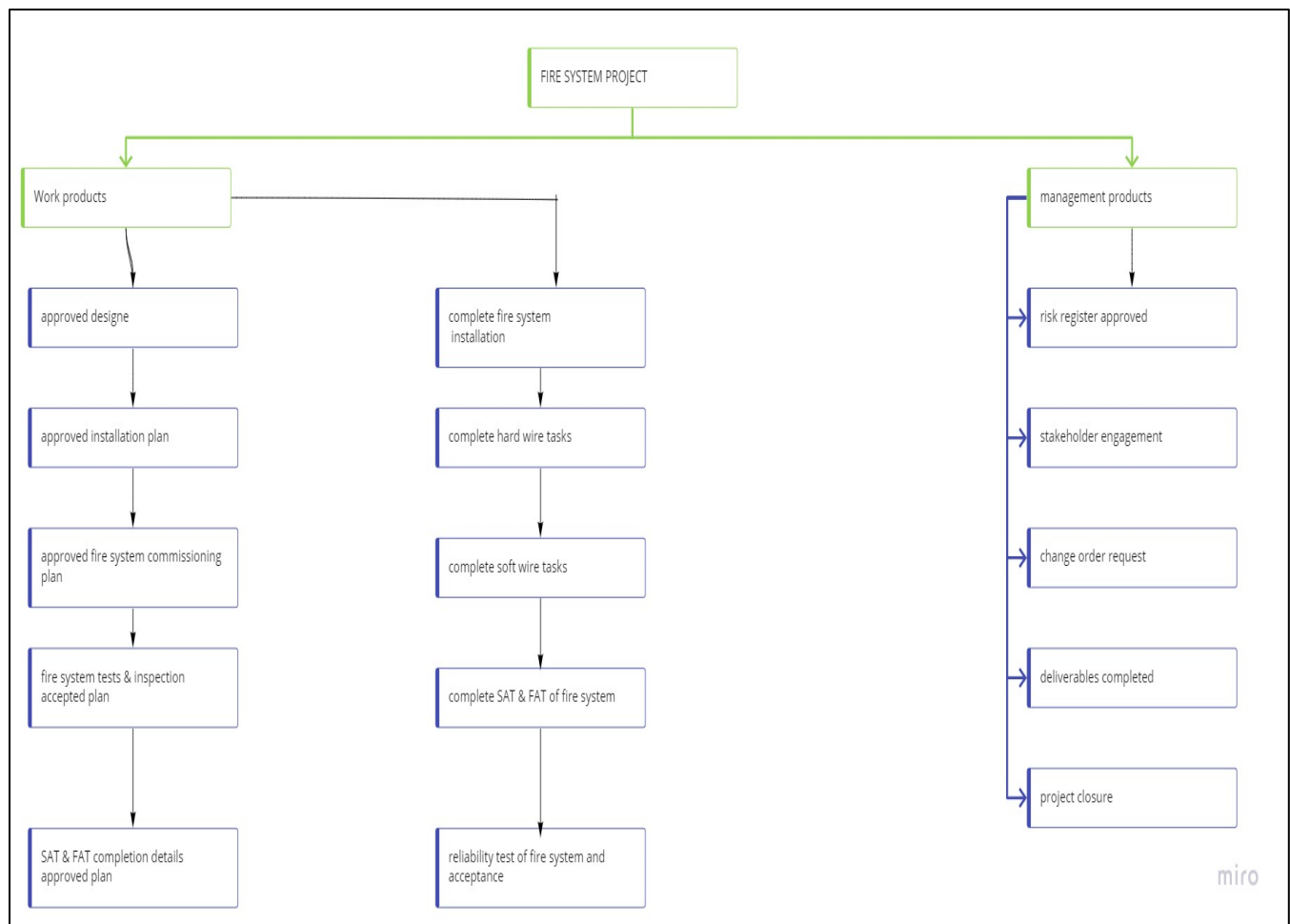


Figure 23 (PBS)

18. Time

18.1 functions list/activities included in WBS

Basically, WBS divided into four main parts and will be listed below:

1. Initiation

1.1. Project Start

Project consider started when LOA created or contractor sign the contract but usually depend on the organization. For this one project started according to the LOA sign by both BAM and contractor.

1.2. Kick-off Meeting

Kick off meeting is the most important milestone because all parties with stakeholder are engaged in this meeting. In this meeting scope, constrain and all project main relative part discussed and exposed to avoid and miscommunication or issues in the future that might delay or affect the scope/cost of the project.

2. Planning

1.1. Engineering

1.1.1. Civil

Civil part and foundation usually take long time because it is very difficult to change if any matter occurred, so engineering company do high effort to avoid any miss for the engineering package. Calculation and drawings must be reviewed by end user and confirmed before starting the work.

1.1.2. Mechanical

For the mechanical part, contractor take all dimension for the fire system pdf and isometric to install and implement the functionalize and optimum system. Also, specification for all equipment that going to be installed should be shared with engineering company.

1.1.3. Electrical

For the electrical part all drawings and electrical specification should be take place to finalize the engineering package according to project needs. The IPT also are very restricted in this stage when contractor create and identifying it clearly. After getting this information integration of the system should be tested or simulated to make sure no issue with it.

1.2. Procurement

1.2.1. Civil Work

Issuing PO "purchase order" is affected the schedule and for the civil work usually include concrete work or excavation or any relevant civil work.

1.2.2. Electrical Fire System

Issuing the PO of the electrical fire alarm and PAGA system also main panel for the fire system. This is the most important part because all the system will be integrated together.

1.2.3. Mechanical Parts

For the mechanical parts the same, we are going the finalize and check the PO for every mechanical part or equipment for example (pipes, valves, sprinklers and etc..)

1.3. Mobilization Start

Mobilization started when the contractor starts moving all resources like worker and machines and cabinets and prepare the welfare area. Usually this is called real work start point which is testing the contractor commitment.

1.4. Shop fabrication

This task usually can be done before the mobilization or once we have the proper confirmation from the consultant and civil defence that's mean same time with mobilization. This is including the PEB and pipes or any related part that fabricated outside the project construction area.

3. Executing

3.1. Construction

3.1.1. Pre-construction work

some part constructed out of the site then transferred to the site to do the remain work for construction like welding and pipe joint.

3.1.2. Fire Protection System Water Tank

The tanks will be prepared outside of the site as sheets so we will complete the work in the project site. Welding will take place with proper x-ray test to make sure that we have the high quality of work.

3.1.3. Fire Protection System Water Pump

Pumps will be constructed outside also in the vendor company and it will be sent as one set in pump house. This is one of the long lead items but the po for this one issued from the planning phase to avoid any unexpected risk and delay the project schedule.

3.1.4. Piping Work- Site Work

pipe will be arranged in the company FP "Future Pipes" which is the best company and we have checked the past project that did by them with the schedule lead time so mainly we have no issue.

