



Everyone's Smart University

Project (Spring 2021)

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Project Risk Management

1. Introduction

In project management, risk management is the practice of identifying, evaluating, and preventing or mitigating risks to a project that have the potential to impact the desired outcomes. Project managers are typically responsible for overseeing the risk management process throughout the duration of a given project.

In Royal Commission for Jubail and Yanbu (RCYJ), risk management is a process dedicated to identifying risks within a business and developing procedures to mitigate or eliminate potential issues. Risk assessments reduce the chance of injury in the workplace. A risk management plan protects a company's resources.

Jazan City for Primary and Downstream Industries (JCPDI), is the latest industrial city that will be managed and operated by the Royal Commission. It is located on the coast of the Red Sea at the southwestern end of the Kingdom of Saudi Arabia. It is 66 kilometers to the north of Jazan City, and 20 kilometers to the west of Baish. Its coast is 11.5 kilometers long. It has a strategic location due to its proximity to the international shipping routes and the horn of Africa.

One of the main construction project in JCPDI is the construction of Road and Utilities between two existing Road in Industrial City District Area 6 Phase 1. Wherein the major construction activity is for the hauling works.

The contract scope is the hauling of soil material at the designated borrow pit area to project site, construction commenced in 11th of March 2020, with a scheduled EOC date of the 2nd September 2022. The total budget for construction is \$9,728,379.36. The area is divided by the contractor into seven (7) phases consisting of Phase 1, Phase 2, Phase 3, Phase 4, Phase 5, Phase 6, and Phase 7.

By having that kind of project work scopes, RCYJ understood that an unmanaged risk can easily prevent a project from achieving objectives or even cause it to fail to succeed. Risk management is important during project initiation, planning, and execution; well-managed risks significantly increase the likelihood of project success. And by this project risk management our organization will take great value and adhere everything within proper risk management plan.

2. Literature Review and Conceptual Framework:

The risk level shall determine if action is required to reduce the impact or potential impact to an acceptable level, or as low as reasonably practicable (ALARP), as well as to identify the time frame for implementation. The preference for controls, along with legal requirements, shall be in alignment with the hierarchy of control:

- a) Elimination
- b) Substitution
- c) Engineering controls
- d) Signage/warnings and/or administrative controls
- e) Personal protective equipment

3. Purpose:

Risk Assessments (RA's) are required in order to eliminate or reduce the possibility of risk to employees and damage to equipment while performing work tasks for the hauling works. Written procedures, properly used, serve as a base from which tasks can be continually modified to improve work methods, employee and contractor safety and productivity.

4. Objectives:

- 4.1. To identify tasks (segments of work), that have high potential for losses or impacts if not carried out in a specific manner and in a special sequence.
- 4.2. To eliminate or reduce accidental losses or impacts by identifying and controlling the hazards presented in each step of each task.
- 4.3. To develop written risk assessments (RA's) for critical tasks to be followed that will identify and control hazards or risks that might not otherwise have been identified or highlighted. Which will improve the safety, productivity, schedule, cost, and quality of work and minimize the possibility of injury occurrence.

5. Responsibility and Accountability:

- 5.1. The manager, supervisor or contractor (responsible persons) should:
 - 5.1.1. Apply this standard in his area(s) of responsibility.
 - 5.1.2. Develop and approve the Risk Assessments in his area(s) of responsibility.
 - 5.1.3. Risk Assessments should be approved and available in the department, as required, for all critical tasks listing all hazards in each step and how to control them.
 - 5.1.4. Train workers on RAs.
 - 5.1.5. Supervise and observe regularly while performing critical tasks using RA as a guide.
 - 5.1.6. Revise and update RAs guide in his area(s) of responsibility at least once each year, or more often if deemed to be appropriate by the manager concerned.

All workers who are assigned to carry out critical tasks must attend RA training and sign RA indicating he has been trained in it.

6. Principles behind Risk Assessments (RA's):

6.1. Critical Task

A Task which has the potential to cause major loss to people, property, process or the environment if not performed properly.

6.2. Hazards in the Work Environment

Are inherent in the location, the equipment or the materials used. In many cases, those hazards are impossible to eliminate, which means the method for safe work execution must ensure that losses are not caused by incorrect work methods or incorrect work-step sequences.

6.3. Hazard Elimination in Workplace

6.3.1. The first consideration for protection against these hazards or risks should be engineering controls such as barriers, shields, special container, etc.

