



جامعة الجميع الذكية
EVERYONE'S SMART UNIVERSITY

Everyone's Smart University

Project (Spring 2021)

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Section

Master

Date

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Course Code

(PMG510)

Project Risk Management

Instructions:

- اخر موعد للتسليم هو يوم الخميس 2021-05-20 في تمام الساعة ٩ مساءً.
- الإجابة متاحة باللغة الإنجليزية أو اللغة العربية مع مراعاة أن تكون المصطلحات العلمية باللغة الإنجليزية.
- يتم تسليم المشروع في صيغة ملف pdf مع الالتزام نموذج الجامعة ولن تقبل أي مستندات أخرى.
- يجب مراعاة أقسام البحث الرئيسية (مقدمة Introduction، دراسات علمية سابقة Literature Review، طريقة البحث Methodology، النتائج والمناقشة Results and Discussion، وأخيراً المراجع References. وان كان هناك ملحقات Appendices يتم إضافتها)
- يجب الالتزام بـ Theme موحد كما يلي:
- حجم الخط 12.
- نوع الخط Arial.
- لون الخط أسود.
- المسافة بين الأسطر 1.5 line spacing
- عدد صفحات البحث (لا يقل عن ثلاث صفحات ولا يزيد عن ست صفحات).

Instructor's Name: Eng. Mosaab M. Hamed

Project:

Risk Identification and Analysis (Based on the project you chose in APM)

The objective of this report is to identify project risks, prepare a risk probability matrix, and carry out an analysis of selected risks. Referring to the project you select in **Advanced projects management APM course**, your task is to prepare a risk management plan that identifies potential risks in **each stage of the project** and identify risk management strategies.

From the course content and readings, you know that the overall purpose of risk planning is to anticipate possible risk events and be ready to take appropriate action when risk events occur—to eliminate or reduce negative impacts on the project.

You may wish to begin this exercise with a brainstorming about potential risks to get candidate risks “on the table” for consideration. And then identify and refine that wording for risks that have some realistic chance of occurring in this project. For example, potential weather problems present a real obstacle to completing field data collection by the planned completion date. It is also an issue that the project manager will ultimately have to plan for, as opposed to other issues such as a major disaster (e.g., your office burning down), is not a high-enough probability event that requires much time in planning. As described below, you will select several of the identified risks and carry out a risk analysis.

You will use the distilled list of risks to make a risk probability/impact matrix. The matrix will have at least three categories (high/medium/low) for probability and impact.

Remember that it is important to name risks effectively—use words that describe the risk event and point to the impact on the project (e.g., “injury of field technician disrupts data installation work”).

After completion of the risk matrix, document a risk analysis for the selected risks. This detailed documentation for that selected risk will include:

- a description of the risk and potential impacts (schedule, quality of work, cost, etc.) on the project.
- indicators or triggers that would be monitored to help identify the risk as early as possible.
- specific risk response strategies to take.

Using probability and impact matrix calculate the Expected Monetary Value (EMV) for all risks that have the impact in terms of cost \$\$.

Best of luck...

المشروع:

التعرف على المخاطر وتحليلها (بحث مبني على مشروعك الذي اخترته في مادة ادارة المشاريع المتقدمة)

الغرض من هذا التقرير هو التعرف على المخاطر المحيطة بكل مرحلة من مراحل المشروع, تحضير مصفوفة احتمالية المخاطر ومن ثم القيام بالتحليل لهذه المخاطر المختارة. مهمتك هي تحضير خطة متكاملة لإدارة المخاطر تشمل التعريف بالمخاطر المحتملة التي تحيط بكل مرحلة من مراحل مشروعك (نفس المشروع الذي اخترته في مادة إدارة المشاريع المتقدمة Advanced project management). ومن ثم القيام بتحديد استراتيجيات إدارة المخاطر المناسبة لكل خطر على حدة.

من محتويات المقرر والمصادر الأخرى المتاحة أصبحت تعلم الان أن الغرض العام لمرحلة التخطيط للمخاطر هي توقع أحداث المخاطر المحتملة والتجهز لاتخاذ ردة الفعل المناسبة عند وقوع الخطر – لمنع أو تقليل الآثار السلبية على المشروع.