3.1.5. Electrical Work

Electrical work will be done aligned with facility department, third party, contractor, and project team. By this way we are sure integration and building the system is done under high quality without any issue that might occurred. Usually this is the last part on this project and after this commissioning will be done.

4. Closing

4.1. Testing and Commissioning

we must be sure everything done by contractor very well and all ITP implemented according to the standard to guarantee commissioning will be done smoothly. Testing for the system should be done by expert to have MGR and Continuity test and all other mechanical test. Commissioning is most critical and can be called project mirror for the team. At that time all stakeholder and everyone engaged on the project will be check the and ask so the commissioning team will work under pressure, so we need to be confident and move smooth to achieve or deliver the project factualized and gives the benefit from it.

4.2. Documentation (As-Built Drawings and O&M) Closeout

After the project delivered, we need to have the proper documents that end user use for any maintenance and shutdown etc. The formal submission needs to be check by project and end user to be according to the company standard and format.

4.3. De-mobilization

This stage is the final one that we have which is related to all resource that used like machine, equipment and manpower to be de-mobilized and usually contractor take last payment after this step.

18.2 Relationships Between the Activities

According to the project demand and with respect to all activity, project phases fall as usual (initiation, planning, executing and closing). For the initiation we can't move to the next planning until we finish from the kick-off meeting after that we may go to the planning. So, it considers as end to start relation. Once we start planning, we and after we finish 50% from the engineering, we could start issuing the PO's. This

relation is start to start so there is no constrain or condition make force us wait until engineering finish. We could start the procurement once we confirm the 50%. For the mobilization starting and shop fabrication it should be start after the engineering done 100% but there is no condition regarding the procurement. So, it considers as end to start for the engineering but start to start for the procurement. For the executing work, required to be start mobilization and shop fabrication so it is end to start relation. Inside the execution there is no special order for all task inside, but this system should be integrated well with expert consultant and engineering company to make sure there is no miss order occurred. Regarding the closing phase, it should be conducted after execution work finish and for the subtask also the same so all these tasks will be end to start.

18.3 logical diagram of the project activities with critical activity

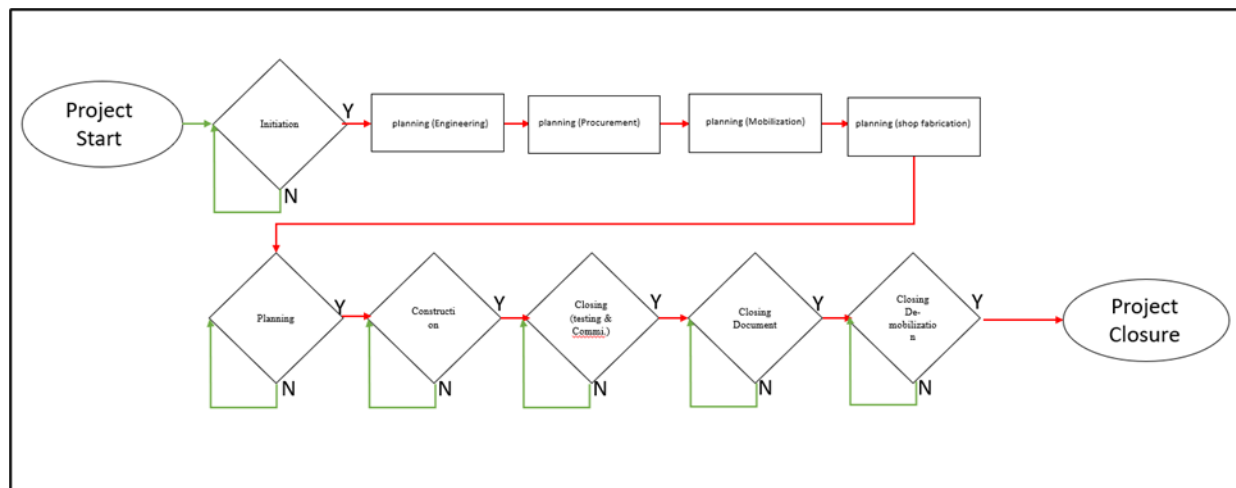


Figure 24 (Red line shows the critical path)

18.4 Gantt chart and Milestones model

Below Gantt chart describe the main milestone and period per month which is achievable and reasonable according to the project engineering study on planning.

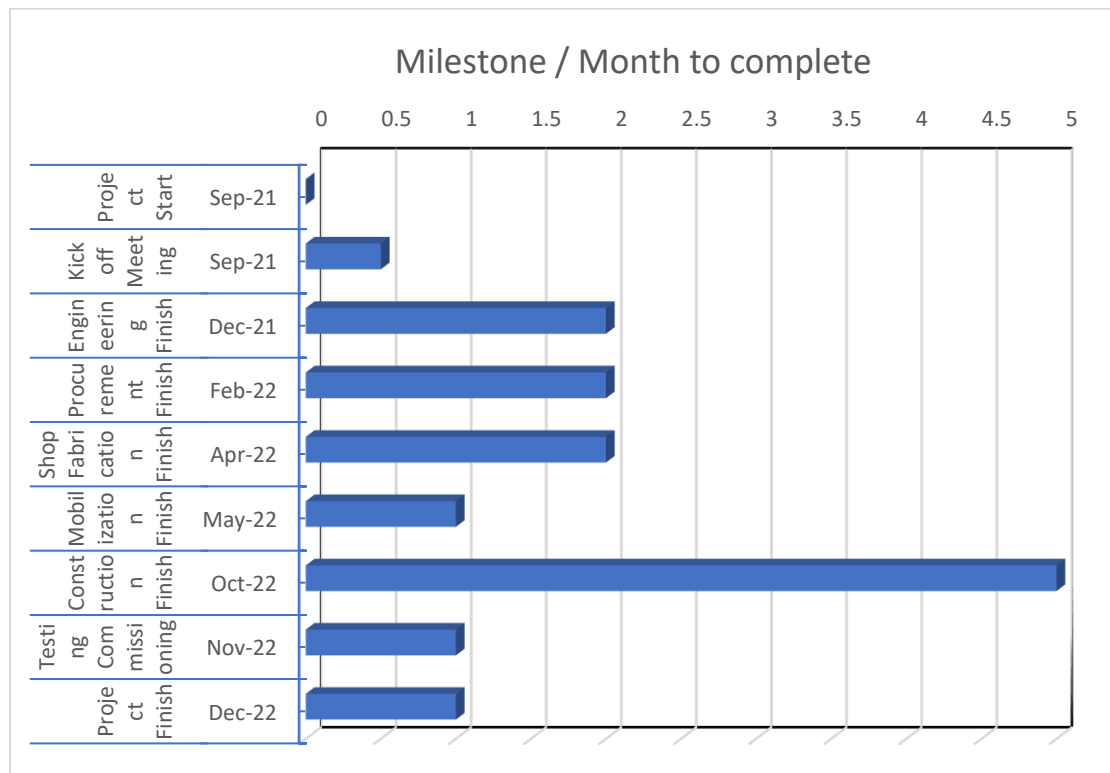


Figure 25 (Gantt Chart)

19. Quality

19.1 Deming Model

The Deming cycle is a continuous quality improvement model which consists of a logical sequence of four key stages: Plan, Do, Study, and Act.