6.3.2. The other means is to identify the high-risk tasks, Critical Tasks (CT)) analyze them and write structured step-by-step procedures (RA's) to carry out the task correctly and safely. (consideration of the supplier's manual /instructions

6.4. Employees are then trained in the correct job method as laid down by the RA.

6.5. Regular Inspections Checklist (IC) are carried out to monitor the performance of the employee carrying out the task, the quality of the training he received, and also to verify the correctness and accuracy of the RA.

7. Methodology:

Risk assessment identifies project specific activity or task, hazards or risks of their occurrence including Expected Monetary Value (EMV) in terms of cost, severity and the controls to mitigate.

General risk analysis includes working environment (site conditions), each phase of the project life cycle and tools/equipment.

The risk assessment team collected facts in the form of interviews, documented statements, photographs, relevant SH&E records, and visited the workplace to determine and assess any factors that may have contributed to the identification of hazards or risks.

7.1. A risk assessment team consisting of experienced employees who are required to do the job / task should be used to write the RA.

7.2. List of all jobs / tasks carried out by them are listed on the risk assessment form

7.3. A risk assessment exercise is carried out using the form to determine the critical jobs / tasks by means of a risk impact matrix rating.

7.4. The draft should be reviewed with the employees to solicit their comments on actual and potential hazards as well as the required controls to eliminate the hazards.

7.5. Update draft of RAs according to the recorded comments.

7.6. The RAs is now Ideally written. Each RA developed will be reviewed by the prospective supervisor, and approved by the manager.

7.7. Risk Assessments will be maintained in the department, as required, to allow for ready access for each supervisor and all employees.

7.8. Risk assessment must be repeated in case of an accident or upon any change in the scope of work and/or at predetermined intervals during long term projects that are carried out over a period exceeding 12 months.

Risk Impact Matrix = Severity x Likelihood of occurrence

SEVERITY		LIKELIHOOD OF OCCURRENCE				
		5	4	3	2	1
	5	25	20	15	10	5
	4	20	16	12	8	4
	3	15	12	9	6	3
	2	10	8	6	4	2
	1	5	4	3	2	1

Risk Impact

It identifies the timeframe for this risk to affect it. The following is classified as one:

HIGH -Catastrophic -Rating A - 100	Immediate requirement to review and investigate the case for removing/reducing the risk or improving the control measures.	Immediate actions Now – until one month
MEDIUM -Critical -Rating B – 50	Risks not broadly acceptable. Need investigation to consider reasonably practicable improvements.	Actions within 45 days Next 2-6 months
LOW -Marginal -Rating C – 10	Detailed working to support conclusion.	Tolerable >6 months

Impact-Probability Matrix

Impact	Probability			
	High $80\% \leq x \leq 100\%$	Medium high $60\% \leq x \leq 80\%$	Medium low $30\% \leq x \leq 60\%$	Low $0\% \leq x \leq 30\%$
A = High	Exposure Very High	Exposure Very High	Exposure High	Exposure Moderate

	(Score 100)	(Score 80)	(Score 60)	(Score 30)
B = Medium	Exposure High (Score 50)	Exposure Moderate (Score 40)	Exposure Moderate (Score 30)	Exposure -Low (Score 15)
C = Low	Exposure Low (Score 10)	Exposure Low (Score 8)	Exposure Low (Score 6)	Exposure -Low (Score 3)

Examples of risk classification:

Risk event	Probability	Impact rating	Score
The hardware will come 10 days late, resulting in a project which is of minor importance to customers and takes a total project delay of 10 days	30%	C	30
A risk of losing goods' capacity for carriage due to bad weather	50%	B	60
The immediate risk for companies is that costs will rise and waiting times will cross borders, especially when customers adapt to new processes.	90%	A	100
Total			190

EMV Calculation:

Risk	Risk Probability (P)	Cost Impact (IC)	Risk Contingency (P*IC)
A	0.3	\$5,000.00	\$1,500.00
B	0.5	\$10,000.00	\$5,000.00
C	0.9	\$15,000.00	\$13,500.00

8. List the Controls (Safe Practices):

For each hazard listed, a control must be developed and considered in the following order:

- ✓ Can the hazard be eliminated?
- ✓ Can the hazard be guarded?

- ✓ Can the frequency of the job be reduced?
- ✓ What must the employee do, or not do, to control the hazard at that step?

8.1. All unsafe conditions should be removed or guarded against wherever possible.

8.2. Where the conditions cannot be removed or protected against, the action the employees must take to avoid a loss at any step in the procedure must be described.

