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Risk Allocation in Construction Contracts

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ABSTRACT

The construction industry is surrounded by a big uncertainty translated into known and unknown risk along the project life cycle. These risks shall be managed proactively in order to achieve the project objectives and eliminate the likelihood of the issues. Accordingly, risks shall be identified before sign the contract to involve and allocate them through the project contract. Therefore, the contract is an effective tool not only to highlight the risks but also to allocate it to the contractual parties.

It is not feasible to allocate all these risks either known or unknown to a specific contractual party. This definitely will affect the project negatively as no party can control and manage all the risk due to the limitation of scope, authority, power and etc. However, this fact, the risks are improperly allocated in the practical field which resulted in many issues raised during and after the project period. Accordingly, the fair allocation of risk ensures to allocate risk to the party who can bear it effectively. Also, some risk may be not allocated to a specific party because the nature of risk is better to be shared between the two parties.

Therefore, this paper aims to identify the most common risk of construction contracts and then determine the optimum contractual party to bear it based on a conducted questionnaire.

Keywords: *Contract, Management, construction, risk allocation, Contractual risk.*

Introduction to Risk Allocation in Contracts

Risk is inherent in each project in the construction industry in various forms. It can be a threat, which has a negative impact on the project objective. On the other hand, it can also be an opportunity, which has a positive impact, or a business risk that has a negative or positive impact. The business risk is usually an economical risk. The impact of the risk may have occurred immediately after the risk occurring or after that by some minutes or even days.

The main purpose of a contract is to allocate risk between parties and some may consider a contract as a risk management tool. An important process of risk management in any project is to allocate the risk among the contractual parties.

The simple definition of risk allocation is a decision of which party shall bear the risk. As usual, each party within the contract prefers to not bear any risk but this cannot be achievable in any project. Moreover, the strongest party within the contract is the employer so he has the full chance to allocate all risk and uncertainties to the second party which is not recommended at all because this case will result into many issues as following:

- the contractor will increase the price to absorb any occurred risk
- the project mostly will suffer from many delays as the contractor will not be able to deal with all risks alone
- there will be many claims and disputes
- the probability of project success will be decreased too much
- some risks which can be eliminated will occur
- some positive risks will not be exploited
- the level of project control will be very low

- the project plans will be unrealistic and unachievable
- the risk management will not be achieved
- there will be big numbers of undesirable and pad impacts
- the stakeholder will be unsatisfied with the project
- the project team, consultant and employer will exert efforts more than the usual many times
- the relation between the contract parties will be unhealthy
- It causes that the qualified contractor to be replaced by a less qualified contractor who is more likely to accept unbalanced risk distribution's contract.

Proper risk allocation shall be done during the phase of contract drafting when negotiation technique is applied by contract parties. This plays a vital role in decreasing the probable disputes and problems. Risk allocation is more than just assigned risks to a specific party, it shall balance between the allocation of risk and the result of it which is added time or cost. The employer firstly shall identify risk, assess, analyze and decide which party to bear is based on available information and analysis done. There are several studies and surveys were conducted on risk allocation to reach the criteria of allocation and the influence of the allocation. Some of these studies are as follows:

(Femeena Mohamed, 2012) suggests four criteria to be followed in order to allocate risk fairly, as following:

- Which party could best foresee the risk?
- Who could best control the risk and the consequences?
- Who can bear the risk?
- Who will benefit or suffer the most when risk eventuates?

The above-mentioned criteria are representing a road map to determine the party who expected to manage the risk properly because of his characteristics such as his scope of work, authority, resources, and awareness. Therefore, it can be concluded that the proper risk allocation shall consider the ability, resources, awareness, full access, and authority of each party to bear the risk and control it effectively besides any probable consequences. This totally aims to reach a better level of project control which will result in optimum project cost and finish with contractual duration, quality, and the other constraints.

COMMON RISKS IN CONTRACTS

The nature of the construction industry is characterized as changeable due to many changes, variables, and certainties. However, there are some risks are common in construction projects as a result of internal and external factors. Internal factors such as construction technology, the experience of the conduction parties, the performance of the contractor, the level of safety and quality and etc. The external risks are such as Change of laws, legislation, policy, and regulation, Delay of obtaining permissions, licenses, and permits, and Fluctuation in the currency exchange rate. Table (1) shows the common risk in contracts.

