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UNIVERSITY OF CALGARY

RISK PREMIUMS
ASSOCIATED WITH EXCULPATORY CLAUSES

BY

ZAINUL ABEDIN KHAN

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF

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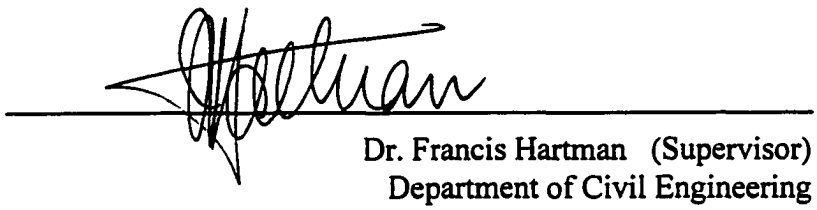
The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "Risk Premiums Associated with Exculpatory Clauses" submitted by Zainul Abedin Khan in partial fulfilment of the requirements for the degree of Master of Science.



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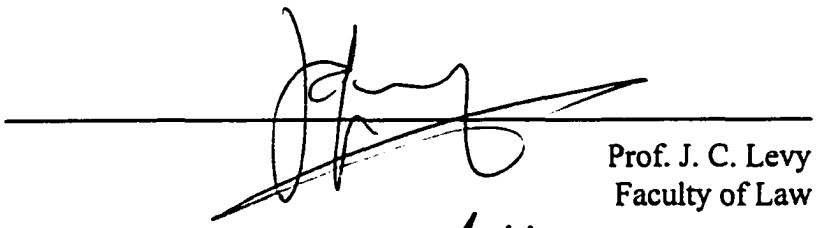

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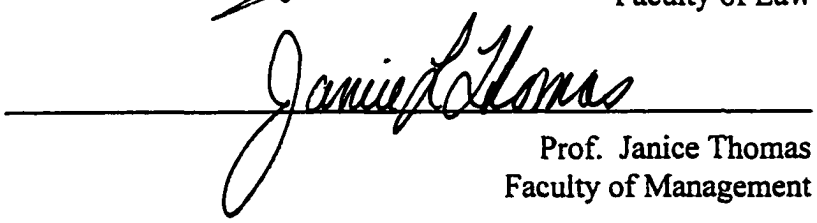

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ABSTRACT

An empirical study of the cost impact of exculpatory clauses was conducted by investigating qualitatively and quantitatively, using a mail survey, how bid prices of construction contractors varied between situations with different level of risk and exculpatory clauses. Two hundred and fifty questionnaires out of five hundred and fifty were completed by top project management personnel with more than 15 years of experience. This gave a response rate of 46%.

The motivation for this investigation was that exculpatory clauses are routinely used by owners to pass on risk to the contractor without any quantification of associated risk premiums or assessment of the benefits.

The results of this study identified the existence and quantified the size of risk premiums. Additionally, this study isolated associated premiums in ideal and adverse conditions and other impacts of shifting risk to the other parties in contracts. Furthermore, the findings suggest that inappropriate allocation of construction risks between owners and their contractors and the resulting disputes cause significant project inefficiencies and adversarial relationships and has a significant impact on the total construction costs paid by owners.

Several applications and implications of these premiums are considered. Specifically, recommendations as to how risk premiums can be used to determine the cost-effectiveness of risk sharing or reduction measures on projects are proposed. The existence and size of these risk premiums also implies a significant role for owners, contractors, consultants and project managers. These stakeholders need to be proactive in reversing the current trends and hence in reducing the risks in contract.

DEDICATION

To my family: Reshma, Aamir and Rumsha. Also to my

father and brothers who always promoted the importance of continued learning.

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This thesis has been completed within the subject area of Project Management in the Civil Engineering Department at The University of Calgary.

The author feels a great deal of indebtedness to the following individuals and organizations and wishes to extend his gratitude to them:

- Professor Francis Hartman, his guidance and insight as my supervisor were critical to the success of this thesis. Like a ships captain, he kept both this thesis and me "on course".
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TABLE OF CONTENTS

LIST OF TABLES

LIST OF CHART

CHAPTER ONE

INTRODUCTION

1.1 Introduction

In the construction industry, contract documents are more than just evidence of an agreement between the contracting parties. The contract is a codification of the private law which governs the relationship between the parties to it. It defines the responsibilities, spells out the conditions of its operations, defines the right of the parties in relation to each other and grants the remedies to a party if the other one breaches its obligations. Furthermore, it is also an agreement to allocate risk between the contracting parties. Theoretically, the aim of a written contract is to achieve certainty of obligation of each party, the avoidance of ambiguities, and such definiteness of understanding as to preclude ultimate controversy[1]. In practice, this concept is neither universally accepted nor practiced. Owner developed construction contracts are generally framed, not to fix obligations but to help the owner avoid obligations. This is accomplished by exculpatory clauses. It is common in many construction contracts to find such clauses. Such clauses frequently appear both in the instructions to bidders and in the terms and conditions which form the agreement between the owner and contractor. These clauses are the source of many of the problems in the area of construction process risk assignment.

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[1] Fox, George A. (1975), "Are Construction Contract Fair?" Civil Engineering – American Society of Civil Engineers, May.

Passing on responsibility for many project risks to the contractor, through the use of exculpatory clauses, may not be in the owner's best interests. When contractors are obliged to assume risk, they must protect themselves and so they attach risk premiums to their bid price. These premiums are both in direct charges (contingency) and through indirect costs (such as added supervision, legal costs and so on). Litigation resulting from such a contract clause is not only costly and time consuming, but frequently results in decisions favoring the contractor[2] [3] [4] [5] [6]. On the occasions where decisions are in favor of the owner, it is only when there is no ambiguity and the intent of the contract is very clear[7] [8] [9] [10]. If the intent is clear, one must wonder why the case needed to proceed to litigation. In any event, the owner ends up with additional costs and inconvenience because any money apparently paid by the contractors or suppliers comes from their only source of revenue - their clients, the owners.

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[2] Hartman, Francis (1993), "Better construction contracts: The secret ingredient". PMI Symposium, March, p. 224 -234.
[3] Vansant, Robert E. (1985), "Exculpatory Clauses: An ineffective techniques", The Construction Specifier, March, p. 17-18.
[4] Duncan, Wallace (1986), "Construction contracts: Principle and policies in Tort and Contract".
[5] Photo Production Ltd. v. Securicor Transport Ltd. (1980), 1 A. C. (English House of Lords) 827, 851.
[6] Canadian Pacific v. McCain Produce (1981), 113 (2d) Dominion Law Reports (Supreme Court of Canada) 584.
[7] Graham Construction & Engineering Ltd. v. Alberta (1990), 37 Construction Law Reports 125-151.
[8] Hunter Engineering Co. v. Syncrude Canada Ltd. (1989), 1 Supreme Court Reports 426-523.
[9] McClain Inc. v. Arlington County (1995), Civil Engineering, September, p. 38.
[10] Green Construction Co. Kansas Power and Light Co. (1994), Civil Engineering, March, p. 27.

Sanvido et al[11] found, while investigating critical success factors for construction projects, that a good contract is one of the important factors that can lead to a successful project. They determined that what owners and contractors need is:

> "A series of contracts that encourages the various specialists to behave as a team without conflict of interest and differing goals. These contracts must allocate risk and reward in the correct proportions."

Recognition that construction contracts are used to pass on risks from the owner to contractors, subcontractors, and suppliers is not apparent in the process usually adopted in selecting a contract strategy. Furthermore, the fact that such risks carry a premium, does not appear to be well recognized by the professionals who write the contracts. Hartman[12] states:

> "The management of risk, in normal business terms, requires that the nature and potential impact of the risk be assessed, and that the premium for insuring the risk be evaluated... Yet in the construction business we not only do not evaluate the risks in a formal way, we also do not question - or even know - what the premium is. This is not rational behavior."

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[11] Sanvido, V., Grobler, F., Parrett, K., Guvenis, M., and Coyle, M..(1992), "Critical Success Factors for Construction Projects," Journal of Construction Engineering and Management, Vol. 118, March.

[12] Hartman, Francis T. (1995), "Re-engineering the Construction Contract," International Conference on Construction Project Management, Singapore, January, p. 47-58.

In other words, misallocation and misperception of risks has resulted in owners paying more than necessary for many projects due to risk premiums and involvement in dispute resolution by owners' staff, consultants and attorneys. Improper risk allocation can also cause additional costs in the form of delays to project utilization. The literature[13] [14] [15] has emphasized the risk-cost relationship.

1.2 Problem Statement

> "Risk! Major construction projects have lots of it, contractors manage it, and project owners pay it. Allocation of construction risks between owners and their contractors has a significant impact on the total construction costs paid by owners...Owners want to be able to ensure both a predictable final cost and a stated performance standard by placing these risks contractually on their contractors and designers... As long as the cost associated with their shedding of risk remain obscure, ill-defined, and unquantified, owners will naturally adopt those strategies designed to minimize the susceptibility to variations in costs, and contractors and designers will naturally charge premiums for their increased susceptibility to these risks. This is the root cause of the problems." [Levitt et al[15]]

Construction disputes are commonplace. The multiplicity of parties and technical complexity of major construction projects make them very susceptible to disagreements. Construction disputes generally have a long incubation period and are costly to all concerned and disruptive to the project. The cost associated with solving major disputes

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[13] Construction Industry Institute (1986), "Impact of Various Construction Contract Types and Clauses on Project Performance," Publication # 5-1, July, p. 1-14.
[14] Construction Industry Institute (1993), "Allocation of Insurance Related Risks and Costs on Construction Projects."
[15] Levitt, Raymond E., Ashley, David B., and Logcher, Robert D.(1980), "Allocating Risk and Incentive in Construction," Journal of the Construction Division-ASCE, September, p. 297-305.

is burdensome. The cost of taking a "typical" $100,000 disputes through the Canadian courts is estimated to be, on average, $140,000 for each party, exclusive of lost time and opportunity of the disputing parties[16]. Delay in resolving outstanding disputes causes serious cash flow problems for smaller companies and sub-trades. Construction contracts in North America are estimated conservatively to cost the owner between 15% and 20% more than they should. A study in Canada by Hartman[17] identified that between 14% and 20% of the money paid by owners to contractors is paid as a result of changes, claims and litigation. In essence, this is a reflection of the concerns raised by the industry about the contracting process and the litigation and consequent protectionism it has attracted[18] [19].

The greatest uncertainty for a project is present during its early (front end) stage. This is the stage when the project owner has the greatest influence over the course of a project. Decisions are made which significantly affect the project. Among the significant decisions made are the type of contract, contract strategies and assignment of risks to the parties under which the project will be executed.

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[16] Bristow, D.I., and Perrie, N.J. (1989), "Cost of a $100,000 Construction Litigation," Fraser & Beauty.

[17] Hartman, Francis T. (1993), " Construction Dispute Reduction through An Improved Contracting Process in the Canadian Context," Ph.D. Thesis, Loughborough University of Technology, UK

[18] Construction Industry Institute (1986), "Impact of Various Construction Contract Types and Clauses on Project Performance," Publication # 5-1, July, p. 1-14.

[19] Business Roundtable (1983), "Summary report of the Construction Industry Cost Effectiveness Project," New York, January, p. 2,8,11,24,50,72.

Contracts are the vehicles by which owners and their representatives allocate the risks in a project between the parties. Contracting strategy is usually formulated and implemented to meet the owners' preferences and objectives. The strategy is often implemented without a formal evaluation or quantification of the strategy's influence on key result areas, particularly the project capital cost, schedule and construction risks.

In the early stages of a project, the project owner effectively owns all the associated risks. To decrease the risk liability, most owners, with the exception of a few enlightened ones, often manage some of the risks by allocating them to other parties through the use of contracts and specifically through contract clauses. Delays, differing soil/site conditions, accelerated work schedule, loss of productivity, weather, indemnity, errors and omission in design, and consequential damages are but a few examples of the risks frequently allocated to the contractor by the owner through the use of contract and exculpatory clauses. By doing this, owners feel that they are limiting their liabilities in the event of unforeseen circumstances. Two examples of typical exculpatory clauses used on Canadian contracts are presented by Jergeas and Hartman[20].

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[20]Jergeas, George, and Hartman, Francis (1996), "A Contract Clause for Allocating Risks," Proceedings of AACE Annual Symposium, Vancouver, p. D&RM1.1-1.3.

No Damage for Delay

This provision is intended to prevent the contractor from claiming monetary compensation from the owner for delays caused by whatever event, including act or omission of the owner, or his agent. The following is an example:

> "----, the contractor shall not have any claim for compensation for damages against the owner for stoppage or delay from any cause whatsoever".

Examination of Work

This disclaimer clause prevents the contractor from claiming relief in case of encountering changed soil conditions. In the following example, the owner shifts the burden of both site and subsoil investigations onto the shoulder of the contractor.

> "The bidder is required to investigate and satisfy himself of everything and of every conditions affecting the works to be performed and the labour and material to be provided, and it is mutually agreed that submission of a tender shall be conclusive evidence that the bidder has made such investigation".

What owners may not realize is that, as the risk is shifted to the contractor, the contractor must protect himself and so it attaches premiums (usually hidden) to cover the cost of carrying risk. Failure of a contractor to include such premium can result in its eventual bankruptcy. General contractors, like owners, also tend to be risk averse and often reduce their exposure by apportioning or assigning risk to their subcontractors, with little concern for the premium associated with doing so. Even after increasing its cost to

account for additional risk, many contractors today will seek remedies from the owner for "unforeseen" conditions and ambiguities in the documents.

Hartman[21] noted that the premiums associated with construction risks that are passed on to the contractor are normally hidden in bonding charges, contingencies, loss of profit, claims and subcontractor or supplier costs.

Despite contract language that assigns specific risks to a specific party, disputes arise over the intent of the contract clause. In other words, there is fuzziness over who, or which party, is responsible for managing or mitigating a specific risk event. These different risk perceptions, unfair allocation of construction risks between owners and their contractors and the resulting disputes cause significant project inefficiencies and have a significant impact on the total construction costs paid by owners. Disproportionate allocation of risks leads to acrimony and an adversarial relationship during the performance of the work. Not only that, a contract that attempts to transfer all the risks of a project to the contractor provides no guarantee to the owner that disputes will not occur and that claims will not be made[22]. Even the preparation of defenses to claims and participation in the protracted negotiations over disputes causes costs to the owner. In

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[21] Hartman, Francis T. (1994), "Reducing or Eliminating Construction Claims: A New Contracting Process," Project Management Journal, Vol. XXV, No. 3, September, p. 25-31.

[22] Paget (1989), "Who Should Bear the Risk? A Contractor's Perspective," Insight Press, p. 7-10.

addition, the danger has always been present that a court will be reluctant to enforce what it sees as a one-sided contract. Courts in Canada, England and the US have tended to examine clauses in which owners disclaim liability for, for example, sub-surface conditions very closely and to refuse to apply them if they are insufficiently precise[23]. This tendency has led to the possibility that the owner may end up paying twice for the same risk - once in the contract price which contains premiums to cover the onerous clause and again in damages if the owner's clause is overturned[24]. A study conducted by Neufville[25] in the US identified that contractors add significant premiums, in the order of 3%, to their risks when they have a low need for work or projects have high risks.

In other words, owners must realize that forcing contractors to assume maximum risk via the contract and exculpatory clauses is not cost-effective and will result in higher costs. Clauses that do not grossly and inequitably allocate all risk to the contractor can benefit the overall project performance and improve working relationships between the parties to the contract. A study by a Construction Industry Institute (CII) task force found that a 5% saving is realized when everything goes well on a project. Given the realistic prospect of

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[23] Wallace, Duncan (1986), "Construction Contracts: Principles and Policies in Tort and Contract." p. 383.

[24] Percy, David R. (1991), "The Allocation of Risk in the Construction Project from the viewpoint of the Owner," Paper presented to Canadian Bar Association mid-winter meeting, Edmonton, February, p. 1-21.

[25] Neufville, Richard de (1991), "Risk and Need for Work Premium in Contractor Bidding," Journal of Construction Engineering and Management, Vol.117, No.3, September, p. 659-673.

a 5 percent savings in this investment through a better contracting process and proper allocation of risk, the potential dollar savings are enormous.[26] [27]

1.3 The North American Construction Industry

The construction industry in both Canada and the US is the single largest non-governmental employer in those countries. The industry has a tremendous impact on the economy of the two nations. The Canadian Construction Research Board, in an internal document in March 1990, reported that the total capital expenditure for construction exceeded $1,100 billion. In Canada, the industry was estimated, in 1993, to have a value of $94.411 billion, representing at 14% of the gross domestic product and employing over 861,199 workers directly[28]. But this industry is highly fragmented (in an internal document, CCRB reported in March 1993 that the Canadian Construction Industry had 140,000 active firms and over 700 technical and trade associations). Furthermore, within the last twenty years, considerable wastage has been identified by many authorities[29] [30] [31].

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[26] Percy, David R. (1991), "The Allocation of Risk in the Construction Project from the viewpoint of the Owner," Paper presented to Canadian Bar Association mid-winter meeting, Edmonton, February, p. 1-21.
[27] Construction Industry Institute(1990) , "Assessment of Construction Industry Project Management Practices and Performance," April.
[28] Statistic Canada (1991-1993), "Construction in Canada," Cat. No. 64 - 201, p. 10, 20.
[29] Rose, Gregory (1991), "Alternative Dispute Mechanisms and Contract Settlement," a secretarial report, Construction Industry Development Council, Ottawa, April, p. 1-11.
[30] Construction Industry Institute (1986), "Impact of Various Construction Contract Types and Clauses on Project Performance," Publication # 5-1, July, p. 1-14.
[31] Morris, Peter (1994), "The Management of Projects," Thomas Telford, London.

A significant portion of this wastage is attributable to inappropriate risk allocation in contracts as cited in various reports analyzing risk allocation in the construction industry and the underlying causes of disputes conducted in Australia, Canada, and the US[32] [33] [34] [35].

The past few decades have seen increasing controversy surrounding the issue of contracts. Due to large scale projects, higher technical complexity, court litigation, economic instability, growing public awareness, environmental regulations, large cost overruns and delays, and greater competition by business participants, the construction industry certainly faces a momentous challenge to provide quality construction at the least total cost to the user, be he or she a taxpayer or consumer.

Schliefer[36] identified that ten prime causes of business failures were related to:

- Increase in project size (most common cause of contractor failure);
- Unfamiliarity with new geographic areas;

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[32] Rose, Gregory (1991), "Alternative Dispute Mechanisms and Contract Settlement," a secretarial report, Construction Industry Development Council, Ottawa, April, p. 1-11.
[33] Hartman, Francis T. (1993), " Construction Dispute Reduction through An Improved Contracting Process in the Canadian Context," Ph.D. Thesis, Loughborough University of Technology, UK
[34] American Consulting Engineers Council and Associated General Contractors of America (1990), "Owner's Guide to Saving Money by Risk Allocation", Washington, p. 6.
[35] National Public Works Conference and National Building and Construction Council Report (1990), "No Dispute: Strategies for Improvements in the Australian Building and Construction Industry", Australia Pirie Printer Sales, p. 8.
[36] Schliefer, Thomas C (1990), "Construction Contractor's Survival Guide", John Wiley and Sons, New York, NY.

- Moving into new types of construction;
- Changes of key personnel;
- Lack of managerial maturity in expanding organizations;
- Poor accounting systems;
- Failure to evaluate project profitability;
- Lack of equipment cost controls;
- Poor billing procedures;
- Transition to, or problems with, computerized accounting;

Five of the major causes identified relate to a company's business strategies and five relate to fiscal or accounting considerations. These difficulties can essentially be related to bad management of the risk inherent in the construction industry.

Two other aspects of the industry which are worth noting are the frequency of legal action and bankruptcy. As Hartman[37] noted, the construction industry has the second highest rate of legal action, preceded only by personal injury cases, and the second highest failure (bankruptcy) rate preceded only by the restaurant business. Bankruptcy and contract disputes end up costing the owner money. The owner possesses little control over

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[37] Hartman, Francis T. (1993), " Construction Dispute Reduction through An Improved Contracting Process in the Canadian Context," Ph.D. Thesis, Loughborough University of Technology, UK.

bankruptcies but can exercise considerable control over the issue of contract disputes. These disputes usually fall into one of four categories[38]:

- Changes;
- Impact;
- Performance Quality;
- Bad Faith;

Changes, claims and litigation are all symptoms of risks. If risks are managed more effectively, then there is a higher likelihood that the associated potential disputes will not arise, or else will be more easily and economically resolved.

Hartman[39] noted that many of the contracting process in the US and Canada are similar, although details vary from state to state and from province to province. Each regulatory body will typically have its own set of construction lien law, contractor licensing requirements, building codes, environmental laws and many other legal and regulatory requirements. Each of the business sectors will also operate differently. For example, the heavy industrial and resource base sectors will frequently use the EPC or EPCM (Engineer, Procure and Construct or Engineer, Procure and Construction Manage). The

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[38] Bramble, Barry B., D'Onofrio, Michael F., and Stetson, John B. (1990), "Avoiding and Resolving Construction Claims", R. S. Means Company Inc., Kingston, MA.
[39] Hartman, Francis T. (1994), "Reducing or Eliminating Construction Claims: A New Contracting Process," Project Management Journal, Vol. XXV, No. 3, September, p.25-31.

commercial construction sectors (offices, shopping malls etc.) have the equivalent in Design/Build contracts. Cost plus contracting is frequently used in the heavy industrial and resource based sectors. Government contracts are typically of the stipulated price and unit price type. and Cost plus is rarely used in this sector. Clearly, practices vary from location to location and from sector to sector of the industry.

The industry is gradually responding to this challenge. The issues are being publicized through respective professional organizations and trade journals[40] [41] [42] [43] [44]. Some of these trends have been identified as:

- Stipulated Price Bidding - The cost plus era is rapidly coming to an end. The preferred method of contracting is to bid competitively, then award a stipulated price contract. Many projects are now being awarded through stipulated price bids.

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[40] Hartman, Francis (1993), "Better construction contracts: The secret ingredient". PMI Symposium, March, p. 224-234.
[41] Rose, Gregory (1991), "Alternative Dispute Mechanisms and Contract Settlement," a secretarial report, Construction Industry Development Council, Ottawa, April, p. 1-11.
[42] Construction Industry Institute (1986), "Impact of Various Construction Contract Types and Clauses on Project Performance," Publication # 5-1, July, p. 1-14.
[43] Hammer M. and Champy J. (1994), "Reengineering the Corporation", Harper Collins, NY.
[44] Munisteri J. (1995),"The Engineering/Construction Industry: Reengineering for Survival:, Cost Engineering, November.

- Global Competition - Project total cost has become a deciding factor in the award of many contracts. Major Engineering and Construction organizations, emerging from all areas of the world, compete for projects on a global basis.
- Strategic Alliances - Strategic alliance formation, sometimes referred to as partnering, has developed as a contracting strategy of choice for the business community world wide.
- Lower Profit Margins – Stipulated price bidding and tougher competition has brought down profit margin in stipulated price contracts.
- Construction Risk - The risk inherent in the construction process has grown substantially over the past 50 years as a result of a myriad of factors. Despite this, the process for allocating risk has not changed in the same proportion. However, the participants are becoming aware that the key to better contracting lies in the better assessment and allocation of risks. Efforts are focused on the risk associated with contracts. Risk apportionment's are being examined with a view toward minimizing the cost and balancing the risk of the participants.
- Alternative Dispute Resolution - Alternative Dispute Resolution (ADR) procedures are, gradually, becoming more common as a cheaper, quicker and less destructive way of handling disputes than going through the courts.
- More Specialty Trades - Due to higher construction complexity, more and more specialty trades are doing the work, limiting the general contractors' roles to that of broker and manager.

Despite the trends identified above, today's construction contracts are, still, based on a confrontational system. Confrontation has led to attitudes that are based on mistrust and which will not allow owners, consultants and contractors to work closely together towards a better product. Owners, sometimes through their consultants, produce contracts that are intended to eliminate their construction risk. Consequently, to stay in business, contractors assume these risks that are often inappropriate. In turn, contractors will pass on as many of these risks to their subcontractors. These risks translate into premiums that, ultimately, the owner will pay.

1.4 Main Objectives of the Research

The main objective of the research was to identify and quantify the risk premiums associated with exculpatory contract clauses. The risk premiums were measured in terms of a percentage of total project cost and perceived benefits for sharing specific risks between contracting parties.

Quantification of the premium associated with construction risks is not at all questioned and evaluated by the contracting parties. Hartman[45] noted:

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[45] Hartman, Francis (1993), "Better construction contracts: The secret ingredient". PMI Symposium, March, p. 224-234.

"there is generally no discussion at the tender and award stage of a construction contact of the risk being taken by the contractor, and the premium being charged. Because of the insidious way in which such clauses have grown into construction contracts, often the two parties (owner and contractor) are unaware of the impact of the risk on the bid price. It is frequently hidden in the cost of doing business, in subcontractor prices and in the unit rates by contractors in developing their bids."

The net result is that the project cost becomes inflated. This is because of misallocation of risk.

The *hypothesis* tested in this study was: that there are identifiable and measurable risk premiums associated with exculpatory contract clauses.

Misallocation of risk can occur in a number of ways, as identified by Hartman[46].

- Risk can be inadequately defined.
- Risks are defined but simply not allocated to one or another party to the contract.
- Risks can be misrepresented.
- Risks may be hidden to one or all parties to the contract.
- Risks may be passed on to the wrong party, either deliberately or in error or ignorance.

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[46] Hartman, Francis T. (1993), " Construction Dispute Reduction through An Improved Contracting Process in the Canadian Context," Ph.D. Thesis, Loughborough University of Technology, UK.

- Risks may be overstated or understated, with consequent incorrect assessment of the premium.
- New risks may be created in the administration of a contract, or as a result of changes to the contract.

Risk is an integral part of construction and some of these risks are avoidable and the rest need to be managed in a rational way. The process for managing risk has been documented by several authorities[47] [48] [49] [50] [51]. The challenge is to manage and implement this process effectively.

Specific aims of the research were to do the following:

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[47] Al-Bahar, James F., and Crandall, Keith C. (1990), "Systematic Risk Management Approach for Construction Projects," Journal of Construction Engineering and Management, Vol. 116, No.3, September, p. 533-545.

[48] Ashley, David B. (1981), "Construction Project Risks: Mitigation and Management," PMI Symposium, p. 331-340.

[49] Ward, SC, Chapman CB and Curtis B (1991), "On the Allocation of Risk in Construction Project," Int. Journal of Project Management, Vol.9, No.3, August, p. 140-146.

[50] The Associated General Contractors of America and Consulting Engineers Council(1990) "Owner's Guide to Saving Money by Risk Allocation," Washington, June, p. 1-16.

[51] Biedelman, Carl R. and Veshoski, David (1991), "Using Project Finance to help manage Project Risks", Project Management Journal, Vol.XX11, No.2, June, p. 33-38.

- Determine through a literature search whether risk allocation in contracts, and specifically by use of exculpatory clauses, was a recognized cause of contractors' including premiums in their bid costs;
- Whether such clauses lead to increase in project prices, disputes and litigation;
- Assess the contracting parties' perception and awareness of such clauses;
- Evaluate qualitatively and quantitatively how contractors, subcontractors and suppliers adjust their bid in view of exculpatory clauses through an industry survey. In other words, the risk premiums owners pay to contractors, subcontractors and suppliers;
- The relevant characteristics of the projects undertaken by such construction project owners; and
- Enforceability of such clauses and their legal implication and evolving trends.

Owners must realize that prudent contractors will not accept responsibility or a risk that they cannot control and fund. The various parties involved in construction projects need to cooperate in designing contractual risk transfer agreements in order to achieve the optimum level of risk allocation utilizing both an equitable and efficient basis for doing so. From an economic perspective, it is no longer acceptable to shift excessive amount of risk to those parties with weak bargaining power. Excessive risk shifting leads to excessive costs for all parties in the long run. Efficient risk shifting is needed to minimize the total project cost of risk.

1.5 Work Undertaken

The following work was undertaken in the preparation of this thesis:

- A literature search was done to review the following subjects:
  - Contract, risk and risk allocating characteristics of contract clauses generally and exculpatory clauses specifically, for development of a qualitative understanding of how contracting parties view, measure and compensate for project risk in view of the contract generally and specific contract clauses;
  - Legal interpretations of contract clauses and specifically exculpatory clauses;
  - Review of UK, Canadian and the US court cases for the last 50 years, beginning with 1947 cases involving exculpatory clauses, in order to have an in-depth understanding of enforceability and non-enforceability of such clauses.

