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**CEM 520: CONSTRUCTION CONTRACTING AND
ADMINISTRATION**

Term Project

*Titled: Liability Allocation Among The Parties To Fixed-Price
Construction Contracts In Saudi Arabia*

Submitted to

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Abstract

This paper discusses the issue of liability allocation among the parties to fixed-price construction contracts in Saudi Arabia. It focuses on the public and semi-public sectors. A survey was conducted using the principles of quota sampling where 52 questionnaires were distributed to 10 owners from sectors, 6 consultants and 36 contractors. The survey comprised of two parts. The first constituted of a tabulation of all liabilities found in actual local contracts. Respondents were asked to allocate liabilities to the party that best controls it, which may differ from actual allocation. The second part constituted of 25 statements. This part included either liabilities that were not covered in actual contracts or liabilities that were of controversial nature. Respondents indicated their level of agreement on a 5-level scale in addition to a “no opinion” response. The first part resulted in a matrix reflecting a comparison between actual and proposed liability allocation. The second produced discussion of liability areas not covered by local contracts, proposed changes to current contracts and conclusion that proper liability allocation may lead to better bids through more competition and less contingency.

1.0 Introduction

It is one of the facts of the construction industry that each project is unique in the sense that it has to be custom designed and built. The parties to a construction contract, the designer or consultant, the owner, and the contractor join forces to bring to a life a project conceived in the owner’s mind, detailed by the designer carried out by the contractor. All of the parties have one common goal; which is to complete the project; however, each of them has his own interests to protect. Due to the diversity of each construction project, each of the parties faces a magnitude of responsibilities. Failure to carry out activities delineated by such responsibilities may jeopardize the interest of the other party. This may lead to suffering. Allocation of such responsibilities among the parties should generate better understanding and hence, reduce claims that, in effect, lead to a successful project with regards to finance and schedule.

We could define liability as the condition of being responsible for a possible or actual loss, penalty, evil, expense or burden. This issue of liability in construction sets to answer the following question: Who is liable and for what? However, proper liability allocation means that liabilities should be assigned to the party that best controls it. Since construction projects are unique in nature and have to be custom designed and built, problems are inevitable. Each party feeling the existence of such problems tries to use contractual language or clauses to set the burden on another party. This leads to the formulation of the following statement of the research problem:

- Who is liable and for what.
- How is liability being allocated or shared in actual construction contracts in Saudi Arabia.
- What are the financial/schedule effects of liability fixing.
- How to reduce such effects with emphasis on Saudi construction contracts.

If an answer to the questions above is to be found, it becomes easier for the contractual parties to assume or even share liability without having to fix it on another. This should lead to the following:

- Better understanding of each party to its responsibilities.
- Reduce or eliminate avoidable schedule delays.
- Avoid or reduce damages to outside parties.
- Reduce or eliminate claims.
- Overcome the almost inevitable adversarial relationship among them.

The main objectives of this research are to study how liability is being allocated and shared among the contractual parties both in theory and in practice. Emphasis shall be made on the Saudi construction environment. Also, to study the impacts of improper liability allocation on various aspects; mainly cost and schedule. And to produce proper sharing and allocation of liability which reduces loss.

This research shall be limited to study only the owner, the designer or A/E, and the contractor. Emphasis shall be made on large construction projects in both the public (Government agencies) and semi public (Saudi Aramco, SCECO...) sectors. The study of which contractual arrangement is best for Saudi contractual environment is beyond this research. However, emphasis shall be made on the type most commonly used throughout the world, and most certainly in Saudi Arabia, which is fixed price contracts.

2.0 Literature Review

2.1 Liability in fixed-price construction contracts

Contractual Agreement: Perhaps the most important phases of any construction project are the design or engineering phase and the construction phase. Here, traditionally, the owner enters into contractual agreement with an A/E to complete the design and with a contractor to construct that design.

Contract, could be defined as an agreement by two or more competent parties to do or not to do some lawful acts. In order to have a binding contract there must be an offer and an acceptance.

Usually contracts should be written and the aim of contracts to be written is to achieve certainly of obligation of each party, the avoidance of ambiguities, and such definiteness of understanding as to preclude ultimate controversy. There is an attempt by the owner or A/E to pass all liabilities to the contractor; to avoid responsibility for uncertainties and possible design or computation errors. The idea being that the owner can thereby firmly establish his costs and the owner and A/E can avoid liability for error.