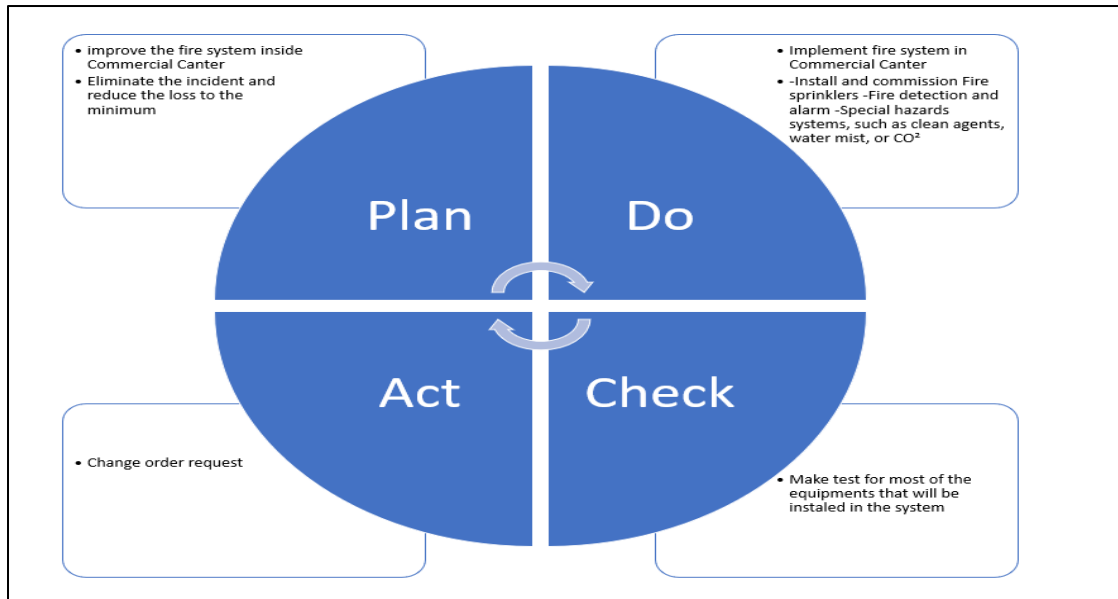


Figure 26 (Quality)

19.2 SIPOC model

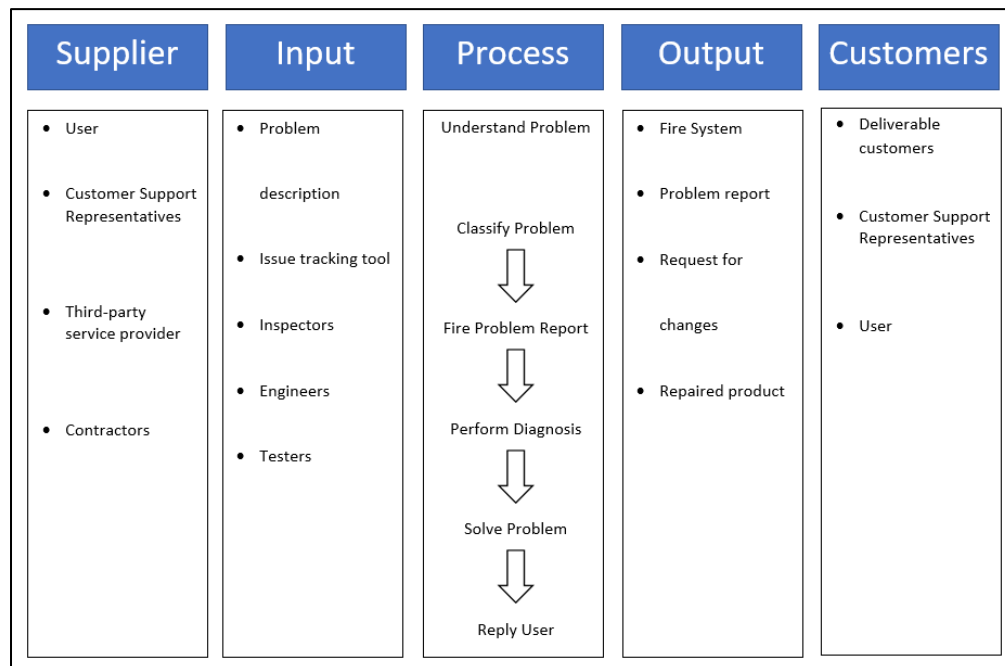


Figure 27(SIPOC model)