The reviewed identified a gap in the knowledge. This gap is reflected in today's **owners' risk-averse attitude and litigious mind set of project participants.** It comes as no surprise that parties to a contract often include contract language designed to shift risk to the other party, so that the basis for claims and disputes is eliminated. Such contract provisions, however, do not prevent disputes from occurring. Often, they only create fractious relationships, among the parties involved in the project, to the detriment of project itself. Furthermore, the result of this study clearly shows that shifting risk to another party at the front end of a project may seem beneficial, but ultimately there is a

price associated with doing so. And such contract clauses have often led to litigation involving claims in breach of contract, tort or fraud. Litigation is a very costly process and there is no reason not to believe that the courts may overturn such clauses. The net result is that the project total cost is increased without adding any material value to the finished project. **Ultimately, it is the owner who pays for the perceived benefits of transferring risk.** Therefore,

- a method was devised to test the hypothesis and to measure the premiums, qualitatively and quantitatively, associated with exculpatory clauses;
- the method of measurement was used to survey industry members (owners, consultants, contractors, subcontractors etc.) across Canada who rely on contracts to assign risk;
- the survey allowed quantifying, in a numerical manner, the respondents' perception and awareness of factors causing risk, risk premiums and legal issues, generally and premiums associated with exculpatory clauses, specifically. Furthermore, quantifiable patterns emerged with regard to how contracting parties behave under different circumstances. In turn, this measurement helped in the analysis of the results;
- data analysis gave insight into the knowledge gap and added to the body of knowledge;
- areas for future research were identified.

1.6 The Main Achievements

The primary goal of this research was to quantify the risk premiums associated with exculpatory clauses. Both the qualitative findings and statistical results of this study identified and quantified the size of risk premiums and other impacts of shifting risk to other parties in contracts. It has also demonstrated the importance of careful risk allocation and thoughtful and meticulous contract preparation. The result shows that an owner cannot be assured of protection by exculpatory clauses. The best protection to the owner and designer, and in the long run the lowest final project cost, is to have a contract without the risks associated with these clauses. It is false economy for an owner to seek to avoid the increased engineering costs involved in proper research, study, and design with the expectations of passing all the risks that result to the contractor by way of the usual exculpatory clauses. The results of this study show that contractors routinely add a premium to their bid to account for every risk of a project as well as their interest in taking the contract when they either do not need the work or when the contract administrator is known to be unfair.

The size of the risk premiums associated with the five exculpatory clauses used in this study were in the order of 9% of the base cost of the project in normal conditions and 19% in adverse conditions, as Tables 20 and 23 indicate. Furthermore, these premiums are ***additive*** with the increasing risk, as shown in Table 21. Naturally, the size of these premiums depends on the actual situation. As a result these results cannot be applied

directly to any specific case. The important fact is that these premiums represent a significant percent of the total cost of a project.

A significant indication from the results is that these exculpatory clauses influence the time, cost and quality of a project and often have lead to disputes and litigation. Neither owner nor contractor benefits from disputes and litigation. The old concept of "sticking it to the other guy" by shifting as much risk liability as possible to the other side of the contract, is now clearly viewed as a detriment to the successful completion of projects on time, within budget, and with reasonable quality of workmanship and materials. The survey respondents agree that the unabashed risk shifting that has flourished in the writing of construction contract must be reversed. A partnership and/or an alliance between the owner, architect/engineer, and contractor must be re-established on the basis of risk sharing. If that effort succeeds, there will be a real promise of turning the adversarial tide.

Additional significant achievements are summarized below:

- The study indicated that significant disagreement exists between owners and contractors with respect to perception of risk assessment.
- Stipulated price contracts are still preferred and used by the majority of respondents including Contractors, Owners and Consultants.

- Almost all of the respondents depend on intuition, judgment and experience to price risks involved in construction. Lack of familiarity featured prominently amongst the reasons provided by the respondents for non-use of more formal techniques such as Monte Carlo Analysis. This is followed by the claim that the amount of calculations involved using the techniques is unwarranted in order to meet that project's objectives of time, cost and quality. Furthermore, utility theory tends to be regarded as a theoretical technique, not easily applied in the construction industry.
- It was found that many of the problems in the area of construction process risk assignment arise because the owner traditionally uses exculpatory and hold-harmless clauses to avoid obligations in construction contracts.
- Risk and uncertainty are inherent in all construction work no matter what the size of a project. Unforeseen site conditions can be one of the major causes of risk, as can external factors. Other factors carrying risk with them include the complexity of the project, environmental risks and the degree of difficulty in the work.
- The contractual arrangements and terms have a significant influence on the risk carried by each party, on the clarity with which they are perceived and therefore on the cost, quality and duration of the project.
- Significant agreement exists that exculpatory clauses should not be included in the contract documents.
- Respondents' awareness of legal issues that related to these clauses are very limited.

- Recent common law case authority has strengthened the potential liability of a consultant/engineer to the general contractor for negligence in design, despite the absence of a contract directly between them.
- Project performance is indeed affected by the conflicting set of objectives each party pursues.
- Competitive tendering coupled with traditional contractual arrangements limits the realistic management of risk. The pressure is always on those bidding for contracts to keep their tender prices as low as possible, which can put both them and their clients at significant financial risk if things go wrong.

The main findings of the survey are as follows:

- Increasingly, companies are looking at risk assignment in contracts. Examples of classic clauses that add a significant amount of money to the price of a contract are exculpatory clauses. These types of clauses may provide a degree of protection to the owner, but the cost (**PREMIUM CHARGED BY CONTRACTORS**) is high. Furthermore, the presence of exculpatory clauses sets a tone of mistrust from the outset of a contract.
- Equity in contract wording, avoidance of latent disputes through review of contract intent and other mechanisms and the opportunity for bidders to have a say in alternative terms and conditions, as well as specifications lead to greater probability of trust being developed between the parties.

- All three major groups of industry participants felt that 'unforeseen site conditions', 'technical complexity', 'contract terms', 'environmental risk' and 'degree of hazard in the work' are significant sources of increase in contract pricing. However, 'need for work', and 'contractor's expertise' do contribute to reduction in the contract price. These findings are consistent with Akinci and Fischers' recent results[52].
- Industry recognizes the need to address two major issues in contract management. The first is that of new solutions to contracting, and particularly the appropriate sharing of risks between owners and contractors. The second is that of alliances and other collaborative arrangements that are designed to reduce both confrontation and risk.
- Intelligent and fair administration of the clauses is just as crucial as writing the best contract.
- Attention to contract strategy based upon systematic consideration of risk can achieve significant cost saving for a project. There is growing acceptance in Canada that traditional contractual arrangements are no longer the best basis for managing today's high-risk projects.

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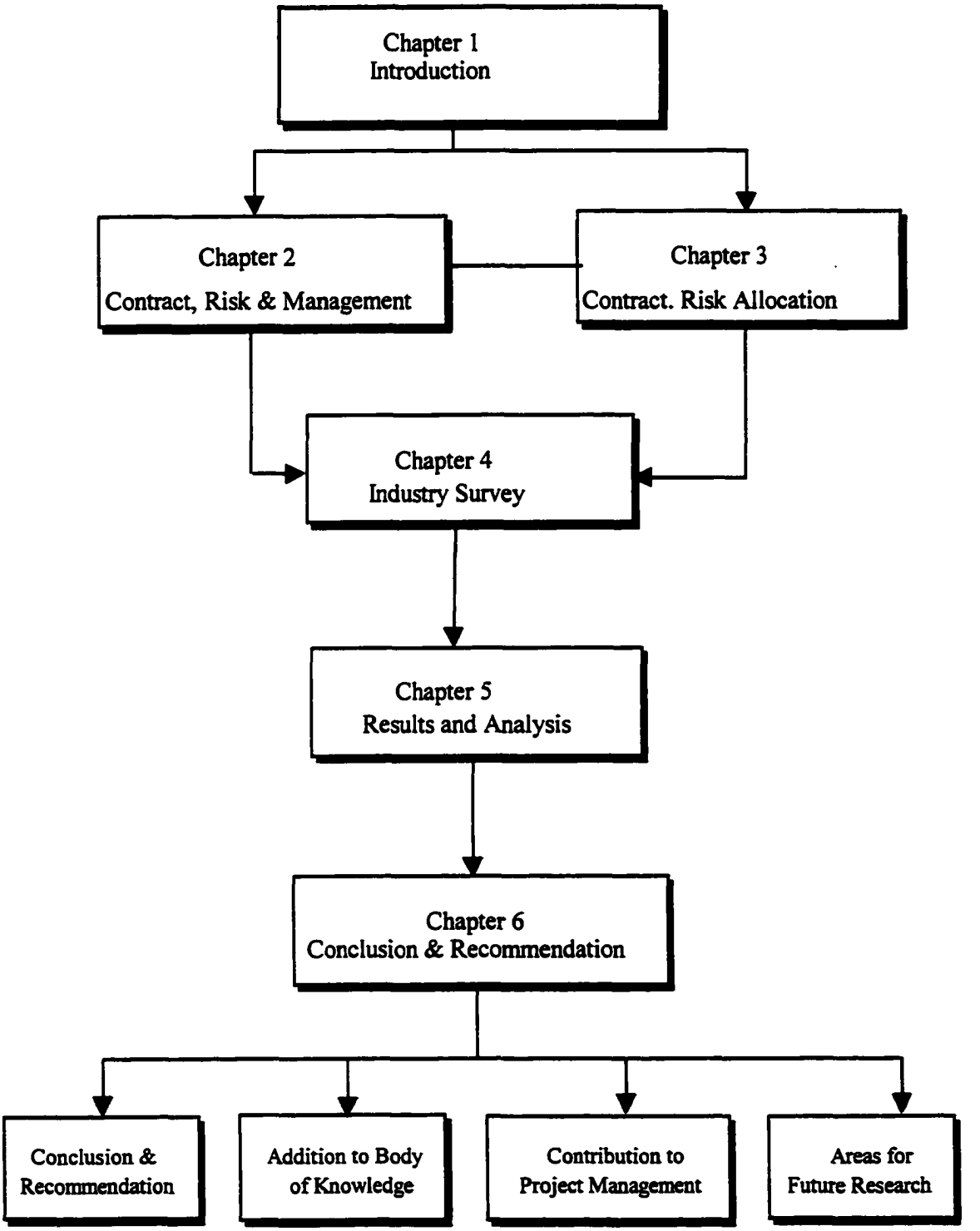
[52] Akinci Burcu and Fischer Martin (1998), "Factors Affecting Contractors' Risk of Cost Overburden," Journal of Management in Engineering, Vol. 14, No. 1, January/February, p. 67-76.

1.7 Organization of the Thesis

This thesis is organized into six chapters as shown in Figure 1. Chapter 2 reviews the subjects of contracts, risk and risk management. Chapter 3 reviews risk-allocating characteristics of some of the commonly used exculpatory clauses in contracts. It also reviews the literature and courts cases pertaining to cost impact and legal issues associated with these exculpatory clauses. Chapter 4 presents the industry survey, undertaken to bridge the gaps in the reviewed literature, and to quantify the risk premiums associated with exculpatory clauses. Specifically, this chapter presents in detail the research design, sample population, methodology and the development of the questionnaire followed by the results. Chapter 5 presents the qualitative and quantitative results of the findings of the survey. Chapter 6 concludes by suggesting several applications of the findings, additions to the body of knowledge, contribution to the Project Management discipline, limitations of the findings and recommends potential areas for future research.

Figure 1 -Thesis Flow Chart



CHAPTER TWO

CONTRACTS, RISK AND MANAGEMENT

2.1 Introduction

A construction project of any size is based on a series of contracts between all parties in the construction pyramid, from the owner down to the subcontractor. A contract consists of benefits and obligations of the contracting parties. Each contract imposes rights and obligations of each party to other. Contractual risk transfer, the subject of this chapter, is a form of risk management employed with increasing frequency in the construction industry [53] [54] [55] [56]. It involves the allocation or distribution of the risks inherent to a construction project between or among contracting parties. If done effectively, risk transfer does not inequitably allocate all risk to one party, but instead places risk upon parties according to their ability to control, manage or insure against such risk. Additionally, effective risk management generally results in an overall positive effect on

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[53] CII (1986), "Impact of various Construction Contract Types and Clauses on Project Performance," Publication # 5-1, July, p. 1-14.
[54] Vansant, Robert E. (1985), "Exculpatory Clauses: An ineffective Techniques," The Construction Specifier, March, p. 17-18.
[55] Ward SC, Chapman et al (1991), "On the Allocation of Risk in Construction Project," Int. Journal of Project Management, Vol. 9, No. 3, August, p. 140-146.
[56] Hartman, Francis (1991), "Construction Dispute Reduction through an Improved Contracting Process in the Canadian Context," A Ph. D Thesis, Loughborough University of Technology, UK.

a project by improving project performance, increasing cost effectiveness, and creating a better working relationship between contracting parties.

This chapter briefly reviews basic elements which must be considered with regard to creation of a contract and the risks in contract. It then outlines risk management systems used to identify, evaluate and manage risks.

2.2 Contracts- The Basic Principle

There is a fundamental distinction between an obligation that has been assumed voluntarily and obligations that have been imposed by the legal system. The former falls under the law of contract and the latter falls under the law of tort[57]. Contract law ratifies and enforces promises of joint venture between individuals. It facilitates disposing of our rights on terms that seem best to us. A contract establishes a "private law" between the parties to it.

Tort liability arises where there is no contractual relationship between the plaintiff and the defendant. The fundamental purpose of tort law is to compensate a party that has suffered damages as a result of a negligent act or omission by others. In contract, damages are what is reasonably contemplated or agreed to at the time the contract is

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[57] Goldsmith, Immanuel and Heintzman, Thomas G. (1989), " Goldsmith on Canadian Building Contracts", 4th edition, Carswell.

formed. Thus, contracts give an opportunity to limit liabilities between the contracting parties. In essence, a contract is an understanding, enforceable by law, made between two or more persons, by which rights are acquired on the one side to acts or forbearance on the other.

Contract law is founded in common law. The common law comprises those doctrines which have their origin in court decisions and are not statute. The rules established through the judicial process are not inflexible but are modified as particular facts or situations warrant. Ron Engineering[58] is a perfect example of change in contract law through court precedent. In rendering its decision in the Ron Engineering case, the Supreme Court of Canada confirmed a very significant principle of offer and acceptance in contracts. An offer could not be retracted or made invalid by declaring an error in the bid. Acceptance of an offer, erroneous or not, obligates the contractor to provide the work or services in the contract. The contractor's failure to do so constitutes a breach of the bid contract and the contractor is liable to lose any deposit which accompanies the bid and may be liable for the difference in price between its' and the next compliant bidder's price. The Supreme Court of Canada had an opportunity to "reconfirm" its position in Northern Engineering v. The City of Calgary[59].

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[58] Her Majesty the Queen in Right of Ontario v. Ron Engineering & Construction (Eastern) Ltd. (1981), 1 S.C.R. 111.
[59] Northern Construction Ltd. v. The City of Calgary (1984), 52 A. R. 54.

2.3 Contracts- Technical/Legal

A building contract does not posses any special qualities which set it apart from other types of contracts. Building contracts are simply viewed as one particular type of contract[60]. There are certain features and problems particular to the area of building contracts, however, which makes it possible to deal with them as a separate class[61]. While an absolute and universally correct definition of a contract is probably impossible to set out, at its most fundamental level "a contract is nothing more than a promise or set of promises which the law will enforce". Paraphrasing Goldsmith[62], a contract is a private agreement entered into voluntarily by at least two people for the purpose of creating legal obligations between them which are capable of being enforced by a Court of Law.

In order to constitute a valid contract, the following elements must be present:

- offer and acceptance;
- consideration;
- genuine intent;

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[60] Goldsmith, Immanuel and Heintzman, Thomas G. (1989), " Goldsmith on Canadian Building Contracts", 4th edition, Carswell, Toronto.

[61] For comprehensive works on building contracts specifically, see e.g., Keating (1978), "Building Contracts", 7th edition, Sweet and Maxwell, London; "Hudson's Building and Engineering Contracts",(1970), 10th edition, Sweet and Maxwell; and Goldsmith, Immanuel and Heintzman, Thomas G. (1989), "Goldsmith on Canadian Building Contracts", 4th edition, Carswell.

[62] Goldsmith, Immanuel and Heintzman, Thomas G. (1989), "Goldsmith on Canadian Building Contracts", 4th edition, Carswell.

- legal capacity.

2.3.1 Offer and Acceptance

On first principle, if a contract is to be formed, there must be an offer and an acceptance of that offer. The offer must be one which invites, and is therefore capable of, acceptance by a second party. Furthermore, the offer must be one which is specific such that, when accepted, there can be certainty as to the essential terms of the agreement. The acceptance by the second party may be express, as communicated by words, orally or in writing, or implied, as communicated by conduct. The combination of offer and acceptance must be such that there is "a meeting of the minds".

2.3.2 Consideration

A promise given for nothing is not binding in the eye of the law. Consideration is something of value given in exchange for the promise of the other contracting party. That is, a party looking to enforce a contract must have given something of value in return for the promise which he is attempting to enforce. The only time consideration is not required is in the case of a promise made under seal. The seal itself is held to supply the required consideration.

2.3.3 Intention to Create Legal Relations

The third essential ingredient necessary for the creation of a contract is the intention of the parties to enter into a legal relationship. The parties to the contract must have intended, or at least be deemed in the eyes of a "reasonable objective bystander" to have intended to create a legal relation, and a clear outward manifestation of such intention must be present[63]. The intention to create a legal relation is the ingredient which distinguishes legally enforceable contracts from "agreements" made in a social context as opposed to a business context. The intention may depend upon the clarity and uncertainty of the language used when setting out the terms of the agreement.

2.3.4 Legal Capacity

There must be a definite promisor and a definite promisee, each of whom is legally capable of playing the intended part in the proposed contractual arrangement. A contract cannot obligate someone who does not have the legal capacity to incur at least voidable contractual duties. Certain persons are by law incapable of binding themselves by a promise. Such incapacity may stem from one of several causes, the most significant of which are infancy and lunacy.

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[63] O'Kennedy et al v. S. King Holdings Ltd. (1989), 34 Construction Law Report.

2.4 The Construction Contracts

A construction contract is designed as a promissory agreement between two or more parties that creates a legal relationship. The agreement is reached by the acceptance of an offer made by one party (the contractor) to build a project for the other (the owner) for a stipulated consideration.

Construction contracts set forth the intention and procedures to be employed in any building effort. The provisions of a construction contract are intended to establish the legal framework for the practical relationship between the owner and the contractor. The contract defines obligations and responsibilities of the parties to it and represents the end result of the process of workable balance of their respective interests. As discussed by Collier[64], obligations under contract include both duties and rights, as one party's right is another party's duty. For example, a contract may provide a time within which the work must be completed. The owner has a right to expect the work completed within that period. But, on the other hand, the owner has a duty not to interfere with the contractor utilizing its time.

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[64] Collier, Keith (1979), "Construction Contracts," Reston Publishing Company, Inc., Reston, Virginia.

2.5 Types of Construction Contracts

The ground rules for allocating risk in the construction industry begin with the construction contract. Under common law, parties have the right to choose their contract terms and conditions; thus there is no prescribed format for construction contracts. There are, however, certain types of contractual arrangement and contract formats that are being used in the industry. The form of contract entered into generally reflects the risk each of the parties is prepared to bear in relation to the work performed and unforeseen circumstances, which may arise. Contracts may be as simple or as complex as the parties wish to make them. Each contract type has distinct differences and produces very important effects on project performance. The degree of success in project performance must be measured in terms of three variables: cost, schedule and technical performance. Selecting the optimal contract type and making the necessary project-specific modifications requires sensitivity and awareness of the impact of these decisions. The owner's goal can best be achieved by selecting the contract type that will most effectively motivate the contractor to the desired end. Ibbs et al[65] state that the contract form is, undeniably, a major determinant of project success or failure.

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[65] Ibbs William C. and Ashley David B. (1987), "Impact of Various Contract Clauses", Journal of Construction Engineering and Management, Vol. 113, N0. 3, September, p. 501-521.

Construction contracts are typically categorized based on the form of payment and are broken down into three basic groups[66]:

- Stipulated price contracts;
- Unit price contracts; and
- Cost plus contracts

2.6 Contract Strategy

Construction accounts for nearly 14% of the gross domestic product of Canada and holds a similar position in most economies of the developed countries. Obviously, any improvement in the efficiency of the process has the potential for large cost saving. In fact, it has been estimated that selection of a more efficient contract strategy could reduce project cost by an average of 5%[67].

Construction contracts employ a wide variety of strategies and payment terms to deal with a diversity of project complications. A very common contracting strategy, often called, the "traditional method" consists of an owner retaining a separate designer and

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[66] For comprehensive works on construction contracts the reader is directed to review specifically, Keating (1978), "Building Contracts", 7th edition, Sweet and Maxwell, London; "Hudson's Building and Engineering Contracts", (1970), 10th edition, Sweet and Maxwell; and Goldsmith, Immanuel and Heintzman, Thomas G. (1989), "Goldsmith on Canadian Building Contracts", 4th edition, Carswell.

[67] The Business Roundtable (1982), "Contractual Arrangement," Report A-7, New York, NY.

general contractor (responsible for construction only) using a fixed stipulated price contract, arrived at by competitive bidding based on a completed set of design documents (drawings and specifications). The project is conducted in linear fashion, with the construction following the design and bidding. The other types of construction contract are cost reimbursable. The differentiating factor is cost responsibility. In a cost reimbursable contract the owner shares in the responsibility whereas in a stipulated price contract the contractor has primary cost responsibility. Stipulated price contract method has advantages for owners in that they ideally have complete control over the design, a fiduciary relationship with the designer to monitor the contractor, a single source of construction, a known total price before construction starts, price competition, and impartial selection. This method is suitable in many cases where the project is clearly definable, well and completely designed, and is unlikely to change during the construction process.

Many modern projects, however, do not meet these criteria, and owners need to look at other methods. Projects are getting more complex as technology is developed and as the construction industry continues to mature and, with lengthy approval processes and a faster-paced economy, projects are constantly in need of time saving. Also, with the cost of construction often increasing at a rate greater than inflation, cost-saving innovations are always critical.

Related concerns with stipulated price contracts are the adversarial relationships and the lack of teamwork created between designer, owner and contractor. Most of the negative influences of stipulated price contracts stem from the fact that the contractor bears the economic risk for many factors not under its control. These economic pressures place the owner and contractor into adversarial roles. The sequence and timing precludes a contractor's design and constructability input and motivation to improve quality.

The advantages of cost reimbursable contracts depend upon the particulars of a project, but the general advantages from an owner's point of view are clear. First and foremost is the time advantage. A cost reimbursable contract can be run in a fast-tracked manner, phasing and integrating design with construction thereby greatly reducing project length. Second, cost reimbursable contracts allow great flexibility for the inevitable changes that occur on every project. Third, the owner can theoretically count on a higher standard of care and better quality with a "pay as you go" scheme. Lastly, where contractors are unwilling to accept high risks or where project scope cannot be "nailed down", cost reimbursable contracts offer an alternative that most contractors will be willing to accept.

In response to these issues, various alternative methods have evolved over the years. New contracting components have been created, and combined in various innovative contracting methods to meet the owner's needs on modern, complex projects. The scope

of work, as identified by Hartman[68] that may be assigned to a contractor could include one or more of the following:

- Design;
- Construction;
- Trade Construction;
- Design/Build;
- EPC (Engineering, Procurement & Construction);
- EPCM (Engineering, Procurement, Construction & Management);
- Project Management;
- Management Contracting;
- Turnkey;
- Leaseback;
- BOT (Build, Operate & Transfer);
- BOOT (Build, Own, Operate & Transfer).

The list is by no means exhaustive and contracts are often tailored to meet the needs of the client.

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[68] Hartman, Francis T. (1993), "Construction Dispute Reduction through An Improved Contracting Process in the Canadian Context," Ph.D. Thesis, Loughborough University, UK.

Examples of how these methods can improve on the more traditional ones for certain types of projects are:

- shortening the duration of projects by overlapping design and construction (fast-track) and/or eliminating bidding time;
- providing flexibility for changes during construction, without paying a premium for it;
- creating increased designer/contractor teamwork by reducing adversarial relationships;
- allowing a contractor to participate in the design process, thus augmenting the designer's construction experience, for such tasks as value engineering, constructability analysis, and cost estimating. The total project cost can be affected more during design development and detail design phases than during the construction phase;.
- providing incentives for the contractor to save money; and
- providing alternative financing methods.

Choosing an appropriate contracting strategy is far from an exact science. There is no formula into which one plugs project and owner variables to produce a contracting strategy. In many cases, there is not one single best method, but several that are appropriate. Selecting a contracting strategy becomes a question of merging the most favourable aspects of contract types to fit the project goals. The trade-offs in this merger

involve and depend upon the risk assumed in relation to the overall project goals. "The three objectives of cost, time, and quality must be analyzed and placed in some priority, since trade-offs will probably be necessary in deciding what type of contract is to be used"[69]. Thus, the owner's ranking or prioritizing of the three goals will determine the contract type.

In selecting a contract strategy the owners should take a hard look at their own needs and objectives in order to ensure that the current strategy fairly and reasonably meets those needs and objectives. Then owners should consider the interests and needs of the contractor to ensure that the proposed contract responds to those goals in a reasonable and equitable way because we have seen , with the exception of a few enlightened owners, very few contracts in the Canadian construction industry which demonstrate a balanced approach to the allocation of risk. Typically these contracts reflect the economic power exercised by the owner and require the contractor to accept harsh provisions. The owners should realize that no prudent contractor will accept a risk without charging an appropriate premium to cover such risk. After all is said and done, money apparently paid by the contractor or supplier ultimately comes from their only source of revenues - their clients, the owner.

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[69] CII (1989), "Impact of Risk Allocation and Equity in Construction Contracts," Source Document # 44, March.

2.7 Risks in Contracts

Contract disputes are a common aspect of most construction projects. The causes of these disputes can range from mistakes of inexperienced people, to poorly written contracts, to overly complex construction processes. In a recent survey[70] of 204 members of the Construction Industry Institute (CII) to identify possible reasons for major disputes, three of the main causes dealt with the contract - ambiguous contracts or contract documents (54%), contract provisions which unrealistically shift risks to parties who are unprepared to cover those risks (50%), and failure to provide for some type of ADR mechanism for resolving disputes during construction (12%). The results are based on the percentage of the 204 respondents who indicated that contracts were among one of his/her top six causes.

Some of the means by which the risk associated with the construction project are often allocated in contracts include the use of:

- properly written contractual documents expressly defining the scope of each party's responsibility;

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[70] Diekmann, James E. and Girard Matthew (1995), "Construction Industry Attitudes Towards Disputes and Prevention/Resolution Techniques", Project Management Journal, March, p. 3-11.

- clauses excluding liability generally or excluding liability for specific types of loss, such as consequential loss or damage, including but not limited to loss of use or loss of profits;
- time limitations to bring actions and notice requirements;
- indemnities;
- warranties;
- contractual provisions excluding liability in tort and for implied terms;
- obligations to place and maintain insurance on defined risks covering the interests of all parties.

As can be gleaned from this list, risk allocation in the construction process is largely determined by the nature of the specific contractual arrangement used on a project. Also, the most obvious means to allocate risk arising during construction is through specific and express terms of the contract governing the relationship between the participants. Therefore, it is the contract documents that hold the key to determining who is responsible for assuming specific risks. Whenever the burden of risk shifts in a construction project as a result of contractual relationships, it is in the interests of each contracting party to make sure that it understands the potential extent to which particular contractual relationships on a project may result in limiting liability. It is advisable for each participant involved on a construction project to carefully address the risks that may

arise in the circumstances of each particular project with a view to minimizing their impact.

The contractors must review and make themselves fully aware of the rights and responsibilities which the proposed contract places on them, before agreeing to it. They must ensure that they understand the risks allocated to them and that the contract entails an acceptable level of risk, particularly with respect to possible worst case scenarios. Affording proper attention, at the front end, to the contract documents can minimize the potential for their generation of costly disputes and litigation or arbitration. Obligations overlooked or ignored could be much more costly to address at a later point in time.

On the other hand, owners can ensure cooperative attitudes and the endorsement of the principle of reasonable and equitable risk allocation. The owner should develop a contract strategy such that both sides of the agreement are happy with its terms and should stand to benefit from them in equal measure. Neither party should intend to take unfair advantages of the other. An enlightened approach to dealing with risk at the outset by project participants can potentially lead to lower overall project costs and lessen the likelihood of claims and disputes. The result of aggressive and adversarial contracting attitudes has often been protracted, expensive, and disruptive disputes, claims and ultimately litigation.

Contracting parties need helpful guidance to understand allocated risks. With understanding, future contractual arrangement can be formulated to enhance awareness of risks and thereby improve project outcomes. Areas of risk to be considered in the preparation of contractual documents include[71] [72]:

- responsibility for design

-responsibility for quality control

-responsibility for performance of the work after completion and turnover

-unexpected or differing site conditions

-changes in quantities of work

-weather and other natural causes

-the causes and effects of delay

-supply, delivery and price of equipment and material to be incorporated in the work

-labour problems (availability and quality)

-work changes and the decisions to be made by the consultant in interpreting the responsibility of parties under the contract

-site availability

-interference from other contractors involved in the construction process

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[71] Thompson, Bonita (1992), "The Contract Document Package," Paper presented at Canadian Institute Superconference, March 5.
[72] Marston, D.L. (1996), "Law for Professional Engineers," 3rd ed., McGraw-Hill Ryerson Limited.