2.2 Proper liability allocation

Success of a competitive bid contract is almost fully dependent upon the degree of competition generated. The higher the number of contractors competing for the contract, the higher the degree of competition and hence the cost will most be lower. Liabilities that owner pass on to prospective bidders via the contractual language play a significant role in either restricting or enhancing the degree of competition.

Many owners may elect a liability-free policy by shifting all liabilities to the bidders. Here, the owner hands out plans and specifications and asks the bidders to quote a price to construct the project. Bidders will be held to that price regardless of anything that occurs, whether it is their fault, the A/E's or the owner's.

Some liabilities should be borne by the owner; such as, full disclosure of known information, site access, prompt checking and approving of shop drawings and timely payments. Also, they're some liabilities to be borne by the contractor such as project scheduling, construction methods, material procurement, site safety and timely completion. There are, also, areas of liabilities that should be shared by both the owner and the contractor; such as the escalation of cost. This establishes that proper liability allocation shall result in better bids and most likely a lower cost to the owner. Also, it shall enhance the adversarial relationship between the owner and the contractor and hence; result in fewer claims.

2.3 Liabilities in the design phase

It is intended by this section to describe some of the liability issue in the design phase:

Owner-provided data: the owner usually submits as-built drawings, operation drawings, isometric drawings ... etc.

Adequacy of design: the A/E should be found liable for his design. If he possesses the required knowledge and skill but does not utilize it, he is charged with negligence; and if does not possess such knowledge and skill, he is liable for the lack of it.

Accuracy of design: it should be clear that the A/E will be liable for his design; most construction contracts try to shift the liability of such errors and omissions to the contractor via the use of exculpatory language.

Owner abandons work: the owner should decide to abandon the project while in the design stage, the A/E should be entitled to recover not only that portion of his fee which he has actually earned up to the date of abandonment by the owner, but also damages for the loss of opportunity of which he was deprived as a result of being prevented by the owner from completing this services. The proper measure of such damages should be the loss of profits, which he would have earned in the future under the contract.

A/E's liability for accuracy of estimate: if the owner requires that the A/E develops an estimate and it was found to be grossly erroneous, the law may hold the A/E liable for and damages suffered by the owner, and he may forfeit his compensation if the final cost is substantially in excess of his estimate.

A/E's liability for construction cost: if the contract between the A/E's and the owner stipulates that the project to cost not more than a defined amount, the A/E will be liable for the amount of his compensation if his design package will cost substantially in excess of the amount.

2.4 Liabilities in the construction phase

It is intended by this section to describe some of the liability issue in the construction phase

Bid evaluation: public owners are governed by governmental laws and regulations pertaining to contract procurement. They do not usually have the freedom of selecting a bidder who is not the lowest. On the other hand, semi-public owners have more flexibility to choose any contractor, not necessarily the lowest. In their instruction to bidders, they reserve the right to reject any or all bids for any reason whatsoever or for no reason.

Disclosure of information: perhaps one of the basic liabilities of the owner is to disclose all information necessary for the proper execution of the work. Not doing so, the contractor may enter a bid for less than what he should bid for.

Safety: as a general rule, an owner who undertakes the design and construction of a certain project and employs a competent contractor, should not be liable for any unsafe

occurrence caused by the failure of the contractor to follow require safety rules and regulations of the failure of the A/E to properly design the project.

Specification: the liability can be changed when using detailed specifications or performance specifications. The contractor will be responsible for the performance specifications but not for the detailed specification if the final project will not work well.

Shop drawings, samples and materials: the owner or the A/E usually reviews the shop drawings, samples, and materials to approve them. This procedure takes time. The owner should be liable for any delay caused by the review time, but the owner is not liable for defects in shop drawings, samples, and materials.

Differing site condition: it is common in construction contracts to find various exculpatory clauses to shift the liability for site conditions to the contractor. It provides that neither the owner nor the A/E accepts liability for the accuracy of site conditions especially subsurface soil and water conditions. It also provides that bidders are expected to satisfy themselves as to the character, quantity and quality of subsurface materials to be encountered.