Table1. *Common Contractual Risks in Construction Industry*

Risk ID	Risk Category	Risk Name	Risk Description
External Risk			
1	Politics, Economic, and Laws	Change of laws, legislation, policy, and regulation	Change of laws, legislation, policy, and regulation done by the authorities may affect the project time, cost, or both of them.
2		Delay of obtaining permissions, licenses, and permits	Permits and licenses represent a predecessor or successor for other activities so any issue with the permits or licenses may affect the project activities and accordingly the project objectives.
3		Fluctuation in the currency exchange rate	Currency exchange rates may be changed along the project period and almost will affect the project cost especially in case of importing resources for the project.
4		Inflation (Change in resources price)	Inflation is basically a rise in prices so it has a direct relation with the project cost.
5	Force Major (Exception	Natural disasters	A natural disaster is a major adverse event resulting from natural processes of the Earth; examples are floods, hurricanes, tornadoes, volcanic eruptions, earthquakes, tsunamis, and other geologic

	al Event)		processes
6		Wars, strikes, revolutions	Wars, strikes, revolutions cause high damage to the project.
7		Exceptionally adverse climatic conditions	Bad weather conditions may obstruct many activities in the project especially outside activities.
Internal Risk			
8	Employer -related risks	**Insufficient Site Investigation**	
9		Insufficient design, and specifications	Insufficient Survey, design, and specifications may result in time delay, quality shortfalls, rework, and additional costs
10		Design and quantities change	Change in design always resulted in additional cost and probable additional time.
11		Late issuance of drawings, instructions, permissions, and approvals	Insufficient Survey, design, and specifications normally resulted in time delay, quality shortfalls, rework, and additional costs
12		Delay in payment	Delay in payment affects the cash flow of the contractor and accordingly lower performance and progress.
13		Unforeseeable Physical Conditions	Unforeseeable Physical Conditions are beyond the contractor authority and such as Site conditions, geological condition, physical, and ground conditions
14		Poor Supervision of Engineer	Poor qualification of Engineer likes too much hesitation, incompetency and other issues that obstruct providing the obligation as a contract.
15		Delay of full access to the site	Full access to the site is a necessity for the contractor to start execution.
16		Financial problems of the Employer	In some cases, the client becomes not able to provide enough funds to the project which will affect the cash flow of the contractor.
17	Contractor -related risks	Protection of works and site	Site includes equipment's, tools, temporary structures, materials and executed works which all shall be well p
18		Slow progress	An issue with performance has normally affected by the project highly.
19		Improper plans	Plans are the road maps that if developed well and followed. The project shall achieve the objectives, otherwise, it will mislead the project.
20		Accidents and safety issues	Accident and safety issues obstruct the project progress and increase the cost.
21		Incompetent manpower	Incompetent manpower has a high direct impact on quality and production rate so it may delay the project and increase the quality shortfalls
22		Financial problems of the contractor	In some cases, the contractor becomes not able to provide enough funds to the project which will affect the progress of the project.
23		Poor procurement planning (Fail to approve the material- Delay in supply)	A procurement plan is a very important and vital plan because it has a direct relationship with material suppliers to the site.
24	Construction technology	Inappropriate construction method	Inappropriate construction method results from improper selection criteria and may increase the cost, time or both of them.
25		Poor quality	Poor quality has many causes such as improper plans, incompetent staff, bad tools or equipment, and absence of control completely or partly. It causes rework, increases in cost, delay, issues with client and an increase in disputes.
26		Shortage of resources (Material - Manpower - Equipment)	Resources are vital to execute and it shall be supplied at the site timely without any delays as per the time schedule.
27		Pollution and noise	Pollution is resulted from construction activities such as excavation, demolishing, backfilling and other several activities. It represents a big challenge in front of neighbors and local concerned entities.
28		Inappropriate disposal of wastage	Disposal of waste material shall be done according to regulation and laws to avoid any penalties.

