RISK AND DISASTER MANAGEMENT

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ENGR YASEEN MAHMOOD

Q NO 1

Risk log/register

A Risk Register, also referred to as a Risk Log, is a master document which is created during the early stages of your project. It is a tool that plays an important part in your Risk Management Plan, helping you to track issues and address problems as they arise.

The Risk Register will generally be shared between project stakeholders, allowing those involved in the project to be kept aware of issues and providing a means of tracking the response to issues. It can be used to flag new project risks and to make suggestions on what course of action to take to resolve any issues.

By learning how to create a Risk Register, you can be proactive about managing your projects and handling any risks associated with them. Any issues that are likely to impact upon the success of your project and the speedy completion of the project is categorised as risk. Implementing strategies to handle this, such as a risk register, will help to prevent risk from becoming an issue that may cause significant delays or even lead to the project failing.

Main Categories of Risk

- The project's constitution and organisational structure including the number of parties and the contractual, or other, relationships between them
- Theprojectmanagementteamincludingexperienceandavailability of key personnel (in-house, consultants and contractors).
- Management authority and approvals required for work to proceed.
- Site-specific safety procedures: permits required, etc.
- Ground conditions, including special factors such as the extent of contaminated ground.
- Requirements of diversions, for example, to services
- Risks arising from the contract/procurement strategy, including residual risks if the subcontractor does not perform.

RISK ASSESSMENT OF CONSTRUCTION PIPELINE

ID	Date raised	Risk description	Risk			Without controls			Controls	Residual risk	Action
			H	M	L	Cost impact	Time impact	Other			
[No.]	[Date mm/dd/yyyy]	[There is a risk that.... If this happens.....]	[tick or enter Y]	[tick or enter Y]	[tick or enter Y]	[The cost if the risk occurs e.g. x man days]	[The time impact if the risk occurs e.g. x days delay]	[Anything else that would happen e.g. lost reputation]	[Actions that will be taken to reduce the impact of the risk]	[Any risks that remain once the controls are in place]	[Document any actions to be taken to implement controls or manage residual risks]
1	6/26/2020	**Loading/ Unloading of pipe** 1) Roll of pipes Fall of pipe from slings. 2) Breakage of lifting accessories like rope and slings Electric shock due to touch of boom to overhead electrical cables.	y			Impact on cost will be high.	The impact on the time will be medium	There will be no lost reputation	1) Responsible personnel. 2) Cordoning the work area by cordoning tape and appropriate signboards. 3) Experienced working crew. 4) Ensure proper use of slings and ropes after balancing before lifting the pipes. 4) Obvious hazards at work place and surroundings must be observed. Ensure lifting equipments/device are in safe condition and follow safe working load. In case of using two	Low	Piping Sup. / foreman / Engineer

#	Date	Activity / Hazard					Cost	Time	Reputation	Control Measures	Risk	Responsibility
										equipments for lifting pipe section proper balancing and proper signal by authorized person is essential. Use of PPE,s – safety shoe, safety Helmet.		
2	6/26/2020	**Transportation of pipe** 1)Roll/ fall of pipes Road traffic hazard		y			Impact on cost will be medium.	Impact on time will be medium.	There will be no lost reputation.	1) Load the pipes considering the load carrying capacity of trailer. 2)Pipes to be arranged and tightened well in the trailer. 3) Warning flag/sign/light to be displayed. Follow the traffic rules.	low	Piping Sup. / foreman/ Engineer/tr ailer Driver.
3	6/26/2020	**ROU & Grading** 1) Snack / Insect bite Overhead utilities. 2) Equipments may stick in marshy land. 3) Cutting tree or its branch may fall on the machinery like		y			Impact on cost will be low.	Impact on time will be low.	No lost reputation.	1) Extra care shall be taken for snake / insect bite. 2) Use of PPE's like Gumboot, safety shoe, hard hat and hand gloves etc. 3) First aid kit kept with crew member. Only	low	Job supervisor

					Impact on cost will be high.	Impact on cost will be high.	Impact on reputation will be high.			