It may be worth mentioning that the owner and the A/e should be liable for this part because they have enough time to thoroughly investigate subsurface conditions as part of the design package. It also does not make sense to ask the contractor to investigate subsurface conditions during the bidding period.

Variation in quantity: the owner sets estimated quantities of materials needed to accomplish an activity. If the actual quantities is lower than estimated, the contractor may not be able to recover his fixed cost, and if the quantity is higher than estimated, the contractor may incur loss due to change in method.

Owner directives and interferences: the owner or his agent should be liable for any directives he give to the contractor or any interference in his work.

Changes: the owner must pay for what he gets or receives benefits from. From this, contracts generally include a clause that gives the owner the right to order extras or to do changes in the work. Changes should always be properly documented even if good faith persists. The reason for documenting changes is that an oral agreement may not leave both parties with the same understanding of its condition. Also, oral agreements are usually not bidding by law.

Schedule delay: it makes sense that the contractor should bear the consequences of the delay if it was caused by his action, but how much sense does it make if the delay was not caused by the contractor's action. Liabilities for schedule delay caused by earthquakes, acts of the public enemy, acts of government, freight embargoes and delays of subcontractors or suppliers due to the similar causes should be shared between the contractor and the owner. The contractor is usually bound contractually to notify the owner in writing of any delay within a certain number of days from the beginning of the delay.

Weather: when considering liability for weather delays, contractor should bear liability for usual weather. However, in cases of sever weather shown to be beyond the average expected for the area based upon past records, the liability should be shared. The contractor, in such a case, should at least be allowed for time extension.

Accuracy of design: most contracts contain disclaimers to shift the liability of the plans and specifications errors and omissions to the contractor. Proper liability for such errors and omissions should belong to the A/E because; firstly, he should have the expertise to produce a reasonably sufficient design; secondly he had the time to think and study the project; thirdly, it is illogical for contractor to virtually redesign the bidding period; which is, only enough for the contractor to produce his bid.

3.0 Research Methodology

Data required for this study were collected through the use of questionnaire to survey the opinion of the parties to construction contracts in the local construction industry. Actual construction contracts from the public and semi-public were studied from the allocation of liabilities point of view. Also, literature dealing was screened to consider liability issues related to construction industry. It was necessary to survey the opinion of public and semi-public owners, design/consultancy or A/E firms and construction contractors.

The questionnaire is divided into three (3) parts. The first part is different depending on the party responding to it (contractor, A/E ...). The second part is divided into two sections and it is asking the respondent to allocate liabilities to the party that best controls it which may differ from the way liabilities are being allocated. The first section is for liabilities of design/consultancy contract between the owner and the A/E and the second is for liabilities of the construction contracts between the owner and the contractor. Areas of liabilities that are not covered in local contracts but covered in the literature and areas of controversial opinions were set in the form of 25 statements in the third part. In this part, respondents are asked to indicate their level of agreement with each statement.

3.1 Statistical Sample

The population is divided into three strata; namely, the owners stratum, the A/Es stratum and the contractors stratum. The owners' stratum consists of 38 public agencies having separate construction project budgets and 15 projects departments responding the semi-public sector such as Saudi Aramco and SCECO-East, Central and West. Therefore, the entire stratum consists of 53 agencies. The A/E stratum consists of 20 firms according to a Saudi Aramco listing of qualified general engineering services contractors and; finally, the contractor's stratum consists of 367 contractors having at least on classification in categories 1, 2, 3. Therefore, 440 possible respondents represent the entire population. The researcher in this thesis utilized the concept of Quota sampling, and by this respondents selection was non-random in the sense that respondent selection was non-random in the sense that respondents did not have a known non-zero chance of being selected.