9. Results and Discussion:

Over the course of the project, SH&E team of RC Construction Department have raised a number of SH&E observations in relation to the poor safety standards being implemented on the project. And from the Safety Trending Analysis provided by the SH&E team, driving is on the top of the list for most safety violations being recorded. And something caused a concern to the company or into the business.

True enough wherein from the Risk Assessment that our company held, it is being concluded that Driving safety violation and its risk may directly cost impact the business very badly when it comes to Expected Monetary Value that has been approximated to 1,000,000SAR, as minimum against the company.

After figuring out the risk impact to the company from the derived risk assessments, the company were able to adjust positively policies that must be risk-related such as for procedures, attitudes towards risk, and safety culture.

Although the purpose of having proper risk assessment is clear, the company found difficulty at the beginning on its implementation. As limitation taken place with regard to the issue on competency of employees that will comprise a risk assessment team.

In general, the company's performance for safety is on a high level of effectiveness on its Risk Management System compared to prior months, industry benchmarks gone positive favoring the company, and so on.

10. Reference:

Cross-References

- Project Contract - Attachment C General Conditions, Article 15 – Safety
- IOSH Managing Safely
- Bartlett, J. (2004). Project risk analysis and management guide. APM publishing limited
- Kmec, P. (2011). Temporal hierarchy in enterprise risk identification. Management Decision
- Ward, S. C., & Chapman, C. (2003). Project risk management: processes, techniques and insights.

Risk Assessment Report

Risk Assessment No. 1	Project Name: Construction of Road and Utilities between two existing Road in Industrial City District Area 6 Phase 1				Prepared by: Engr. Darwin Africa – SRCE, RC Construction Department						
	Activity: Hauling Works.				Reviewed by: Engr. Deafallah Alenazi – Construction Manager, RC Construction Department						
					Approved by: Engr. Abdulmajeed Almutairi – Project Manager, RC Construction Department						
Rev. No.: 0		Tools & Equipment: Trailer dump trucks, Water Tanker, Grader, Roller Compactor, Pay-Loader, Excavator, Site Vehicles.				Date Issued: 13-04-2021					
Tasks	Hazards / Risks	Persons at Risk			Risk Factor L x S = RF			Control Measures <i>All of the following measures must be implemented</i>	Residual Risk L x S = RF		
		E	C	O	L	S	RF		L	S	R F

								<i>to reduce the risk factor to a tolerable level.</i>			
Transportation of materials to site.	Collision of vehicles.	1	2	1	5	5	25 (H)	Plan the trip travel including all access roads to be travelled to.	1	2	2 (L)
	Falling object.				4	2	8 (M)	Secure an approved Traffic Management Plan, and follow agreed requirements and precautions.	1	2	2 (L)
	Tipping-over.				4	2	8 (M)	Acknowledge relevant risk assessment and task method statement.	1	2	2 (L)
	Mechanical failure.				4	2	8 (M)	Only licensed, competent, and authorized driver and/or helper.	1	2	2 (L)
	Relevant risk may result into approximate risk EMV of 500,000.00SAR for property damages and high premium rate of medical insurance for personal injury.				5	5	25 (H)	Inspect first the vehicles, trucks, plant & equipment before transportation. Check materials quality and its transportation readiness before travelling.			

								Check for loose items upon loading. Put cover on materials whilst travelling. Bring valid permit, insurance, and authorization from/to local authorities related purposes. Do not use mobile phone whilst driving. Maintain safe distance from other vehicles at road. Follow road safety rules, regulations, and protocols. Wear face mask use sanitation gel, and always wash the hands. Wear appropriate PPE such as safety gloves, shoes, vest, goggles.			
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								Report any accident/incident to local authorities and to immediate supervisor.			
Surveying	Slips, trips, & falls.	1	3	1	5	2	10 (M)	Plan the survey tasks before going to the workplace(s).	1	2	2 (L)
	Fatigue.				4	2	8 (M)	Acknowledge relevant risk assessment and task method statement.	1	2	2 (L)
	Heat stress.				4	2	8 (M)		1	2	2 (L)
	Relevant risk may result into approximate risk EMV of 30,000.00SAR for property damages (surveying equipment) and high premium rate of medical insurance for personal injury.				5	2	10 (M)	Only licensed, competent, and authorized surveyor and assistant worker(s).	1	2	2 (L)
								Attend safety toolbox talk by the immediate supervisor.			
								Secure necessary work permit.			
								Follow road safety rules, regulations, and protocols.			
								Wear face mask use sanitation gel, and always			