-government and regulatory intervention

-environmental hazards

-extra work

-insolvency

-inadequate construction methods or equipment

Briefly, the framework laid down by the construction contract defines and limits the rights and responsibilities of consenting parties in order to accomplish their goals. Thus, the entire contracting process serves as a vehicle for achieving both owner and contractor objectives. The importance of the contract cannot be overemphasized. After a project is awarded, the interpretation of the contract terms and of the risk allocation between the owner, engineer, and contractor can sometimes vary considerably. As a result, the source of a costly dispute may be latent within the contract clauses[73]. This conclusion is consistent with Thompson's[74].

> "the parties to a contract are also frequently at odds over the interpretation of risk allocation in the contract and the responsibility for managing risks (or carrying the consequences of the risk)... The result has been the rapid growth in the "claims industry", contract arbitration and litigation, in building and civil engineering in the UK, USA, and some commonwealth countries".

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[73] Hartman Francis, and Snelgrove Patrick (1996), "Risk Allocation in Lump-Sum Contracts-Concept of Latent Dispute", Journal of Construction Engineering and Management, Vol. 122, No. 3, September, p. 291-296.

[74] Thompson, P.A. and Perry J.G. (1992), "Engineering Construction Risks", Thomas Telford Services Ltd., UK.

Imanuel Goldsmith in his book entitled Canadian Building Contracts, refers to this practice when he states[75]:

> "It cannot be emphasized too strongly that the greatest care should be taken in the preparation of a contract and that every endeavour should be made to attain precision of language and to avoid ambiguities and inconsistencies. One of the greatest pitfalls in the preparation of building contracts is the dangerous habit of stringing together a series of so-called standard clauses, most of which have been prepared at different times and by different persons, with the result that the final document is often an ill-assorted collection of inconsistencies and ambiguities".

2.8 A Risk Management System

Risk is not new to anyone who has been involved in projects. What is new is its intensity, which grows day by day. The construction process, like other processes, involves risks. Not only because of the size of the projects, but also due to complexity, speed of construction, location of site, special requirements, technical innovations---etc.; often required by clients in a hurry to obtain complex and high standard structure that meets economic considerations. Tuman[76] noted:

> "One aspect of the future is obvious: all new undertaking will be accomplished in an increasing complex technical, economic, political and social environment. Thus project management must learn to deal with a much broader range of issues, requirements and problems in directing their projects to successful conclusions. Certainly, project management in every field will be called upon to address complexities and risks beyond anything experienced in the past".

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[75] Goldsmith, I. and Heintzman, T.G. (1988), "Goldsmith on Canadian Building Contracts", 4th edition, Carswell, Toronto, p. 1-37.
[76] Tuman, J. (1986), "Success Modeling: A Technique for Building a winning Project Team", PMI , Montreal, Canada, September, p. 94-108.

Risk in construction has been the object of attention because of time and cost overruns associated with construction projects. Paraphrasing Hartman[77], in today's increasingly competitive market where technology doubles roughly every three years, regulation is becoming increasingly precise and focussed and traditional barriers are becoming blurred and irrelevant, management of risk is mandatory. Projects have to be managed to achieve their objectives[78]. Misallocation and misperception of risks have resulted in owner paying more than necessary for many projects, as a result of bid contingencies and unanticipated involvement in dispute resolution by owners' staff, consultants and attorneys. Improper risk allocation can also cause additional costs in the form of delays to project utilization[79].

Construction projects and participants in such projects will benefit significantly from routinely taking a more systematic, structured and global view of and approach to risk than is sometimes done at present. The Construction Industry Institute (CII) reported[80]:

> "Project cost benefits can be realized when risk allocation is tailored to the circumstances of an individual project. Owners who routinely force maximum assumption of risk on the

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[77] Hartman, Francis (1997), "Proactive Risk Management- Myth or Reality?" Managing Risks in Projects, E&FN Spon, England, p. 15-21.
[78] Turner, J.R., Grude, K.V., Haug, T., and Anderson, E.S. (1988), "Corporate development: Balancing changes to people, system and organization", International Journal of Project Management, Vol.6, No.1, p. 27-32.
[79] Percy, David R. (1991), "The Allocation of Risk in the Construction Project from the viewpoint of the Owner," A Paper delivered to Canadian Bar Association Mid-Winter Meeting, Edmonton, February.
[80] Construction Industry Institute (1986), "Impact of Various Construction Contract Types and Clauses on Project Performance," Publication # 5-1, July, p. 1-14.

> contractor are likely to incur higher project costs. Contract preparation that allocates risk with a balanced input from all parties will be most cost effective".

The principal aim of risk management is not to remove all the risks from a given project but to ensure that all risks are managed as efficiently as possible. In other words, the basic risk management premise is that factors which contribute to loss can be eliminated or controlled to minimize the possibility of loss or the financial impact if a loss does occur. Yosua et al[81] state:

> "It is a method of managing that concentrates on identifying and controlling the areas or events that have a potential of causing unwanted change. It is no more or no less than informed management".

In essence, it is a technique aimed at controlling the level of risks and mitigating their effects. Managing risk means minimizing, covering, and sharing of risks - not merely passing them off onto another party.

The generally recognized steps entailed in risk management are[82]:

- risk identification;
- risk analysis and evaluation;
- risk response

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[81] Yosua, Dave A. and Hazlett, Robert L. (1988), "Risk Management- the Proposed Standard for Department of Defense Program Managers", PMI Seminar, September.
[82] Perry, J.G. and Hayes, R.W. (1985), "Risk and its Management in Construction Projects," Proceedings of Institute of Civil Engineers, June, Vol. 78, p. 499-521.

2.8.1 Risk Identification

The identification of risks associated with any project or contract is a necessary first step before the risks can be analyzed and appropriate responses determined. The identification of risks provides a groundwork for the selection of the appropriate contract strategy and eventually the allocation of risk between the parties to a construction contract. If a risk is not identified, it cannot be controlled, transferred or otherwise managed. Hartman states[83]:

> "Projects are all about change or transformation. Transformation management implies uncertainty. If we compare uncertainty and risk, we will see that the essential difference is awareness. Crossing a busy street is a risk. It is a risk if we look both ways, listen for anything we may not have seen, make a decision to cross- presumably because we believe we will not be part of an accident on the way across- then go. If, however, we were to close our eyes, block our ears and stride across at random, that would be more than risky, it would be uncertain! Specifically from the last point, we can see that a large part of risk management is to eliminate uncertainty. In today's world where perception is, to a large extent, reality there is two steps to effective risk management. The first art is a question of moving project elements from "uncertain" to being a risk. This means creating visibility on the issue. If we know about a problem we are half way to solving it... The second part to today's risk management is to move the risk from a perceived high one to a perceived low risk."

Typical project uncertainties and their appearance in project life cycle have been identified[84] in Table 1. Tables referred to in this chapter are located in Appendix B.

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[83] Hartman, Francis (1997), "Proactive Risk Management- Myth or Reality?" Managing Risks in Projects, E&FN Spon, England, p. 15-21.
[84] Doherty, N. (1985), "Corporate Risk Management", McGraw - Hill Book Company.

In risk identification, what is important is to seek risk sources, risk items, risk factors, risk events and risk circumstances which may cause problems. Several authors[85] [86] [87] [88] have identified common sources of risks (Table 2) which may range from simple and obvious to highly complex and invisible.

2.8.2 Risk Analysis and Evaluation

It is not enough to identify risk. What is needed now is to determine their significance quantitatively, through analysis, before the response management stage. The risk analysis and evaluation process is the vital link between systematic identification of risks and rational management of significant ones. It forms the foundations for decision making between different strategies. The term risk analysis is used to denote methods which aim to develop an awareness and understanding of the risk associated with variables such as time and cost. In other words, it is an attempt to quantify beliefs about uncertainty. Many risk elements are quantifiable in terms of their impact on cost, time and quality. Risk can be analyzed by measuring their impact on project objectives. It is the combined effect of

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[85] Al-Bahar, James F., and Crandall, Keith C. (1990), "Systematic Risk Management Approach for Construction Projects," Journal of Construction Engineering and Management, Vol. 116, No.3, September, p. 533-545.

[86] Papageorge, T. (1988), "Risk Management for Building Professionals", R. S. Means Company Inc.

[87] Singleton, J. (1992), "The Contract Document Package", Canadian Institute Construction Superconference, March 5.

[88] Marston, D.L. (1996), "Law for Professional Engineers", 3rd ed., McGraw-Hill Ryerson Limited, p. 205.

value loss including cost increase and occurrence probability that determines the degree of riskiness.

Several techniques of risk analysis (e.g., Sensitivity Analysis, Probability Analysis, Monte Carlo Simulations, Decision Trees, etc.) are presently available to the construction industry and are viable techniques, but each one applies to a specific situation. These tools serve useful purposes in helping us to understand the nature and likely impact of specific risks, once we have identified them. The analyst's task is not only to perform the analysis but to ensure that the proper technique is used in its proper context. Paraphrasing Diekman et al[89], two important considerations which influence the selection of a technique are the nature of the decision to be made, and the appropriateness of a technique to the decision context.

2.8.3 Response System

After completion of the risk analysis, appropriate management strategies for identified and measured risks are needed. The greater the uncertainty associated with a project or contract the more flexible the management response must be. The objective here is to

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[89] Diekman, J.E. and Kraiem, Z. (1988), "Explanation of Construction Engineering Knowledge in Expert Systems", Journal of Construction Engineering and Management, Vol. 114, No. 3, p. 364-389.

move the risk from a high one to a low risk and minimize the negative aspects of the risk and to increase control over the outcomes.

Implementing risk management techniques and monitoring the results is useful to ensure that the process is achieving the results expected of it. The process can then be adjusted for changes in loss exposures and the availability and/or cost of alternative risk management techniques. A risk management program must, from the start, be planned and organized based on the principle that every risk management technique an organization chooses to use must be one it can successfully implement and monitor. A technique that cannot be put into practice and then assessed for its effectiveness clearly cannot be a part of a well-managed program.

The following is a composite list of alternative tactics to control risk which has been compiled from Doherty[90], Hartman[91], Hayes et al[92], Perry et al[93] and Perry[94].

1) **Avoidance** - Sometimes the best method of dealing with an exposure to loss is to try to avoid all probability of the loss occurring. When the probability of loss is

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[90] Doherty, N. (1985), "Corporate Risk Management", McGraw - Hill Book Company.
[91] Hartman, Francis (1997), "Proactive Risk Management- Myth or Reality?" Managing Risks in Projects, E&FN Spon, England, p. 15-21.
[92] Hayes, R.W., Perry, J.G., Thompson, P.A. and Willmer, G. (1986), "Risk Management in Engineering Construction", Thomas Telford, London
[93] Perry, J.G. and Hayes, R.W. (1985), "Risk and its Management in Construction Projects", Proc. Institution of Civil Engineers, Part 1, Vol. 78, June, p. 499-521.
[94] Perry, J.G. (1986), "Risk Management-An Approach for Managers", International Journal of Project Management, Vol. 4, No. 4, November, p. 211-216.

high and loss severity is also high, avoidance is often the best, and sometimes the only, alternative.

Risk avoidance means the probability of loss has been eliminated. By avoiding the risk, the avoiding party knows that it will not be exposed to the risk. However, by doing so means loosing the potential gains derived from the assumption of the risk. Risks, once identified and analyzed for their project impact, can often be mitigated or avoided through different packaging of the work content or different methods of construction and alternative strategies.

2) **Reduction** - These strategies are directed towards reducing the probability and severity of the risk should it occur. Examples of these types of strategies include substituting a less risky method, process or materials, alternative contract strategies, redesign, more detailed design, and further site investigations.

3) **Transfer** - Risk transfer is generally accomplished in three ways in construction projects and contracts:

- owner to contractor or designer;
- contractor to subcontractor or supplier;
- owner, contractor, subcontractor, supplier or designer to surety and/or customer.

The main characteristic of the transfer response is that the consequence of the risks, should they occur, are shared or totally carried by a party other than the owner. However, such a prospective does not serve the owner's interests nor those of the projects. It merely creates inflated tender prices, disputes, delays and finally, increased costs to owners and increased bankruptcies for contractors. It is the owner who initiates response to transfer through contract and specific contract clauses; hence it is his responsibility to ensure that risk transfer really responds to his needs and objectives. Some factors to consider when deciding risk transfer include[95]:

- Which party can best control the events that may lead to the risk occurring?
- Which party can best manage the risk if it occurs?
- Is it preferable for the owner to retain an involvement in the control of the risk?
- Which party should carry the risk if it cannot be controlled?
- Is the premium charged by the party to accept the transferred risk reasonable OR EVEN KNOWN?
- Which party is most likely to sustain the consequences if the risk occurs?

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[95] Thompson, P.A. and Perry J.G. (1992), "Engineering Construction Risks", An SERC project report, Thomas Telford, London, p. 32.

- If the risk is transferred will it lead to other risks of a different nature being transferred to the owner?

4) **Sharing** - The risk may be best shared when one party cannot control the risk. It may be best managed by segmentation, with each party taking responsibility for a defined portion of the activity concerned. Examples include Joint Ventures (by owner or client), risk-sharing contracts (such as those developed on BP project through CRINE).

5) **Retention** - Risk retention means that the consequence of a loss will be borne by the party exposed to the probability of loss and is the internal assumption, partially or completely, of the financial impact of the risk by that party. The real ability to assume risk is a function of one's financial capacity. Risk retention does not mean insuring risk. The party carrying an uninsured risk is either assuming a low probability of occurrence, or covering the risk by increasing the project contingency, or is providing for an alternative course of action if the risk element should occur. In adopting the risk retention strategy, however, it is important both to the owner and contractor to differentiate between two types of retention - planned or unplanned. Paraphrasing Al-Bahar[96], under a planned risk retention, risks can be retained in any number of ways, depending upon the philosophy, the particular needs, and the financial capabilities of the

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[96] Al-Bahar, Jamal (1990), "Setting-up a Risk Management Policy in Contracting Firms", PMI Symposium, Calgary, October, p. 705.

owner and contractor. Unplanned risk retention exists when one or other party does not recognize or identify the existence of a risk and unwittingly or unconsciously assumes the loss that could occur.

Owners, contractors and consultants can manage risk associated with projects and contracts by using the above discussed risk management options.

In essence, the risk management process apprises decision makers of potential problems that may affect project execution and success, and assists the managers in developing and implementing plans to deal with the potential losses before they occur. It is the determination of whether to respond, how to respond and when to respond in case of exposure to loss.

Risk management is increasingly considered an essential element for strategic project management, be it for the owner, the consultant, the contractor or the sub-contractor. This process of risk management generates both benefits and costs for organizations. For an organization, the benefits include reduced cost of risk and lower deterrence effects from loss exposures. It is more than just a way of helping to get projects completed on time and within budget. Some of the benefits identified[97] include:

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[97] Thompson, P.A. and Perry J.G. (1992), "Engineering Construction Risks", An SERC project report, Thomas Telford, London, p. 9.

- decision - making more systematic and less subjective
- the relative importance of each risk is immediately apparent
- a realization by management that there is a range of possible outcomes for a project
- improved corporate experience and communication
- an improved understanding of the project through identifying the risks and thinking through response scenarios
- comparison of the robustness of projects to specific uncertainties
- demonstration of responsibility by a company to the customer

2.9 Chapter Summary

The contract is a legal tool designed to establish practical relationships between the parties. It defines the responsibilities, spells out the conditions of its operation, defines the rights of the parties in relation to each other and grants the remedies to one party if the other breaches its obligations. For a contract to be effective, there should be an offer and a subsequent acceptance of that offer. Once an agreement is reached between the parties to a contract, they become legally bound to the terms agreed upon in the contract document. Any disputes or litigation arising from a contract will be settled according to the contract documents. Whether the party looks to the courts or to an arbitrator to

enforce the terms of the contract, the law stands behind a judgment of the court or an award of the arbitrator and will enforce it with the same effect.

There exists a variety of contract types, ranging from stipulated price to cost plus to unit price contracts. Each one is designed to accommodate different conditions as related to the nature of project, state of existing technology, assessment of risk and uncertainty, company objectives and motives and a host of other variables. There is no single type contract which best fits these criteria in every situation. The owner should choose the one that best suits his needs and objectives. The owner's ranking of the three goals of cost, time and quality will determine the contract type. At the same time, the owner should consider the interests and needs of the contractor to determine if the current contract provisions respond to those needs in a reasonable fashion. It is possible to find common ground that can form the basis for fair and reasonable contract provisions which are acceptable to both sides. A contract that is biased towards the owner results in inflated project costs. The rationale is that when one of the parties to a contract is required to bear all the risks, or is perceived as bearing more than a fair share of the risks, it is this author's observation that the contractor will do everything possible to adjust that risk in the everyday administration of the contract using the existing vehicles available to him and that the court will not be reluctant to find some legal basis upon which it can reallocate the risk[98].

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[98] The reader is asked to review next chapter for legal discussion.

A contract document that is clear in meaning and risk allocation is clear evidence that the basis of the intended relationship is on stable ground. Clarity in the contract means saying what needs to be said in the most accurate, stable and understandable way possible.

Optimizing the cost of a project depends on properly assessing the risks, allocating the risks and ensuring that each party properly manages the risk allocated to it. Both risk assessment and contract types can influence project outcome in a dramatic fashion. Proper contracting strategy is absolutely critical to satisfy all of the owner's objectives and motivate contractors to the desired result as stated by MacEwing[99]:

> "An awareness of good contracting practice is the best available loss prevention or control technique for claims. The contractual process entails the potential for negotiating a reasonable balance of rights, responsibilities and risk acceptable to each party. It thus provides an opportunity to structure your own legal liabilities. It is simply poor business practice not to utilize the process intelligently, in order to minimize involvement with construction claims and litigation".

Proper contract drafting was, and remains, the parties primary risk management tool. Understanding and applying the contract is the parties' second most important tool.

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[99] MacEwing J. Marc (1991), "Contracts to Minimize Construction Claims", Construction Canada, July, p. 54.

CHAPTER THREE

RISK ALLOCATIONS IN CONTRACTS

3.1 Introduction

The contract is the major medium of communication between the parties interacting in a construction project. It is the yardstick that manages and regulates all the dealings involved in the construction process. In essence, the purpose of a construction contract is to govern the rights, duties and liabilities of the contractor who performs the work, the owner or organization for whom the construction is to be executed, and the architects and engineers who design and perform contract administration duties.

Any construction project involves risk. It is by no means possible to eliminate the risk. It is a natural heritage of any construction project and must be accepted as such. All that can be done is to regulate the risk allocated to different parties and then to properly manage the risk. This can be done through the construction contracts and specifically through contract languages. Risk allocation in construction contract has been the subject of much debate. Careful attention to the design of contracts was recommended by the Business Roundtable's Construction Industry Cost Effectiveness (CICE) project[100]. The Construction Industry Institute (CII) also identified risk allocation as influential in project

success and recommended a balanced approach[101]. Nonetheless, many owners and contractors resist modification to their past normal practices.

In common law the parties to a construction contract have inalienable rights that the courts recognize and enforce. These rights allocate risk and give a business efficacy or reasonable meaning to the contract. Ideally, the parties' contract will assign the risks and liabilities to the party best equipped to manage and minimize them. The contract serves as a framework of the law between the parties and will establish which party has assumed the risk or negated a particular risk. One way in which contracting parties attempt to redress the balance of rights and responsibilities provided for by the balance of the provisions in a contract is by dealing directly with the issue of legal liability by including provisions which limit or exclude liability arising from certain causes. Exculpatory clauses are examples of such provisions. Most often it is the owner who has inserted exculpatory clauses, stating that in no or limited circumstances will he be liable to the contractor. An exculpatory clause limiting a party's liability, though widely drawn, will be enforced by the court, unless it is unconscionable to do so[102].

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[100] Business Roundtable (1983), "Summary report of the Construction Industry Cost Effectiveness Project," New York, January, p. 2,8,11,24,50,72.
[101] Construction Industry Institute (1986), "Impact of Various Construction Contract Types and Clauses on Project Performance," Publication # 5-1, July, p.1-14.
[102] Goldsmith, Immanuel and Heintzman, Thomas G. (1995), "Goldsmith on Canadian Building Contracts", 5th edition, Carswell, Toronto.

There may be agreement that an exculpatory clause which shifts all risk to the contractor is unconscionable, but the real issue in today's construction industry seems to be a question of what the courts will allow - what can we legally get away with? Is it cost effective for the owner to shift its responsibilities to the contractor? Although it is perfectly legal for parties to contract and bind themselves to an exculpatory clause, the courts tend to look at the relative bargaining positions of the parties and try to find an equitable result rather than enforce exculpatory clauses. Due to this lack of strict legal precedent, courts find many exceptions to these clauses and are therefore relatively inconsistent in their decisions. Percy states[103]:

> "there is nothing unreasonable in placing on the contractor the risk of possibilities that are quite beyond the contractor's control and that will undoubtedly increase the contractor's costs if they materialize. The problem with this type of risk allocation lies not in unfairness, but in the fact that it is in the long run prohibitively expensive and frequently self-defeating".

This chapter reviews some often used exculpatory clauses: no damage for delay, examination of work, examination of engineering work, liquidated damages and indemnification clauses, to illustrate the risk allocating ability and discusses some economic reasons for the excessive cost of the approaches presently found in many public and private sector contracts in the US, Canada and the UK. Specifically, the chapter begins with examples of some of the exculpatory clauses and then outlines rules of

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[103] Percy, David R. (1991), "The Allocation of Risk in the Construction Project from the viewpoint of the Owner", A Paper delivered to Canadian Bar Association, Edmonton.

interpretation employed by the courts. Recent judicial decisions that highlight the shifting legal winds in this area are then reviewed. The courts, particularly in the US, Canada and the UK, commencing in 1985, have started to retrench and decide liability based on the contracts/relationships between the parties, rather than on tort or negligence duties or "doctrine of fundamental breach".

3.2 Exculpatory Clauses

Just what are exculpatory clauses? Also known as "disclaimer" or "weasel" clauses? They are provisions that are placed in written contract documents in order to provide specific information to the contractor (or bidder). Such clauses are intended to limit or exclude an owner and/or his representatives liability in contract and often also in tort for costs or expenses incurred by a contractor as a result of variety of factors including unforeseen or differing soil/site conditions and errors in the bid or contract documents. Below are some examples, with explanations following in some cases:

> *1.The bidder is not entitled to rely on any data or information included in the bid documents as to the job site or subsurface conditions or test results indicating the suitability or quantity or otherwise of the job site or subsurface material for backfilling or other uses in carrying out the construction of the work.*

Can you imagine 15 bidders drilling a site for core samples to calculate how much to include in their bids in order to meet this requirement? Extensive below-grade investigations are not cheap and much duplication is implied. How many owners would give permission for all those bidders to access the site with their drilling/sampling rigs?

This clause prevents the contractor from claiming relief in case of encountering differing soil/site conditions to those supplied by the owner.

> *2.The owner is entitled to alter required quantities of material without waiving any condition of the contract,it being always understood that the contractor would be paid the agreed unit price.*

If quantities are significantly reduced, the contractor loses its right to recover the associated overhead, profit and other costs it incurs that are not quantity dependent but must be built into unit rates in order to be recovered.

> *3.The contractor shall not have any claim for compensation for damages against the owner for any stoppage or delay in the work from any cause whatsoever.*

This provision is intended to prevent the contractor from claiming monetary compensation from the owner for delays caused by whatever event, including acts or omissions of the owner or of its agent.

> *4.Any representation in the tender documents were furnished merely for the general information of the bidder and were not in any way warranted or guaranteed by or on behalf of the owner or the owner's consultants or its employees, and neither the owner or its consultants or its employees shall be liable for any representations, negligent, or otherwise contained in the documents.*

This clause requires the contractor to find out what is missing from the general conditions and specifications. Some will argue that this clause means the contractor is required to bring forth its own architectural and engineering or other design, working drawings and specification-writing talents, essentially duplicating all the work for which an owner has

already paid for. Again, this is a clause that implies that a significant amount of duplicated work be completed by all bidders.

> *5. To the fullest extent permitted by law, the contractor shall indemnify and hold harmless the Owner and the Consultant, their agents and employees from and against claims, demand, losses, cause, damages, actions, suits or proceedings by third parties that arise out of, or are attributable to, the Contractor's performance of the Contract...*

This clause makes the contractor liable to indemnify the owner from third party claims brought against it as a result of the contractor's own work. This is a fair clause except where the responsibilities are complicated by a clause such as # 4 above. Who then holds the owner harmless for a design error? The designer or the contractor. If this were not bad enough, the contractor may well pass this risk even on to its suppliers and subcontractors, adding to both the cost and the confusion.

3.2.1 Interpreting Exculpatory Clauses

Contracting parties are free to limit or exclude their liability on any terms they feel are appropriate. Depending on the jurisdiction and local practices, this may be constrained by bidding practices that limit the bidders response to compliance to terms in the invitation to tender. Outside of this, the only limitation or restriction to this right to contract are the rules of interpretation employed by the Courts in applying these exclusions. The following is a summary of these general rules:

- An exculpatory clause will be interpreted strictly against the interests of the party who seeks to invoke the clause. The burden lies with the party relying upon the exemption to prove that the particular loss is within the scope of the exculpatory clause[104].
- Where ambiguity creates two or more reasonable constructions, the construction which will prevail is the one least favorable to the author of the agreement [105].
- Courts may look to the relative bargaining positions of the parties when enforcing an exculpatory clause. This factor may lead to inconsistent results within and between the states/provinces. However, in a normal commercial setting, the court will not delve too deeply into the fine points of bargaining power.
- Similarly, the exacting standards that are generally applied to interpreting exculpatory clauses will not be employed with the same force where there is no inequality of bargaining power between the contracting parties[106] [107].

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[104] Falcom Lumber Ltd. v. Canada Wood Specialty Co. Ltd. (1979), 23 Ontario Reports, (2d) (Ontario High Court) 345.
[105] Kiewit Eastern Co. Inc. v. L&R Construction Co. Inc. (1995), 44 F3d (3rd Cir.) 1194.
[106] Photo Production Ltd. v. Securicor Transport Ltd. (1980), 1 A. C. (English House of Lords) 827.
[107] Canadian Pacific Ltd. v. McCain Produce (1981), 113 (3d) Dominion Law Reports 584; affirmed without reason (1981), 123 (3d) D. L. R. (Supreme Court of Canada) 764.

- A broad and general exculpatory clause will generally not exclude liability for loss or damage resulting from an event which is not mentioned in the contract as part of the service to be provided[108] [109].
- Where the parties' intent is clear and no ambiguity is found, many courts will enforce the clause in question as a matter of law[110] [111] [112] [113].

3.2.2 Fundamental Breach

Any review of the application and interpretation of exculpatory clauses is not complete without a brief discussion of the doctrine of fundamental breach which, until recently, was one of the most powerful devices developed by the common law in dealing with "unconscionable" contracts and to limit the effect of exculpatory clauses. A working definition of the doctrine of fundamental breach is simple enough: a clause that attempts to limit or exclude liability will not be available to the party attempting to rely on the

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[108] McLenaghan v. Nixon and Beaver Lumber Co. Ltd. (1977), 1 Sask. Reports (Saskatchewan Queen's Bench) 101.
[109] Drake v. Beacon's Moving and Storage Co. (1982), 6 Western Weekly Reports (B. C. County Court) 640.
[110] Hunter Engineering Co. v. Syncrude Canada Ltd. (1989), 1 Supreme Court Reports 426.
[111] Graham Construction & Engineering Ltd. v. Alberta (1990), 37 Construction Law Reports 125.
[112] Green Construction Co. v. Kansas Power and Light Co. (1994), Civil Engineering, March, p. 27.
[113] McClain Inc. v. Arlington County (1995), Civil Engineering, September, p. 38.

clause if that party creates a situation that is radically different from that contemplated by the agreement as a whole.

The origin of the doctrine of fundamental breach can be traced to a judgment of Lord Denning. In Karsales (Harrow) Ltd. v. Wallis[114], where it was held that the doctrine was a "rule of law" that operated to defeat any exculpatory clause, regardless of the intention of parties to a contract and regardless of the clear and express language used, where the breach of contract was so fundamental to the obligations undertaken that the exculpatory clauses could not have been meant to apply in such a case. Lord Denning held at pages 868 - 869 that:

> "exempting clauses... no matter how widely they are expressed , only avail the party when he is carrying out his contract in its essential aspects... They do not avail him when he is guilty of a breach which goes to the root of the contract. It is necessary to look at the contract apart from the exempting clauses and see what are the terms, expressed or implied , which impose an obligation on the party. If he has been guilty of a breach of those obligations in a respect which goes to the very root of a contract, he cannot rely on the exempting clauses."