19.2 Ishikawa

Discretion of some issue by presenting Ishikawa model

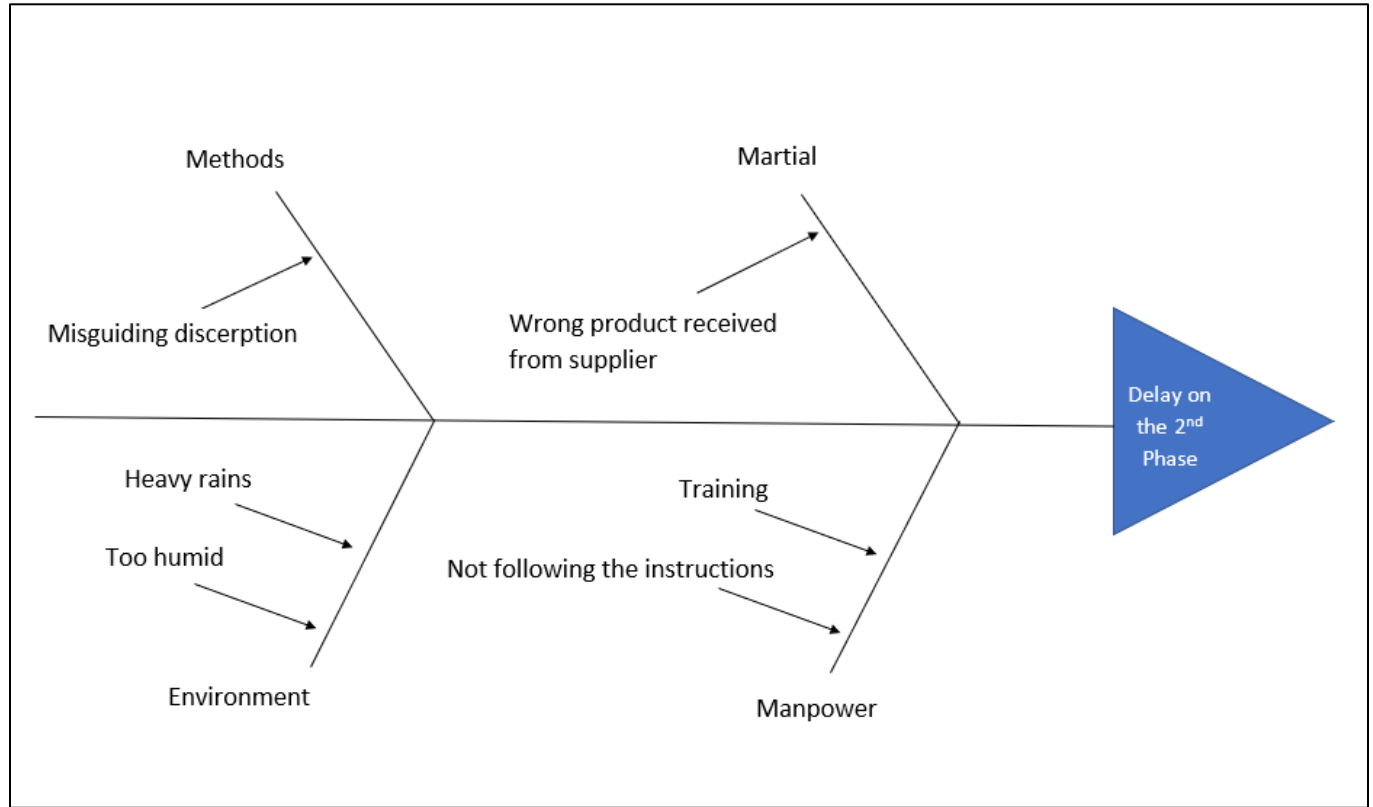


Figure 28 (Ishikawa)

20. Finance

20.1 Cost breakdown structure according to WBS

Project cost details is described in the below schedule with required percentage according to the Project PO and WBS.

Activity Description	Budgeted Total	
EPC Fire System Project	Cost	%
Initiation	200,000.00	2.00
Project Start	0	-
Kick Off meeting	200,000.00	2.00
Planing	5,100,000.00	51.00
ENGINEERING	1,300,000.00	13.00
Civil	400000	4.00
Mechanical	400000	4.00
Electrical	500000	5.00
PROCUREMENT	2,400,000.00	24.00
Civil Work	600,000.00	6.00
Electrical Fire System	700,000.00	7.00
Mechanical Parts	1,100,000.00	11.00
Mobilization Start	400,000.00	4.00
Shop fabrication	1,000,000.00	10.00
Execution	2,900,000.00	29.00
CONSTRUCTION	2,900,000.00	29.00
Pre construcation Work	550,000.00	5.50
FIRE PROTECTION SYSTEM WATER TANK	650,000.00	6.50
FIRE PROTECTION SYSTEM PUMP STATION	500,000.00	5.00
Piping Works-Site Works	800,000.00	8.00
Electrical Works	400,000.00	4.00
closing	1,800,000.00	18.00
TESTING & COMMISSIONING	900,000.00	9.00
Documentation (As-Built Drawings and O&M)	500,000.00	5.00
De-mobilization	400,000.00	4.00
Total	10,000,000.00	100.00

Figure 29 (cost)

21. Resources

21.1 Concept

Project management is the most necessary component in the planning and designing section for completing the project. The scheduled calculations have been made to utilize the resources required for the fire system for the commercial center (Kerzner, 2017). Initially, the risk assessment has been made by considering the human as well as the non-human resources. The people, capital and material, time, and tools have been required to successfully execute and complete the fire system installation (Meredith et al., 2017). The fire suppression system has been planned to install for life safety protocols to protect lives, assets, and the workplace in a commercial center. Starting activities from planning, monitoring fire detection, alarm setting, installation, and testing are the main activities to complete the project.

Scope

The project is designed to develop an innovative fire system for commercial-level organizations. The system enables the fire to be detected at an earlier stage without damaging the business activities. This project helps businesses at risk make the safe decision effectively rather than escaping because of the fear of fire (Tucker, 2018). While seeing the scope and requirement of the fire system, it is assessed that most of the legislative systems of the countries that have developed the laws too must install the fire alarms at their homes and the industrial level. This project has a broader scope in the market by becoming an influential contributor to the economy.

21.2 Tools

The planning for actual installation is a significant need for effective project management. A proper timeline is required for designing the system and knowing the local, insurance, and special owner requirements. In addition, the understanding of the fire alarm requirements according to the international or national electrical code is also considered an essential requirement for the completion of projects (Ramirez, 2015). Development of policies to color coding wiring, junction and terminal boxes and training of elections and lastly, the testing of the system. All these prices come under the process and planning section, which need time for completion.

Quality

The evaluation of the effectiveness of the systems has a significant role in the quality, consumer and employee trust. Well-maintained fire systems alert people and businesses at

risk, making the customers and employees feel safe and alerting the authorities to contact the emergencies (Rowan et al., 2020). This project has a demand in the market, which gives the assurance of protection while helping the business reduce the damage to the asset and property.

Finance

A specified cost is required in the specifications, designing, installing, managing, and maintaining to operate the commercial center to maintain and install the fire system. The cost determination is the most effective process which works to proceed with the project (Lock, 2017). Initially, for the conduction of this research, the cost is required for research and development on the fire detection and alarms systems, unique hazard systems. The cost of training and development of the researchers are all the costs that did not exceed form the budget.

22. Procurement

For the implementation of a fire system in the commercial center, the procurement activities mainly depend on different phases starting from the planning for the identification of skilled and trained individuals (Kabirifar et al., 2019). Starting from the scoping of the project by assessing the economic, the socio-economic analysis, for an effective management plan to define the project team is the main and initial step of the procurement process.

Procurement Planning and identification

After planning, for the assessment of an effective contractor, the feasibility analysis is done for the mitigation of project risks. Several activities are carried out during this phase starting from the scope refining, pre-designing and feasibility. Commercial, socio-economic assessment carried out to minimize the risk of the project contract. In project procurement, the project managers have to access the commercial assent, the commercial feasibility in terms of financial and non-financial which is conducted by using the public sector cooperator method (APMG, 2021). After risk assessments, the project managers decided to prepare the due diligence on pre structures project procurement by defining the procurement strategies, the route and designing of the fire system plan.

Requirement definition

The detailed requirement form outside the company is needed for the completion of the project consisting of the services and goods without depending on the physical worth by relying on the vendors. To implement the idea of a fire system in the company, the general

requirement includes visual inspection, testing, preventative maintenance to minimize the risk of system failure along with smoke detecting sensors. The system software updates and corrective maintenance is also important requirement of this project before initiation.