The scope of this research is focusing on large contractors, A/Es, and owners who have their own project management departments. Therefore, a high level of professionalism can be safely assumed and risk of bias can be excluded. The next table 3.1 shows the required sample size for each stratum obtained from the following equation:

$$n = \frac{\sum_{i=1}^3 \frac{N_i^2 p_i q_i}{w_i}}{N^2 D + \sum_{i=1}^3 N_i p_i q_i}$$

Where an average value of $p=0.8$ and $q=0.2$ can be selected; $D=0.0025$ and $w_i=N_i/N$

STRATUM	STRATUM POPULATION	SAMPLE SIZE	PROP. OF POPULATION	PROF. OF SAMPLE
OWNERS	53	10	19%	19.2%
A/Es	20	6	30%	11.6%
CONTRACTORS	367	36	10%	69.2%
TOTAL	440	52	12%	100%

Table 3.1 Stratified Quota Sample

Respondent responses for part B of questionnaire were presented in two tables; one for each type of contract showing the frequency for all parties and the composite frequency. In the third part, respondents were asked to indicate their level of agreement on a 5 level scale. In order to combine and rank responses, a severity index is used as shown by the following equation:

$$I_s = \sum_{i=1}^5 a_i x_i$$

The constant a_i is used to determine a quantitative measure. This means that the respondent is limited to a 5 scale while completing the questionnaire. The variable x_i is the frequency of the statement.

A severity index of 100% means that all respondents chose the “strongly agree” response. On the other hand, a 0% severity index means that all respondents went for the “strongly disagree” response. This gives a range of 100% for the severity index.

4.0 Findings and Results

A liability matrix had been generated from local contracts and responses to the second part of the questionnaire. This liability matrix is summarizing the local liability allocation from actual Saudi construction industry contracts. Also, it discussed the results and analysis of the data obtained from the third part from the questionnaire.

4.1 The liability matrix

The tables 4.1 and 4.2 in the appendix show the allocation of liability for the design and construction contracts respectively. Under “Actual Contracts”, the distribution of liability is given as found actual public and semi-public contracts. Under “Sector”, a “P” denotes a liability particular to the Public sector only and an “S” for semi-public contracts only. If none is indicated it means that the liability item is found in both. Under “Proposed” a reflection of the opinions in the second part for the party that best controls that particular liability item and should bear it.

4.1.1 Advantages of the liability matrix

This liability matrix has several advantages; the following are the most significant:

- It serves as a guide or checklist for those involved in writing contracts as to the liability items to be considered.
- It gives a guide for allocation of liability; it suggests a better allocation of liability.
- It indicates to public and Semi-public owners which items are not included in their contracts.

4.1.2 Results of the proposed matrix for design contracts

Following is a discussion of the major findings of the second part of the questionnaire pertaining to design contracts as reflected from table 4.1:

- The A/E, in his capacity as consultant, should assist the owner in completing the details scope of work. One way of accomplishing this is by advising the owner of items that should be added, deleted or even changed in the scope of work prepared by the owner.
- Some respondents indicated that the A/E should provide all available information on the project; however, the majority indicated that the owner best controls this item, which is not different from actual. These responses, however, indicate that the A/E should advise the owner of missing or complete information and propose methods of obtaining.
- The owner should share the A/E the liability for selecting the most appreciate scale for drawings and provide benchmarks. This is logical since the use of scale would determine the number of drawings, which is the basis for estimating the required man-hours and fee to complete the contract.

- Some respondents indicated that the owner should share the liability for both technical and economic feasibility analyses. This is quite understandable since the owner is liable for the criteria upon which the analyses are based.
- The liability for preparing the contract document should be shared. This makes sense because the owner is going to control the execution of the contract.
- The owner should share the liability of obtaining the necessary licenses and governmental authorization and to coordinate with the concerned agencies. Since the owners are public or semi-public, they could be in better control to reduce the procedures to obtain licenses, authorizations and coordinate with the concerned agencies.
- The A/E should share the owner's liability to issue and document change. This is due to the A/E's capacity as a consultant in which he is obliged to advise the owner of necessary changes and having these changes properly.

4.1.3 Results of the proposed matrix for construction contracts

Following is a discussion of the major findings of the second part of the questionnaire pertaining to construction contracts as reflected from table 4.2:

- The liability for the confidentiality of bid details is borne by the owner in actual contracts; however, respondents indicated that both, owner and contractor should share it. This is true after placing bids; it is common for contractors' personnel to communicate bid prices and information.
- The majority of respondents placed the liability of bid mistakes with the contractor; however, some indicated it should be shared. It is unethical for the owner to discover a mistake in the bid without clarifying it with the contractor and give him the chance to withdraw. Semi-public owners allow contractors to withdraw in such cases.
- Obtaining necessary licenses and permits was placed on both rather than on contractors only. As the case with the A/e, the owner usually would be in better position to deal with this issue. In the other words, the owner should assist in obtaining such licenses and permits.
- Third party liability is proposed to be shared. It is logical for the owner to stipulate cases in which he would bear the third party liability, instead of generally shifting it to the contractor.
- Promotion of local manufacturers and suppliers should be a shared liability. The owner should specify articles to be brought from local manufacturers and suppliers and hence giving the same message to all contractors during the bidding period. Should such items be more expensive than similar imported items, the owner should indicate that he is willing to bear the cost difference.
- Performing government relations' activities is proposed to be a shared liability. The owners are either public or semi-public who have more resources to perform such activities. Owners should indicate what activities are expected of the contractor and those, which are not.
- The owner should be liable for failure to carry out QA/QC or inspection and testing of work. This liability should be borne by the contractor, but the owner should approve the contractor's QA/QC program and make sure the contractor

- has qualified personnel and equipment to carry out such activities. Also, the owner's representative should inspect work to guarantee adherence to specifications.
- Respondents indicated that the liability for site conditions including surface and subsurface should be shared. This indicates that there are situations in which the owner best controls this liability such investigation subsurface conditions.
 - The contractor should share the responsibility of issuing and documenting changes. This protects the contractor since he is fully liable for working on undocumented changes.
 - Semi-public contracts stipulate that neither the owner nor the contractor shall be liable to the other liquidated or consequential damages. Public contracts do not cover this issue. Respondents indicated that both should be liable. This means that owners should stipulate fair methods of compensation due to them or due to the contractor depending on the case.

4.2 Major findings

Following is a discussion of the major findings of the third part of the questionnaire.

4.2.1 Liabilities applicable to both contracts

In our coming discussion in this part, I will consider the contractor to be both design contractor and construction contractor.

4.2.1.1 Contract language

Three statements from the third part of the questionnaire were directed toward testing owners' use of exculpatory language in contracts to evade liability. These three statements are # 1, 17, and 18 from the part c table in the appendix. Respondents agree that owners use subjective phrases to shift or escape liability. Owners and A/Es had higher severity index on all phrases than contractors. As for statement # 17, a "mild" disagreement was concluded. Contracts are not written in simple language. Also, most of the contractor respondents agreed that contracts are written in simple language. For statement # 18, it was agreed that owners try to shift liability to the consultant or the contractor depending on the phase of the project. The highest severity index was for the contractor. From the outcome of these statements, it was obvious that owner respondents are very objective; and the element of owner bias can be ruled out.

4.2.1.2 Progress payments

Two statements test owner's liability on the issue of progress payment. Statement # 2 states that owners should guarantee due payments to contractors by submitting a payment bond or other type of guarantee. Statement # 14 says that owners should pay amounts plus damages to the contractor should they delay paying due progress payments. Owners and contractors agree on statement # 2 but A/Es disagree. Respondents agree # 14; therefore, owners should submit a guarantee or payment bond to guarantee due payments

and owners should pay damages in addition to due payments in case of progress payment delay. This is only fair since owners ask for guarantee for performance and impose damages or fines on contractors if they delay completion. Also, these statements prove that owners understand that their delay of progress payments create cash flow problems for the contractor.

4.2.1.3 Suspension or termination of work by contractor

Statements # 10 and 11 test if contractor could spend work in case of serious disputes or even terminate work should the owner commit a substantial breach of contract. Owners agree to both statements, A/E's disagree to both and contractors agree to both. Owners give themselves the right to suspend or terminate contracts even for convenience without cause or fault of contractor, but they do not give a similar right to contractors, leaving them at a disadvantage. Responses to the above statements suggest that owners should stipulate similar rights in cases where serious disputes or breaches of contract occur. Also, answers to both statements prove consistency of respondents since they gave similar responses to both statements.

4.2.1.4 Suspension or termination by owner

According to responses of statement # 5, respondents agree that owners should compensate contractors for liquidated damages or loss of opportunity owners decide to suspend or terminate contract for convenience. Also, owners show higher severity index than contractors.

4.2.1.5 Timelines of owners' reviews

This area of liability was tested by two statements; the first, # 13, stating that an owner should compensate the A/E if he delays submitting his review of design beyond the stipulated period; and the second, # 25, which states that the owner should guaranty making his inspection and review of submittals within certain time after which he should compensate contractor for delay. Owners and A/Es agree on both, so owners should assume liability for delaying their reviews or inspection beyond a given period.