The approach of Lord Denning was widely embraced by the US, Canadian and the UK Courts[115] [116] [117]. The "rule of law" approach of Lord Denning prevailed until the decision

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[114] Karsales Ltd. v. Wallis (1956), 1 W. L. R. (English Court of Appeal) 936.
[115] Astley Industrial Trust Ltd. v. Grimely (1963), 1 W. L. R. 584.
[116] Dominion Leasing Corporation Ltd. v. Suburban Superdrug Ltd. (1966), 56 Dominion Law Reports (2d) (Alta. S.C. App. Div.) 43.
[117] Murray v. Sperry Rand Corporation et al (1979), 23 Ontario Reports (2d) (the Ontario High Court of Justice) 457.

of the House of Lords in Suisse Atlantique v. N.V. Rotterdamsche[118]. In that case, the House of Lords significantly restricted the application of the doctrine. The court held that the effect of a fundamental breach on the applicability of an exculpatory clause was a matter of contractual interpretation only. If the parties clearly intended to waive liability in the event of a fundamental breach and occupied positions of equal bargaining power, the exculpatory provisions would apply[119] [120] [121]. In other words, a fundamental breach did not automatically negate an exculpatory clause. One up for the lawyers!

3.2.3 Exculpatory Clause Judgments

In reviewing and understanding exculpatory contract clauses, it is important to remember that while most of these clauses are not beneficial to the contractor's or subcontractor's interests and should be removed from the construction agreement whenever possible, as a practical manner, the general contractor, and more likely the subcontractor, may not be able to negotiate the removal of these clauses from the contract documents. Thus, the goal should be to recognize the potential harmful clauses, to understand the situations or conditions under which these clauses may apply, to avoid those circumstances whenever possible, and where avoidance is not possible, to manage the risks presented by the

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[118] Suisse Atlantique v. N. V. Rotterdamsche (1967), 1 A. C. (English House of Lords) 361.
[119] B.P.G. Litton Construction Ltd. v. Canadian National Railway Co. (1975), 2 Supreme Court Reports 678.
[120] Beaufort Realties v. Chomedy Aluminum (1980), 2 Supreme Court Reports 718.
[121] Photo Production Ltd. v. Securicor Transport Ltd. (1980), 1 All E. R. 827.

exculpatory clauses. In most cases, the law recognizes and the courts are willing to apply provisions which bar claims but only if the allocation of risk is clearly and carefully done. At the same time, the law recognizes defenses to these clauses arising from fraud, bad faith, active interference, or ambiguity.

The following cases are but a few examples about enforceability of wide variety of exculpatory clauses that withstood challenges in Canadian, the US, and British courts. The recent decisions of the Supreme Court of Canada in Hunter Engineering Co. v. Syncrude Canada Ltd[122], and the case of Graham Construction & Engineering Ltd. v. Alberta[123] marked a significant shift in the approach of our highest court to the issue of unconscionability and laid "the doctrine of fundamental breach to rest". In Hunter Engineering Co. v. Syncrude Canada Ltd., Syncrude entered into three contracts in 1975 for the supply of gearboxes for its tarsands projects. In 1979 defects were discovered. Syncrude repaired these defects at a cost of $400,000 and sued the various manufacturers for the costs of repair. Two of the manufacturers, Hunter Engineering and Allis-Chalmers, under the contract, had warranted the design, material, workmanship and title of the goods for a period of 24 months after delivery or 12 months after the gearbox entered into service. The contract also provided that "the provisions of this paragraph represents the only warranty of the seller and no other warranty or conditions, statutory or

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[122] Hunter Engineering Co. v. Syncrude Canada Ltd. (1989), 1 S. C. R. 426.
[123] Graham Construction & Engineering Ltd. v. Alberta (1990), 37 Construction Law Reports 125.

otherwise, shall be implied". At trial, Hunter Engineering disclaimed liability on the basis that their respective contractual warranty periods had expired and the Court unanimously rejected Syncrude's action for damages. Dickson C. J. feels that the time has come for the law to start afresh. The following passage from page 462 is self-explanatory:

> "In the light of the unnecessary complexities the doctrine of fundamental breach has created, the resulting uncertainty in the law, and the unrefined nature of the doctrine as a tool for averting unfairness, I am much inclined to lay the doctrine of fundamental breach to rest, and where necessary and appropriate, to deal explicitly with unconscionability... It is preferable to interpret the terms of the contract, in an attempt to determine exactly what the parties agreed. If on its true construction the contract excludes liability for the kind of breach that occurred, the party in breach will generally be saved from liability...".

Similarly, the case of Graham Construction v. Alberta is of importance on this point because it held that an express exculpatory clause overrides an implied term. In that case, Graham Construction entered into a contract with Alberta Transportation to construct bridges over a canal. Water leaked through the berms into the construction site, raising havoc with the work and its completion date. The engineering firm brought an action against Alberta for damages for the extra expense involved in the construction. Contract specifications provided that "bidder is required to investigate and satisfy himself of everything and every condition affecting the works to be performed and labour and material to be provided, and it is mutually agreed that submission of a tender shall be conclusive evidence that the bidder has made such an investigation." Furthermore, General Specification 1.2.15.1 provided that "the contractor shall not have any claim for compensation for damages against the Department for any stoppage or delay for any

cause whatsoever". Supreme Court of Canada dismissed contractor's action against the owner.

In Olin Corporation v. Consolidated Aluminum Corporation, 5 F3d 10 (2ndCir 1993), the Court stated:

> "this is a seemingly harsh result for a company that must pay for the cleanup of contamination that it apparently did not cause. However, we are unwilling to ignore the broad inclusive language of the agreements freely entered into by two sophisticated parties. Parties should be able to rely on the terms of an agreement arrived at after an arduous negotiations."

In Millgard Corp. v McKee/Mays, 49 F3d 1070 (5th Cir 1995), the subcontractor sued the general contractor for additional sums expended after it encountered wet soil while sinking piers for a foundation. The contract contained a provision in which the general contractor "disclaims any responsibility for the accuracy, true location and extent of the soils investigation", including data concerning "the presence, level and extent of underground water". Additionally, the contract stated "the soil report is not a warranty of subsurface conditions, nor is it a part of the contract documents". The subcontractor chose not to investigate the site independently, but instead relied on the soil reports furnished by the contractor to assist in bid preparation which did not reveal the wet soil condition. The court held that the soil report disclaimer effectively barred the subcontractor's ability to recover for the unforeseen conditions.

In Marriott Corp. v Dasta Constr. CO., 26 F3d 1057 (11th Cir 1994), the court refused to grant the contractor relief even though evidence showed the owner had been responsible for delays. The contract contained a "no damages for delay" clause which stated "to the fullest extent permitted by law, Owner... shall not be held responsible for any loss or damage sustained by Contractor, through delay caused by Owner... or its agents or employees, or any other Contractors or Subcontractors, or by abnormal weather conditions, or by any other cause, and Contractor agrees that the sole right and remedy therefore shall be an extension of time". The general contractor's failure to request an extension of time constituted breach of contract which barred recovery against the owner.

Also, in Suisse Atlantique v. N. V. Rotterdamsche (1 A. C. 361, 1967), the English House of Lords significantly restricted the application of the doctrine of fundamental breach. The court held that the effect of a fundamental breach on the applicability of exculpatory clauses was a matter of contractual interpretation only.

These cases do signal a trend toward enforcement of contractual exculpatory clauses between parties of relative equal bargaining position. Accordingly, it is now possible to say with far more certainty than had previously been the case, that a properly drafted exculpatory clause may be relied on. The US, Canadian and the British courts emphasis are now to look carefully at the wording of each contract, even in circumstances involving a fundamental breach, and resolve matters according to the true intention of the parties at the time the contract was negotiated. Furthermore, on these authorities, it might

still be possible to advise an owner that placing all the risk on a contractor through a properly worded contract would probably increase the cost of the project, but would probably withstand challenge in the courts. Wallace states[124]:

> "If the rational contractor discovers in the contract documents that it may be liable for the costs of unexpected circumstances beyond its control, the contractor has no choice but to either include the cost of dealing with that eventuality in its price or to include a contingency if the risk is uncertain".

Wallace states further:

> "It is possible that present public and private sector contracts are grossly unfair to the efficient contractor who tenders a realistic price, and who is not in the habit of either advancing or arbitrating and litigating.....claims. There is today undoubtedly a class of contractor operating highly successfully under the present system by tendering unrealistically well below his competitors and then manipulating and exploiting every comma of the contract in order to achieve his profit".

However, there is judicial uncertainty too about the enforceability of exculpatory clauses that a draconian allocation of risks is likely to be frustrated by litigation. In a remarkable series of decisions, the British Columbia Courts have cast considerable doubt on the routine enforceability of a wide variety of clauses that attempt to place on the contractor the risk of sub-surface conditions and a variety of other events. The British Columbia cases appear to open up two distinct lines of arguments to the contractor: fraudulent misrepresentation and variation in unit price contracts. Cases decided on the basis of

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[124] Wallace, Duncan (1970), "Hudson's Building and Engineering Contracts", 10th edition, p. 458.

fraudulent misrepresentation and variations in unit price contracts are K.R.M. Construction Ltd. v. B.C. Railway Co.[125], Rainbow Industrial Caterers Ltd. v. C.N.R.[126], Avalon Construction & Engineering Ltd. v. The City of Corner Brook[127], and B.G. Checo International Limited v. B.C. Hydro and Power Authority[128]. In the above cases, the courts ignored the presence of numerous exculpatory clauses and found that the owner was liable in negligent misrepresentation and that it had been reckless as to the accuracy of the quantities and had shut its eyes to the facts.

The preceding provides some of the recent court decisions and how exculpatory clauses can impact the project cost. Construction contract litigation is very expensive. For not only must lawyers, consultants and experts be paid for the vast amount of time required in preparing the mass of law and detail involved in such litigation, but the time of the contractor's own personnel must be absorbed in digging out facts from records, correspondence, interviews with knowledgeable personnel, etc. Owners, consultants and project managers should be aware that while shifting risks to the contractor may seem appealing, it comes with a price and some remaining latent risks.

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[125] K.R.M. Construction Ltd. v. B.C. Railway Co. (1982), 18 Construction Law Reports 159.
[126] Rainbow Industrial Caterers Ltd. v. C.N.R. (1989), 54 Dominion Law Reports (4d) 43.
[127] Avalon Construction & Engineering Ltd. v. The City of Corner Brook (1987), 24 Construction Law Reports 1.
[128] B.G. Checo International Limited v. B. C. Hydro and Power Authority (1990), 44 British Columbia Law Reports (2d) 145.

3.3 Delay

On construction projects "time is of the essence". Owners strive to minimize the time between the investment of capital and the start of the return on that investment. Contractors know that their costs are directly related to the length of time it takes to execute the work. Delay costs everyone money.

Delay is "the time during which some part of the construction project has been extended or not performed due to an unanticipated circumstances"[129]. These delays can have any one of many imaginable origins and causes. The Construction Industry Institute (CII) has developed a comprehensive list of action that can be taken to compress a construction schedule. This list, when examined. conversely serves as a check-list for potential causes and origins of delay. Some of the more common causes and origins include[130]:

- differing site conditions,
- changes in requirements or design,
- inclement weather,
- unavailability of labour, materials or equipment,
- defective plans and specifications,

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[129] Bramble, Barry B., Callahan, Michael T. (1987), "Construction Delay Claims", John Wiley and Sons, New York, NY.

[130] Construction Industry Institute (1988), "Concepts and Methods of Schedule Compression", Publication 6-7, November.

- owner interference in contractor's performance,
- poor management,
- inefficient staffing,
- adversarial relationships between contractor and owner,
- unfair risk assessment,
- interruptions,
- inadequate contractor cash-flow,
- poor material management,
- lengthy shop drawing ,
- lack of crew training,
- lack of access to site,
- strikes, and
- equipment down-time.

This list is very general and by no means exhaustive.

These causes may originate from any party connected with the construction project, including: contractors, owners, subcontractors, suppliers, designers, labour unions, force majeure. Many provisions of a contract deal with delay and spell out the rights of each of these parties. In the event a delay occurs, different legal rights arise depending on the type of delay and the actual cause of delay. The responsibility for delay is largely determined

by the terms of the construction contract. There are two dimensions of delay which determine responsibility and impact: excusability and compensability.

3.3.1 Excusable and Nonexcusable Delays

Excusable and nonexcusable are two main categories of delay and distinguishing the two is important when determining whether time extension or damage should be granted. Excusability is usually a matter of contract. In other words, most contracts enumerate which delays are excusable and leave the remainder as nonexcusable.

According to Richler, an excusable delay is one which will justify an extension of the contract performance time, **and in certain situations**, the contractor will be entitled to compensation for the cost incurred as a result of excusable delay[131]. The time is directly related to the length of the delay. These delays might include: design problems, owner initiated changes, unanticipated weather, or acts of God. Three factors govern the excusability of a delay[132]:

- Whether the event was foreseeable by the contractor,
- Whether the causes were beyond the control of the contractor, and
- Whether it was without the fault or negligence of the contractor.

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[131] Richler, Joel (1992), "Construction Delays: General Principles", Insight Education Services Seminar, Insight Press, p. 16.
[132] Richter, Irv, and Mitchell, Roy S., (1982), "Handbook of Construction Law and Claims", Reston Publishing Co., Inc., VA.

The existence of one of these factors makes a delay excusable and therefore subject to a time extension and/or compensation or both.

A nonexcusable delay is one for which the party at fault assumes the costs and time impacts of its own performance and possibly the other party's. These delays include: normal weather, subcontractor's actions, contractor's failure to examine the site, failure to provide proper equipment or manpower, and removal and replacement of nonconforming work.

Inexcusable delay is not the precise opposite of excusable delay, for it is not limited to those events causative of delay that are within the control of the contractor. Richler Joel states that delay will be inexcusable where it can fairly be stated that the contractor has assumed the risk of the events that have caused such delay.

3.3.2 Compensable and Noncompensable Delays

The classification of delays can be further broken down into compensable and noncompensable delays. Usually a delay is considered compensable to one party if it cause is within the control of the other party. The aggrieved party is thus entitled to

additional compensation as well as an extension of time. Goldsmith[133] states that there is an implied contractor's right to have full utilization of the time period:

> "Where a contract provides a time within which the contract must be completed, the Contractor is entitled to the whole of that time for doing the work, and the Owner is not entitled to deprive the Contractor of such time either by delaying commencement of the work or causing delay during its progress".

When the contract is silent to specify a period, the Contractor must still complete the work within a reasonable time limit.

Goldsmith states further:

> "... in the absence of any provision in the contract to the contrary, a Contractor is entitled to damage for any loss occasioned by such delay".

In order to qualify for additional compensation the aggrieved party must demonstrate that:

- The delay was attributable to the other party,
- The compensation is allowed by a compensation clause in the contract, and
- Such delay caused the alleged damages.

Delays are the roots to three primary side effects. When a delay occurs, project completion time and costs are increased. These additional costs are the result of

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[133] Immanuel, Goldsmith (1976), "Canadian Building Contracts", The Carswell Company Limited.

acceleration of the work to gain lost time and greater inefficiency of labour and equipment. These acceleration costs may be direct or indirect. Some of the direct costs of acceleration include: overtime wages, added work-force, added equipment, overhead, and insurance. Some of the indirect costs of acceleration include: general administration and office overhead, attorney's fees, and depreciation.

The labour and equipment on the project are directly effected by a schedule acceleration. When work is accelerated, it is often necessary to reschedule or re-sequence work activities. This shifting of equipment and work-force breeds inefficiency and negative impacts on the morale of the contractor's personnel. Higher cost and lower productivity are the end result when all of these impacts are accumulated.

Owner must act reasonably to facilitate the completion of contract work. When an owner unreasonably fails to act so as to facilitate, he will be deemed to breached the obligation. Paraphrasing Goldsmith[134] the owner is under an implied duty not to delay the contractor in the performance of his work. Implied duty compels the owner to[135]:

- provide access to work site[136],
- provide drawings containing no errors and omissions,

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[134] Immanuel, Goldsmith (1976), "Canadian Building Contracts", The Carswell Company Limited.
[135] McDonald, Phillip R., and Baldwin, George C., (1989), "Builder's and Contractor's Handbook of Construction Claims", Prentice Hall.

- review submitted drawings and plans in a timely manner,
- respond to requests for information or clarification in a timely manner,
- provide timely inspection,
- deliver owner- furnished materials, owner work performance and owner supplied equipment in a timely manner,
- make timely payments,
- issue change orders without reasonable delays[137], and
- provide sufficient space to undertake the work[138].

Parties to a construction contract should bear in mind that damage awards are not a blank cheque written to the aggrieved party. When a party to a contract experiences a delay it knows is excusable and compensable, it has the duty to mitigate the damages[139]. Mitigation is the general principle of law which states that the aggrieved party must make a reasonable effort to make the damages it suffers less severe. While mitigation is a positive duty imposed upon the plaintiff, the defendant bears the onus of proving or establishing that the plaintiff has not discharged its duty to mitigate its damages.

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[136] R. v. Walter Cabott Construction Ltd. (1975), 69 Dominion Law Reports (3d) 542.
[137] Brindle, Derek A., (1992), "Construction Claims for Changes, Delays and Extras", Insight Educational Services Seminar, Insight Press.
[138] Harve Pomerleau Inc. v. Canada (1988), 28 C. L. R. 200.
[139] Interprovincial Concrete Ltd. v. Great West Construction Ltd. (1987), 23 C. L. R. 123.

3.4 Delay Clauses

Within a contract there are many provisions which are connected with delays. Some of these provisions include: no damage for delay clause, liquidated damages clause, time is of the essence clause, time extension clause, termination clause, change clause, suspension of work clause, etc. The language of delay clauses is infinite, limited only by the imagination of the person drafting the contract. Generally speaking, delay clauses establish a division of risk between the owner and the contractor. One frequently encountered delay clause is "no damage for delay". The **"no damage for delay"** clause is an attempt by the owner to prevent the contractor from recovering any damages for any delay regardless of fault. Each contract will vary in its use of this clause but there are three common elements of a "no damages for delay" clause[140]:

- Clause applies to delays which affect the contractor's cost of performance,
- Clause will enumerate several causes for delay, and
- Clause will purport to exculpate the owner from liability for the contractor's delay damages.

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[140] Bramble, Barry B., and Callahan, Michael T (1987), "Construction Delay Claims", John Wiley and Sons, New York, NY.

One of the problems with the use of this clause is the court's lack of uniformity in enforcing it. The clause is generally upheld, but there have been many exceptions. Courts have ignored the clause and allowed the contractor to recover delay damages when specific types of circumstances exist[141]:

- The delay was of a kind not contemplated by the parties,
- The delay amounted to abandonment of the contract,
- The delay was caused by bad faith, and
- The delay was caused by active interference.

As stated by Blaikie[142]:

> "clauses of this kind are much like the Trojan horse, since they appear to bear gifts, but their reality is otherwise. While the extension of time may limit the contractor's exposure to a claim for a liquidated damages, it does not provide compensation for the inevitable cost increases which flow from being on the site for an extended period of time".

3.4.1 Legal Illustration of "No Damages for Delay" Clause

Time means money to all parties on a construction project. The owner suffers at least increased financing costs, and in a commercial project, a delay in the commencement of cash flow from the project. The contractor may be subjected to increased labour, material,

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[141] Richter, Irv, and Mitchell, Roy S. (1982), "Handbook of Construction Law and Claims", Reston Publishing Co., Inc., Reston, VA.
[142] Blaikie, Peter M. (1988), "Claims by Contractors against Owners", Construction Law Seminar, Toronto, Ontario, April 8.

equipment or overhead costs and an inability to proceed onto the next contract. Accordingly, owners attempt to ensure the inclusion of various exculpatory clauses respecting damages for delay in the construction contract.

The law expects both parties to behave reasonably. Subject to the developments of law respecting good faith and reasonableness a properly drawn "no damages for delay" clause will disentitle the contractor to recover its costs for any delay caused by a third party and in some instances by the owner. "No damages for delay" clauses have been upheld by the courts[143] [144] [145] [146] [147]. The facts in the case of Graham Construction v. Alberta were that the plaintiff, Graham Construction, entered into a contract with the defendant, Alberta, to construct bridges over a canal. The plaintiff inspected the site, including channel blocks, which had been constructed by the Department of the Environment, upstream and downstream of each bridge site and submitted a tender. The bridge construction period had rigid time constraints. The Department of Transportation told the plaintiff on January 28, 1986 that the first site would not be available to the plaintiff until February 10, a fact known to the Department on January 16. The extended construction period found the canal subjected to deluge of water as a result of a February Chinook. Water leaked

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[143] Perini Pacific Ltd. v. Greater Vancouver Sewer and Drainage District (1967), Supreme Court Reports 189.
[144] Lewis Construction v. Toronto and Hamilton Highway Commission (1922), 22 O. W. N. 74.
[145] Woollatt Fuel and Lumber v. Mathews Group Ltd. (1978), 83 D. L. R (3d) 137.
[146] Graham Construction & Engineering Ltd. v. Alberta (1990), 37 C. L. R. 125.
[147] Marriot Corp. v. Dasta Construction Co. (1994), 26 F3d (11th Circuit) 1057.

through the berms into the construction site, raising havoc with the work and its completion. The plaintiff brought an action against the defendant for damages for extra expense involved in the construction.

Among other questions, one before the court was whether the exculpatory clause in General Specification 1.2.15.1, which provided that "the contractor shall not have any claim for compensation for damages against the Department for any stoppage or delay for any cause whatsoever", should apply. The court found that the plaintiff had not "diligently proceeded with the work" and action was dismissed. Also, in Perini Pacific Ltd. v. Greater Vancouver, the court refused to grant relief to the contractor for loss of overhead during delays caused by owner because the contract contained a "no damages for delay" clause which stated that:

> " unless otherwise particularly provided in the contract, the Contractor shall have no claim or right of action against the Corporation for damages, costs, expenses, loss of profits or otherwise howsoever because or by reason of delay in the fulfillment of the contract within the time limited therefor occasioned by any cause or event within or without the Contractor's control, and whether or not such delay may have resulted from anything done or not done by the Corporation under this contract".

Additional cases upholding the validity of "no damages for delay" clause in the US are reported in 10 A.L.R. 2d 803. However, clauses which preclude the contractor from recovering for owner caused delay are strictly construed[148] [149]. The court after reviewing

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[148] Brule Construction v. City of Ottawa (1981), 32 C. L. R. 313.
[149] City of Dallas v. Hubbell (1959), 325 S. W. 2d (Tex. Cir. App.) 880.

all of the facts of the case in City of Dallas v. Hubbell, rejected the arguments of the City, and made the comments with reference to the application of the exculpatory provision:

> "The "no damages for delay" provision was intended to protect Owner from damages for delays caused by others than Owner, and was intended also to protect Owner from damages for delays caused by Owner itself even if such delays were due to negligence and mistakes in judgment. But the "no damages for delay" provision did not give Owner a license to cause delays 'willfully' by 'unreasoning action, without due consideration' and in 'disregard of the rights of other parties' nor did the provision grant Owner immunity from damages if delays were caused by Owner under such circumstances".

3.5 "Examination of Work" Clause

One major source of dispute and claim emanating from the tendering stage is differences in site/soil conditions between those represented in the tender documents and those actually encountered during the course of the work. It is almost standard practice in many public and private works contracts to include clauses which place the entire risk of unexpected site/soil conditions on the contractor. Typically, these clauses will include a declaration that "the bidder is required to investigate and satisfy himself of everything and of every condition affecting the works to be performed and the labour and material to be provided, and it is mutually agreed that submission of a tender shall be conclusive evidence that the bidder has made such investigation". The types of conditions may include subsurface, latent physical or any type of working condition which may have a

significant impact on a project. Bramble states that most differing conditions/examination of work clauses have similar characteristics[150]:

- Require notice,
- Provide an opportunity for investigation,
- Define the risk,
- State the grounds upon which the contractor may base its expectations,
- Require a pre-bid inspection by the bidders, and
- Allow adjustment in the contract time and/or amount.

A major reason behind the use of such clause is to improve the cost effectiveness of the competitive bidding process. This is done by allowing the contractor an avenue for recovery for unforeseeable project conditions. The cost effectiveness is realized when the owner provides site analysis reports prior to project bid and allows the contractor to rely on this information. Because the contractor knows the contract price will be equitably adjusted, large premiums designed to cover differing conditions risk and the cost of pre-bid investigations are excluded from the bid.

Paraphrasing Sweet, the problem arises from the fact that Owners often use a disclaimer to relieve themselves from the accuracy of site/soil information they have gathered and

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[150] Bramble, Barry B., and Callahan, M. T. (1987), "Construction Delay Claims", John Wiley and Sons, New York, NY.

made available to the contractor[151]. These disclaimers are an attempt by the owner to nullify the purpose of the differing site/soil conditions clause and thus provide protection from risk exposure. Sweet further states that the courts are not in uniformity in their decisions as to the use of disclaimers or the recovery of additional costs. However, in the absence of fraud on the part of the Owner or its Consultants, the risk of differing site/soil conditions will generally fall upon the Contractor where clear exculpatory provisions exists[152] [153] [154] [155] [156]. The common law rule states that the contractor will bear the risk of differing conditions unless:

- It can be established that it relied on information furnished by the owner[157] ,
- The contract provides protection[158],
- The owner or its consultant did not disclose information that it should have[159] [160], and

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[151] Sweet, Justin (1985), "Legal Aspects of Architecture, Engineering and the Construction Process", West Publishing Company, New York, NY.
[152] Atlas Construction Ltd. v. City of Montreal (1954), 4 Dominion Law Reports 124.
[153] Catre Industries Ltd. v. Alberta (1989), 36 C. L. R. 169.
[154] Graham Construction and Engineering Ltd. v. Alberta (1989), 37 C. L. R. 125.
[155] Green Construction Co. v. Kansas Power and Light Co. (1994), Civil Engineering, March, p. 27.
[156] Millgard Corp. v. McKee/Mays (1995), 49 F3d 1070, 5th Circuit.
[157] Cardinal Construction Ltd. v. City of Brockville et al (1984), 4 C. L. R. 4.
[158] Auto Concrete Curb Ltd. v. South Nation River Conservation Authority (1989), 30 C. L. R. 245.
[159] Brown and Huston Ltd. v. The City of York et al (1983), 5 C. L. R. 240.
[160] Advice Pipelines Ltd. v. Mississauga Golf & Country Club Ltd. (1989), 33 C. L. R. 280.

- The cost of performance was extraordinarily higher than could have been anticipated[161].

3.5.1 Legal Illustration of "Examination of Work" Clause

Since any holding must be analyzed with reference to these items, it would be helpful to review few recent cases. The case of Graham Construction v. Alberta is of importance on this point because it held that an express exculpatory clause overrides an implied term Supreme Court of Canada dismissed contractor's action against the owner.

Similarly, in Green Construction Co. v. Kansas Power and Light Co., KPL solicited bids for the construction of an earthen dam to create a reservoir at a power plant. The dam was to be built out of dry soil found at the project site. KPL provided bidders with a geotechnical data report on the subsurface conditions at the site, but instructed the bidders to make their own investigation because there would be no further adjustment in price for unforeseen conditions. Green sued KPL to collect the withheld fees as well as extra costs incurred during construction because the soil in the borrow area contained more moisture than indicated in the geotechnical report. The appellate court stated that when a contract contains a site-inspection clause, it places a duty on the contractor to exercise professional skill in inspecting the site and estimating the cost of the work. "Thus, Green

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[161] Warden Construction Co. Ltd. v. Town of Grimsby (1983), 2 C. L. R. 94.

was not entitled to additional compensation merely because the project was more expensive due to unexpected soil moisture", the court said.

However, in Cardinal Construction Ltd. v. City of Brockville et al, an exculpatory provision was ineffective to protect the owner from a claim by the contractor for negligent provision of sub-surface conditions. In that case, the Ontario Supreme Court held that there was an actual change in the work attributable to incorrect tender information and found the owner liable for the unanticipated extra costs of the contractor. Similarly, in Opron Construction Ltd. v. Alberta Department of the Environment[162], Opron encountered several soil condition problems which resulted in a claim against the Department for breach of contract and, concurrently, for deceit and negligent misrepresentation. The Court of Queen's Bench of Alberta held the Department liable for deceit and negligent misrepresentation.

With respect to the obligations on the part of the owner, it is clear that he has no responsibility to conduct tests of the sub-soil. In fact the editor[163] of the authoritative text Hudson's Building and Engineering Contract, has expressed the view that the owner "may suspect or know that the Contractor has underestimated the difficulties, but is under no duty to warn him and, in the absence of fraud, will not be liable even for a

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[162] Opron Construction Co. Ltd. v. Alberta (1994), 11 Construction Law Letter 3.
[163] Wallace, Duncan (1970), "Hudson's Building and Engineering Contracts", 10th ed., p. 316.

representation as to the state of the site". Conversely, it is the contractor's right and duty to make such a site investigation and become familiar with the site and local conditions. Since it is the contractor's duty to make a site investigation, it is assumed (by owners and courts) that every contractor has the knowledge that can be obtained by a reasonably prudent and experienced contractor from such an investigation. Difficulties arise when time and money constraints do not allow the contractor to make a detailed investigation of surface or subsurface conditions. Owner contract administration may also impact the cost-effectiveness of a differing condition clause. If the contractor feels the owner will administer the clause unduly, it will include a higher contingency for the expected higher cost of submitting a claim[164]. In other word, the cost savings achieved by the differing conditions clauses are neutralized by the higher expected administration costs the contractor must include in the bid price.