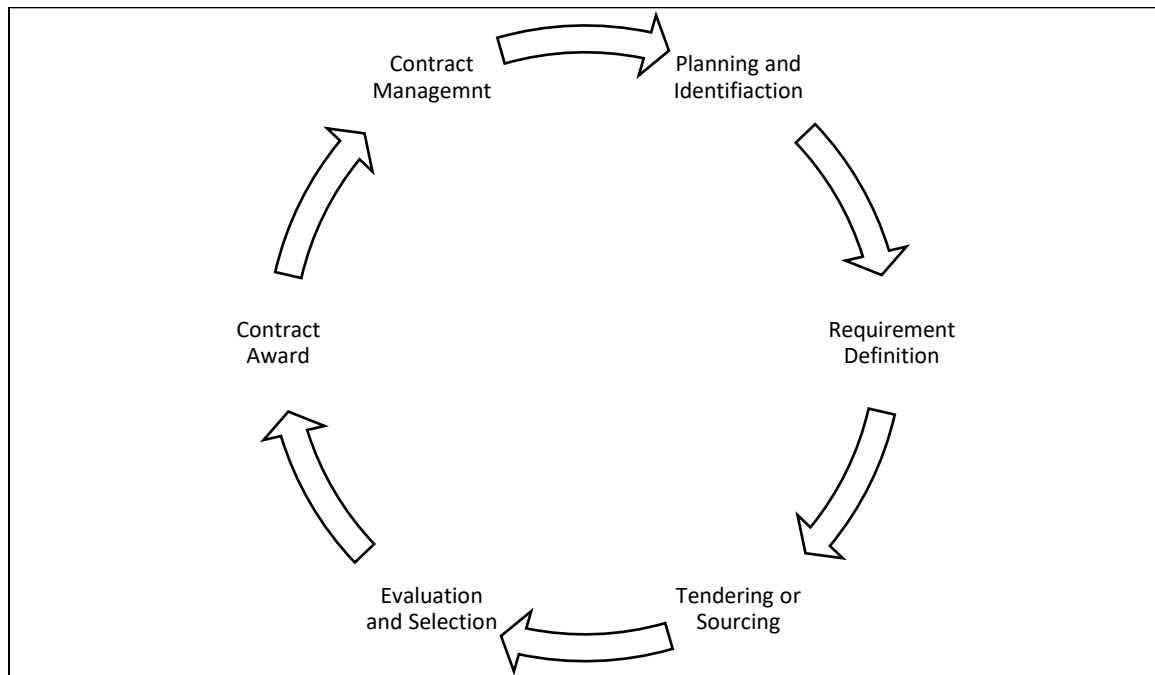


Figure 30 (Procurement process)

The project procurement is done by drafting the contract solution, which is the process development and structuring the need of tender and contractor to protect the project. In this phase, the main aim of the contractor is to align several activities starting from defining the structure of the project contract by providing the details on risks that might be faced in the project outline, the financial structuring and the mechanism of risk allocations. In addition to this, the project manager also has the responsibility to make the finalization of tasks under the initial phase (Chen et al., 2016).

Tendering or Sourcing

To make a better decision for the selection of contractor, the manager worked on the confirmation of previous analysis as well as on reassessments and prepare the drafts by drafting the criteria of qualification (RFQ) along with a request for proposal (RFP). Once all assessments are finalized, the contact will be sent to the committee for internal process to make execute the tender or contractor process.

Evaluation and contractor selection

To sign the award of contractor the contractor launch is done by following a complete process starting from taking initiatives on that proposal which is received from a person having competent qualification along with strong experience under-regulated environment. For contractor selection, the main tasks, the project manager along with the project panel is starting from the lunch of tender by making evaluations on some process of the shortlisted individuals who have to qualify the bid (Seaman and Salem, 2017).

Contract Award

After shortlisting, under the interaction process, the dialogues will be made on negotiation and the basis of the final decision, the request for proposal of the contract converted into the invitation propose which will be further evaluated, negotiated and then completed. At the completion stage, the signature call by the contractor will be awarded by the project team while checking the precedent conditions followed at the global level.

Contract management

After the contract selection process, the contract management phase is the most important phase for a contractor to manage and monitor the requirements (Lutchman and Akula, 2021). During this phase, for risk minimization during the project implementation phase, there are some major activities the management has to be considered. Initially, the contract management strategies utilized to manage the contract include the effective use of a financial model of reporting, the procedure to mane the risk and threats associated with the project. To manage the contract, the activities that need to be considered are; to establish the governance, contract administration and effective management team. Site management, changes in the project, the permits and delays, communication and administrative payments.

23. Plan and control

Meeting Information	
Topic	Change request
Place	Microsoft Teams
Date	2-12-2021
Reference#.	100243

Audience				
#	Name	Job	Concerned party/Compony	E-mail
1	Mohamed Abdullah Baqader	CEO	INTERNAL	
2	Adel Metgan	FINANCE DIRECTOR	INTERNAL	
3	Bander H.Alhashmi	FACILITY DIRECTOR	INTERNAL	
4	Adnan Almohammadi	OPERATION DIRECTOR	INTERNAL	

Discussion points	
1	Tracking of an order with better quality
2	Adding a customer service page to increase the link of customers to the site and know their opinions, expectations and suggestions in improving the products or services provided to them

Recommendations and Decisions		Responsible	Date
1	The overall management recommends adopting the procedure because it achieves one of the most important objectives of the project, which is customer satisfaction	CEO	5-Sep-2021
2	Supports ease of communication with them and facilitate their services.	CEO	5-Sep-2021
3	Add a web page for customers	CEO	5-Sep-2021

Preparing an agenda - an invitation form and minutes for a virtual meeting.

Meeting goals:

1. Performance reports
2. Objectives that have been achieved
3. Ensuring that the project is going according to plan (deviations).

meeting time:

9:30a.m. (for 30 minutes)

Guests:

Department managers are the main stakeholders (with high interest and influence).

Defining the performance measurement cycle and evaluating reports with an explanation of the reason:

1. Status report:

Status reports give information on the current status of the project and are used because they show whether the project is going according to plan to meet set deadlines. Helps keep stakeholders informed of any project developments. It is delivered periodically according to the communication plan defined in the project.

(Works that have been completed - upcoming work - budget used - risks and problems)

2. Performance reports

Shows all operations and works completed since the previous report. As well as all the work that has been completed in the project so far.

In other words, it measures performance to facilitate comparison between the previous and current performance report.

3. Report deviations:

The Deviations Report compares the actual performance of the project with the planned performance.