29		Ground settlement	Ground settlements sometimes tack place during the execution because of many causes such as the improper design of the soil supporting system and if occurred it affects the project time and cost.
30	others	Lack of coordination	Lack of coordination may results in errors, delay, rework and increase the project risk.
31		Variations	Variations may represent a risk if not being assessed, analyzed, planned, and controlled well.
32		Breach of contract	Breach of the contract occurred if one of the contract parties failed to follow the contract.
33		Transportation problems	Transportation of material, equipment and manpower may face some problem especially in urban places which may delay the project.
34		Delay notification of risk (Early Warning)	All parties with the project shall be informed about the related risks so any issue notifies them may lead to problems.
35		Delay of completion	Delay of completion is a high risk which if occurred will result in some penalties as per the contract.
36		Termination of Contract	Terminate the project work before finishing the scope and contractual obligation for any reason.

QUESTIONNAIRE SURVEY

Introduction to the Question Survey

A questionnaire is generated to validate the mentioned above outputs and also to gather and analyze other practical outputs that gathered from real experience through the respondents.

The questionnaire is composed of an introduction in addition to three parts designed carefully to gather information about the respondents and the allocation of common risks. In the first section, the respondents are asked eight questions to reflect their experience, educational level, job title, company size, and contact information. In the second section, they are asked for their opinion related to the optimum party to bear each specific risk. There are three options as following: Contractor – Employer- Shared.

To remove any ambiguities in the questionnaire, pilot testing was carried out. As pilot testing, the survey was sent to five practitioners consisting of two academic professors. Accordingly, minor revisions were made prior to mailing it out to the construction industry.

Sample Survey

The population of the survey concentrates on Engineers in the construction industry in order to reach the maximum possible level of accuracy which makes the findings more effective and realistic. More than 400 participation invitation is sent to a targeted population through a variety of communication channels. The questionnaire is sent to different firms including contracting companies, consultants, client representatives and also designers with the construction industry to gather data from all effective practitioners.

Despite sending about (400) invitation to fill the questionnaire, the Seventy-One response is received from the Twenty-Six company. This response rate is returned to the specialist needed to fill the questionnaire due to the fact that a low number of Engineers are dealing with contracts and risk management which is advanced topics.

Also, a variety of roles participate in the questionnaire such as project managers, contract engineers, project controls engineers, planning engineers, technical office engineers, academic professors, cost control engineers, PMO engineers, quantity surveyors.

Analysis of Responses of Selection of the Suitable Party to Bear Risks

Throughout the questionnaire, each respondent is asked to select the optimum contractual party to bear the most probable and common risk on construction. The questionnaire involves (36) risks are categorized into internal risks and external risks. The choices available are to bear the risk by the Employer, Contractor or shared between them. The questions are mandatory to finish and submit the questionnaire so all respondents filled all questions as requested.

Table (2) shows the gathered responses in an organized way to facilitate the analysis and highlight the findings. To capture an overall view on the table, it can be obviously seen that there is plurality on some risks to be assigned to either one party or shared. However, some risks are not reaching this plurality from respondents. Plurality case is assumed to be reached when risk scored more than (50%) of responses on a specific choice as it is not realistic to reach consensus.