It is the researcher's experience that the possibility that the site/soil conditions will be different from those anticipated is, and should be, an ever present concern of the contractor. Often such surprises result in costs that are much higher than planned and cause projects which should have been profitable to become uneconomical. The most reliable method of guarding against this risk is to carry out tests and investigations prior to bidding for the work.

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[164] Sweet, Justin (1985), "Legal Aspects of Architecture, Engineering and the Construction Process", West Publishing Company, New York, NY.

Forcing a bidder to make an educated guess as to the subsurface conditions, spending time and money to make an adequate geotechnical investigation and including a premium to cover the risks associated with subsurface conditions is not in the best interest of either party. If the tenderer makes an educated guess which turns out to be wrong then the scene is set for costly disputes and litigation. What is required in such circumstances is for the owner to perform adequate geotechnical investigations prior to the tendering process and to thereafter accept responsibility for the results of such survey by providing the results to the bidders.

3.6 Examination of Engineering Work Clause

With the help of the "examination of engineering work" clause the owner excludes liability in case of misrepresentation or inaccuracies in the tender documents. Such clause provides that "any representation in the tender documents were furnished merely for the general information of bidder and were not in any way warranted or guaranteed by or on behalf of the owner or the owner's consultants and its sub-consultant, employees, and neither the owner or his consultants or employees shall be liable for any representations, negligent, or otherwise contained in the documents". As explained above, such exculpatory clauses are upheld by the courts[165] [166].

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[165] Trident Construction v. Wardrop, (1979), 6 W. W. R. 481.
[166] Graham Construction & Engineering Ltd. v. Alberta, (1990), 101 A. R. 209.

In a construction project there is rarely a direct contractual relationship between the consulting engineer or architect and the successful bidder on a job. The engineer usually contracts with the owner to prepare the drawings and specifications which will comprise the tender package which the contractor will use in preparing his bid on a job. If he is successful, the contractor enters into his contract with the owner to undertake the project for an agreed-to compensation. When preparing their bids on a project, prospective contractors will use the drawings and specifications presented in the tender package to familiarize themselves with many aspects of the job. Although these drawings and specifications are usually prepared by the consulting engineer, they are presented to the bidders by the owner and it is the owner with whom the successful bidder will usually contract. Despite the fact that in most cases the drawings and specifications properly inform the bidders as to what is involved in the job, situations do arise where they do not. The failure of the drawings and specifications to accurately reflect the actual work conditions may cause, at least in part, damages to the contractor.

Disputes invariably arise as to who will shoulder the financial burden caused by these delays. At first instance, the contractor looks to the owner with whom he has privity of contract for recompense. However, his ability to recover these losses may be thwarted by express exculpatory clauses in the tender documents which limit owners liability for, among other things, incorrectly prepared tender material. The next likely source for recovery is the engineer or architects, as the case may be, who prepared the plans and specifications for the owner. This work can give rise to the consulting engineer being

liable to the contractor for negligent misrepresentations contained in the tender information. This sort of liability is known at law as a tort liability, which means that it does not arise because of any contract between the parties but because of their relationship.

The concept of negligent misrepresentation applies for the most part to professionals who give advice and has its root in a case involving a banker that arose in England in 1964 known as Hedley Byrne and Co. v. Heller and Partners[167]. That case set out the rules for a finding of negligent misrepresentation. It will be found if:

- a person makes a statement or representation of fact to another person;
- that person knows or intends that the statement or representation will be relied upon by the other party;
- the other party in fact relies on the statement; and
- the other party's reliance on the statement results in it suffering damages or loss.

Prior to 1993, an engineer's liability in these circumstances was uncertain with some decisions particularly out of British Columbia and England. The decision appeared to support the proposition that the contractor's entry into the contract with the owner which

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[167] Hedley Byrne and Co. v. Heller and Partners, (1964), A. C. 465.

states that he is not relying on the drawings contained in the tender package is also a representation to the engineer. Therefore, since there is no reliance placed on the consultant's work, and there is not sufficient legal proximity between the engineer and the contractor to impose a duty of care on the engineer to ensure that the information provided to the contractor is correct. As a result the engineer is not liable to the contractor for the consequences of any error or misstatement contained in the tender documents[168] [169]. In other words, the relationship between the engineer and the contractor was not close enough to impose tort liability on the engineer.

However, in 1993 the Supreme Court of Canada addressed the issue and clarified the law. In Edgeworth Construction Ltd. v. V.D. Lea and Associates the supreme court of Canada found that an engineer is liable to a contractor for extra costs the contractor incurred due to errors in specifications in the construction drawings prepared by the engineer. In that case the contractor's right to claim the extra costs from the owner was precluded by the terms of the contract which contained a site investigation clause and a non-reliance clause. As a result, the contractor sued the engineers that had prepared the tender information upon which it relied that turned out to be wrong and resulted in the extra costs being incurred.

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[168] Pacific Associates Inc., v. Baxter, (1989), 2 All E. R. 159.
[169] Sceptre-Riedel-Dawson Construction Ltd. v. British Columbia (1990), 41 C. L. R. 305.

Also, according to the District Court of Appeal of Florida, a general contractor could sue an engineer for professional malpractice in designing plans for a retaining wall, even though the contractor has no direct contractual relationship with the engineer[170].

Given the above, and in the absence of a clear disclaimer in the bid documents which preclude the contractor from suing the engineer, it seems apparent that where there is an error in the drawings or specifications, the contractor may have a viable claim against the design/consulting engineer for negligent misrepresentation.

3.7 Indemnification Clause

Indemnification, also known as an agreement to hold harmless, may be defined as one party's obligation to reimburse another part for the losses he incurs or damages for which he may be held liable. In its simplest form, indemnification can be thought of as the right to reimbursement for expenses, losses or costs incurred[171]. It is contractually based and serves the undeniable purpose of spelling out who ultimately pays for defined risks. This aspect of the clause is the most appreciated by construction owners who tend to proceed cautiously and like to know all of their costs up front.

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[170] Southland Construction Inc. v. Richeson Corp. (1995), Civil Engineering, February, p. 28.

[171] Howell, R.A., Allison, J.R., and Henley, N.T. (1985), "Business Law: Text and Cases", CBS College Publishing, 3rd edition.

Indemnity provisions typically express a promise from a promisor (indemnitor, often the owner) to a promisee (indemnitee, often the contractor) to assume responsibility (hold indemnitee harmless) for a specified losses resulting from contract performance. Agreements fall into three categories[172]:

- **Limited form** clauses express the indemnitor's promise to be responsible only for losses caused by its **sole fault.**
- **Intermediate form** clauses oblige the indemnitor to answer for losses that it caused and those that are caused in part, irrespective of degree of fault, by the indemnitee (indemnitor assumes risk for his sole and promisor-promisee joint negligence).
- **Broad form** clauses state the indemnitors promise to answer all losses, even those caused solely by the indemnitee.

3.7.1 Legal Illustration of "Indemnification" Clause

The underlying principle of indemnity rests on the notion that when one is compelled to pay money another ought to pay, the former (the indemnitee) may recover the sum so paid from the latter (the indemnitor) if the one making the payment is free from casual

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[172] McNerney, J.P., (1986), "Contract Indemnity Clauses Open to Tort Reform Efforts", Constructor, September.

negligence[173]. Further they state that under common law, therefore, parties seeking indemnification have the burden of proving that they are not at fault.

Common law is not available to a party who has been charged with or held liable for active negligence. The general principles of contract law apply to the interpretation of indemnification agreements. Where the parties intent is clear and no ambiguity is found, many courts will enforce the indemnification provision as a matter of law[174] [175]. In New Zealand Kiwifruit v. City of Wilmington, the court found that while Delware recognized an implied - in contract theory of indemnification, implied indemnification is limited to a situation in which no express indemnification exists. In view of express indemnification clause, we are unwilling to ignore the broad inclusive language of the agreements freely entered into by two sophisticated parties.

With all the risks involved and keeping in mind the function of a hold harmless provision one might question why a prime contractor would agree to indemnify an owner? First, due to market conditions or other economic considerations the contractor has little choice in the matter. Second, the contractor may be able to pass the majority of the risks to

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[173] Meyers, R., and Perelman, D., (1989), "Construction Insurance- Risk Allocation through Indemnity Obligations in Construction Contracts", 40 S.C.L. Rev. 989.
[174] Olin Corporation v. Consolidated Aluminum Corporation, (1993), 5 F3d 10, 2nd Circuit.
[175] New Zealand Kiwifruit Marketing Board v. City of Wilmington, (1993), 825 F Supp. 1180.

subcontractors. Lastly, and most importantly, the contractor often realizes the risk imposed can be insured with the corresponding cost passed on to the owner.

3.8 Liquidated Damages Clause

The construction contracts often contain provisions for the payment of specified sums of money by one party in the event where that party commits a specified breach or upon happening of a certain event. The objective of liquidated damages clause is to ensure performance of the obligations contained in the contract. They state in a precise manner the rights of the parties rather than leave them to other less predictable remedies, such as an assessment of damages for breach of contract.

In a further attempt to limit the area of risk, owners frequently insert liquidated damages clauses in contracts which purport to establish the amount of damage which an owner will suffer in the event of delays in completion caused by the contractor. Liquidated damages are those damages which the parties agree to at the time of contracting. They represent the damages the owner will suffer in the event of late completion of the contract. The principle of liquidated damages is of immediate appeal to an owner because it provides an immediate remedy in the event of the contractor's delay in completion. However, liquidated damages present a problem for the owner in that the owner now has the burden

of proving the contractor's inexcusable delay[176]. Furthermore, this process has advantages for both the owner and the contractor. By fixing a liquidated damage sum, the contractor effectively limits liability for that breach to that stipulated sum. In other word, the owner's sole remedy when a liquidated damages clause exists is that clause. The owner benefits in that the owner can "recover delay damages immediately by withholding from the contract amount"[173]. Thus, liquidated damages clauses serve as effective deterrents to trying to recover actual delay damages.

3.8.1 Legal Illustration of "Liquidated Damages" Clause

The nature of the liquidated damages term itself will determine whether or not the courts will recognize it. The court may be able to defeat the operation of a limitation clause which outs the normal right to sue for damages at large pursuant to the principle of Hadley v. Baxendale[177]. Furthermore, if the term provides an alternative remedy which is purported to be the sole resource available to the injured party the courts may not recognize it as legally enforceable. In all cases, the court will inquire whether the payment provided for by the clause is in the nature of a penalty or liquidated damages[178]. If it is held to be a penalty, the party claiming damages will not be permitted to recover

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[176] Engineering News Record (1985), "The Construction Owner, Developer, Architect and Engineer and Claims: Practical Approaches to Claim Prevention", Seminar Proceedings, ENR, New Orleans, LA, March.
[177] Hadley v. Bax (1854), 156 E. R. 145.
[178] Wallace Duncan (1970), "Hudson's Building and Engineering Contracts", 10th ed., p.670.

under the clause. If, on the other hand, it is held to be liquidated damages, the court will allow the innocent party to recover.

In common law, it is the occurrence of a breach of contract which brings penalty and liquidated damages clauses into effect, and it is at that point that the courts are asked to determine their validity. There are a number of factors which the court will consider in assessing the validity of a liquidated damage clause as laid down by the English court of Appeal in Dunlop Pneumatic Tyre Company Ltd. v. New Garage and Motor Company Ltd[179]. The most significant factor is the amount of damages to be paid. The amount must be a genuine pre-estimate of damages which the owner will suffer. Keeping in mind the general principle that contract damages are designed to be compensatory in nature (i.e., they are designed to put the injured party in a position he would have been if the contract had been performed), a clause designed to provide the injured party with gross profit, as opposed to merely compensating him for losses flowing naturally from the breach, will, in all likelihood, be seen as a penalty clause and therefore be construed by the courts as invalid[180].

As indicated above, an owner should realize that his attempts to provide for a simple and straightforward remedy in the form of a liquidated damages clause will be frustrated unless the clause is drawn in accordance with principle that it must provide for damages

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[179] Dunlop Pneumatic Tyre Ltd. v. New Garage and Motor Company Ltd , A. C. 79.
[180] H.F. Clarke Ltd. v. Thermidaire Corp. Ltd. (1974), 54 D. L. R. (3d) 391.

which bear some relation to reality and should constitute a genuine attempt to accurately pre-estimate damages which occur. Similarly, the contractor should understand that the courts will recognize the freedom of the parties to create their own contract, and are therefore favourably disposed toward enforcing these clauses.

3.9 Chapter Summary

This chapter details experiences with the interpretation of exculpatory clauses. Specific exculpatory clauses have been referenced, discussed and legal interpretations given. The advent of legal cases clearly indicate that the problem exists and the cause of the problem is closely associated with the distribution of risk. With the ever increasing complexity of construction projects and the tremendous amount of dollars expended in each project, the amount of risk inherent in these contracts has expanded. The contract language dealing with risk has not advanced far enough to match this drastic change in the nature of construction. The old concept of "sticking it to the other guy" still continues and has flourished in the writing of construction contracts. Dissatisfied owners, bankrupt contractors and excessive litigation in the courts offer supporting evidence.

A fundamental purpose of a contract is to allocate project risks between the various parties. An equitable contract serves as the first step in building cooperation and close coordination among the project participants. It provides a strong foundation for working out the inevitable disputes before they lead to claims. In reality, today's construction

contracts often reflect the economic power exercised by the owners to require the contractor to accept harsh exculpatory provisions. A clear and unambiguous exculpatory clause will be upheld by the court. The owner is both entitled and able to utilize the construction contract to secure a large measure of protection against delay and extra claims. However, a claim can be brought up against the owner or engineer for misrepresentation in the tender document.

Such clauses are not in the best interest of project and they are a detriment to the successful completion of projects on time, in budget and with reasonable quality of work and materials. Misallocation and misperception result in owners paying more than necessary for many projects, due to risk premiums and unanticipated involvement in dispute resolution by owner's staff, consultants and attorneys. Once disputes arise that may lead to litigation the final project cost becomes a question mark.

3.10 Gaps in the Literature

The extensive literature review contains numerous reference to project risks having a major impact on project success. The problem of inappropriate allocation of risk through contract, and specifically, through exculpatory contract clauses is well researched. Yet, despite many publications on the topic, **owners and engineers typically resist changing contract content.** This resistance manifests itself in the continued use of exculpatory clauses to avoid claims from the contractor, inflated project costs due to hidden premiums

and increased incidences of disputes and claims. The number of disputes and claims has proliferated over the years. **Published literature does not quantitatively address the cost impact of exculpatory clauses in contracts.**

A survey was undertaken to bridge the gaps identified above. The main purpose of the survey was twofold:

- quantify the risk premiums associated with exculpatory clauses in contracts; and
- raise contracting parties' awareness of the potential costs and other impacts of shifting risks in contracts.

CHAPTER FOUR

INDUSTRY SURVEY

4.1 Introduction

This chapter explains in detail the design and method of the study. In turn, it sets forth the methodology of the study, including descriptions of the research design, the sample plan, data collection procedures, and measuring instruments followed by the results. The complete version of the survey data is presented in Appendix B.

This chapter also identifies the specific problems encountered while designing and conducting the survey and steps taken to solve and minimize these problems.

4.2 General Research Design

The purpose of this research was to quantify the cost impact of exculpatory clauses in contracts. It attempted to determine whether these clauses significantly affect contract price, as we originally hypothesized. This study attempted both to obtain qualitative and quantitative understanding of how contractors adjust their bids to compensate for different level of project risk, and direct and indirect costs associated with these clauses.

Given these goals, and based on crystallization of the research problem, this was very much a formal study involving the testing of a hypothesis. Furthermore, this study also possessed some elements of an exploratory research.

The data gathering portion of this study consisted of a survey process. The reasons for selecting a survey as the method of data collection are explained in more detail in the next section. The variables studied were: risk premiums, exculpatory clauses, need for work, design completeness, contract administration, bidding process, and indirect costs. This was an ex post facto design because the researcher has no control over the variables in the sense of being able to manipulate them.

4.3 Survey Methodology

A self-administered questionnaire[181] [182] was used to collect data. The survey solicited information qualitatively and quantitatively on individual perception of exculpatory clauses and associated risk premiums. The reason for using a questionnaire format was inherent in the areas studied. These clauses (no damages for delay, examination of engineering work, liquidated damages, examination of work, and indemnification) were of sufficient complexity to warrant the respondents' personal research into the

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[181] Grinnell, Richard M. (1997), "Social Work Research and Evaluation", 4th edition, F.E. Peacock Publishers, Inc., Itasca, Illinois, p. 277-282.
[182] Cooper, Donald R., Emory, William (1995), "Business Research Methods", 5th edition, Irwin, p. 282-288.

documentation of past dealings to properly answer the questions. Furthermore, the researcher chose this method over other methods of acquiring information due to the following reasons:

- the information being sought was not available through publications or through statistics gathered by government or other agencies;
- it allowed the researcher to study a much larger number of respondents than was otherwise possible;
- respondents could take more time to collect facts, talk with others, or consider replies at length than is possible with a telephone or personal interview;
- more impersonal, thereby providing more anonymity;
- no interviewer error or bias, either in asking for data or in recording responses; and
- no other method of data collection currently used would be economically feasible.

However, there are limitations with mail surveys as identified in the literature review. The major weakness is non-response[183] [184]. The next few sub-sections detail the problems the researcher faced and the steps taken to address and mitigate them in order to have reasonable and acceptable survey returns.

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[183] Grinnell, Richard M. (1997), "Social Work Research and Evaluation", 4th edition, F.E. Peacock Publishers, Inc., Itasca, Illinois, p. 277-282.
[184] Cooper, Donald R., Emory, William (1995), "Business Research Methods", 5th edition, Irwin, p. 282-288.

4.4. Research Sample Population and Data Collection Method

To obtain meaningful results, and to generalize the findings, it is necessary to collect data from construction contractors, owners, and consultants who regularly work on commercial, industrial, institutional, or public construction projects. These project participants typically engage in different types of contracts and thus are felt to be capable of providing good insights into their attitudes and perceptions on risk allocation of specific contract clauses.

Because the success of this study is highly dependent on participation of owners, contractors and consultants, the sample size of the survey was established at 810 organizations across Canada. Going beyond 810 organizations may have induced biases in sample size. The sample was randomly selected from a member list of 4250. The random sample was done to provide each member of the population with the same probability of being selected. The breakup of population sample is as follows:

- Seven hundred contractors selected randomly from a list of 4000 contractors across Canada made available to researcher by his interim supervisor Dr. George Jergeas in association with the good office of the Canadian Construction Association;
- Sixty owners out of 120 picked up randomly from current membership directory of COAA (Construction Owners Association); and

- Fifty consultants out of 130 picked up from April issue of Consulting Engineers magazine.

Out of 810 questionnaires sent to senior practitioners in the construction industry across Canada, 250 questionnaires were completed and returned, and 260 questionnaires were returned unclaimed; thus giving a **total response rate of 45.5%.** However, 20 of the returned questionnaires were not properly completed and therefore only 230 returned questionnaires could be used for analysis. The breakdown of participants by contracting party was:

155 contractors (35.2 %) out of 440;

50 owners (83.3 %) out of 60; and

45 consultants (90 %) out of 50.

The reader's attention is also drawn to the facts that out of 810 questionnaires sent to industry representatives, a large numbers of questionnaire and follow-up letters were returned unclaimed citing various reasons: address change, person no longer with the same organization, person had left the province, company no longer in existence, to name a few.

The above statistics are based on total number of questionnaires returned to the researcher by Canada Post. The exact figures may be more than as recorded above because Canada

Post returns only those unclaimed letters which are mailed by affixing first class postage. Generally, Canada Post does not return unclaimed letters which have been mailed through the bulk rate.

Some contractors simply refused to respond to the questionnaire. They were reluctant to divulge any detailed cost effectiveness information for fear it might dull their competitive edge. Five companies who did not respond to the questionnaire, in fact, are presently in litigation over one or more of these contract areas and could not reveal any details of their companies' policies on these issues. Furthermore, 20 contractors did not complete the survey commenting that most of the questions did not apply to them and that they have stopped bidding on projects that include such clauses. Instead, they have formed alliances with the owners and undertake projects only through negotiation.

In spite of a low response rate from contractors (35%) as compared to the owners and consultants, findings of this study are significant. The overall response rate of 45.5% is typical of a construction industry questionnaire survey and cannot be regarded as biased. Grinelle[185] and Moser et al.[186] assert that the results of a postal survey could be considered as biased and of little value if the return rate was lower than 30-40%. However, most

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[185] Grinnell, Richard M. (1997), "Social Work Research and Evaluation", 4th edition, F.E. Peacock Publishers, Inc., Itasca, Illinois.
[186] Moser, C.A. and Kalton, G. (1971), "Survey Methods in Social Investigation", Heineman Educational, UK.

findings are consistent with statistical data and results from previous research[187] [188] [189] [190], which lend more reliability to the findings of this study.

It is of utmost importance to enumerate here the steps taken by the researcher to increase the response rate. Specifically, the following steps were taken in order to solve the problem of a potential low response rate associated with such a study:

1. A Cover Letter by Supervisor - In a cover letter enclosed with the survey questionnaire the researcher's supervisor made an appeal to each survey respondent (a total of 810 respondents). All respondents were given an explanation of the purpose of the study and were assured of the confidentiality of the information that they would be providing;
2. Prepaid Return Envelope - Return envelopes with postage paid were enclosed with the questionnaire;

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[187] Hartman, Francis (1993), "Construction Dispute Reduction through an Improved Contracting Process in the Canadian Context", A doctoral thesis, Loughborough University of Technology, UK.

[188] Neufville, Richard de (1991), "Risk and Need for Work Premium in Contractor Bidding", Journal of Construction Engineering and Management, Vol. 117, No. 3, September, p. 659 - 673.

[189] Construction Industry Institute (1986), "Impact of Various Construction Contract Types and Clauses on Project Performance", Publication # 5-1, July, p. 1-14.

[190] Akintoye Akintola S, and MacLeod Malcolm J (1997), "Risk Analysis and Management in Construction", International Journal of Project Management, Vol. 15, No. 1, p. 31-38.

3. Follow-ups – The first follow-up/reminder letters were sent at after three weeks. Additional copies of survey questionnaires were faxed to those who asked for another copy;
4. Follow-ups - Second follow-up/reminder letters were sent to all respondents after three weeks of sending the first follow-up letter;
5. Respondents from Calgary were given an advance telephonic notification prior to mailing questionnaires;
6. Repeated telephone calls were made to owners, consultants and contractors over a period of two months;
7. Finally, an appeal was made to the contractors, in the General Contractors Meeting held at Calgary, to respond to the questionnaires.

In essence, the researcher left no stone unturned within his capability and capacity to increase the responses from the contractors. Recommendations made in the literature for improving survey returns were strictly followed.

4.5 Developing the Survey Instrument: The Questionnaires

The development of questions included in the questionnaire was accomplished over a ten month period, beginning May 1996 until February 1997, and it was an iterative process. To ensure that the right type of data and questions were being sought, several drafts were

prepared. In essence, the questionnaire went through several cycles as the list of potential questions was built up and cut down.

A first draft of the questionnaire was delivered to the research advisory committee representing industry for review. One concern brought forth from this review regarded the length of the questionnaire. Because of the complexity of the subject matter, the length had steadily grown since the beginning of the questionnaire development. The concern was that respondents would be reluctant to even attempt to fill out the questionnaire because of the time involved. The researcher along with his supervisor thus reviewed each question included for its contribution to the investigation of the hypothesis developed for the research.

An instrument such as a mail out survey questionnaire is valid and reliable to the extent that it actually measures what it is meant to measure[191]. Thus, while developing the questionnaire, several aspects were considered. Structuring the questionnaire within the four areas of validity - content, wording, response structure, and sequence, were some of the most difficult problems encountered. To solve those problems and hence maximize internal as well as external validity, the following steps were taken in the design of the questionnaire:

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[191] Corcoran, K.J. and Fischer, J. (1987), "Measures for Clinical Practice", Free Press, New York.

- the purpose of the study was clearly defined and stated in plain and simple language;
- sensitive questions were kept to a minimum;
- questions relevant only to this study were asked;
- the wording of each question was designed very carefully in order to avoid ambiguity;
- only questions respondents are qualified to answer were included;
- to the maximum possible extent, double barreled and negative questions were avoided;
- the questionnaire was pretested to meet its objective as identified by Dillman[192];
- pretesting was followed with a debriefing session. This gave the researcher an opportunity to discuss with the pretest respondents what they did and did not like about the design of the questionnaire, what kind of problems they had with it, and how they felt about the experience; and
- an illustrated example was enclosed with each questionnaire.

Two nearly identical owner/consultant and contractor versions of the questionnaire were produced to tailor the questions to each party. The idea was to trace contracting parties

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[192] Grinnelle, R.M. (1997), "Social Work Research and Evaluation", Peacock Publishers, Itasca, IL., p. 239.

reactions and subsequent actions to the same questions. Questions were asked about exculpatory clauses in such a way as to allow a cross comparison of the risk allocation strategies and to quantify the cost impact of these clauses and hence determine their corresponding impacts. The questionnaire was then finalized, reproduced, and distributed. The final questionnaire can be found in Appendix B. Responding companies were asked to fill out the questionnaire and return it in the envelope (postage prepaid) enclosed.

The heart of the questionnaire was broken down into three sections: A, B, and C. Section A deals with information relating to the respondent and his company, and rating of factors contributing to the overall project risk. In Section B, individual exculpatory clauses were qualitatively evaluated. For example, impact, perception on risk allocation, enforceability by the courts, source of disputes, and associated premiums with these clauses, to name a few. Some of the questions in each clause were general in nature and designed to draw on the respondents' knowledge of current issues and practices. It was recognized here that percentages and rating recorded in Sections A and B were likely to be subjective opinion of the respondents rather than hard statistics.

In Section C, participants were presented with a series of questions related to individual exculpatory clauses and related variables based on hypothetical situations. Clauses included in the questionnaire were taken from pre-printed contracts widely used in the US, Canada and the UK. This section attempted to quantify risk premiums associated with exculpatory clauses and other variables.

The question types used were:

- open-ended questions for identifying the respondent;
- multiple-choice questions to identify respondent's preference, and/or agreements (majority of questions in Section B of the questionnaire); and
- use of "standardized" (percentage of construction volume and types of contract used) numerical answers where data could be collected in this manner.

The rating scales were used for closed-responses (e.g., majority of questions in Section B). The Likert scale was also used where respondents were asked to respond to each statements or factors by choosing one of five agreement choice (e.g., question 5 in Section A).

Some of the problems identified in using rating scales include[193]:

- Leniency - when a respondent is either an "easy rater" or a "hard rater";
- Central tendency - when the respondent does not know the subject being rated;
- Halo effect- a systematic bias that the respondent introduces by carrying over a generalized impression of the subject from one rating to another.

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[193] Cooper, Donald R., and Emory C. William (1995), "Business Research Methods", 5th edition, Irwin, p. 173.

There are methods that may be used to adjust the results of a survey to allow for these effects[194]. Care must, however be taken in their use, to avoid worsening the effects of such adjustments. The simple tests on the accuracy of the data collected suggested that such biases did exist. The impact of such bias is discussed in the analysis of the results in the next chapter.

4.6 Chapter Summary

This chapter presented the survey that was completed to fill gaps identified in the literature search. The research design and the survey methodology (i.e., purpose of the survey, why survey was selected as the most suitable vehicle for data collection, development of the questionnaire and problem encountered, how the sample was chosen, to name a few) was discussed.

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[194] Grinnell, Jr. (1997), "Social Work Research and Evaluation", Peacock Publishers, Itasca, IL.

CHAPTER FIVE

RESULTS AND ANALYSIS

5.1 Introduction

This chapter presents the results and analysis derived from the information and data obtained from the survey participants. It reviews the findings from the postal questionnaire regarding five exculpatory clauses and their associated premiums, factors contributing to risk premiums, awareness of enforceability of clauses, and current usage of risk management techniques by the survey participants. Furthermore, it provides a detailed description of the steps undertaken for both data preparation and data analysis.

5.2 Coding and Analysis of Data

After the questionnaires were completed and returned they were entered into a computer database after the identity of the respondent was removed and then analyzed using the Excel spreadsheet by Microsoft and SPSS, a statistical software package. This was done to protect the confidentiality of the information that had been collected. All data was converted to spreadsheets, databases, charts and graphs. Once the data was compiled, statistical analysis was used to quantify the risk premiums and to determine trends and patterns. These were further developed into conclusions and recommendations. The next

section presents the results obtained from the research and provides an analysis of the data gathered.