- Compare the schedule according to the plan with the actual schedule.
- Compare the cost per plan with the actual cost

The report is used to help determine the amount of deviations in the project to highlight and work to resolve them

Project Title	CEO	Project number	234565
Project Manager	MOHAMED BAQADER		
The change request form was developed through which the impact and alternatives were analyzed and the work team's recommendation regarding the change request			

applicant : CEO	The date of application: 2021-12-5	Change request number: 537
Description of the change:		
Add a cartoon page for customers		
cost estimate		
S.R 50,000		
Execution time and duration		
30 - 90 days		

Impact analysis
Adding a customer service page to increase the link of customers to the site and know their opinions and expectations in improving the product.
Customer Service Evolution
Alternative Analysis
There are no alternatives to this change
Recommendation
The Board of Directors recommends the adoption of the procedure because it is one of the most important goals of the project, which is customer satisfaction.

Defining risks (threats) and opportunities and presenting examples:

The risk can be defined as any event that affects the project or the project goal in a more accurate manner, and from this it is possible to define the opportunity as the event that can be transformed into a positive form that helps in accelerating the progress of work or an achievement that counts for the project and the work teams.

The project risks are constantly monitored and how they are dealt with. It also determines the priority of dealing with risks according to the impact and the probability of occurrence.

Example: An error occurs in the marketing mechanism for a particular product, and this was not scheduled in the risk table, if it occurs, and this error becomes media echoes. From this, the project team can reach the largest target segment through the media without marketing for that and pitting the risk for an opportunity to market a specific product or the project goal in general.

Project information

Project's name	BAM POPERTIES
The owner	CEO
Project manager	MOHAMED BAQADER
Project start date	December 2022

change request document

General information			
project name	CEO	The date the document was prepared	December 2022
project icon	3295	Project classification	Average
Project manager	MOHAMED BAQADER	Project Executor	CEO
project owner	MOHAMED BAQADER	project sponsor	CEO

Escalation request	
applicant	☒ Project manager ☐ Project owner ☐ Project sponsor
field of change	☒ Scope of work ☐ Implementation plan ☐ Cost
Description of the change	Add a web page for customers
Justifications for the change	The Board of Directors recommends the adoption of the procedure because it is one of the most important goals of the project, which is customer satisfaction.
Consequences if the change does not take place	Affects the project and the project goal more accurately
Signature of Applicant	

change request document

Impact on the project		
Impact on the project	work area	Increasing the working period from 30 days to 40 days
	implementation plan	Nothing
	the cost	S.R 50,000
	Other	Implications for the rest of the project

Accreditation					
project owner	MOHAMED BAQADER	Signature		Status	☒ Accepted
		Date	2021-12-5		☐ Not accepted
project sponsor	MOHAMED BAQADER	Signature		Status	☒ Accepted
		Date	2021-12-5		☐ Not accepted
					☐ Pending

Change Request – 2021

Figure 32(change request)

Risk Assessments have been carried out by all the assigned team members under the guidance of Project Support Department. Risk Register finalized by as

Risk Analysis				Detailed impact							Residual Risk Assessment		
Risk ID	Existing Controls	Risk Drivers / Root Causes	Potential Consequences (Inherent exposure)	Budgetal imp	Schedule imp	Environment imp	H&S imp	Assets damage imp	Reputation on imp	Inf	Like	Risk S	Risk I
PJ	1. Adoption to latest codes and standards for design. 2. Develop emergency response measure in case of changes to design inputs. 3. Proper selection of the Engineering team by EPC contractor. 4. Site survey and design review.	1. Changes in Standards & Specifications. 2. Changes in Design Requirements midway through the project. 3. Inaccurate non availability of as-built data.	1. Project delay.	1	3	2	0	1	0	3	1	3	Low
PJ	1. Verification of the site conditions thru Site survey AG and UG(Scanner) during design. 2. Contractor to prepare updated As-Built drawings using the existing provided drawings as per the contract.	1. Available as-built drawings are not accurate - Document library not updated for previous projects. 2. Non availability of Manpower plan. 3. Inadequate procurement management. 4. Manufacturing flaws like Overlooking approved specification, datasheet and drawings. 5. Delay in CC/force major	1. Property damage. 2. Safety Incident. 3. Project Delay 4. Incomplete design 5. Cost Impact	1	3	2	2	2	0	3	1	3	Low
PJ	1. Ensure availability of agreed Resources as per contract proposal. 2. Manpower plan to be review/ monitor and update if required.	1. Non availability of Manpower plan. 2. Not having enough resources to execute the job.	1. Project delay 2. Work quality may be compromise	1	3	0	2	1	0	3	1	3	Low
PJ	1. Procurement plan reflecting the schedule of delivery as per the contract to be followed. 2. Inspection test plan. 3. On time F.A.T.	1. Inadequate procurement management. 2. Manufacturing flaws like Overlooking approved specification, datasheet and drawings. 3. Delay in CC/force major	1. Project delay.	0	3	0	0	0	0	3	2	6	Medium
PE	1. Integration requirement needs to be addressed in SDW.	1. Integration details overlooked in SDW.	1. Project delay. 2. Operation Interference.	1	3	0	2	2	0	3	1	3	Low
PJ	1. Review availability of accurate As-built drawings for existing facilities. 2. PTW	1. Non availability of accurate As built drawings for existing facilities.	1. Project delay. 2. Operation Interference.	1	3	0	2	2	0	3	1	3	Low
PJ	1. Construction schedule needs to be prepared to minimize disturbances to the operation of the existing facilities. 2. Any SD requirement to be coordination with Operation during design phase. 3. Device transition plan need to be developed inline with annual shutdown plan.	1. Construction schedule is not adequately prepared to avoid any disturbance for the existing facilities during shutdown period	1. Project Delay. 2. Compromised business objective.	1	2	0	0	1	0	2	1	2	Low
PE	1. PE to include training clause at SDW stage.	1. SDW not included training request	1. Delay on hand over of project because O & M not trained 2. un-skills O & M to handle system futures	1	3	0	0	1	0	3	1	3	Low
PE	1. SDW shall be reviewed and concurred based on available OT GRC policy and procedures.	1. Outdated operating system 2. Unavailability of antivirus protection 3. Unavailability of backup and restore feature.	1. Project delay. 2. Business impact 3. Cyber vulnerability	0	3	0	0	0	0	3	2	6	Medium