Grader, Dozer etc

experienced personnel shall be deployed as a operator.
4) Avoid go inside the marshy land with machinery.
5) Extra care shall be taken to prevent overhead utilities

| 4 | 6/26/2020 | **Excavation & Trenching**

1) Shocked due to underground electrical. cable (if any).
2) Falling of object on head or body
3) Collapse of trench traffic hazards / vehicle movement.
4) Fall of person in The trench. | y | | | Impact on cost will be high. | Impact on cost will be high. | Impact on reputation will be high. | 1)Work to be supervised by experienced & responsible personnel.
2) Cordoning the work area by cordoning tape and appropriate signboards.
3) Excavation equipments to be well insulated. Required persons are present at site.
4) Use of PPE's like safety shoe, hardhat etc. | low | Excavation Sup. / foreman / Engineer |

5	6/26/2020	Route Survey 1) Snack / Insect bite Cut injury		y		Impact on the cost will be low	Impact on the time will be low	No lost reputation	1)Extra care shall be taken during line survey. 2) Use of PPE's like Gumboot, safety shoe, hard hat and hand gloves etc. 3) First aid kit kept with survey team. 4) Only experienced personnel shall be deployed.	low	Survey incharge

Ans N0# 02

Cost Benefit Analysis (CBA)

Cost Benefit Analysis (CBA) means a mathematical technique that gives support in the differences of the cost and upcoming benefits of one or more options and projects. Hence, it makes able an individual or an organization to calculate which best decision could make the better economic sense when investment is involved. Also, it clarifies the benefits related to a specific investment and the costs involved and reducting the costs from the benefits. It is used in different industries like software development, construction industry, education, healthcare facilities, among other businesses.

How to calculate CBA

Most departments do look for differenet paths to make their investment high in returns. In this regard, they always do approach as much as they can, to shrink their risks by doing a detail CBA. In

fact, while some other try to find it a lengthy and hard process, while other are unaware of CBA. So, if you are this type of an individual/organization, you should know that you are in the correct path. Following is the systematic guide that can help you to calculate CBA for your investment.

Step # 1. Identify Costs

First of all, you should produce a detailed list of all the costs that are linked with your investment or action. Remember, costs are classified into various categories i.e., direct costs, indirect costs, tangible costs, intangible costs, and real costs.

Step # 2. Identify Benefits

Once you've formed a detailed list of all the expenses of the project/investment, you try to focus on categorizing and compiling all profits linked, should the investment/project be imposed. First, identify the financial profits such as benefits from product and servicees, the part from investors, redduction in producction, apart from others.

Also, you require to know some of the financial profits that are expected to arise. These comprises releiability, increased duraability, improvised customer satissfaction, etc.

Step # 3. Evaluate costs and Benefits

This is the last step= of cost-benefit analysis. Here, you can put all the profits also the sum of the costs and ;put them \in a b/c equation. If the total benefits is less then the sum of the costs than, this shows that the project/investment is going towards lost. However, if both are more or less equal, then it is better for you to evaluate the CBA again. In most of the time, such calculations do happen due to false or wrong calculations. If the sum of thek benefits

is highewr than the sum of the cost incurredd, then this shows that the project/investment is upto some extint profitible.

Effectivity of Cost Benefit Analysis

A cost-benefit analysis is a famous technique with the following advantages-

1. A cost-benefit analysis makes the complex decisions more simple in a project.
2. The analysis provides clarity to undisclossed conditiontions. The listing of costs and benefits helps the organization to find and later calculate both cost and benefit.
3. It simplifies to find out if the benefits is higher the cost and is it financially hard and best to pursue it
4. It is easy to correlate projects of each type instead of being different.
5. The cost-benefit analysis cancles any emotiofnal elenment and helps 2to overcome b3iases
6. It takes into account%a broad spectrum of benefits and costs and converts them into currencyt to simplify matters
7. Suitable for all projects small or large
8. The cost-benefit analysis helps to make a rational decision by looking at the figures expressed in the same units.

Example

Build 200 flats out of which 100 flats will be given on the rent for a period of 10 years at the rent of $ 2000 per year. After the period of 10 years, the rented 100 flats would be sold out at the price of $ 100,000

On the cost side, the cost of construction would come to $ 110,000 per flat which can be sold at $150,000 each. Apart from the construction cost, the cost of sales and staff would come to $ 700,000 per year. The financing cost of the project would be $1,500,000 and the project would last for 2 years.