4.2.1.6 Undocumented change

According to responses to statement # 4, owner may find contractors liable for their compensation if they work on change without proper documentation. Owners and contractors showed an agreement to this statement and A/Es disagree. Nevertheless, the composite response was in agreement.

4.2.1.7 Force majeure

A statement # 6 states that neither owner nor contractor shall be liable to the other as result of any delay or failure to perform arising out of unforeseeable happenings beyond either party's control. Respondents agree to the above statement. Therefore, this statement should be provided for in contracts.

4.2.1.8 Removal of unfit persons

An owner should have the right to remove any person from work he sees him unfit and the contractor must replace him at his expense; so stated # 3. Owners and A/Es strongly agree. Therefore, it shall be accepted as a liability borne by the contractors. The reason this liability does not pose a great risk on contractors may be the high level of professionalism of owners' representatives.

4.2.1.9 Information releases by owner

Statement # 9 tests the owners' right to publish information about the contract, including data about the contractor, without contractor's consent. Owners disagree while A/Es and contractor strongly disagree. Therefore, owners amend their clauses prohibiting contractors from issuing information releases without owners' consent to include a paragraph where they reflect the same upon themselves should they release information about contract without his consent.

4.2.2 Liabilities unique to construction contracts

4.2.2.1 Owner's rejection of bid

Owners strongly disagree to statement # 7, A/Es agree and contractors showed different responses but agree that owners should compensate contractors for all part of cost to prepare bids should they elect not to award the contract after receiving bids. Compositely, the respondents disagree to this statement. Also, respondents disagree to statement # 8 that an owner should reject any bid for reason of for no reason.

4.2.2.2 Verification of site conditions

Statements # 20 and 21 deal with contractors' liability to verify site surface conditions. The first places the liability on the contractor, as it is the case with actual local contracts; whereas the second suggests that the owner should include a "differing site condition clause" in contracts to shift the liability of surface and subsurface conditions back to them. Owners' response was deemed contradictory, since they agreed to both opposing statements. On the other hand, A/Es and contractors disagree on the first and agree on the second. Therefore owners should include a differing site condition clause in contracts to shift the liability for surface conditions back to them if it found different than those shown in the drawings.

4.2.2.3 Contractor verification of quantities

Statement # 24 places the liability for verifying quantities in the bill of quantities on the contractor before he places his bid. It even asks contractors to make allowances for mistakes if they be able to find any. Owners show agreement whereas A/Es show disagreement. The surprising result is the contractors agree with this statement.

4.2.2.4 Weather

Responses to statement # 23 strongly agree that contractors should not be responsible for all type of weather; including severe unpredictable weather. It is worth nothing that owners and A/Es responses were stronger in disagreement than those of contractors.

4.2.2.5 Price escalation

Statement # 22 states that an owner should share the contractor's loss due to steep escalation in prices. While owners strongly disagree, A/Es and contractors showed a severity index of just agree. This liability area does not constitute an area of concern to contractors. This may be due to the relative stability in construction material prices in the local industry.

4.2.3 Liabilities unique to design contracts

Statement # 12 places the liability on the A/E for the accuracy of his estimate of construction and operation cost. A/Es disagree, whereas owners and contractors agree. The A/Es disagreement may be due to their concern that their estimate is based upon data given by the owner, and that data may be incomplete or even erroneous. Should this be their concern, then they should be found liable because they can either verify the estimate basis or mention that estimate is based upon such and such data.

The second statement that is unique to A/Es is statement # 15. Here, liability is borne by the owner should he fail to give the A/E all the data in his possession related to the project. All respondents agree, but owners and contractors agree stronger than A/Es.

4.2.4 Sharing of risk and liability

Statement # 19 was the theme of the research. Proper sharing of risk and liability in contracts may lead to lower bids to the owner through more competition and less contingency. Owners agree, and A/Es and contractors agree. This is encouraging since the highest agreement was by the owners. This indicates that liability sharing is going to improve in contracts in Saudi Arabia.

5.0 Conclusion

The outcome of this research could be divided into two sections; the outcome from the second part of the questionnaire (liability matrix), and the outcome from the third part (25 statements).