Strategy	Detailed Impact						Target Risk Assessment				Risk Management (Improvement opportunities)			
	Budget imp	Schedule imp	Environment imp	H&S imp	Assets damage imp	Reputation imp	Impact	Likelihood	Risk Score	Risk Level	Action Plans	Risk response	Support Required From	Timeline
Reduce	1	3	2	0	1	0	3	1	3	Low	1. Adoption to latest codes and standards for design. 2. Develop emergency response measure in case of changes to design inputs. 3. Proper selection of the Engineering team by EPC contractor. 4. Site survey and design review.	PJ	TSD, BU, PE	11/22/2022
Reduce	1	3	2	2	2	0	3	1	3	Low	1. Verification of the site conditions thru Site survey A/G and UG(Scanner) during design. 2. Contractor to prepare updated As-Built drawings using the existing provided drawings as per the contract.	PJ	BU, PE, TSD	8/7/2021
Reduce	1	3	0	2	1	0	3	1	3	Low	1. Ensure availability of agreed Resources as per contract proposal. 2. Manpower plan to be review/ monitor and update if required.	PJ	P&C	2/5/2025
Reduce	0	3	0	0	0	0	3	1	3	Low	1. Dedicated expediting team needs to be assigned to ensure on time deliver for components/ materials. 2. Ensure early approval/availability of specification, datasheet and drawings for the components.	PJ	P&C	2/7/2024
Reduce	1	3	0	2	2	0	3	1	3	Low	1. Integration requirement needs to be addressed in SDW.	PE	BU, TSD	7/20/2022
Reduce	1	3	0	2	2	0	3	1	3	Low	1. Review availability of accurate As-built drawings for existing facilities. 2. PTV	PJ	BU, TSD	12/22/2021
Reduce	1	2	0	0	1	0	2	1	2	Low	1. Construction schedule needs to be prepared to minimize disturbances to the operation of the existing facilities. 2. Any tie-ins or SD required to be coordination with Operation during design phase.	PJ	BU, TSD	12/7/2021
Reduce	1	3	0	0	1	0	3	1	3	Low	1. PE to include training clause at SDW stage.	PE	BU, TSD	7/20/2022
Reduce	0	3	0	0	0	0	3	1	3	Low	1. Dedicated team will review SDW for necessary compliance.	PE	project	7/20/2022

Project Priority:

In addition to the risk assessment, Risk based project priority is evaluated based on “Unified Risk Assessment Criteria (UARC). The project priority based on UARC is given below:

• Risk Based Project Priority:

Based on the Unified Risk Analysis Criteria (URAC), the project was evaluated on Impact and Likelihood and matched with the Heat Map.

• Risk Based Project Priority:

Based on the Unified Risk Analysis Criteria (URAC), the project was evaluated on Impact and Likelihood and matched with the Heat Map.

Following are the findings:

a. Perspective-1	:	Impact
i. Impact criteria	:	Legal - Regulatory
ii. Description	:	Warning to revoke the operating permits or sever penalties
iii. Score	:	4
b. Perspective-2	:	Likelihood Criteria
i. Probability of occurrence :	:	Incident has happened in 2years within BAM or similar industry in region.
ii. Score	:	4
c. Risk Band	:	Impact x Likelihood, 4 x 4 = 16
d. Risk Level	:	16 - High

Hence, as per the analysis this project is having risk level “**High**” with a priority score of 16. The matrix as per evaluation is shown below:

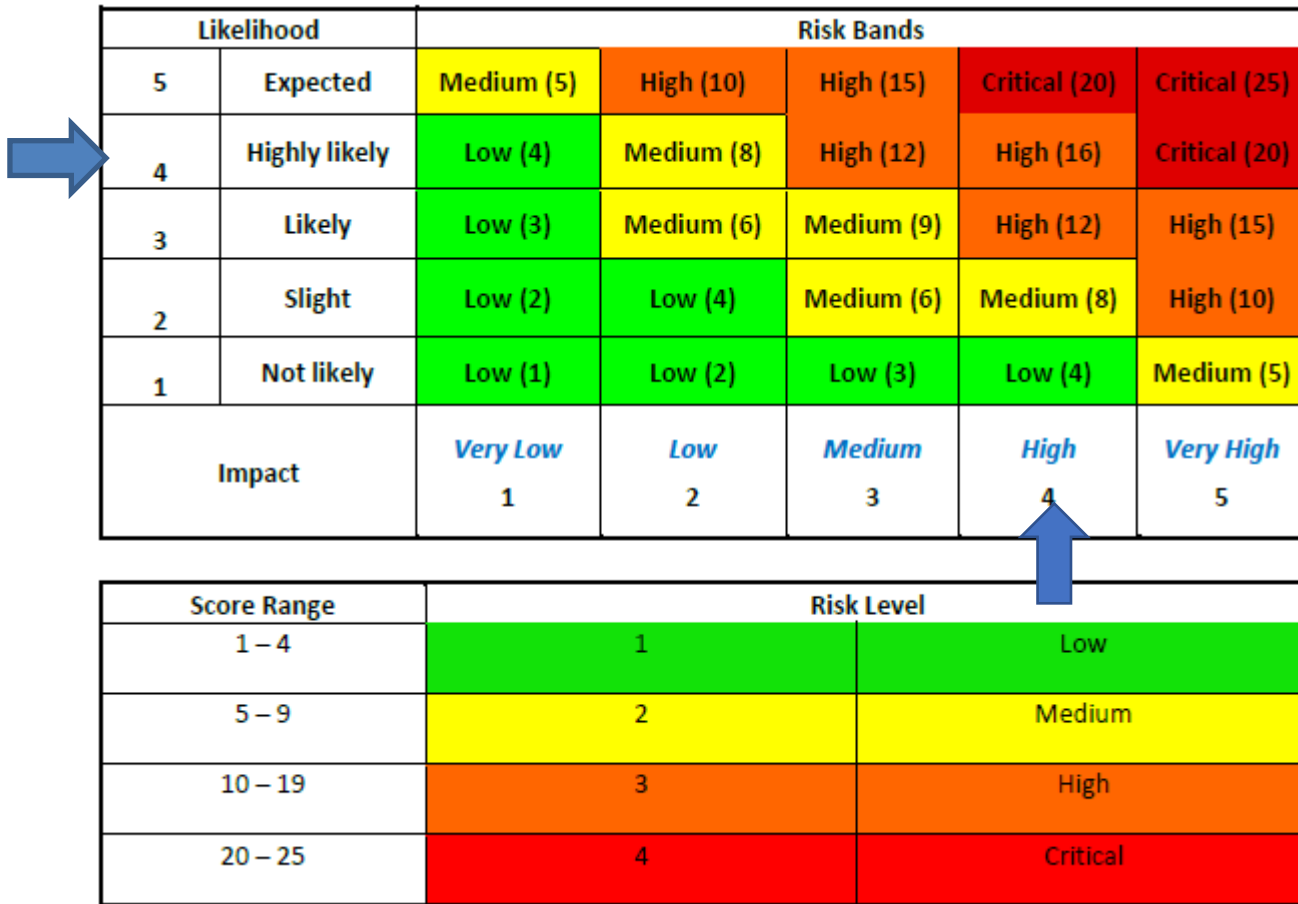


Figure 33(heat MAP)

BAM	Fire system for commercial center	Document ID No:	MVEF-1-CE-305
		Page:	1 of 2
		Rev. No.:	0
	Lessons Learned	Date :	24 – 04 – 2021
Project Management	Technical	Team Effectiveness and Organization	General
Project Execution Planning	Requirements of the User	Teamwork / Collaboration	Deliverable Quality
Status Reports	Technology Assessment	Team Communication	Technical Success
Resource Management	Specifications	Technical Experience and Capabilities	Team Satisfaction
Risk Management	Basic Design Packages	Management support	On-time completion
Change Management	Detailed Design	Collaboration with end user	On-budget completion
Procurement & Contracting	Construction	Decision making	Project objectives
Budget Management	Inspection Plans	Vendor interaction	Business objectives
Quality Control	Precommissioning / Commissioning	Stakeholder involvement	
Progress Control	Handover		