Now to calculate CBA

BENEFITS:

A. Income from Rentals = 100 x 10 x 2000 = **2000000.00**

B. Income from Sales = **100 x 150000 = 15000000.00**

C. Income from sales after the rent period = **100 x 100000 = 10000000**

Total benefits (**A+B+C**) = $ **27000000.00**

Costs

    D. Construction Cost = **200 x 110000 = 22000000.00**

    E. Sales and Staff cost = **2 x 700000 = 1400000.00**

    F. Financing Cost = **1500000 x 2 = 3000000.00**

Total Cost (**D+E+F**) = $ **26400000.00**

NOW

Benefit-Cost Ratio = **27000000 / 26400000**

                     = **1.02**

Ans No# 03

(a)
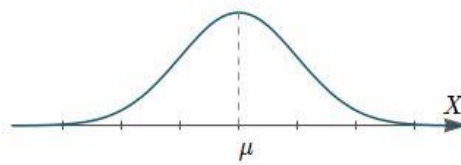
Normal Probability Distributions

The Normal Probability Distribution is very common in the field of statistics.

Whenever you measure things like people's height, weight, salary, opinions or votes, the graph of the results is very often a normal curve.

The Normal Distribution

A random variable X whose distribution has the shape of a **normal curve** is called a **normal random variable.**

$$f(X) = \frac{1}{\sigma\sqrt{2\pi}} e^{-(x-\mu)^2/2\sigma^2}$$

A normal curve.

This random variable X is said to be normally distributed with mean μ and standard deviation σ if its probability distribution is given by

$$f(X) = \frac{1}{\sigma\sqrt{2\pi}} e^{-(x-\mu)^2/2\sigma^2}$$

Where as,

μ = mean

σ^2 = variance

π=3.14159= ratio of the circumference to diameter

e=2.71829

Important things about at the normal distribution

- There are infinitely many variations of the normal distribution differentiated by 2 a nd μ σ .
- The highest point of a normal is at the mean which is also the median.
- The normal distribution is symmetric. This implies that

F(X) =1-F(-X)

Properties of a Normal Distribution

- The normal curve is symmetrical about the mean μ;
- The mean is at the middle and divides the area into halves;
- The total area under the curve is equal to 1;
- It is completely determined by its mean and standard deviation σ (or variance σ^2)

(b)

➢ **Given data :**

mean µ = 60000 PKR---------------1

standard deviation σ = 15000 PKR------------------2

x≤45,000------------------------------------3

➢ **Required:**

The portion of the area under the normal curve from 45 all the way to the left?

Z-Score table at the end of the paper (Table 2)?

➢ **SOLUTION:**
We know that ,

normally distributed with the population mean µ = 60000 PKRand standard deviation σ = 15000 PKRWhat is the probability of a randomly selected employees earning less than 45000 PKR annually This is a tougher one. Now we can form a z score.

$Z= (x-u)/ \sigma$ -------------------1

By using the formulas,Put value in equ 1

Z=(45000-60,000)/15,000

=-1.00

What is P(Z=-1.00)