5.3 Results and Analysis

The aim of this research is to quantify the risk premiums associated with the five exculpatory clauses. The statistical analysis of the data obtained supports the hypothesis that there are measurable premiums associated with these clauses. The combination of qualitative findings and statistical results provide a good understanding of the impact of these clauses on total construction costs.

5.3.1 Characteristics of Sample Population

A total of 250 completed questionnaires from owners consultants (90%) and contractors (35%) were returned. The questionnaires were completed by top management in the responding organization and almost all of respondents had over 15 years of project management experience. The respondents thus have the requisite professional qualification. On the basis of background, it can be inferred that the respondents have adequate knowledge of the activities associated with construction and the associated risks. Table 3 summarizes the type of respondent by business category. Tables referred to in this chapter are located in Appendix B.

The average and total annual construction volume reported by different respondent groups, both expressed in million of dollars, are shown in Table 4. Charts 4 & 4A display the distribution of annual average construction volume by all parties and by respondent type. Note that the cost categories in Chart 4A are in increment of $5 million per year initially and change to increments of $25 and $50 million respectively. As can be seen from Chart 4A, construction volume ranges from $5 million to over $200 million per year. This shows that there is a wide distribution of construction volume and there is a good representation from organizations of various sizes. Furthermore, the majority of construction volumes reported by survey respondents were more than $ 10 million annually.

Documenting the characteristics of the sample population was important, since they could help explain the obtained results. For example, the survey participants for this research could generally be described as large, successful, and relatively sophisticated. The results of this study may have been completely different if the sample population had consisted of small owners, consultants and contractors.

Based upon what respondents have historically constructed, Tables 5 to 8 and Charts 5 to 8 present the type of work performed along with a corresponding fraction of what contract type under which work was done. Respondents could answer anywhere from 0 to 100 percent, as long as the total for three contract types equaled 100 percent. The

responses total 45 to 150 percent because one respondent could have potentially performed all six types of work.

Significant findings from Tables 5 to 8 are the clear predominant use of stipulated price contracts by all respondents. Additionally, the majority of work is performed in the heavy civil and heavy & light industrial sectors although some also had numerous institutional, commercial and residential projects.

5.3.2 Current Usage of Risk Management Techniques

Techniques for risk analysis in construction projects include Monte Carlo Simulation, Probability Analysis, Sensitivity Analysis, Decision Analysis as well as Intuition, Judgement and Experience.

Monte Carlo analysis is a form of stochastic simulation. Using this method the probability of project outcome is obtained by carrying out a number of iterations, depending on the degree of confidence required.

The decision tree shows the sequence of known choices (a number of alternatives) and their possible outcomes graphically in a tree form such that the decision maker can identify best alternatives that achieve the objectives of a project. The decision tree method is useful in deciding methods of construction, choosing alternative projects, and

in addressing contractual problems such as whether to proceed with a claim and assessing the likelihood of a claim succeeding[195].

The respondents were asked to identify which of these risk analysis techniques their firms use for project risk analysis. Tables 9 to 10 show that the use of risk analysis techniques by respondent firms is generally low in construction projects with the exception of intuition, judgement and experience. This tends to support Birch and McEvoy[196] who found that the approach to risk analysis is largely based on the use of checklists by managers, who try to think of all possible risks and take appropriate action. Jamieson and Low[197] have faulted this method of risk analysis by maintaining that, although it is possible to make a long list that is reasonably comprehensive, this approach gives little confidence that all risks have been identified.

Although a checklist based on intuition/judgement/experience is the most frequently used technique by the respondents, it cannot be regarded as a formal technique for analyzing risk. Furthermore, the results tend to suggest that the consultants and owners, compared with the contractors, have more awareness and usage of risk analysis techniques.

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[195] Thompson, P. and Perry, J. (1979), "Engineering Construction Risks - A Guide to Project Risk Analysis and Risk Management", Thomas Telford Services, London, UK.
[196] Birch, D. G. W. and McEvoy, M. A. (1992), "Risk Analysis for Information System", Journal of Information Technology, Vol. 7, p. 44 -53.

Almost all organizations depend on intuition/judgment/experience to identify and assess risk involved in construction. This is followed by sensitivity analysis. The popularity of sensitivity compared with any other formal techniques of project risk analysis is probably because it provides answers to a whole range of 'what if' questions, it is comparatively simple to use and has the ability to focus on particular estimate components[198]. The technique provides information on the project risk variables which are considered to have a potentially serious impact on project cost and time estimates. Other techniques such as subjective probability and Monte Carlo simulation require quantification of probability occurrence and probability distribution of risk factors before the procedures involved in calculations can be undertaken. With the exception of checklists and sensitivity analysis, these results generally contradict those obtained by Simister[199]. This could be explained by the work-related background of his respondents with some skewness towards IT-related fields.

5.3.3 Factors introducing risk premiums

Many previous research works have identified various risks associated with projects. All these risks can happen to any construction project. Therefore, the purpose of this part of

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[197] Jamieson, R and Low, G. (1990), "Local Area Network Operations: A Security Control and Audit Perspective", Journal of Information Technology, Vol. 5, p. 63-72.
[198] Flanagan, R and Norman G. (1993), "Risk Management and Construction", Blackwell, UK.
[199] Simister, S.J. (1994), "Usage and benefits of Project Risk Analysis and Management", International Journal of Project Management, Vol. 12, p. 5-8.

the investigation was not to identify a lists of risks, but to identify the importance of these major risks that will definitely increase and/or decrease contract pricing. An indication of the relative importance of these risks in the Canadian construction practice is given by examining respondents' observations and judgments. The findings from the survey have been summarized in Table 11. The left-hand column in the table is the list of sixteen risks identified, and the numbers above the column represent the rank of the risk's relative contribution to risk premiums between the sixteen risks. In the survey, each respondent was required to rank the sixteen risks by considering their contribution on a risk premium scale of +2 to –2. +2 is assigned to a risk which will definitely increase contract pricing, and –2 is assigned to a risk which will definitely decrease contract pricing. The rank value "0" denotes no contribution to contract pricing. The figures within the table 11 represent the number of respondents who gave the relative contribution rank to each risk. For example, the figure 109 in the left corner indicates that 109 respondents considered "unforeseen site condition" to be the most important risk which definitely increases contract pricing and thus rank this risk with the highest rank value +2.

In order to demonstrate quantitatively the relative importance of the risks, a weighting approach was adopted. The principle is that the risk with the highest contribution rank would be assigned the largest weight, and the risk giving the lowest contribution would be given the smallest weight. The figures in bracket in Table 11 are weighted scores for each risk at different contribution ranking. Each individual weighted score is obtained by

multiplying the number of respondents with the corresponding weight. The figures in the right column of the table give the total weighted score for each risk.

The foregoing analysis shows that all respondents perceived 'unforeseen site condition' as the most important risk that definitely would increase contract pricing followed by 'technical complexity', 'contract terms', and 'environmental risks'. Geo-technical uncertainty in construction promotes design and construction conservatism. The quality and quantity of geo-technical information available during the bidding phase has a significant impact on the accuracy of the cost estimates for the work and determines the amount of contingencies included in construction bids and the resulting total cost of the project to the owner. Now looking at Table 12, a better insight to each party's views can be obtained. It is also worth noting from Table 12 that some factors are considered to be important by owners but not so by the contractors and consultants and vice versa (e.g., external factors, need for work). Furthermore, the factor 'design completeness' was seen by the contractors to have influence on the bidding markup decision but the owners and consultants gave the same factor the lowest ranking. This shows the differences in the perception of the risk. The biggest risk a contractor faces is trying to attach a firm number to incomplete plans and specifications. The whole point of drawings and specifications is to minimize misunderstanding and minimize risk.

5.4 Qualitative Results - the Questionnaire (Section B)

Any construction project involves risk. With the ever increasing complexity of construction projects and the tremendous amount of dollars expended in each project, the amount of risk inherent in these contracts has expanded dramatically. The question now is: has the contract language dealing with risk also advanced far enough to match this significant change in the nature of construction? The obvious negative answer can be deduced easily. Dissatisfied owners, bankrupt contractors and excessive litigation in courts offer supporting evidence for this answer. While construction methods and practices have undergone a serious shift, contract practices have not advanced as much. Contracts have so far failed to provide a clear policy for managing construction risks. Disagreements occur between owners and contractors as to what risks are involved, and who should bear what risk.

Risk is typically assigned through contracts with little or no assessment of the financial consequence of the decision. Previous studies in this area mostly presented the contractors' views of risk. In this study, however, owners, contractors and consultants across Canada join in sounding their views. Specifically, this section of the questionnaire was intended to evaluate the risk assigned to contractors by owners, under the terms of the contracts that are used in the industry. With owners, contractors and consultants expressing their opinions concerning the same issues, a more practical approach can be

developed. Differences between respondents regarding risk issues will be displayed. An analysis of all parties' views is applied and guidelines for a potentially better contract strategy are then developed and listed in the next chapter. The results for this section of the Questionnaire are summarized in Tables 13 to 18. Tables 13 to 18 give perception of five exculpatory clauses by respondent type (owner, consultant and contractor).

5.4.1 Presenting the Exculpatory Clauses

The first step in this analysis was to define the so-called "Exculpatory Clauses." To do so it was necessary to adopt the points of views of those who completed the questionnaire, i.e., owners, contractors and consultants. The reason for the distinction is the special nature of risk. That is, the risk issue was and always will be an issue of subjective judgment. Each party assesses the nature and amount of risk in its own way. No matter how open-minded and good-intentioned everybody may be, some major differences will still occur between the opinions of different parties. It was just as fair then, to look at survey participants' views and pose this crucial question:

> How do respondents differ in their assessment of exculpatory clauses and associated impacts?

As an example, looking at Table 13, a better insight to each party's views regarding exculpatory clauses can be obtained. Eighty five percent of contractors found the

'Examination of Engineering Work' clause a subject of dispute as compared to 60% of owners and consultants.

There is significant agreement among survey participants with regard to the existence and the size of risk premiums associated with the five exculpatory clauses. The overall results indicate that such clauses attract risk premiums and their magnitude is considerably high. As shown in Table 15, the majority of owners, consultants and contractors did place a high risk premium value on 'Liquidated Damages', 'No Damage for Delay' and 'Examination of Engineering Work' clauses, ranking them in the top three for attracting risk premiums. Owners also allocate a higher percentage (94%) to the 'Indemnification' clause and its contribution to risk premiums. The size of the premium placed on each of these clauses is high as viewed by more than 80% of the respondents. The results also indicate that these clauses very often lead to disputes and litigation. Furthermore, these clauses do not serve project objectives. The majority of risks are allocated to the contractor through these clauses. The following is a list of non-exclusive possible project objectives, which might be considered to be paramount by contractors[200]:

- maximizing total profit;
- maximizing productivity;
- minimizing project duration;

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[200] CII (1989), "Impact of Risk Allocation and Equity in Construction Contracts", Source Document 44, March.

- maximizing safety;
- enhancing corporate reputation.

Comparatively, the following is a list of non-exclusive possible overall objectives, which might be considered important by owners[201]:

- minimizing total cost;
- maximizing overall quality;
- maximizing overall safety;
- minimizing project duration.

By contrasting these two sets of objectives, it is evident that they overlap and that there is also a natural conflict of interests arising between owners and contractors. On some occasions this is reflected in an antagonistic working environment. It is then of no surprise to expect that each party will seek to have specific contract clauses phrased in a way that its goals may be satisfied.

On an aggregate basis, nearly 90% of all survey respondents indicated that the clauses 'No Damage for Delay', 'Indemnification' and 'Examination of Engineering Work' were

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[201] CII (1989), "Impact of Risk Allocation and Equity in Construction Contracts", Source Document 44, March.

not necessary i.e., they should not be included in contract documents. Reviewing the responses to individual clauses show that only responses for the 'Examination of Work' and 'Liquidated Damages' clauses were scattered. Nearly 33% of the sample population viewed the 'Examination of Work' clause as being necessary to include whereas 75% specified that the 'Liquidated Damages' clause as not being necessary. A comparative examination of Tables 13 & 14 also confirms that only 33% owners and consultants consider inclusion of these two clauses as unnecessary. This displays the differences between the owners/consultants and contractors. However, the general attitude as viewed by all respondents for all five exculpatory clauses is that generally they do not serve project objectives and often lead to disputes. Looking at the individual clauses, the 'Indemnification' and 'Examination of Work' clauses were both at the top as being the subjects of dispute for all parties. Further analysis of the database clearly shows that the price for having a conflicting set of goals and objectives is substantial for both parties. Although it is certainly true that project performance is also affected by almost any abnormality that occurs within the project environment, it has been clearly shown that non-compromising, divergent project objectives will adversely affect overall project performance in terms of cost, schedule and quality. This is based on highest percentage response.

The results presented in this section clearly demonstrate that assigning maximum risk to the contractor through commonly used contract wording creates a confrontational and non-cooperative work environment. This finding is consistent with Hartman.[202]

5.5 Quantitative Results - Risk Premiums

The quantitative results of this study were the product of the statistical analysis of the data obtained from the survey. This statistical analysis consisted of t-test for sample mean and analysis of variance (ANOVA) between independent and dependent variables. The statistical results indicate that contractors increase their bid price as project risk is shifted to them through the use of exculpatory clauses as project risk increases and as their need for work decreases. Another way of stating these results is that contractors charge a "premium" when risk is passed onto them contractually. Given this interpretation of the results regarding contractor bidding, the question of primary interest is "How large are these premiums associated with five exculpatory clauses and other sources of risk?" This section addresses this question.

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[202] Hartman, Francis T. (1993), " Construction Dispute Reduction through An Improved Contracting Process in the Canadian Context," Ph.D. Thesis, Loughborough University of Technology, UK.

5.5.1 Design of bidding questionnaire - Section C

The acquisition of new construction contracts is one of the most important management functions in a construction organization. New contracts are often awarded through the process of bidding. The bidding process can be viewed as a problem of decision making. One of the decisions required is the determination of the risk premiums (the allowance added to the cost estimate to cover cost associated with risks in contracts).

The questions used in Section C of the survey questionnaire were designed to reflect a real life situation familiar to the participants and was intended to obtain realistic replies. Participants were asked to assign a dollar value in specific risk situations as described to them. The base bid was limited to $10 million and included all direct and indirect costs as well as home office overhead allowances and profit (excluding any allowances associated with risk).

5.6 Overall Results

The results presented in Tables 19 and 21 as well as Charts 19 and 21 (Appendix B) are the overall results for all respondents, grouped into one population sample for the five exculpatory clauses and nine risk sources. The overall results give a general indication of the size of risk premiums attached to each of the exculpatory clauses and the sources of risk.

Visual review of the Charts 19 & 21 and corresponding Tables 19 & 21 shows that the 'No Damage for Delay' and 'Liquidated Damages' clauses attract high premiums followed by the 'Examination of Work' clause. Table 21 shows that contractors charge significant premiums, in the order of 2.24%, to cover the risks associated with 'technical complexity'. In other words, technical complexity has the most adverse consequences on the successful completion of a construction project.

5.6.1 Results by Respondent Type

The premium placed on each of the exculpatory clauses and sources of risk may depend on the risk exposure perceived by an individual firm from these clauses, each of the sources of risk, the likelihood of occurrence, the experience of the firm in dealing with the particular type of risk, the attitude of the firm toward risk, and the extent of impact posed by these clauses. Some of the exculpatory clauses and risk sources are more important to the survey participants than others and this is recognized by the different premiums attached to different risks associated with construction.

The respondents were asked to indicate the size of the premium that their organization applies to each exculpatory clause and to each risk source. The purpose was to quantify overall views of their organizations' premiums associated with five specific and commonly used exculpatory clauses and the sources of these risk premiums.

Additionally, it was intended to demonstrate quantitatively the relative contribution of exculpatory clauses as perceived by respondent type. The responses are summarized in Tables 20, 22 and 23.

The tables show that both the owners and consultants are quite similar in the order of importance they attached to exculpatory clauses and to the perceived sources of risk. However, the contractors have a significantly divergent perception than that of the owners and consultants. The contractors gave highest importance to the 'Examination of Work' and 'Indemnification' clauses followed by the 'No Damage for Delay' clause. Consequently, these clauses attracted large premiums from the contractors.

Consultants assigned consistently 'low' premiums to the 'Examination of Engineering Work' clause and to 'design completeness' (a risk source) which indicates that they do not view and appreciate the amount of risk premiums attached to this exculpatory clauses and the cost implications of incompleteness or errors in the design.

Table 20 lists the risk premiums for five exculpatory clauses under ideal conditions. Looking at the contractors' column, the "average" risk premium is approximately 9.0%. The 'average' risk premium, as perceived by the owners and consultants, and as charged by the contractors are also listed. It should be noted here that the total premium charged on a project would actually be higher than the contractors' risk premium listed since the contractors would also be carrying and marking up subcontractors and/or suppliers' risk

premiums. Furthermore, if a project has high technical complexity, a contractor's bid on the project would be, on average, 2.24% higher than if the project had low technical complexity. Similarly, if the contract administration from the owner's side is known to be unfair, a contractor would raise his bid price by an average of 1.74%. Briefly, as the risks are shifted to the contractor, the cost for construction increases. These increased costs come not only in the form of additional premiums to reflect the expected costs of such risk, but also in fees for the risk-bearing services, adding personnel, equipment costs, legal fees and so on. Table 23 summarizes the premiums associated with the specific five exculpatory clauses examined in this study. These are premiums charged by contractors under adverse conditions. As can be seen in Table 23 that contractors, on average, charged 19% to reflect cost items associated with the five clauses under adverse conditions. Furthermore, it was found that the 'Indemnification' clause had attracted the highest premium for these cost items followed by the 'No damage for Delay' and 'Liquidated Damages' clauses.

5.6.2 Results of *t*-Test

To determine whether there were differences between the means of responses obtained from the different categories of survey respondents, an analysis of sample means, using the *t*-test, should give a good indication of whether each sample is statistically similar. The null hypothesis was that the two means are equal (not statistically significant), versus

the alternative hypothesis that the two means are not equal (significantly different). Mathematically speaking

H0: $\lambda = 0$ $(\lambda_1 - \lambda_2 = 0)$

Against alternative

H1: $\lambda \neq 0$ $(\lambda 1 < \lambda 2$ or $\lambda 1 > \lambda 2)$

A two-tailed hypothesis test was performed; an alpha of less than or equal to 0.01 0.05 and 0.1 (99%, 95% and 90% confidence levels) were selected as the critical significance levels for rejecting the null hypothesis. A calculation was performed to determine the critical value using the appropriate distribution. When the calculated t-value exceeded the critical value, the null hypothesis was rejected; and it was concluded that a statistical difference existed between the means of the categories. Otherwise, it was concluded that no statistical difference was present.

The results of the t-test applied to the sample means for the five exculpatory clauses are shown in Table 24. Columns 3, 5 and 7 give the probability that the sample means are equal for each clause. The t-test results lead the researcher to reject the null hypothesis for every clause except the 'No Damage for Delay' and 'Indemnification' clauses between respondents contractor-owner and consultant-owner respectively. Additionally, the direction of difference in means with regard to the 'Examination of Work' and 'Examination of Engineering Work' clauses between consultants-owners, and

contractors-owners still show some significance. The samples are not statistically similar with respect to other clauses and between respondent categories.

5.6.3 Results of Analysis of Variance (ANOVA) Test

The One-Way ANOVA procedure was used to find the *F*-value between the dependent variable, risk premium and the independent variables, the five exculpatory clauses, and to determine the *P*-value (the probability of independence between the two variables). The intent was to determine (if any) the overall changes in risk premium due to non-inclusion of one or more exculpatory clauses. Four hypotheses were developed and tested. The following hypotheses were tested:

1. There will be no significant difference in risk premiums charged by contractors when only four (liquidated damages + examination of work + examination of engineering work + indemnification) of the five exculpatory clauses are included in the contract document.
2. There will be no significant difference in risk premiums charged by contractors when only three (examination of work + examination of engineering work + indemnification) of the five exculpatory clauses are included in the contract document.
3. There will be no significant difference in risk premiums charged by contractors when only two (examination of engineering work + indemnification) of the five exculpatory clauses are included in the contract document.

4. There will be no significant difference in risk premiums charged by contractors when only one (indemnification) of the five exculpatory clauses are included in the contract document.

Results are summarized for the respondent type in Tables 25 to 28. The variable, risk premium, for the above three hypotheses was found to be significantly different at both the 0.05 and 0.01 level; therefore the hypotheses were rejected. Only hypothesis four was found not to be significantly different. The criterion for accepting a null hypothesis was the obtained F value. If the obtained value of F is less than the tabled critical value, it is concluded that the probability is fairly high ($p > 0.05$) that the obtained F would occur in a coilection of samples drawn from a single population. That is, the observed differences in sample means have a relatively high probability of resulting from sampling error and should not be considered statistically significant.

5.7 Overall Analysis of Results

Although the statistical results of Sections 5.6 indicated that exculpatory clauses have a significant effect on contractor bidding, these results require additional analysis to develop a deeper understanding of the nature of risk premiums. This section considers trends in the statistical results that provide additional insights into risk premiums.

5.7.1 Risk Aversion and Preference

The size of risk premiums as charged by contractors and perceived by owners and consultants exhibited the phenomena of risk aversion and risk preference as defined by utility theory. Risk aversion is the phenomenon where people, when faced with two options, often prefer the one which is most certain, even if it is less profitable[203]. Conversely, risk preference is the phenomenon where people, faced with two options, prefer the one which is less certain but has a greater possible payoff. (Note: the term risk used in conjunction with risk aversion or preference refers to the risk of losing.) In other words, people who exhibit risk aversion tend to go for the "sure thing."

With increased exculpatory clauses, high project risk and/or low need for work, the contractor exhibits risk preference's phenomenon. This behavior would be expected since if more exculpatory clauses are included, and if project risk is high and/or need for work is low, a contractor will only be willing to take the project if there is the potential to make above average profits by charging premiums. When only one or two disclaimer clauses are included in the contract, the project risk is relatively low or need for work is high, the contractors were generally more risk adverse. Again, this would be expected because when one or two exculpatory clauses are there, and the need for work is high and/or risk

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[203] Neufville, de (1990), "Applied System Analysis: Engineering Planning and Technology Management", New York, McGraw-Hill Inc.

is low, a contractor bids low to improve his chance of winning, even it means making less profit. This finding is consistent with McKim[204].

5.7.2 Observations Regarding Exculpatory Clauses And Risk Premiums

Both the t-tests and ANOVA results and the calculated risk premiums indicate that contractors seem more sensitive to the "Examination of Work" and "Indemnification " clauses than owners. Owners are very sensitive to the "Liquidated Damages" and "No Damage for Delay" clauses. The consultants seemed to be less sensitive to the "Examination of Engineering Work" clause than both the owners and contractors. The risk premium assigned to "Examination of Engineering Work" clause by consultants is 0.54% whereas it is 2.14% and 1.55% by owners and contractors respectively. Several possible explanations as to why one party appears to be more or less sensitive to the inclusion of exculpatory clauses and associated premiums are presented below:

(1) The allocation of risk between the owner and the contractor is primarily determined by the type of construction contract and the wording and intent of the contract clauses. Once the risk, responsibility, and financial burden are transferred to the contractor through specific exculpatory clauses, their effects on the projects are theoretically no longer a concern of the owner. However, contractors do not appreciate and accept the idea that responsibility for risks associated with these clauses belong to them or can be

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[204] McKim, Robert A.(1992), "Risk Behavior of Contractors: A Canadian Study", Project Management Journal, Vol. XX11, No. 2, p. 51-55.

assigned to them. The owner and/or his representative engineer have ample time to make a complete investigation and evaluation of the project risks. The cost of these investigations and evaluation is trivial in relation to the total cost of the work. In other words, the way these risks are shared between the owner, the designer, and the contractor determines the risk premiums to be required by each party.

(2) The **Indemnification clause** is a security or protection against hurt, loss, or damage. Broad indemnity, which purports to extend protection to the owner to include claims brought about by the owner's own negligence, and without negligence on the part of the contractor. As the risk is shifted from the owner to the contractor, the contractor increases its costs to account for this additional risk.

(3) **Liquidated damages** clause serves to limit an owner's delay exposure. Liquidated damages clauses are often used by owners to protect their schedules against delays caused by the contractor. But at the same time it presents a problem for the owner in that the owner has the burden of proving the contractor's inexcusable delay[205]. Theoretically, the inclusion of this clause is more cost effective for contractors because it serves to expedite the delay damage process by forcing the contracting parties to agree upon a compensatory sum to be paid by the breaching party prior to contract signing. Furthermore, the magnitude of the liquidated damage allows the contractor to understand the magnitude of

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[205]ENR(1985), "The Construction Owner, Developer, Architect and Engineer and Claims: Practical Approach to Claim Prevention," Seminar Proceedings, Engineering News Record, New Orleans, LA, March.

the risks as the owner views them. This results in a more accurate pricing of the premiums[206].

(4) **No damage for delay** - Contractors view the 'No Damage for Delay' clause as an inequitable one[207]. The contractor bears cost liability for delays over which he has no control and delays caused by the acts or omissions of the owner. Delays place additional stress on the difference in objectives between the two parties. This is true because delays foster disputes and disputes create a great deal of finger-pointing and face-saving.

(5) **Examination of Engineering Work** - The presence of the '**Examination of Engineering Work**' clause in the contract alerts the contractor to expect discrepancies in design and hence they include premiums in their price. The whole point of design, drawings, plans, and specifications is to minimize misunderstanding and minimize risk. The general rule of law is that the owner impliedly warrants the adequacy of the plans and specifications for construction cases. This means that when the owner requests bids for construction, the contractors assume that the owner has checked the design, plans, and specifications, and has determined that the design is adequate, constructible, and can be built within the time frame set forth in the contract. Furthermore, the contractor can assume that he can rely on any representation made in the contract documents. For both the owner and contractor, the costs of claims are greatest when the errors are discovered

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[206] CII (1989), "Impact of Risk Allocation and Equity in Construction Contracts", Source Document 44, March.

[207] Constructor (1986), "Risk of Delay Shifted to Contractor," Constructor, November, p. 64.

during the actual construction of the project. For example, when the contractor discovers a discrepancy between plans and specifications and has craftsmen standing around waiting to receive a decision on what to do, or when he discovers that two or more contractors are scheduled to work in the same place at the same time, costly delays, which result in claims, occur.

A possible explanation as to why consultants appear to be less sensitive to the 'Examination of Engineering Work' clause and its associated premium is that they are not financially impacted by the presence of this clause except that their professional liability premiums go down. Furthermore, these clauses are seen as reducing design error risk, but can reduce fees too. Any money (risk premium) apparently paid to the contractor comes from the pocket of the owner.

5.7.3 Explanation of Bias Associated with Nonresponse

The effect of nonresponse on survey estimates depends on the percentage not responding and the extent to which those not responding are biased - that is, systematically different from the whole population[208]. The nature of bias associated with nonresponse differs somewhat among mail survey, telephone, and personal interview procedures. The researcher recognizes the existence of such bias in this study. This bias exists due to a

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[208] Fowler, Floyd J. (1996), "Survey Research Methods", 2nd edition, Sage Publications, Inc., California, p. 40.

relatively low response from the contractors (35%). However, this bias does not stop the generalizability of the findings. There are various explanations for this. A few of them include:

- The annual volume of construction in Canada is estimated to be nearly $100 Billion. The total annual volume represented by the population sample is $18.7 Billion. In other words about 19% of the whole population as measured by annual construction volume was captured by this study.
- The response rate of 35% from contractors cannot be viewed as biased considering Akintoye[209] and Yates[210] assertion. They state that the results of a postal survey could be considered as biased and of little value if the return rate was lower than 30%. The response rate is typical for a construction industry questionnaire survey.
- The questionnaires were completed by senior project management personnel in the respondent organizations (mainly directors and partners) and almost all of them (more than 90%) had over 15 years of construction experience. The respondents thus have the requisite professional and academic qualifications to provide reliable and quality data.

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[209] Akintoye, Akintola and MacLeod Malcom (1997), "Risk Analysis and Management in Construction", Int. Journal of Project Management, Vol. 15, No. 1, p. 31-38.
[210] Yates Janet and Aniftos S. (1997), "International Standard and Construction", Journal of Construction Engineering and Management, Vol. 123, No. 2, June, p. 127-137.

- The statistical analysis for sample estimates is grouped closely around the true population value as is evident from the low variance in the quoted value for risk premiums associated with exculpatory clauses.
- A review of the published literature supports the findings in this study that exculpatory clauses are routinely used to assign risk to the other parties in a contract. This practice is not confined to North America.
- Other studies also suggest that problems arising from these exculpatory clauses are universal.