Table2. *Optimum contractual party to bear risks*

No.	Risk Description	Score		
		Contractor	Employer	Shared
1	Change of laws, legislation, policy, and regulation	13	25	35
2	Delay of obtaining permissions, licenses, and permits	20	39	14
3	Fluctuation in the currency exchange rate	14	28	31
4	Inflation (Change in resources price)	29	24	20
5	Natural disasters	7	16	50
6	Wars, strikes, revolutions	5	19	49
7	Exceptionally adverse climatic conditions	21	16	36
8	Insufficient Site Investigation	46	12	15
9	Insufficient design, and specifications	26	31	16
10	Design and quantities change	18	38	17
11	Late issuance of drawings, instructions, permissions, and approvals	17	41	15
12	Delay in payment from the Employer	11	54	8
13	Unforeseeable Physical Conditions	13	23	37
14	Poor Supervision of Engineer	27	31	15
15	Delay of full access to the site	19	42	12
16	Financial problems of the Employer	10	51	12
17	Protection of works and site	60	7	6
18	Slow progress	53	6	14
19	Improper management plans	43	4	26
20	Accidents and safety issues	53	7	13
21	Incompetent manpower	60	6	7
22	Financial problems of the contractor	52	9	12
23	Poor procurement planning (Fail to approve the Material -Delay in supply)	48	8	17
24	Inappropriate construction method	52	6	15
25	Poor quality	51	10	12
26	Shortage of resources (Material - Manpower - Equipment's)	57	3	13
27	Pollution and noise	45	7	21
28	Inappropriate disposal of wastage	55	8	10
29	Ground settlement	46	11	16
30	Lack of coordination	36	8	29
31	Variations	8	26	39
32	Breach of contract	15	6	52
33	Transportation problems	44	7	22
34	Delay notification of risk (Early Warning)	40	5	28
35	Delay of completion	39	9	25
36	Termination of Contract	16	11	46

The first group of risk that reach plurality involved (29) risks are as following:

- **Delay of obtaining permissions, licenses, and permits:** From the total responses, (39) responses are to allocate it to the Employer.
- **Natural disasters:** From the total responses, (50) responses are to allocate it to be shared between the contractual parties.
- **Exceptionally adverse climatic conditions:** From the total responses, (36) responses are to allocate it to be shared between the contractual parties.
- **Insufficient Site Investigation:** From the total responses, (46) responses are to allocate it to the Contractor.
- **Design and quantities change:** From the total responses, (38) responses are to allocate it to the Employer.
- **Late issuance of drawings, instructions, permissions, and approvals:** From the total responses, (41) responses are to allocate it to the Employer.
- **Delay in payment from the Employer:** From the total responses, (54) responses are to allocate it to the Employer.
- **Delay of full access to the site:** From the total responses, (42) responses are to allocate it to the Employer.
- **Financial problems of the Employer:** From the total responses, (51) responses are to allocate it to the Employer.

- **Protection of works and site:** From the total responses, (60) responses are to allocate it to the Contractor.
- **Slow progress:** From the total responses, (53) responses are to allocate it to the Contractor.
- **Improper management plans**: From the total responses, (43) responses are to allocate it to the Contractor.
- **Accidents and safety issues:** From the total responses, (53) responses are to allocate it to the Contractor.
- **Incompetent manpower:** From the total responses, (60) responses are to allocate it to the Contractor.
- **Financial problems of the contractor:** From the total responses, (52) responses are to allocate it to the Contractor.
- **Poor procurement planning (Fail to approve the Material -Delay in supply):** From the total responses, (48) responses are to allocate it to the Contractor.
- **Inappropriate construction method:** From the total responses, (52) responses are to allocate it to the Contractor.
- **Poor quality:** From the total responses, (51) responses are to allocate it to the Contractor.
- **Shortage of resources (Material - Manpower - Equipment):** From the total responses, (57) responses are to allocate it to the Contractor.
- **Pollution and noise:** From the total responses, (45) responses are to allocate it to the Contractor.
- **Inappropriate disposal of wastage:** From the total responses, (55) responses are to allocate it to the Contractor.
- **Ground settlement:** From the total responses, (46) responses are to allocate it to the Contractor.
- **Lack of coordination:** From the total responses, (36) responses are to allocate it to the Contractor.
- **Variations:** From the total responses, (39) responses are to allocate it to be shared between the contractual parties.
- **Breach of contract:** From the total responses, (52) responses are to allocate it to be shared between the contractual parties.
- **Transportation problems:** From the total responses, (44) responses are to allocate it to the Contractor.
- **Delay notification of risk (Early Warning):** From the total responses, (40) responses are to allocate it to the Contractor.
- **Delay of completion:** From the total responses, (39) responses are to allocate it to the Contractor.
- **Termination of Contract:** From the total responses, (46) responses are to allocate it to be shared between the contractual parties.