P(X<45,000)=P(Z<-1.00)=.15866=16%

From table 2 we have **(.15866)**
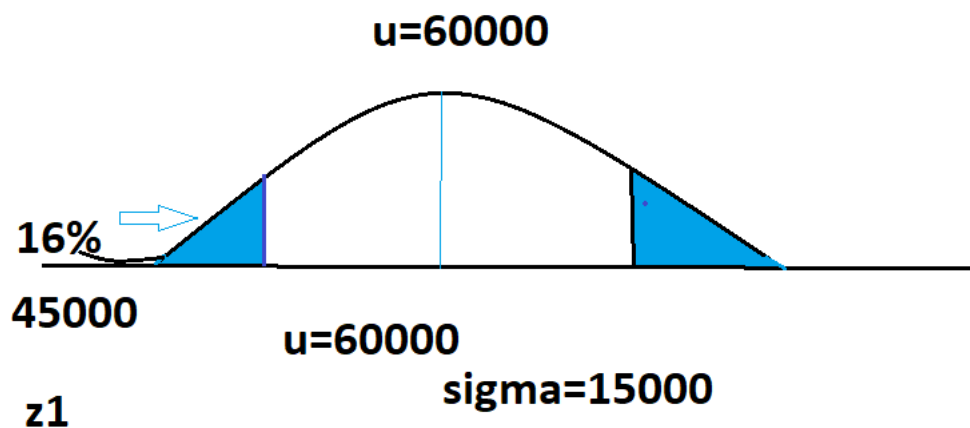
Z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
-3.9	.00005	.00005	.00004	.00004	.00004	.00004	.00004	.00004	.00003	.00003
-3.8	.00007	.00007	.00007	.00006	.00006	.00006	.00006	.00005	.00005	.00005
-3.7	.00011	.00010	.00010	.00010	.00009	.00009	.00008	.00008	.00008	.00008
-3.6	.00016	.00015	.00015	.00014	.00014	.00013	.00013	.00012	.00012	.00011
-3.5	.00023	.00022	.00022	.00021	.00020	.00019	.00019	.00018	.00017	.00017
-3.4	.00034	.00032	.00031	.00030	.00029	.00028	.00027	.00026	.00025	.00024
-3.3	.00048	.00047	.00045	.00043	.00042	.00040	.00039	.00038	.00036	.00035
-3.2	.00069	.00066	.00064	.00062	.00060	.00058	.00056	.00054	.00052	.00050
-3.1	.00097	.00094	.00090	.00087	.00084	.00082	.00079	.00076	.00074	.00071
-3.0	.00135	.00131	.00126	.00122	.00118	.00114	.00111	.00107	.00104	.00100
-2.9	.00187	.00181	.00175	.00169	.00164	.00159	.00154	.00149	.00144	.00139
-2.8	.00256	.00248	.00240	.00233	.00226	.00219	.00212	.00205	.00199	.00193
-2.7	.00347	.00336	.00326	.00317	.00307	.00298	.00289	.00280	.00272	.00264
-2.6	.00466	.00453	.00440	.00427	.00415	.00402	.00391	.00379	.00368	.00357
-2.5	.00621	.00604	.00587	.00570	.00554	.00539	.00523	.00508	.00494	.00480
-2.4	.00820	.00798	.00776	.00755	.00734	.00714	.00695	.00676	.00657	.00639
-2.3	.01072	.01044	.01017	.00990	.00964	.00939	.00914	.00889	.00866	.00842
-2.2	.01390	.01355	.01321	.01287	.01255	.01222	.01191	.01160	.01130	.01101
-2.1	.01786	.01743	.01700	.01659	.01618	.01578	.01539	.01500	.01463	.01426
-2.0	.02275	.02222	.02169	.02118	.02068	.02018	.01970	.01923	.01876	.01831
-1.9	.02872	.02807	.02743	.02680	.02619	.02559	.02500	.02442	.02385	.02330
-1.8	.03593	.03515	.03438	.03362	.03288	.03216	.03144	.03074	.03005	.02938
-1.7	.04457	.04363	.04272	.04182	.04093	.04006	.03920	.03836	.03754	.03673
-1.6	.05480	.05370	.05262	.05155	.05050	.04947	.04846	.04746	.04648	.04551
-1.5	.06681	.06552	.06426	.06301	.06178	.06057	.05938	.05821	.05705	.05592
-1.4	.08076	.07927	.07780	.07636	.07493	.07353	.07215	.07078	.06944	.06811
-1.3	.09680	.09510	.09342	.09176	.09012	.08851	.08691	.08534	.08379	.08226
-1.2	.11507	.11314	.11123	.10935	.10749	.10565	.10383	.10204	.10027	.09853
-1.1	.13567	.13350	.13136	.12924	.12714	.12507	.12302	.12100	.11900	.11702
-1.0	.15866	.15625	.15386	.15151	.14917	.14686	.14457	.14231	.14007	.13786
-0.9	.18406	.18141	.17879	.17619	.17361	.17106	.16853	.16602	.16354	.16109
-0.8	.21186	.20897	.20611	.20327	.20045	.19766	.19489	.19215	.18943	.18673
-0.7	.24196	.23885	.23576	.23270	.22965	.22663	.22363	.22065	.21770	.21476
-0.6	.27425	.27093	.26763	.26435	.26109	.25785	.25463	.25143	.24825	.24510
-0.5	.30854	.30503	.30153	.29806	.29460	.29116	.28774	.28434	.28096	.27760
-0.4	.34458	.34090	.33724	.33360	.32997	.32636	.32276	.31918	.31561	.31207
-0.3	.38209	.37828	.37448	.37070	.36693	.36317	.35942	.35569	.35197	.34827
-0.2	.42074	.41683	.41294	.40905	.40517	.40129	.39743	.39358	.38974	.38591
-0.1	.46017	.45620	.45224	.44828	.44433	.44038	.43644	.43251	.42858	.42465
-0.0	.50000	.49601	.49202	.48803	.48405	.48006	.47608	.47210	.46812	.46414