5.1 Conclusion from the liability matrix:

The following are from the matrix for the design contract:

1- Liabilities borne by owner but proposed to be shared.

- Detailed scope of work.
- Stipulate payment method.
- Issue and document change.

2- Liabilities borne by A/E but proposed to be shared:

- Select most appropriate scale for drawings.
- Provide benchmarks.
- Prepare construction contract document
- Estimate construction cost
- Use of national products
- Third party liability.
- Obtain all applicable insurances
- Obtain necessary licenses and governmental authorizations.
- Coordinate with concerned agencies.
- Adherence to laws and customs of Saudi Arabia
- Adherence to import and custom laws
- Confidentiality of information
- Infringement of patent copyrights and trade secrets owned by others.
- Liquidated damages for delay.
- Conflict of interest.

3- Liabilities controlled by owner and proposed to be shifted to A/E

None

4- Liabilities controlled by A/E and proposed to be shifted to owner

None

The following are from the matrix for the construction contract:

1- Liabilities borne by the owner but proposed to be shared:

- Confidentiality of bid detail.
- Special risks (limited to outbreak of war)
- Issue and document change.

2- Liabilities borne by contractor but proposed to be shared:

- Obtain necessary licenses and permits.
- Third party liability.
- Adherence to laws and customs of Saudi Arabia
- Adherence to import and custom laws.
- Infringement of patent, copyrights and trade secrets owned by others
- Conflict of interest
- Promotion of local manufacturers and suppliers
- Utilize Saudi airline and maritime carriers
- Obtaining SASO approval on imported material and equipment
- Perform government relations activities.
- QA/QC (inspection and testing of work)

3- Liabilities controlled by owner and proposed to be shifted to contractor

None

4- Liabilities controlled by contractor and proposed to be shifted to owner

None

5- Liabilities not controlled but proposed to be shared

- Liquidated damages (consequential damages)
- Force majeure

5.2 Conclusion from the third part (25 statements)

1- Conclusions applicable for both contracts (contractor refers to design contractor and construction contractor)

- Owners in Saudi Arabia use exculpatory language to escape or shift liability. Refraining from such practice shall produce clearer contracts.
- Owners should submit a guarantee or payment bond to contractors to guarantee paying progress payments on time.
- Owners should stipulate a clause giving contractors the right to suspend or terminate contracts in case of serious disputes or substantial breach of contract by owner.
- Owners should compensate contractors for liquidated damages or loss of opportunity should they decide to suspend or terminate contract for convenience.
- Contractor are to be bear the risk of losing all or part of their compensation on a particular change if they work on it without proper documentation.
- Neither owner nor contractor shall be liable to the other as result of any delay or failure to perform arising out of unforeseeable happenings beyond either party's control
- It is the owners' right to remove from work any person they deem unfit at contractors' expense remains unchanged.
- Owners should include a clause to prohibit them from issuing publicity releases about contract or contractor without contractor's consent.

2- Conclusion unique to construction contracts

- It is the owners' right to abandon awarding a contract without compensating contractors for all or part of costs incurred while preparing bids remains as is.
- Owners should relinquish their right to reject any bid, especially for no reason.
- Owners should include a 'differing site condition clause' in their contracts to shift liability for surface and subsurface conditions back to them should it be found different than those shown in drawings.
- Contractor's liability to verify quantities given in the Bill of Quantity and make allowances should he be able to find mistakes remains unchanged.
- Contractors should clearly stipulate the contractors should not be liable for all kinds of weather, especially, severe unpredictable weather.
- The suggestion that owners should share steep price escalation with contractors was turned down.

3- Conclusions unique to design contracts

- A/E are to be responsible for the accuracy of their estimates provided that the owners do not withhold any necessary information required to make better estimates.
- The owner should bear the liability if he fails to give the A/E all the data in his possession related to the project.
- Proper sharing of risk and liability in contracts may lead to lower bids through more competition and less contingency.

5.3 Future research

This research should be considered as the basis for future research, and then the following should be considered.

- Studying the relation between number and type of disputes and improper liability allocation.
- Quantifying or estimating the reduction in bid contingency when liabilities are properly allocated.
- Quantifying impacts of improper liability allocation on cost and schedule.

APPENDIX

REFERENCES

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