قد تحبذ بداية هذا البحث بعصف ذهني عن ماهية المخاطر التي قد تحيط بكل مرحلة من مراحل مشروعك, وذلك للحصول على قائمة بتلك المخاطر. ومن ثم تحديد وتصفية هذه القائمة للوصول إلى قائمة مختصرة بالمخاطر التي لها فرصة واقعية أكبر في الحدوث. على سبيل المثال: المشاكل الجوية المتوقعة والتي تمثل عقبة حقيقية أمام اكتمال جمع البيانات من المواقع في أو قبل الوقت المحدد, هذه تعتبر مشكلة على مدير المشاريع أن يضعها في الحسبان. من ناحية أخرى, فإن المخاطر غير الواقعية مثل الكوارث الطبيعية والأعاصير (تلك التي تسبب حريقاً بمكتبك وفقدان الأوراق المهمة) ليست لها احتمالية وقوع عالية وبالتالي لاتستدعي تضيق الكثير من الوقت في التخطيط لها. كما سيتبين لك, ستقوم باختيار عدة مخاطر من تلك التي قمت بالتعرف عليها لتحليلها.

ستقوم باستخدام هذه القائمة المختصرة لعمل مصفوفة المخاطر (الاحتمالية/الأثر). المصفوفة ستحتوي على الأقل على ثلاث تصنيفات (عالي/متوسط/منخفض) للإحتمالية والأثر.

لاتنس استخدام أسماء تصف طبيعة المخاطر بصورة فعالة – قم باستخدام كلمات تصف الحادثة الخطرة وتشير الى أثرها على المشروع (مثل: إصابة أحد الفنيين في الموقع مما يؤثر على أعمال التركيب).

بعد انتهاءك من مصفوفة المخاطر, قم بتوثيق تحليلك للمخاطر المختارة. هذا التسجيل المفصل للمخاطر يجب أن يتضمن:

- وصف للخطر واثاره المحتملة (الجدولة, جودة العمل, التكلفة, الخ)
- المؤشرات والمحفزات التي يجب مراقبتها للمساعدة في التعرف على هذا الخطر قبل وقوعه
- تفصيل للاستجابة المقترحة للتصدي لهذا الخطر

باستخدام مصفوفة الاحتمالات والتأثير , احسب القيمة النقدية المتوقعة (EMV) لجميع المخاطر التي لها تأثير من حيث التكلفة \$\$.

مع تمنياتي بالتوفيق..

Introduction:

The first idea for any business is the need, the need to build or produce, or the need to change or develop ... etc.

Project management science consists of many stages, tools, and a set of different mechanisms and techniques that are used in the stages of project implementation and development. A project's life cycle is the stages that a project goes through from its inception to its closing.

The Hawiyah-Haradh gas compression project is in the execution phase and my roles and responsibilities as PE¹ in SA² as follows:

- Participate in meetings to discuss/review value engineering, PHA³, risk assessment, and technical review of the design packages.
- Continue to follow up on project exception closeout until all outstanding issues are resolved.

Program Objective:

Support the kingdom's energy demands and provide an increment gas production of 1.1 Billion SCFD⁴.

Scope of work:

The project consists of three main packages which are North, South and Satellite gas compression plants.

Before starting any project, it is necessary to pay great attention to project risk and develop a department focus to the project risk, and since the risks are inevitable, especially when we talk about a work environment for oil and gas projects in which there is a lot of risk on people, buildings and countries and since it has a great impact, especially on the economies of major countries. We must give great attention to risk management.

Since the beginning of time, risk assessment has been done informally by all. The risk management team embarked on the process of identifying the risks related to the project, which may greatly affect the progress of the project. The risk identification team has gone into great depth to reach a conclusion that may lead to enumerating all the risks facing the project and then focus on the most influential in all aspects. They are also going to be in a precise and detailed risk since it was identified as a minor risk in the previous project and it was not focused on, but it had a high impact and led to a disaster that was not taken into consideration.

¹ Project engineer

² Saudi Aramco

³ Process Hazard analysis

⁴ Standard Cubic Feet/Day.

Literature view:

SA pays great attention to the risk of its various projects with the highest standards of accuracy and excellence, including that it devotes an independent department to care, and follow-up lessons learned from various projects around the world.

Therefore, once a new project idea is started, the lessons learned team is contacted to give full attention and support to the risk team in charge of the new project.

Before the start, and since the idea was a spur of the moment, the team that will adopt the project was formed. And after the idea crystallized and was approved by the SADD⁵ and transferred to the SAPMT⁶, the required documents were prepared and presented to the risk team of lessons learned for modification and advice.

Many workshops were held with several teams from different parties to identify the different types of risk, SA and those with a PMC⁷ in projects.