Figure 34(Lessons learned)

Lessons Learned

The Lessons learned have been carried out by all the team members and it is provided as:

BAM		Fire system for commercial center											
Lessons Learned													
ID	Date	Entered By	Project Name	Project Type	Project Location	Project Stage	Subject	Description of the Situation	Impact of the Situation	Affected Discipline	Recommendations & Comments	Follow-Up Needed?	
7		Adnan Alnohamed	Yanbu building project			ALL - F3		Early Prequalification of Contractors, Subcontractors and Vendors	1- Project Objective 2- Quality of Project Deliverables 3- Addition Cost 4- Scope Creep 5- Project Delay 6- Reputation of the company 7- HSE	owner	1- Review & improve Prequalification criteria for contractor/Subcontractors / Vendors 2- Conduct site visit to new bidder sites / offices before confirming Bidder List 3- Conduct site visit to referenced companies 4- Make sure contractor Key staff are skilled by interviews & check references	Yes	
8		Adnan Alnohamed	Yanbu building project			SS		Non clarity of Preliminary Scope of Project & premises of project	1- Project Objective 2- Selection of proper contractor 3- Complying Bidder List 4- Scope Creep	1-TSD 2-OBM 3-SD 4-PPD 5-PPD 6-PPC	1- Review of the Shopping list (List of Major Equipment) with all stakeholder during SS/ F3 stage 2- Conduct workshop to understand Scope of Work with all Stakeholders	Yes	
12		Adnan Alnohamed	Yanbu building project			All		Change Management	1-Additional Cost 2- Project Delay	1-TSD 2-OBM 3-SD 4-PPD 5-PPD 6-PPC	1- Clarity of Scope of Work at the early stage of project prior to award 2- Implementation of proper & strong change management process as per project management of change	Yes	
13		Adnan Alnohamed	Yanbu building project			All		Communication Gap between Stakeholders	1-Additional Cost 2- Project Delay 3- Scope Creep 4- Quality of Project Deliverables 5- Gap in Knowledge &	1-TSD 2-OBM 3-SD 4-PPD 5-PPD 6-PPC	1- Identify the right communication protocol 2- Proper Project Document Control 3- Specific Project Email Group 4- Increase the Capacity of Email Account at acceptable limit	Yes	
14		Adnan Alnohamed	Yanbu building project			All		Communicating the bidder list with P&C at early stage of the project	1- Fail to operate 2- Additional Cost 3- Project Delay	1-TSD 2-OBM 3-SD 4-PPD 5-PPD	1- Coordination with SEC for relay coordination at FEED Stage 2- Structures like fence shall be taken approval from HDS 3- SW/CDPC approvals should be in advance	Yes	
New Lesson learned													

25. Stakeholder

A stakeholder engagement assessment matrix supports comparison between the current engagement levels of stakeholders and the desired engagement levels required for successful project delivery. One way to classify the engagement level of stakeholders is shown in Figure below.

The engagement level of stakeholders can be classified as follows:

- **Unaware.** Unaware of the project and potential impacts.
- **Resistant.** Aware of the project and potential impacts but resistant to any changes that may occur as a result of the work or outcomes of the project. These stakeholders will be unsupportive of the work or outcomes of the project.
- **Neutral.** Aware of the project, but neither supportive nor unsupportive.
- **Supportive.** Aware of the project and potential impacts and supportive of the work and its outcomes.
- **Leading.** Aware of the project and potential impacts and actively engaged in ensuring that the project is a success.

In table below, C represents the current engagement level of each stakeholder and D indicates the level that the project team has assessed as essential to ensure project success (desired). The gap between current and desired for each stakeholder will direct the level of communications necessary to effectively engage the stakeholder. The closing of this gap between current and desired is an essential element of monitoring stakeholder engagement.

Stakeholder	Unaware	Resistant	Neutral	Supportive	Leading
CEO				C	D
Finance Director		C		D	
Procurement Director			C	D	
Operation Director	C		D		
Facility Director	C		D		
Quality Director	C			D	
Project Director				C	D
Project manager					C D

Table 15 (Stakeholder Engagement Assessment Matrix)

References

- APMG, 2021. An overview of the PPP process cycle: How to prepare, structure, and manage a PPP contract. *10. An Overview of the PPP Process Cycle: How to Prepare, Structure and Manage a PPP Contract | The APMG Public-Private Partnerships Certification Program*. Available at: <https://ppp-certification.com/ppp-certification-guide/10-overview-ppp-process-cycle-how-prepare-structure-and-manage-ppp-contract> [Accessed November 25, 2021].
- Kerzner, H., 2017. *Project management metrics, KPIs, and dashboards: a guide to measuring and monitoring project performance*. John Wiley & Sons.
- Meredith, J.R., Shafer, S.M. and Mantel Jr, S.J., 2017. *Project management: a strategic managerial approach*. John Wiley & Sons.
- Tucker, E.T., 2018. *An Examination of Public Safety Resources Aiding the Houston Fire Departments Response Time to Improve Safety, Standardization and Sustainability of the Emergency Medical Service* (Doctoral dissertation, Texas Southern University).
- Sam Houston state university division 28 fire alarms. Available at: <https://www.shsu.edu/dotAsset/e5951e25-e0ce-4c82-9564-b01e44aeeb1a.pdf> [Accessed November 25, 2021].
- Ramirez, A., 2015. In the line of fire. *Building Control*, p.16.
- Rowan, K.E., Botan, C.H., Kreps, G.L., Samoilenko, S. and Farnsworth, K., 2020. Risk communication education for local emergency managers: Using the CAUSE model for research, education, and outreach. In *Handbook of risk and crisis communication* (pp. 168-191). Routledge.
- Lock, D., 2017. *The essentials of project management*. Routledge.
- Kabirifar, K. and Mojtahedi, M., 2019. The impact of Engineering, Procurement and Construction (EPC) phases on project performance: A large-scale residential construction project case. *Buildings*, 9(1), p.15.
- Chen, Q., Xia, B., Jin, Z., Wu, P. and Hu, Y., 2016. Choosing appropriate contract methods for design-build projects. *Journal of Management in Engineering*, 32(1), p.04015029.
- Lutchman, C. and Akula, R., 2021. Contractor management. In *Process Safety Management and Human Factors* (pp. 159-177). Butterworth-Heinemann.
- Semaan, N. and Salem, M., 2017. A deterministic contractor selection decision support system for competitive bidding. *Engineering, construction and architectural management*.