5.8 Chapter Summary

Contractual allocation of risk is an important issue. This study has clearly demonstrated the importance of thoughtful and meticulous contract preparation as a way to achieve improved project performance. Since the greatest impact on project costs occurs at the front end of a project, the construction contract represents an area of potentially large cost savings for both owners and contractors. This study exposed some of the problem areas associated with risk allocation and equity analysis for the 'Indemnity', 'No Damage for Delay', 'Examination of Work', Liquidated Damages' and 'Examination of Engineering Work' clauses.

The purpose of this chapter was to present the results derived from the information and data obtained from the survey participants. It reviewed the findings from the bidding questionnaire regarding what factors contribute to project risk and thus introduce risk premiums and it discussed how contractors measure and compensate for these factors in their bids. **These results support the hypothesis that exculpatory clauses significantly affect contractor bidding.** The combination of qualitative findings and statistical results provide a good understanding of how exculpatory clauses and risk affect contractor bidding. In summary, the amount of risk premiums charged by the contractor is in direct relationship with the wording and intent of contract clauses and the perceived level of uncertainty about the project. Specifically, the magnitude of risk premiums depends upon the following circumstances:

- Presence and/or absence of exculpatory clause(s);
- Bidders expectation of fair contract administration;
- Project scope, size and complexity;
- The reliability and completeness of geo-technical information;
- The desirability of the project;
- The availability of the work;
- Past history of work experience with the owner and/or the engineer;
- Design completeness;
- The bidding method; and

- Degrees of risk aversion.

All of these are a factor in making the decision to bid. The end result varies from weighing the addition of a premium to the bid to not submitting a bid at all.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

Based on the results of the statistical analysis of the data obtained through postal survey, it can be conclude that both exculpatory clauses and project risks significantly increase contract price. Specifically, it appears that contractors bid higher to compensate for the presence of exculpatory clauses and higher risk. This effect appears to hold true as perceived by construction owners and consultants.

This chapter summarizes the findings of this study and presents the conclusions, recommendations and additions to the existing body of knowledge. Furthermore, this chapter applies and extends these conclusions: Section 6.2 suggests how the results of this study can be applied by the construction industry, and Section 6.6 suggests potential areas for future research.

6.2 Application and Extension of Results

Risk costs money. Rational people avoid playing with the odds when the stakes are high; they add a cushion to their costs to protect themselves from disruptive losses. The

research findings demonstrate that, for contractors, this premium can be as high as 9% in ideal conditions and 19% in adverse conditions. In fact, the risk premiums measured in this study should be viewed as minimum since they only reflect increase in contract price to cover risk associated with the five specific exculpatory clauses under ideal as well as adverse conditions, as shown in Tables 20 & 23. They do not include contractors' premiums attached to the risk sources such as the 'Need for work: 1.1%', 'Technical Complexity: 2.25%', 'Contract Administration Cost: 1.74%', 'Incomplete Design: 0.7% to 4.32%' and 'Bidding Method', as shown in Table 21.

The existence and size of risk premiums associated with the five specific exculpatory clauses and risk sources imply certain consequences for better management of the risk and elimination of all the associated (wasted) cost. The results suggest a benchmark for an owner to determine whether it is cost effective to absorb the risk of project or to pay the contractor to bear the risk. For example, using the total risk premium computed in Tables 20 and 23, assume a project had estimated direct costs of $10,000,000. If a contractor considered this job to be high risk due to the presence of the five specific exculpatory clauses, the contractor would charge a risk premiums of $900,000 (9% times $10MM) under ideal conditions to $1,900,000 (19% times $10MM) under adverse conditions. Furthermore, the contractor would charge an additional 0.7% to 4.4% times $10MM to account for the risks associated with risk sources such as 'high technical complexity', 'low need for work', 'unfair contract administrator' and 'incomplete design'. If an owner can reduce the project risk through better management and

elimination of exculpatory clauses from his contract, he will save money by avoiding the contractor's risk premium. As minimums, these figures (9% to 19%) are still useful for an owner to determine whether or not it is cost-effective to carry the risk or to have the contractor carry the risk.

6.3 Conclusions and Recommendations

This study presented compelling evidence that should convince both owners and contractors to seek equitable risk allocation in the areas of delay, differing site/soil conditions, engineering work, liquidated damages and indemnity. This study not only identified and quantified the size of risk premiums associated with specific exculpatory clauses and risk sources, but also confirmed that current contract practices have, so far, failed to adequately address this issue. Owners' contracts are designed, not to definitely fix obligations, but to limit or exclude an owner and/or his representatives from liability in contract and often in tort for costs or expenses incurred by a contractor. Lack of contract strategy based upon attention to risk can produce very unpleasant surprises that later lead to protracted disputes. The parties to a contract are also frequently at odds over the interpretation of risk allocation in the contract and the responsibility for managing the risks or carrying the consequence of the risk. In other words, there is fuzziness over who, or which party, is responsible for managing or mitigating a specific risk event. Furthermore, unfair contract conditions obviously impact project performance in an

adverse manner. The result has been the rapid growth of the 'claims industry', contract arbitration and litigation in the UK, the US and Canada.

The results of this study indicate that contractors' risk premiums increase with the addition of exculpatory clauses and risk sources on projects. Given this relationship between exculpatory clauses, risk and contract price, owners can reduce the cost of their projects by reducing the risk the contractors are required to bear. This potential is greatest for those forms of risk, which the owner is in a better position to control than the contractor. Fortunately, many of the specific actions needed to reduce risk involve better planning in the pre-construction phase of a project and thus can be controlled by the owner. Since many of these actions take place at the front end of a project they can be highly leveraged i.e., relatively small amount of additional expenditure in the pre-construction phase could result in far greater savings in the construction phase. Specific recommendations as to how the owner can lower contractor risk are:

- Consider the overall cost impacts of these clauses and HAVE A CONTRACT THAT AVOIDS THESE PROBLEMS IN THE FIRST PLACE. By explicitly assuming more of the risk, the owner may obtain bids containing fewer premiums and contingencies. If uncertain events for which the contractor included risk premiums do not occur, the contractor realizes what appears to be a windfall profit. If the contractor could have covered the costs in the event of occurrence, then this apparent windfall profit in the

nonoccurrence case is justified compensation for the contractor's risk exposure. If, however, the contractor would not have been able to cover the costs in the event of occurrence, the premium paid by the owner is not justified.

- Even if the contractor is bonded, a contractor default due to the occurrence of an event for which the contractor assumed the risk results in additional costs for the owner because of delays, claims, and possible litigation. It is likely that such a situation could be averted if the owner assumed more of the risk.
- Owners should reduce the risk on a project whenever cost effective. Specifically they could:
    - Select only architects/engineers/consultants that have a reputation for producing high quality, well-detailed construction drawings and for dealing fairly with contractors. Many contractors stated that apart from exculpatory clauses in the contract documents, incomplete and/or poor quality design documents and uncooperative and unfair engineers/contract administrators were sources of project risk, and thus resulted in higher premiums and markup to cover the risk. There is another lesson and food for thought here for owners and designers. Are fees for design (5%-10%) reasonable compared to 9% to 19% risk premiums?
    - Perform detailed site investigations in the pre-construction phase of a job. These costs would most likely be small relative to the potential savings in

construction costs if the contractor did not have to inflate his price to cover uncertain differing site/soil conditions.

- Owners need to identify major risk sources causing cost increase in bid price in advance and manage it effectively. This requires utilization of a systematic approach to the management of project risks and uncertainties in the conceptual stage to minimize their effects. A systematic approach involves identifying risk sources, assessing their effects on a project, and selecting ways to control them.

Some of the general recommendations that can be drawn from this study include:

- Given the negative impacts exculpatory clauses created, it would seem in the interest of both parties to develop improved communication and negotiation concerning the inclusion of these known problem clauses in contract documents. Use of these clauses must not be company standard practice. Rather, they should reflect the particular circumstances of each individual project.
- Project success is dependent on clear communication of risk allocation. Contracts will be significantly improved by carefully avoiding ambiguity in contract clauses. It has been shown that these clauses have varied interpretations as to the degree of responsibility and the level of enforcement. Such disparities of opinion create the need for frequent clarification and result in contractual disputes.
- Owners should consider their contract strategies. From an owner's point of view, this means balancing such issues as are summarized below:

- **Trust v. Cost:** An inverse relationship (within limits) has been demonstrated between Cost and Trust. The higher the trust levels, the lower the cost. Most contract forms engender mistrust from the outset.
- **Risk Sharing:** Develop a formula (as has been done successfully in the North Sea and elsewhere) to share risk and rewards with the contractor. Done right, this helps keep stakeholders aligned on key issues such as life cycle costs, completion schedules and safety.
- **Pick the Best Form of Contract:** (Stipulated price, unit rate or cost plus) as well as the scope (design, construct, design/build, EPC, BOT, BOOT etc...) and the way it is packaged (Single prime contract, phased packages, multiple prime contracts, project management, construction management etc...). Each of the above decisions involves multiple trade-off in terms of how the work will be done and who may be eligible to do it. Other factors in these decisions include:
    - Risk apportionment;
    - Cost v. time v. quality;
    - Trust levels;
    - Opportunities for value engineering and constructability to be implemented;
    - Project team effectiveness v. certainty of outcome.

The above are just few of the most important factors in avoiding disputes. Although most of the decisions rest with the owner, contractors should be able to interpret the intent of the owner from these decisions, and then govern itself accordingly.

- Improving the contracting process requires a change in mind-set. Current (bad) practices are just part of life and should be accepted philosophically[211]! At issue is the trust between the owners and contractors. Since contracting has historically been adversarial, it is unrealistic to expect parties to trust each other without first establishing a relationship. We recommend that owners take a hard look at their real needs and determine if their current contract provisions respond fairly and reasonably to these needs. Then we encourage them to consider the interests and needs of the contractor and to determine if the current contract provisions respond to those needs in a reasonable fashion without necessarily compromising the owner's requirements. We have seen, with the exception of a few enlightened owners, very few contracts in the Canadian construction industry which demonstrate a balanced approach to the allocation of risk. These contracts reflect the economic power exercised by the owner and require the contractor to accept harsh provisions. The owners should realize that no prudent contractor would accept a risk without charging an appropriate premium to cover it. After all is said and done, money apparently paid by the contractors or

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[211] Fisk, Edward (1997), "Construction Project Administration", 5th ed., Prentice Hall, NJ, p. 225.

suppliers ultimately comes from their only source of revenues - their clients, the owner.

- The final recommendation to owners, designers, project managers and contractors is[212]:

> "The best way to manage a risk and eliminate associated cost is not to have it in the first place. There are many advantages to this type of thinking when one takes into account 9% to 19% risk premiums associated with these clauses. No risk means no time wasted in recovering from it. It also means that we can free-up resources to provide a better service and to make a large profit- everyone wins. Finally, if we can be confident that we will have no risks, we will be more open to collaboration and cooperation between project stakeholders. Further, the working relationship between project participants will be more open and therefore more conducive to creative and effective collaboration. There is strong evidence that close collaboration, based on trust will yield significant savings".

6.4 Addition to Body of Knowledge

The research, based on the survey results, has provided the following insights:

- This research has identified the existence and quantified the size of risk premiums associated with specific and commonly used exculpatory clauses. Furthermore, these premiums appear additive.
- The use of this information (cost impact of such clauses) will help to improve our current practices and competitiveness in North America generally, and specifically in Canada.

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[212] Hartman, Francis (1997), "Proactive Risk Management – Myth or Reality?', Managing Risks in Projects, E&FN Spon, England, p. 15-21.

- This knowledge also will help to develop more effective risk management strategies, as the likely cost of different options are unearthed and made available to business.
- This study confirmed that the traditional and prevalent manner of allocating risk is one in which the owner uses the contract to minimize risk exposure. This, in turn, increases our understanding of industry paradigms as they relate to changes in contracting process.
- This thesis has increased our understanding of the risk factors and sources that contribute to an increase and/or decrease in contract pricing. Specifically, this resulted in a ranking by importance or degree of impact of these factors and sources, which influence contractor bidding. This information can be used by contracting parties in advance to be proactive in managing them. Furthermore, this finding may be used to develop a realistic bidding strategy model.
- The increased availability and power of computers, which has allowed the use of project risk analysis to mature in other related field, does not appear to have made much impact on the tools being used for this purpose in the construction industry. The construction industry has approached risk management in terms of individual intuition, judgement and experience gained from previous contract. These findings may have implications for the curriculum in Project Management education.
- Industry recognizes the need to address two major issues in contract management. The first is that of new solutions to contracting, particularly the appropriate sharing of risks between owners and contractors. The second is that of partnering approaches

and other collaborative arrangements that are designed to eliminate confrontation and reduce risks as contracts grow in size or complexity.

- Finally, the overriding conclusion drawn from the research is that clients and all parties involved in construction projects and contracts benefit greatly from reduction in uncertainty prior to their financial commitment. Money spent in the early phases of the project buys more than money spent in late phases. Willingness to invest in anticipating risk is a test of a client's wish for a successful project. Equity in contract wording, avoidance of latent disputes through review of contract intent and other mechanisms and opportunity for bidders to have a say in alternative terms and conditions as well as specifications will lead to greater probability of trust being developed. Attention to contract strategy based upon systematic consideration of risk can achieve significant cost saving for a project. There is growing acceptance in Canada that traditional contractual arrangements are no longer the best basis for managing today's high- risk projects. But the reluctance to try anything different remains!

6.5 Contribution to Project Management

- Construction activity is particularly subjected to more risks than other business activities because of its complexity. Such complexity is further compounded by one-sided allocation of risks through the use of specific contract clauses. It is not

uncommon to find construction projects with cost overrun, time delay, poor quality, disputes and litigation. Risk management therefore becomes a continuing activity in project development, from inception and throughout the life of a project.

- The responses to the strategies for dealing with risks in construction suggest that the industry is mostly risk averse. The owners transfer risks to their contractors; the contractors transfer risks to their sub-contractors and through insurance premiums. Project managers resort to professional indemnity insurance to transfer risks associated with services provided to clients. Although, it is generally recognized that risk should be transferred to the party that is in best position to deal with it, the process where an owner and a contractor transfer all risks involved in a project does not bode well for the industry because of its resistance to change to current contracting practices.
- The questionnaire survey of all three contracting parties within the Canadian construction industry shows that disproportionate allocation of risk through exculpatory clauses carefully has lead to acrimony and adversarial relationship during the performance of the work. Furthermore, these clauses failed to eliminate claims and disputes.
- The survey results of this report indicate that the contractors, like owners, are risk-averse and hence do not play with the odds when the stakes are high; they add a cushion (Risk Premium) to their costs to protect themselves from the consequence of risk events. The results of the research demonstrate that, for contractors, this

premium can be as high as 9% (under ideal conditions), and 19% (under adverse conditions) of the total cost of the project. In fact, the risk premiums quantified in this study are minimum since they only reflect increases in contract price to cover risks associated with the five specific exculpatory clauses.

- The important fact is that these premiums represent a significant percent of the total cost of the project, comparable to the contractors' own markups above cost. The question is - How can project managers reduce these risk premiums? One approach, of course, is to reduce the risk directly. This can be done by either not including these clauses or making them equitable. The cost of risk can also be reduced by reallocating the risk to the parties best capable of managing it. This can also be done by investing in additional preliminary work such as detailed design, site/soil investigations, and constructability analysis.
- Given that construction accounts for nearly 10% of the gross national product of Canada, any improvements in the efficiency of the process has the potential of large cost saving as well as improving the Canadian economy.
- This thesis provided an overview of risk factors and explained the relationship among these factors and bid prices. These findings on risk factors lead to the significant task of considering the effects of each factors for project managers. Therefore, empirical research should be done to uncover which factors are more significant for certain types of projects than others. Contracting parties would then be able to take advantage of Pareto's law and concentrate only on the factors that are significant for a specific

type of project. Moreover, additional research efforts that show the cost effect of each significant risk factor should be conducted to help estimators to determine realistic cost estimates for projects.

- This study has clearly demonstrated the importance of thoughtful and meticulous contract preparation as a way to lower project costs. **Unfair risk allocation or assumption will eventually have to be paid for,** whether through large premiums, project disputes and disruptions or claims.

6.6 Limitations of Findings

Some non-response is inevitable in any mail survey. Specifically, in this study there are biases in the characteristics of non-respondent contractors. The results of this study reflect the views and opinions of those who participated in it. As such, the views presented may not necessarily directly represent the entire cross section of the industry, or those who are currently affected by it. Additionally, we caution to make inferential leaps that over-generalize our conclusions beyond the conditions under which we have explored the phenomena. However, the trends determined may be considered accurate reflections of the views of those who contributed information to this research. The sample estimate of risk premiums associated with exculpatory clauses is grouped around the true population value. Furthermore, this study covered the views and opinions of 50% of the population sample and 34% of the total population of contractors polled. The respondents

are people who are typically well educated and have more than 15 years of relevant experience in construction project management. The results presented are intended to be a medium for exchange of thoughts, opinions, and ideas of those within the construction industry. The important fact is that the findings of this study are significant, generally applicable and consistent with statistical data and results from previous studies. This lends more reliability to the findings of this study.

6.7 Suggested Areas of Future Research

The primary recommendation for further research is the actual comparison of cost saving resulting from owners absorbing the risks associated with these five exculpatory clauses.

The primary benefits of such studies would be to assist owners in deciding rationally whether it was more cost effective to carry the risk on a project themselves or whether the contractor should. By allocating risk to the party which can most cost effectively bear it, the cost of project can be reduced. Specifically, when contractors' risk premiums associated with exculpatory clauses are 19% of base cost and the annual construction volume in Canada is $100 billion, a 10% reduction in these premiums is:

= 10% X 0.19 X 100 billion =$1.9 billion

The research suggests three additional areas for further research:

- Formulation of equitable clauses to share risk and gains, and consequently cost savings;
- Trust between parties to a contract; and
- Cost of reversed exculpatory clauses.

The potential benefits arising from better risk allocation and trust between stakeholders cannot be realized until the current trends and practices eroding our ability to construct efficiently and profitably in North America generally, and specifically in Canada, are reversed and barriers are overcome. Such attitude and thinking would be a step forward for contracting parties, because of the amount of trust and openness required. This would help improve our practices and competitiveness in Canada. Lowest cost and more efficient construction will lead to significant opportunities for contracting parties at every level. Not the least of these opportunities will be increased investment and the consequent increase in construction activity.

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R. v. Walter Cabott Construction Ltd. (1975), 69 D. L. R. (3d) (Fed. C. A.) 542.

Suisse Atlantique v. N. V. Rotterdamsche (1967), 1 A. C. (English House of Lords) 361.

Sceptre-Riedel-Dawson Construction Ltd. v. British Columbia, et al., (1990), 41 C. L. R. (B. C. S. C.) 305.

Southland Construction Inc. v. Richeson Corp. (1995), Civil Engineering, February, p. 28.

Trident Construction v. Wardrop (1979), 6 W. W. R. 481.

Woollatt Fuel and Lumber v. Mathews Group Ltd. (1978), 83 D. L. R. (3d) 137.

Warden Construction Co. Ltd. v. Town of Grimsby (1983), 2 C. L. R. 94.

APPENDIX B

Industry Survey – Survey forms,

Tabulated and charted results.

INDUSTRY SURVEY
RISK PREMIUMS ASSOCIATED WITH EXCULPATORY CLAUSES

Introduction

Many of the problems in the area of construction process risk assignment arise because of the use of exculpatory clauses to allocate risk or responsibility in construction contracts. These clauses frequently appear both in the instructions to bidders and in the terms and conditions which form the agreement between the owner and contractor. This may not be in the owner's best interest. When contractors are obliged to assume the risk, they include risk premiums for events that may or may not occur. Such contract clauses may ultimately lead to litigation. Litigation resulting from certain risk allocation is costly and time consuming. In the construction business risk and risk premiums are formally not evaluated. The goals of this study are to:

- quantify the risk premiums associated with exculpatory clauses; and
- raise owners' and consultants' awareness of the potential cost and other impacts of shifting risks to other parties in contracts.

We are requesting your contribution to this effort by completing this questionnaire. The questionnaire is designed to capture and help us understand your expert professional judgment.

General Instructions

There are three sections in the questionnaire: demographics, factors affecting risk premiums and quantitative information concerning exculpatory clauses. A description of specific clauses and definitions of question terminology are given in the appendix for your answering section B & C. Please review the entire questionnaire and complete section A, B and C thoroughly.

Confidentiality

All responses are strictly confidential. Company's specific information will remain protected at all times. The results of survey will be tabulated and pooled information will be made available to you in the future. The aggregated data collected will be used in support of research being undertaken at The University of Calgary.

It is anticipated that the survey will take 60 to 90 minutes of your time.

Please mail (or fax) the completed questionnaire (pages 1 to 6 only) to:

Zainul Abedin Khan
Project Management Specialization, Department of Civil Engineering
2500 University Drive NW, Calgary, AB. T2N 1N4.
Fax: (403) 282-7026; Tel: (403) 220-7348; e-mail: zakhan@enci.ucalgary.ca

We thank you in advance for your time and effort. We very much value your cooperation and participation.

SECTION A : QUESTIONS ABOUT YOU AND THE ORGANIZATION

1. Please indicate whether you represent: ☐ Owner ; ☐ Consultant ; ☐ Contractor ; ☐ Subcontractor ; ☐ Supplier _____

2.1 Annual Construction Volume? $ _____Million

2.2 Indicate approximate volume of construction activity, in percent, by construction type and general contract type:

Construction Type	% Volume	Contract Type		
		Stip. Price	Cost Plus	Unit Price
Heavy Civil (Roads, Bridges, Dams, Tunnels, Pipelines)				
Heavy Industrial (Oil & Gas, Petrochemicals, Power Plants, Mining)				
Light Industrial (Consumer Products, Light Manufact'g, Warehousing)				
Institutional (Hospitals, Schools, Government Facilities)				
Commercial (Office Buildings, Shopping Mall, Strip Plazas, Hotels)				
Residential				
Others (please specify)				

2.3Method used for award (in percentage):☐Open Tender ____; ☐ Invited Tender _____; ☐ Negotiated ___

3.What is the largest size contract your organization bids on? (A "ballpark" is sufficient)$_____Million

What is the smallest size contract your organization bids on? $ _____ Million

4. How would you rate your current workload?

☐ **Strong**: Significant backlog, potential resource shortage; ☐ **Good**: Solid backlog of work

☐ **Fair**: Adequate current workload & resources becoming available; ☐ **Poor**: Currently have spare capacity

5. Please check specific methodology used by your organization to quantify or measure contract risk?

☐ Monte Carlo Risk Analysis ☐ Probability Analysis

☐ Decision Trees Analysis ☐ Utility Theory Analysis

☐ Sensitivity analysis ☐ Judgment based on experience

6. Working Experience in Project Management: ____ years

7. Please indicate if you would like the survey results: ☐ Yes; ☐ No

8.Name:_____Company : _____

Address:_____

This information will help us interpret the data you provide later in this questionnaire. Furthermore, data from this section will be used primarily to validate and define the survey population.

FACTORS AFFECTING BIDDING & RISK PREMIUMS

Apart from the factors listed in the following table, contract price may also be influenced by a number of associated elements such as : ¦ Selection of personnel (higher salaries for better people); ¦ Additional procedures (care with correspondence, documentation, record keeping); ¦ Legal fees; ¦ Additional overhead (supervision, clerical time, accounting); ¦ Inspection and Testing; ¦ Use of External Consultants and Experts; ¦ Selection of special equipment; ¦ Additional planning; ¦ Insurance, bonds, and other charges; ¦ Contingencies; ¦ Higher markup for higher risk.

Please include your estimate of all direct and indirect costs associated with the factors in Question 9.

9. Which of the following factors, in your opinion, contribute to the overall risk of a project and thus might introduce additional direct or indirect costs to a construction contract price ? (Rate your response on a +2 to -2 scale).

Rating:

+2 = Will definitely increase contract pricing; **+1** = Will be considered and may increase contract pricing

0 = Will definitely not change contract pricing;

-2 = Will definitely decrease contract pricing; **-1** = Will be considered and may decrease contract pricing

FACTORS	RATING				
	+2	+1	0	-1	- 2
1. Technical Complexity					
2. Contract Terms					
3. Unforeseen Site Condition					
4. Contractor's Expertise					
5. Project Complexity, Size & Duration					
6. Economic Conditions & Market Risk					
7. Design Completeness					
8. Need for Work					
9. Owner's Payment Capability					
10. Degree of Hazard in Work					
11. Contracting Parties Relationship					
12. Location					
13. Political Risk					
14. Stakeholders Concerns					
15. Environmental Risk					
16. External Factors e.g. Weather, Strikes etc.					
OTHERS (please specify)					

SECTION B: EVALUATION OF 5 EXCULPATORY CLAUSES

The following questions associated with each exculpatory clause (1,2,3,4 and 5) are designed to capture qualitative information. Descriptions of each clause are given in the Appendix on page 7. Each question has room for a short answer only (e.g., "yes", "no" , "5" , etc.). The back of each sheet may be used for any additional comment.

CLAUSE QUESTIONS	CLAUSES				
	#1	#2	#3	#4	#5
1. Is this clause necessary ? (Yes/ No)					
2. Are project objectives best served by using this clause? (Yes/ No)					
3. Risk allocated to Contractor %/ Owner %					
4. Where should risk lie? (Contractor %/Owner %)					
5. Will the clause be upheld in court? (Yes/ No/Don't know)					
6. Does this clause carry some sort of risk premium? (Yes/ No)					
7. Premium (value) a contractor would assign to cover the cost of carrying risk associated with clause ? (High / Low/ None)					
8. Is this similar to (i.e. serves similar purpose) a company standard clause? (Yes/No)					
9. Which clause would require more pre-award analysis and review? (Place a "√" mark)					
10. Would this clauses restrict bid competition? (Yes/No)					
11. Has this clauses ever been the subject of a contractual dispute? (Yes/No)					
12. How often was this clauses an issue in your contracts? (Often/Some/None)					
13. What impact does this clauses have on? (Positive/ Negative/ None)					
• Cost?					
• Schedule?					
• Quality?					
• Working relationship between contracting parties?					
14. Other:					
15. Other:					

SECTION C: QUANTIFICATION OF RISK PREMIUMS

Important: Please read this!
This section is primarily addressed to contractors, subcontractors and suppliers. In this section, we present you with a series of questions based on a ***hypothetical situation***. In each question, you will be asked to make a decision in light of specific questions and the economic situation of your firm as constrained by the hypothetical situation below. Each response should be made in your capacity as a corporate decision maker, not as an individual dealing with your own funds. Try to give replies that represent the actual action you would take as if presented with that choice at work today. We want to know what you would actually do, not what you feel you should do or what you feel we might expect you to do. Each firm has learned to deal with risk in a different manner and as such, there are no right or wrong answers to any of these questions. Rather through your answer, we will attempt to quantify risk premiums associated with all five clauses used in Section B and described in the appendix.

HYPOTHETICAL SITUATION # 1

Suppose you are a contractor who is bidding on a contract. The contract contains the clauses in the questionnaire following. The value of the base bid for the project is $10 Million. **The base bid includes all direct and indirect costs as well as home office overhead allowances and profits (excluding any allowances associated with risk).** The owner wants the project to be completed within a reasonable achievable time. The work is to be executed with a lump sum contract. Other fixed factors include:

- low need for work;
- low technical complexity (i.e. simple project, no new technology or need for innovation)
- contract administration is known to be fair;
- this contract is negotiated between the owner and the contractor; and
- contract is based on a design 100% complete.

State the Construction Sector you have assumed in your responses:
☐ Heavy Civil; ☐ Heavy Industrial; ☐ Light Industrial; ☐ Commercial; ☐ Institutional; ☐ Residential

Please assign a dollar amount (in column P) that comes closest to quantifying risk premiums. All figures should be recorded in multiples of one thousand dollars. *If further clarification on how to complete the metrics are required, please refer to* ***worked example***.