The second group of risk that not reach plurality involved (7) risks are as following:

- Change of laws, legislation, policy, and regulation
- Fluctuation in the currency exchange rate
- Inflation (Change in resources price)
- Wars, strikes, revolutions
- Insufficient design, and specifications
- Unforeseeable Physical Conditions
- Poor Supervision of Engineer

All of the above (7) risks have no decided scores as the responses are approximately have very close scores the three choices. For example, Inflation (Change in resources price) scored (29) to be allocated to the contractor, (24) to be allocated to the employer and (20) to be shared between the contractual parties. This confusion is returned to the complexity of the risk and especially it is impacted. Such this risk is out of control of both parties and in this case, the contract tends to allocate it to the strongest party who is the employer or sometimes to be shared. Therefore, the respondents faced a level of confusion on how to manage this risk.

Findings of the Questionnaire Survey

Most of the respondents tend to allocate the risk to the party who can bear the risk better than the other one due to the usual authority and level of control toward the risk sequence. This clearly addressed according to scores of risk. It is found that:

- Total (6) risks are scored to be allocated to Employer which is a small number from the total risks because most of the risks are expected to occur during the construction phase where the contractor shall manage it. However, these risks are allocated to the Employer because the Employer has the full authority to manage and control the risk. For example, Delay of obtaining permissions, licenses, and permits is clearly under the control of the Employer and on the other

hand is beyond the control of the contractor and even it consumes time, the Employer shall bear it.

- Total (18) risks are scored to be allocated to the contractor which is a big number from the total risks. These risks are allocated to the Contractor because of his authority and scope of work enable him to have better control and follow up toward these risks. For example, Pollution and noise are clearly under the control of the Contractor and on the other hand, are beyond the control of the employer.
- Total (5) risk are scored to be shared between the contractual parties. This type of risk, respondents find some complexity of the risk nature obstacle allocating it to a specific party. Usually, this type of risk needs collaboration from the contractual parties to be properly controlled and managed. For example, the risk of exceptionally adverse climatic conditions; the contractor shall consider the expected weather carefully with the time schedule and the other arrangements such as stores, safety, and quality plans. However, the Employer shall bear the risk in case the matter becomes out of the contractor's control. Otherwise, the contractor will not be able to successfully deliver the project or will tend to decrease the quality to achieve the targeted profit or minimize the loss which resulted from the occurrence of the negative risk.

The second group of risk that not reach plurality involved (7) risks are as following:

- Change of laws, legislation, policy, and regulation
- Fluctuation in the currency exchange rate
- Inflation (Change in resources price)
- Wars, strikes, revolutions
- Insufficient design, and specifications
- Unforeseeable Physical Conditions

Poor Supervision of Engineer

All of the above (7) risks have no decided scores as the responses are approximately have very close scores the three choices. For example, Inflation (Change in resources price) scored (29) to be allocated to the contractor, (24) to be allocated to the employer and (20) to be shared between the contractual parties. This confusion is returned to the complexity of the risk and especially the impact. Such this risk is out of control of both parties and in this case, the contract tends to allocate it to the strongest party who is the employer or sometimes to be shared. Therefore, the respondents faced a level of confusion on how to manage this risk

CONCLUSION

An interesting conclusion can be addressed from this study is that the problem of risks in the construction industry has many dimensions and is affected by many factors. Some contractual risk is pointed to be possibly managed under one of the contractual parties either the employer or the contractor. However, some risk is addressed through the responses to be not possibly managed under a specific party. These risks are beyond the control of each party such as Change of laws, legislation, policy, and regulation, Fluctuation in the currency exchange rate and Wars, strikes, revolutions.

The conclusion includes the following recommendations:

- Each party within the contract shall collaborate to properly allocate the risk.
- The risk allocation barrier shall be addressed and considered early and before the final draft of the contract to avoid the negative impact of the improper risk allocation.
- The fair risk allocation supports the project to reach the objectives from the perspective of each party and maintain a good relationship between them. It also decreases the issues and disputes during the project.
- It is not possible or feasible to allocate all the risks to one party. Also, the risk allocation shall consider the authority, scope of work, the ability of each party and then determine the party who can bear and manage the risk effectively.

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