Other important benefits of risk management include:

- Creates a safe and secure work environment for all staff and customers.
- Increases the stability of business operations while also decreasing legal liability.
- Provides protection from events that are detrimental to both the company and the environment.
- Protects all involved people and assets from potential harm.
- Helps establish the organization's insurance needs in order to save on unnecessary premiums.

The entirety of the study in this project focused on the Al-Fadhili GP⁸ project, as it was one of the development projects of SA.

Most of the studies benefited from that project such as the brainstorming processes and the workshops set up to collect and identify the types of risk, the process of controlling and managing them, and the way to deal with or transfer them.

Perhaps in this research I will generally mention the types of risks that we faced with the project, then detail a precise risk for a risk that has always been our great obsession with this project from its inception to this moment due to the climate and nature of the project site.

⁵ Saudi Aramco Development Department

⁶ Saudi Aramco project Management Team.

⁷ Project Management Consultant

⁸ Gas Plant

Methodology:

The following table shows the list of the project risk and ways to mitigate them as a whole, even if we notice that it was mentioned that it is one of those risks, the location and the difficulty of the climate of the project, as it significantly affects all activities related to the project.

	RISK	MITIGATION
FEED⁹ endorsement	Preliminary design Conflict resolution	Feed verification Issue TQs ¹⁰ to rise competitors Room for optimization
Vendor List	Non-updated list Single sourcing	Improved vendor list (unsolicited)
Project location	Remote location and accessibility Extreme weather conditions	Site visit/access road Pre-fabrication/pre-assembly approach
KSA factor	Non-accurate subcon's bid during tender phase	Lesson learnt from another project Huge knowledge of area Several on-going project: benchmarking
Construction activities	Several locations Lack of industrial facilities & manpower close to job site	1.000.000m2 LUP ¹¹ by AOC ¹² Quotations from subcons focus on indirect's cost
IKTVA	Lack of flexibility for construction and procumbent: Condition execution Unforeseen expenses	IKTVA ¹³ letters from suppliers /subcons with estimated values Proposal strategy will condition execution
Revamping works	Hawiyah Live Unit Lack of information	High knowledge of plant Plant maintenance subcontractors

From the previous table, I will highlight the construction activities risk, which is one of the most impact risk to the project schedule from my experience.

My study in this research will focus on an internal risk that occurs during the execution process, which is related to constructions activities, specifically in the working under/near overhead heavy equipment.

⁹ Front End Engineering Design

¹⁰ Technical quarry

¹¹ Lift Upgrading Programme

¹² Aramco Overseas Company

¹³ In kingdom total value add

The risk management process has started with RJSA¹⁴ as this process includes analysing all that is related to this activity, including work area, job task, PPE¹⁵ required, materials used, the type of work permit and the method of communication in case emergency.... etc.

RISK JOB SAFETY ANALYSIS			
Company:			
Project/Site	HARADH AND HAWIYAH FIELD GAS COMPRESSION PROJECT	Main Contractor	
Job Task		Work Area	
Material Safety Data Sheets Required			
Plant & Equipment Required			
Licenses / Competencies Required			
Work Permit System			
☐ Scaffolding Permit	☐ Electrical Work Permit	☐ Cold Work Permit	☐ Hot Work Permit
		☐ Radiography Work Permit	☐ Excavation Work Permit
		☐ Crane Lifting Permit	☐ Other Work Permit
PPE Required:			
			
High Risk Work:			
☐ Work in Tunnel		☐ Structural Collapse	
☐ Drowning		☐ Demolition of Structures	
☐ Tilt-up/Precast Concrete		☐ Confined Spaces	
☐ Asbestos		☐ Excavation >1.2m	
☐ Chemical/Fuel/Refrigerant Lines		☐ Mobile Plant	
		☐ Traffic	
		☐ Contaminated/Flammable Atmosphere	
Task/Location Specific Risks:			
☐ Access & Egress		☐ Ground Conditions	
☐ Compressed Air		☐ Overhead Obstructions	
☐ Ignitions Sources		☐ Noise	
☐ Underground Services		☐ Soil Pollution	
☐ Obstacles/Buildings		☐ Quick Cut Saw	
☐ Rotating Machinery		☐ Angle Grinder	
☐ Dust		☐ Pedestrians / Workers	
☐ Poor Lighting		☐ Fatigue	
		☐ Snakes / Vermin	
		☐ Exposure to UV	
		☐ Weather	
		☐ Water Pollution	
		☐ Hot Work / Burns	
		☐ Unauthorised Persons	
Emergency Contact Number:		Construction Supervisor : ALBAHAHS	
(Project Manager)		Contact No : (HSE Manager) :	
Emergency Contact Number: Rescue-, Traffic-, Fire Fighting-.		TR Hot line- +966	
ALBAHAHS			

Once all stakeholders involved in this job agreed to perform the job, they have to fill the above RJSA by click in the exact box to mitigate the risk.