								wash the hands. Wear appropriate PPE such as safety gloves, shoes, vest, goggles. Report any accident/incident to local authorities and to immediate supervisor.			
Vehicles movement.	Collision. Struck-by. Staff and others may suffer serious, possibly fatal, injury if struck by a vehicle, as relevant risk may result into approximate risk EMV of 300,000.00SAR for property damages and high premium rate of medical insurance for personal injury.	1	3	1	5	3	15 (H)	One-way traffic management system. Vehicles parked in designated bays away from office and staff cars. Safe, well-marked pedestrian routes. High-visibility tabard worn by all those entering the yard. All visitors receive site rules/ site map.	1	2	2 (L)
					4	3	12 (M)		1	2	2 (L)
					5	5	25 (H)		1	2	2 (L)
Entering/exiting workplaces.	Unfamiliarity with risks at	1	3	1	5	3	15	Drivers regularly visit	1	2	2

	customer sites having reversing policy, load handling arrangements, sheeting etc. Drivers may suffer injury or ill health through lack of awareness of risks on site. Relevant risk may result into approximate risk EMV of 80,000.00SAR for property damages and high premium rate of medical insurance for personal injury.				3	3	(H)	most pick-up/drop-off sites and are aware of relevant safety issues. Drivers given a safety checklist to complete for new sites. Order-taking staff ask for information on site rules, unloading arrangements etc. and fix this to delivery note. Drivers told to stay in a safe area when lift trucks etc. are working.	1	2	(L)
Loading/unloading of materials.	Falls from vehicles. Tipping-over. Drivers may suffer serious, possibly fatal, injuries if they fall from the cab or vehicle of a trailer, or vehicle tipped-over.	1	3	1	4	2	8 (M)	Loading and unloading is planned. Working on the bed of the trailer is avoided. Suitable access equipment is used to access the trailer unit and drivers trained how to use it safely.	1	2	2 (L)
					5	2	10 (M)		1	2	2 (L)
					5	4	20 (H)		1	2	2 (L)
					5	5			1	2	

	Relevant risk may result into approximate risk EMV of 500,000.00SAR for property damages and high premium rate of medical insurance for personal injury.							25 (H)	Keep safe distance from vehicle all the time. Drivers trained in safe system of work for sheeting loads, eg safe use of PPE. Fall arrest equipment inspected by a competent person prior to use. Drivers instructed not to walk backwards on the trailer or to jump from the cab/trailer. Fixed steps and grab bars allow drivers to access cab safely.			2 (L)
Site visit/inspection.	Slips and trips. Staff may suffer injuries such as fractures or bruising if they slip on spillages or trip over objects.	2	3	1	5	2	10 (M) 16 (H)	4 4	Drivers wear strong, comfortable footwear with a good grip. Good housekeeping in yard, offices and on vehicles.	1 1	2 2	2 (L) 2 (L)
						4	4			1	2	

	Relevant risk may result into approximate risk EMV of 50,000.00SAR for property damages and high premium rate of medical insurance for personal injury.						16 (H)	Diesel tank bunded, shovel and sand kept nearby to clear up spillages.			2 (L)
Lifting and moving objects.	Manual handling Lifting and moving heavy objects or objects that are difficult to grasp. Staff risk injuries or back pain from handling heavy or awkward objects. Relevant risk may result into approximate risk EMV of 500,000.00SAR for property damages and high premium rate of medical insurance for personal injury.	1	3	1	4	3	12 (M)	Most loads handled mechanically, eg lift truck, crane etc. Sack trucks kept in trailers for certain jobs. Drivers trained in safe manual handling techniques.	1	2	2 (L)
					5	3	15 (H)		1	2	2 (L)
					5	3	15 (H)		1	2	2 (L)
Driving.	Driver fatigue. Driver/other road users may suffer serious injury if road	0	1	0	5	3	15 (H)	Shift schedules are designed to minimise the risk of driver fatigue.	2	2	4 (L)
					5	5	25		2	2	4

	accident results from fatigue. Relevant risk may result into approximate risk EMV of 1,000,000.00S AR for property damages and high premium rate of medical insurance for personal injury.				5	5	(H) 25 (H)	Drivers instructed to take breaks if they become tired whilst driving	2	2	(L) 4 (L)
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