This RJSA must be discussed with all involved personnel prior to job execution to control the risk .In addition, pre-job planning and daily toolbox should be held on site prior to starting daily work to discuss relevant risk, technical procedures and assignment during job execution.

Workers shall be required to wear appropriate minimum PPEs e.g. safety goggles, safety helmet, safety shoes, flame resistant clothing and life vest while close to the edge of the pier.

¹⁴ Risk job safety analysis

¹⁵ Personal protective equipment

Contractors will need to carry out the risk assessment for each identified hazard if it is High, Medium or Low (next table).

Job Step	Potential Hazard	Risk Rating	Control Method	Residual Risk
Positioning of mobile crane	Personnel injury/fatality due to crush/struck by moving equipment	Significant (Major)	Review weather forecast /wind speed /ensure weather condition Are suitable for proposed operations) SAGI ¹⁶ 7.028 standard shall be followed strictly for the critical lifting	Low (Minor)
Equipment's under/near overhead power lines	Contact equipment with live line resulted in fatality/property proprietary damage	High (severe)	While working near or below energized OHL, all equipment's shall maintain a safe distance in accordance with GI7.028 A designated signalman shall ensure following minimum distance are maintained as table below	Low (Minor)
Emergency situation	Inadequate emergency response Lack of communication	Moderate (Medium)	Ensure that all staff understands the action required during emergency situation The emergency contact phone numbers shall be displayed at site in visible location.	Low (Minor)
Adverse weather condition	Extreme hot, heavy rain, sand storm, extreme cold and heat	Moderate (Medium)	Heat stress awareness training will be implemented Daily monitoring environmental conditions	Low (Minor)

Line voltage	Absolute limit of approach
Up to 50.000 volts	3.0 meters/10 feet
50.000 to 25.000 volts	6.1 meters/20 feet
Over 250.000 volts	7.6 meters/25 feet

¹⁶ Saudi Aramco general instruction

Then we start to identifying the Consequences, Potential (Likelihood), and risk rating next table for step1(Consequences), step2(Potential (Likelihood)), step3(Consequences).

Step 1

5 – Severe	Potential to be fatal. Permanent disability. Destruction of property or plant.
4 – Major	Serious injury. Long term disability. Major damage to plant, property or environment.
3 – Moderate	Potential for injury resulting in medical attention. Damage to plant, property or environment.
2 – Minor	Injury requiring First Aid treatment and / or short-term discomfort.
1 – Negligible	Cause a near miss, needs to be reported

Step 2

A – Almost Certain	The event is expected to occur in most circumstances
B – Likely	The event will probably occur in most circumstances
C – Possible	The event might occur at some time
D – Unlikely	The event could occur at some time
E – Rare	The event may occur only in exceptional circumstances

Matrix

Step 3

Potential	1 – Negligible	2 – Minor	3 – Moderate	4 – Major	5 – Severe
A – Almost Certain	M (9)	S (15)	S (19)	H (24)	H (25)
B – Likely	L (7)	M (11)	S (18)	S (21)	H (23)
C – Possible	L (5)	L (6)	M (13)	S (17)	H (22)
D – Unlikely	L (3)	L (4)	M (10)	M (14)	S (20)
E – Rare	VL (1)	L (2)	M (8)	M (12)	S (16)

Legend

High	Activity to be re-planned and/or re-designed. If this is not possible, an independent Hazard Assessment of the activity is to be completed by the Project Manager prior to completing the SWMS.
Significant	Activity Must be reviewed by Senior Site Management Representative and have identified risk controls built into the SWMS and work procedure.
Medium	Site Supervisor must review method of task.
Low	Some action may be required, Supervisor to determine and monitor
Very Low	Minimal risk, monitor where work changes

Result and discussion

By going back to previous projects, benefiting from lessons and applying the highest international standards in avoiding, relaying, or controlling risks, this risk was controlled to a high degree by the team that realized the importance of this risk and its impact on the progress.

We would also like to point that compared to previous projects and to date with the progress of work, no injuries related to this risk have been recorded in the execution phase, and this indicates that the standards applied mentioned above in this project are going well.

Reference:

1. Risk assessment by Ben Cole.
2. Saudi Aramco Engineering Procedures 366
3. Saudi Aramco Engineering Procedures 707