P = Premium assigned (in multiple of thousand dollars); **X** = Do not know; **"0"** = No premium will be added

QUESTIONS	P	X
1.0 What $ value ± you would add to your bid price to your expected cost of risk if:		
1.1 there is no change to base assumptions?	0	
1.2 the following exculpatory clauses are being added in individually?		
1.2.1 No Damage for Delay		
1.2.2 Liquidated Damages		
1.2.3 Examination of Work		
1.2.4 Examination of Engineering Work		
1.2.5 Indemnification		

QUESTIONS	P	X
2.0 Consider each change as if it were the only change from the base condition given in **hypothetical situation #1**, what dollar amount increase or decrease (state +/-) you would add to your expected cost for risk if:		
2.1 the need for work was high?		
2.2 the technical complexities were high? ★		
2.3 the contracts were		
(a) closed(invited) bid?		
(b) open bid? ★		
2.4 the contract administrator is		
(a) not fair?		
(b) not known? ★		
2.5 Design, at the start of construction, is		
(a) 90% complete?		
(b) 50% complete? ★		
(c) 20% complete?		
2.6 Would your answer be different if you consider factors (**marked with an ★**) as cumulative changes from the base case? ☐ Yes ; ☐ No		

Assuming that exculpatory clauses 1,2,3,4 and 5 are being added in individually, what dollar amount (+/-) would you include in your bid price against each clauses to cover:	**DOLLAR AMOUNT (in multiples of thousand) FOR EXCULPATORY CLAUSES**				
	#1	**#2**	**#3**	**#4**	**#5**
time-dependent job-site costs? (e.g. longer time for utilities, trailers, site supervision, insurance etc.)					
contract administration cost? (e.g., additional controls, correspondence, record keeping)					
choice of management team (salaries)? (e.g., more expensive/ experienced personnel)					
legal fees? (e.g., more careful review of contract, advice during project)					
external consultants and experts fees? (e.g., special advisors, photographers, experts)					
insurance, bonding and other charges? (e.g., higher premiums)					
additional planning? (e.g., more time on front-end and mid-course planning)					
special equipment cost? (e.g., additional equipment)					
overtime allowances?					
additional overhead cost? (e.g., supervision, senior executives, additional accounting)					

Hypothetical Situation # 2
After considering all the risk related variables against each clause for the original project, would your answer be different if the value of the project was greater than $50 Million ? Circle one number below.

+2 = Will definitely increase contract pricing ; +1 = Will be considered and may increase contract pricing ; 0 = Will definitely not change contract pricing;
-2 = Will definitely decrease contract pricing; -1 = Will be considered and may decrease contract pricing

AT LAST YOU ARE FINISHED! ONCE AGAIN, THANK YOU FOR YOUR VALUABLE CONTRIBUTION TO THIS STUDY.

DESCRIPTION OF EXCULPATORY CLAUSES

Clause 1: No Damage For Delay

"--the contractor shall not have any claim for compensation for damages against the owner for any stoppage or delay from any cause whatsoever".

Clause 2: Examination Of Work

"The bidder is required to investigate and satisfy himself/herself of everything and every condition affecting the work to be performed and labor and material to be provided, and it is mutually agreed that submission of tender shall be conclusive evidence that the bidder has made such an investigation".

Clause 3: Examination Of Engineering Work

"Any representation in the tender documents were furnished merely for the general information of bidder and were not in any way warranted or guaranteed by or on behalf of the owner or the owner's consultants' and its sub-consultant, employees, and neither the owner or his/her consultants or employees shall be liable for any representations, negligent, or otherwise contained in the documents".

Clause 4: Liquidated Damages

"If final date of completion of the Contract Works according to the agreed delivery time is delayed and if such delay is attributable to fault of the Contractor or its representatives, then the Contractor shall pay the liquidated damages, and not a penalty the amount of one thousand Dollars(CD $1000) to Owner for each day that expires after the contract Time specified in this Contract".

Clause 5: Indemnification

"The Contractor shall be liable to Owner for all losses, damages and expenses whatsoever which Owner may incur; and in addition be liable for and shall indemnify, and hold harmless the Owner, its officers, directors, employees, consultant and agents against and from all proceedings, claims, losses, damages and

expenses whatsoever which may be brought against or incurred by the Owner including solicitor and own client (indemnity) costs; as a result of claims, demands, actions or proceedings made or taken against the Owner by persons not parties to this Contract. Such indemnification shall survive termination or completion of the Contract".

DEFINTIONS AND EXAMPLES OF QUESTION TERMS

Risk
Risk on a construction project appears to be comprised of many factors . Each of these contribute to the uncertainty of the estimate and thus increase the likelihood of potential for expected loss, injury or gain which may result from compliance to the terms and conditions of the contractual arrangement. The term risk is a brief description of the likely impact of all these variables (e.g., technical complexity, differing site/soil conditions, project duration, project size, impact of weather, and the need for work etc.).

Exculpatory Clause
A clause that attempts, by specific language, to shift a risk or burden of risk from one party to another.

Risk Premiums
Risk premiums in this study are defined as an additional cost charged by a contractor, subcontractor, or supplier above the expected value as a result of risk.

The Need for Work
The "need for work" is something which is easy to understand but difficult to quantify or measure. One way to define the "need for work" is the degree of motivation a firm has to acquire new work. Many factors (e.g., current workload, future work anticipation, need for cash flow, need to employ crews, potential relationship w/owner, etc.) contribute to this motivation and the "need for work" is the net effect of all these factors.

Percentage increase or decrease for risk in the contracted price
This is the premium charged by the general contractor, subcontractors, and others to compensate for uncertainties involved in the work.

Time-dependent Job-site Costs
Time dependent job-site costs in this study are defined as the delayed prime contractor's general conditions costs and construction equipment costs that are time dependent. These costs occur at regular intervals in the project i.e. hourly, daily, weekly or monthly. Examples are field supervision, field staff, rental of temporary facilities and utilities, and construction equipment costs, etc.

Liquidated Damages
Liquidated damages are contractual provisions stipulating that one party to a contract shall pay the other specified sums of money when inexcusable delays extend one party's performance beyond the contract completion date.

Design completeness
Design completeness refers to the amount of design complete at the beginning of construction on the project site. A 90% complete design refers to a nearly completed design with minor details and shop drawings outstanding. A 50% complete design refers to a design with much of the detailed design outstanding. A 20% complete design means the general site plans are developed and large portions of the detailed design remain outstanding.

Base Bid
Base bid in this study is defined to include all direct and indirect costs as well as home office overhead allowances and profits but excludes any allowances associated with risk.

Direct Costs
Costs that can be directly attributable to a particular item of work or activity (e.g., direct material costs, direct labour costs, equipment and subcontract costs)

Indirect Costs
Indirect costs are all costs that do not become a final part of the installation. They include, but are not limited to field administration, direct supervision, capital tools, legal fees, insurance, and taxes.

WORKED EXAMPLE

HYPOTHETICAL SITUATION # 1
Suppose you are a contractor who is bidding on a contract. The contract contains the clauses in the questionnaire following. The value of the base bid for the project is $10 Million. **The base bid includes all direct and indirect costs as well as corporate overhead allowances but excludes profits associated with risk.** The owner wants the project to be completed within a reasonable achievable time. The work is to be executed with a lump sum contract. Other fixed factors include :

- low need for work;
- low technical complexity (i.e. simple project, no new technology or need for innovation)
- contract administration is known to be fair;
- this contract is negotiated between the owner and the contractor; and
- contract is based on a design 100% complete.

Please assign a dollar amount (in column P) that comes closest to quantifying risk premiums. All figures should be recorded in multiples of one thousand dollars.

P =Premium assigned (in multiple of one thousand dollars); X = Do not know; "0" =No premium will be added

QUESTIONS	P	X
1.0 What $ value ± you would add to your bid price to your expected cost of risk if:		
1.1 there is no change to base assumptions?	0	
1.2 the following exculpatory clauses are being added in individually?		
1.2.1 No Damage for Delay	+175K	
1.2.2 Liquidated		X
1.2.3 Examination of Work	+112K	
1.2.4 Examination of Engineering Work	+135K	
1.2.5 Indemnification		X

TABULATED RESULTS

AND

CHARTS

OF INDUSTRY SURVEY

Life Cycle Element	Typical Risks	
Concept	• Problem Definition • Scope Definition	
Feasibility	• Inflation • Exchange Rate	• Consumer Market • Interest Rate
Planning	• Technology Change • Laws & Regulation	• Public Interest • Feedstock Supply
Engineering	• Incomplete Scope • Defective Design	• Errors & Omissions • Cost Control
Procurement	• Labour Strike • Bankrupt Suppliers • Theft	• Late Delivery • Quality Control
Construction	• Weather • Labour Dispute • Design Change	• Equipment Failure • Constructability
Commissioning	• Fire, Theft • Earthquake	• Personal Injury • Reliability

TABLE 1 - TYPICAL PROJECT RISKS

1. Permit and application	7. Design Changes	13.Labour problems
2. Contractual	8. Changes in quantities of work	14.Poor management
3. Environmental	9. Weather and other natural	15. Extra work
4. Political	causes	16.Interference
5. Financial	10.Differing site/soil conditions	17.Toxic or hazardous
6. Economic	11.Causes and effects of delays	material
	12. Inadequate construction	
	methods	

TABLE 2 – COMMON SOURCES OF RISKS AND UNCERTAINTIES

RESPONDENTS	Number	Average Experience	STDEV
Owner	50	15	7.9
Consultant	45	20	7.6
Contractor	155	21	6.7

TABLE 3 - NUMBER OF RESPONDENTS AND AVERAGE EXPERIENCE IN PROJECT MANAGEMENT

CONSTRUCTION VOLUME	Total	Average	STDEV
Owner	4570	91.4	110.6
Consultant	3731	82.9	105.4
Contractor	10571	68.2	124.6

TABLE 4 - ANNUAL CONSTRUCTION VOLUME ($million) BY CATEGORY

CONSTRUCTION TYPE (Responses)	Response %	St. Price %	Cost Plus %	Unit Rate %
Heavy Industrial (102)	23.1	60.3	34.1	5.6
Light Industrial (81)	18.3	71.8	26.2	2.0
Institutional (80)	18.1	87.2	10.3	2.5
Heavy Civil (73)	16.5	59.7	25.8	14.5
Commercial (70)	15.8	66.3	27.4	6.3
Residential (36)	8.2	68.4	21.1	10.5

TABLE 5 - CONSTRUCTION TYPE Vs HISTORICAL USAGE OF CONTRACTS- ALL PARTIES

CONSTRUCTION TYPE (Responses)	Response %	St. Price %	Cost Plus %	Unit Rate %
Heavy Industrial (35)	35	52	31	17
Light Industrial (20)	20	63	25	13
Institutional (15)	15	79	21	0
Heavy Civil (13)	13	92	0	8
Commercial (11)	11	55	27	18
Residential (6)	6	50	25	25

TABLE 6 - CONSTRUCTION TYPE Vs HISTORICAL USAGE OF CONTRACTS BY OWNER

CONSTRUCTION TYPE (Responses)	Response %	St. Price %	Cost Plus %	Unit Rate %
Heavy Industrial (45)	34.6	50	30	20
Light Industrial (25)	19.2	52.4	38.1	9.5
Institutional (18)	13.8	66.6	16.7	16.7
Heavy Civil (15)	11.7	66.7	13.3	20.0
Commercial (14)	10.7	76.9	15.4	7.7
Residential (13)	10.0	92.3	0	7.7

TABLE 7 - CONSTRUCTION TYPE Vs HISTORICAL USAGE OF CONTRACTS BY CONSULTANT

CONSTRUCTION TYPE (Responses)	Response %	St. Price %	Cost Plus %	Unit Rate %
Heavy Industrial (88)	22.0	56.0	38.0	7.0
Light Industrial (83)	20.75	70.0	28.0	2.0
Institutional (75)	18.75	68.0	30.0	2.0
Heavy Civil (65)	16.75	85.0	15.0	0
Commercial (62)	15.5	70.0	19.0	11.0
Residential (?)	6.75	74.0	26.0	0

TABLE 8 - CONSTRUCTION TYPE Vs HISTORICAL USAGE OF CONTRACTS BY CONTRACTOR

RISK MANAGEMENT TECHNIQUES	% Response	Ranking
Intuition /Judgement / Experience	64.4	1
Sensitivity Analysis	21.6	2
Probability Analysis	5.2	3
Monte Carlo Simulation	4.9	4
Decision Trees Analysis	3.9	5
Utility Theory Analysis	0.0	6

TABLE 9 - RANKING OF USE OF RISK MANAGEMENT TECHNIQUES BY ALL PARTIES

RISK MANAGEMENT TECHNIQUES	Ranking (% Response)		
	Owner	Consultant	Contractor
Intuition / Judgement / Experience	1 (56.0)	1 (56.2)	1 (56.0)
Sensitivity Analysis	2 (22.0)	2 (28.1)	2 (22.0)
Decision Trees Analysis	3 (8.65)	3 (7.1)	5 (8.65)
Probability Analysis	4 (8.6)	5 (1.75)	3 (8.6)
Monte Carlo Simulation	5 (4.9)	4 (7.01)	4 (4.9)
Utility Theory Analysis	6 (0.0)	6 (0.0)	6 (0.0)

TABLE 10 - RANKING OF USE OF RISK MANAGEMENT TECHNIQUES BY RESPONDENT TYPE

FACTORS	Contribution rank to increase and/or decrease in Premium					Total Weighted Scores
	2	1	0	-1	-2	
Unforeseen site conditions	109(218)	74(74)	11(0)	1(-1)	1(-2)	285
Technical complexity	86(172)	96(96)	9(0)	1(-1)	0(0)	267
Contract Terms	81(162)	103(103)	7(0)	1(-1)	0(0)	262
Environmental risk	78(156)	84(84)	29(0)	3(-3)	1(-2)	235
Degree of hazard in work	50(100)	121(121)	17(0)	6(-6)	0(0)	215
Need for work	8(16)	19(19)	14(0)	97(-97)	55(-110)	-172
Location	25(50)	129(129)	28(0)	13(-13)	0 (0)	166
External factors	44(88)	80(80)	66(0)	3(-3)	1(-2)	163
Project complexity, size & duration	26(52)	121(121)	32(0)	12(-12)	0(0)	159
Economic Conditions and market risk	41(82)	97(97)	31(0)	25(-25)	0(0)	154
Political Risk	26(52)	60(60)	103(0)	2(-2)	1(-2)	108
Design completeness	48(96)	82(82)	12(0)	28(-28)	23(-46)	104
Stakeholders concern	16(32)	68(68)	102(0)	3(-3)	0(-0)	97
Owners payment capability	26(52)	91(91)	38(0)	54(-54)	0(0)	89
Contracting parties relationship	21(42)	105(105)	22(0)	62(-62)	12(-24)	61
Contractor's expertise	9(18)	53(53)	26(0)	98(-98)	13(-26)	-53

TABLE 11 - RANKING OF FACTORS CONTRIBUTING TO INCREASE AND/OR DECREASE IN RISK PREMIUM- ALL PARTIES

FACTORS	Ranking based on Total Weighted Scores		
	Owner	Consultant	Contractor
Unforeseen site conditions	1	1	1
Technical complexity	2	2	3
Contract Terms	3	3	2
External factors	4	7	11
Environmental risk	5	4	4
Degree of hazard in work	6	6	5
Location	7	8	10
Economic conditions and market risk	8	11	9
Project complexity, size & duration	9	10	7
Political Risk	10	12	13
Need for work	11-	5-	6-
Owners payment capability	12	9	15
Stakeholders concern	13	13	14
Contractor's expertise	14-	14-	16-
Contracting parties relationship	15-	15	12
Design completeness	16	16	8

TABLE 12 - RANKING OF FACTORS CONTRIBUTING TO INCREASE AND/OR DECREASE IN RISK PREMIUMS BY RESPONDENT TYPE

EXCULPATORY CLAUSES	Clause necessary?		Project objectives best served?		Clause subject of dispute?	
	% 'No'	% 'Yes'	% 'No'	% 'Yes'	% 'No'	% 'Yes'
No damage for delay	92.5	7.5	98.1	1.9	21.8	79.2
Examination of work	67.3	32.7	67.1	32.9	15.8	84.2
Examination of Engineering Work	93.4	6.6	96.6	3.4	19.6	80.4
Liquidated damages	75.5	24.5	75.8	24.2	21	79
Indemnification	83.5	16.5	86.4	13.6	15	85

TABLE 13 - QUALITATIVE EVALUATION OF EXCULPATORY CLAUSES BY ALL PARTIES

EXCULPATORY CLAUSES	Clause NOT necessary?			Project objectives NOT served?			Was Subject of dispute		
	Own %	Cons %	Cont %	Own %	Cons %	Cont %	Own %	Cons %	Cont %
No damage for delay	93	85	94	98	90	99	69	75	89
Examination of work	33	33	64	56	40	69	66	63	93
Exam. of Eng Work	83	85	94	98	93	98	58	60	85.5
Liquidated damages	53	47	78	74	45	79	65	78	74
Indemnification	47	65	85	74	80	90	55	48	82

TABLE 14 - QUALITATIVE EVALUATION OF EXCULPATORY CLAUSES BY RESPONDENT TYPE

EXCULPATORY CLAUSES	Does Clause carry premium? High ? (% Response)					
	Owner		Consultant		Contractor	
	Yes	High	Yes	High	Yes	High
No damage for delay	89	60	88	39	91	70
Examination of work	87	51	73	30	78	59
Exam. of Eng. Work	94	72	82	55	90	70
Liquidated damages	96	56	90	60	95	75
Indemnification	94	65	80	55	86	71

TABLE 15 - PERCEPTION AND EXTENT OF RISK PREMIUMS ASSOCIATED WITH EXCULPATORY CLAUSES - ALL PARTIES

EXCULPATORY CLAUSES	Where does risk lie?					
	Owner's View		Consultant's View		Contractor's View	
	% Own	% Cont	% Own	% Cont.	% Own	% Cont
No damage for delay	9	91	5	95	12	88
Examination of work	9	91	5	95	15	85
Exam. of Eng. Work	18	82	5	95	15	85
Liquidated damages	17	83	5	95	4	96
Indemnification	10	90	8	92	6	94

TABLE 16 - PERCEIVED RISK ALLOCATION - ALL PARTIES

EXCULPATORY CLAUSES	Where should risk lie?					
	Owner's View		Consultant's View		Contractor's View	
	% Own	% Cont	% Own	% Cont	% Own	% Cont
No damage for delay	52	48	7	93	67	33
Examination of work	38	68	90	10	63	37
Exam. of Eng. Work	71	29	9	91	82	18
Liquidated damages	43	57	8	92	47	53
Indemnification	44	56	10	90	55	45

TABLE 17 - PREFERRED RISK ALLOCATION - ALL PARTIES

EXCULPATORY CLAUSES	Will the clause be upheld? (% Response)								
	Owner's View			Consultant's View			Contractor's View		
	Yes	No	Don't Know	Yes	No	Don't Know	Yes	No	Don't Know
No damage for delay	18	49	33	20	53	28	48	32	20
Examination of work	47	18	35	60	25	15	62	18	20
Exam. of Eng. Work	29	27	44	25	35	40	42	40	18
Liquidated damages	63	16	21	78	13	9	70	15	15
Indemnification	52	18	30	38	20	43	56	29	15

TABLE 18 - AWARENESS OF LEGAL ENFORCEABILITY - ALL PARTIES

EXCULPATORY CLAUSES	Average % Risk Premium	STDEV
No damage for delay	1.75	2.1
Examination of work	1.58	1.8
Examination of Engineering Work	1.47	2.0
Liquidated damages	1.58	2.1
Indemnification	1.46	1.3
TOTAL	**7.82**	

TABLE 19 - AVERAGE RISK PREMIUMS IN PERCENTAGE OF BASE BID BY ALL PARTIES

EXCULPATORY CLAUSES	Contractor		Owner		Consultant	
	Average	Stdev	Average	Stdev	Average	Stdev
No damage for delay	1.68	1.4	2.38	3.29	1.21	1.92
Examination of work	2.02	2.2	1.1	1.4	0.7	0.8
Examination of Engineering Work	1.55	1.6	2.14	3.33	0.54	0.58
Liquidated damages	1.52	1.3	2.43	3.89	0.8	0.8
Indemnification	1.82	1.5	1.0	0.95	0.76	0.89
TOTAL	**8.59**		**9.05**		**4.01**	

TABLE 20 - AVERAGE RISK PREMIUMS IN PERCENTAGE OF BASE BID BY RESPONDENT TYPE

RISK SOURCE	Risk Premium	STDEV
Need for work: high	1.49	2.4
Technical complexity: high	2.75	3.5
Invited bid	0.28	1.0
Invited bid	5.05 (-)	20.0
Open bid	0.36	1.0
Open bid	0.99 (-)	1.1
Contract administrator not fair	1.65	2.1
Contract administrator not known	0.85	1.3
Design 90% complete	0.57	1.4
Design 50% complete	2.48	2.6
Design 20% complete	5.02	4.9

TABLE 21 - AVERAGE RISK PREMIUMS (IN PERCENTAGE OF BASE BID) PLACED ON THE SOURCES OF RISK - ALL PARTIES

RISK SOURCE	Owner		Consultant		Contractor	
	Average	Stdev	Average	Stdev	Average	Stdev
Need for work: high	2.8	4.4	1.1	0.92	1.09	1.0
Technical complexity: high	4.8	6.1	1.9	1.6	2.24	2.2
Invited bid	0.14	0.21	0.5	1.4	0.28	1.1
Invited bid (-)	0.1	0.2	1.0	1.0	0.92	0.6
Open bid	0.3	0.3	0.3	0.6	0.39	1.2
Open bid (-)	0.8	1.2	1.1	1.2	0.96	1.2
Contract administrator not fair	1.55	1.8	1.9	2.4	1.74	2.2
Contract administrator not known	0.45	0.95	0.32	0.78	0.53	1.3
Design 90% complete	0.52	0.61	0.27	0.63	0.68	1.9
Design 50% complete	3.71	3.23	1.74	2.2	2.21	2.4
Design 20% complete	8.16	6.79	3.11	4.22	4.32	3.6

TABLE 22 - AVERAGE RISK PREMIUMS (IN PERCENTAGE OF BASE BID) PLACED ON THE SOURCES OF RISK BY RESPONDENT TYPE

ADVERSE CONDITIONS	Risk Premiums against Clause					Total
	NDD (2)	EOW (3)	EEW (4)	LD (5)	IND (6)	(2) to (6)
Time-dependent job-site costs	0.8	0.4	0.4	0.7	0.8	3.1
Contract administration cost	0.4	0.4	0.4	0.4	0.4	2
Choice of management team (salaries)	0.3	0.3	0.3	0.3	0.3	1.5
Legal fees	0.5	0.4	0.5	0.5	0.7	2.6
External consultant and expert fees	0.1	0.4	0.5	0.1	0.2	1.3
Insurance, bonding & other charges	0.5	0.4	0.4	0.3	0.7	2.3
Additional planning	0.3	0.3	0.4	0.3	0.5	1.8
Special Equipment cost	0.2	0.2	0.2	0.4	0.2	1.2
Overtime allowances	0.3	0.2	0.2	0.4	0.2	1.3
Additional overhead cost	0.5	0.2	0.3	0.3	0.5	1.8
TOTAL	**3.9**	**3.2**	**3.6**	**3.7**	**4.5**	**18.9**

Legend: **NDD**= No damage for delay; **EOW**= Examination of work; **EEW**= Exam. Of engineering work; **LD**= Liquidated damages; and **IND**= Indemnification Clauses

TABLE 23 - CONTRACTORS' RISK PREMIUMS FOR ADVERSE CONDITIONS

Exculpatory Clauses	Mean		P(T<= t) Two tail	Mean		P(T<= t) Two tail	Mean		P(T<= t) Two tail
	C	**O**		**D**	**C**		**D**	**O**	
No damage for delay	1.68	2.38	0.07	1.21	1.68	0.56 *	1.21	2.38	0.23 *
Liquidated damages	1.52	2.43	0.03	0.7	1.52	0.01	0.7	2.43	0.05
Exam. of work	2.02	1.1	0.01	0.6	2.02	0.00	0.6	1.1	0.21 *
Exam. Of Eng. work	1.55	2.14	0.11 *	0.54	1.55	0.00	0.54	2.14	0.00
Indemnification	1.82	1.0	0.00	0.76	1.82	0.01	0.76	1.0	0.84 *

Legend: * = statistically significant; C= Contractors; O= Owners; D= Consultants

TABLE 24 - *t*-TEST RESULTS

SOURCE	df	Sum of Squares	Mean Squares	*F Ratio*
Between Groups	2	213.28	106.64	*3.96*
Within Groups	181	4877.98	26.95	
Total	183	5091.26		

TABLE 25 - SUMMARY OF ANOVA TEST FOR HYPOTHESIS # 1 (PRESENCE OF FOUR EXCULPATORY CLAUSES)

SOURCE	df	Sum of Squares	Mean Squares	*F Ratio*
Between Groups	2	169.62	84.81	
Within Groups	177	2572.13	14.53	*5.84 **
Total	179	2741.75		

Legend: * = Null hypothesis rejected as obtained F is greater than critical value (= 4.74).

TABLE 26 - SUMMARY OF ANOVA TEST FOR HYPOTHESIS # 2 (PRESENCE OF THREE EXCULPATORY CLAUSES)

SOURCE	df	Sum of Squares	Mean Squares	*F Ratio*
Between Groups	2	51.68	25.84	
Within Groups	174	1025.47	5.89	*4.38*
Total	176	1077.15		

TABLE 27 - SUMMARY OF ANOVA TEST FOR HYPOTHESIS # 3 (PRESENCE OF TOEXCULPATORY CLAUSES)

SOURCE	df	Sum of Squares	Mean Squares	*F Ratio*
Between Groups	2	25.82	12.91	7.77 *
Within Groups	151	250.79	1.66	
Total	153	276.61		

Legend: * = Null hypothesis rejected as obtained F is greater than critical value (= 4.74).

TABLE 28 - SUMMARY OF ANOVA TEST FOR HYPOTHESIS # 4 (PRESENCE OF ONE EXCULPATORY CLAUSE)

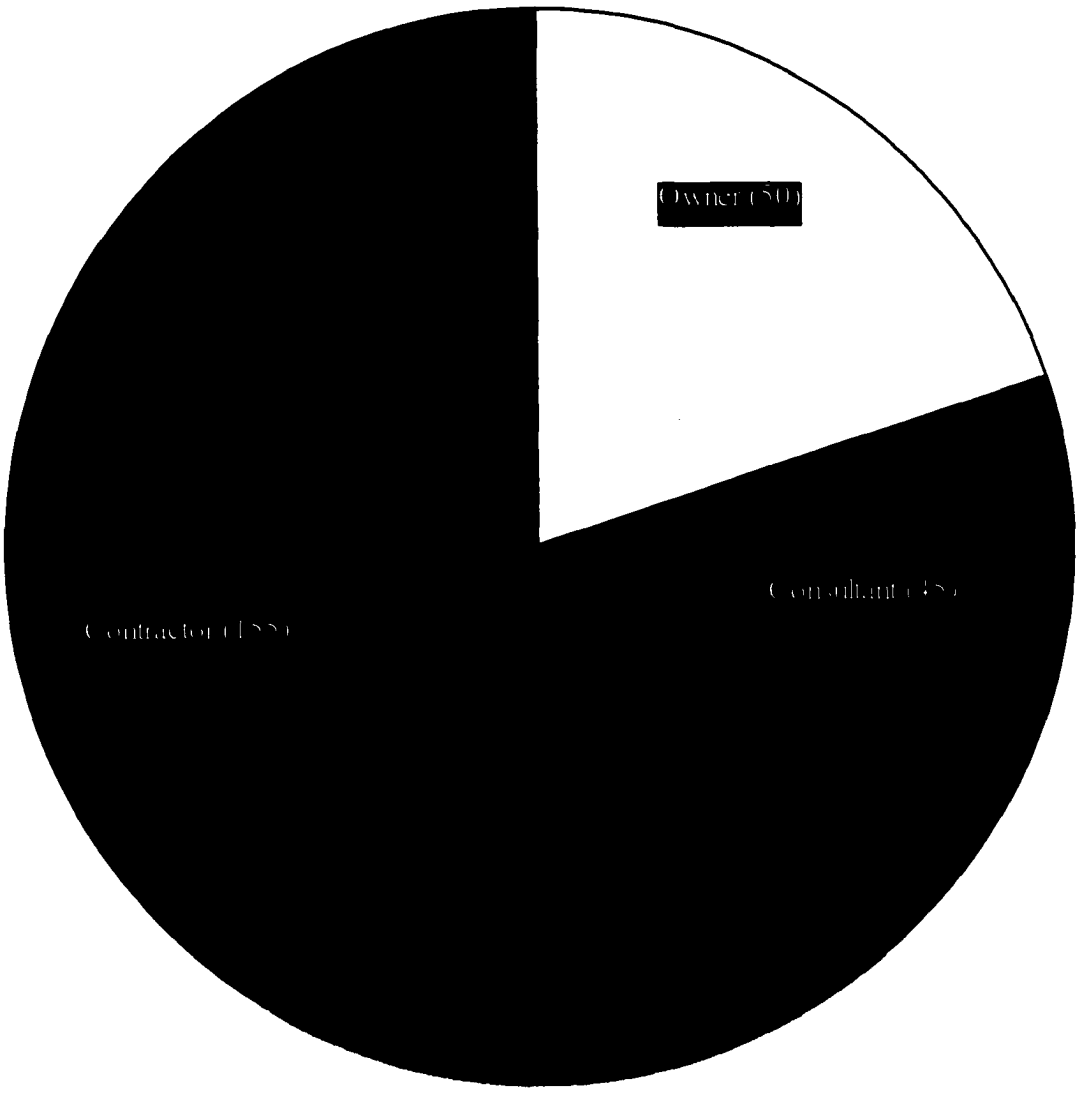


Chart 3 - Number of Survey Respondents

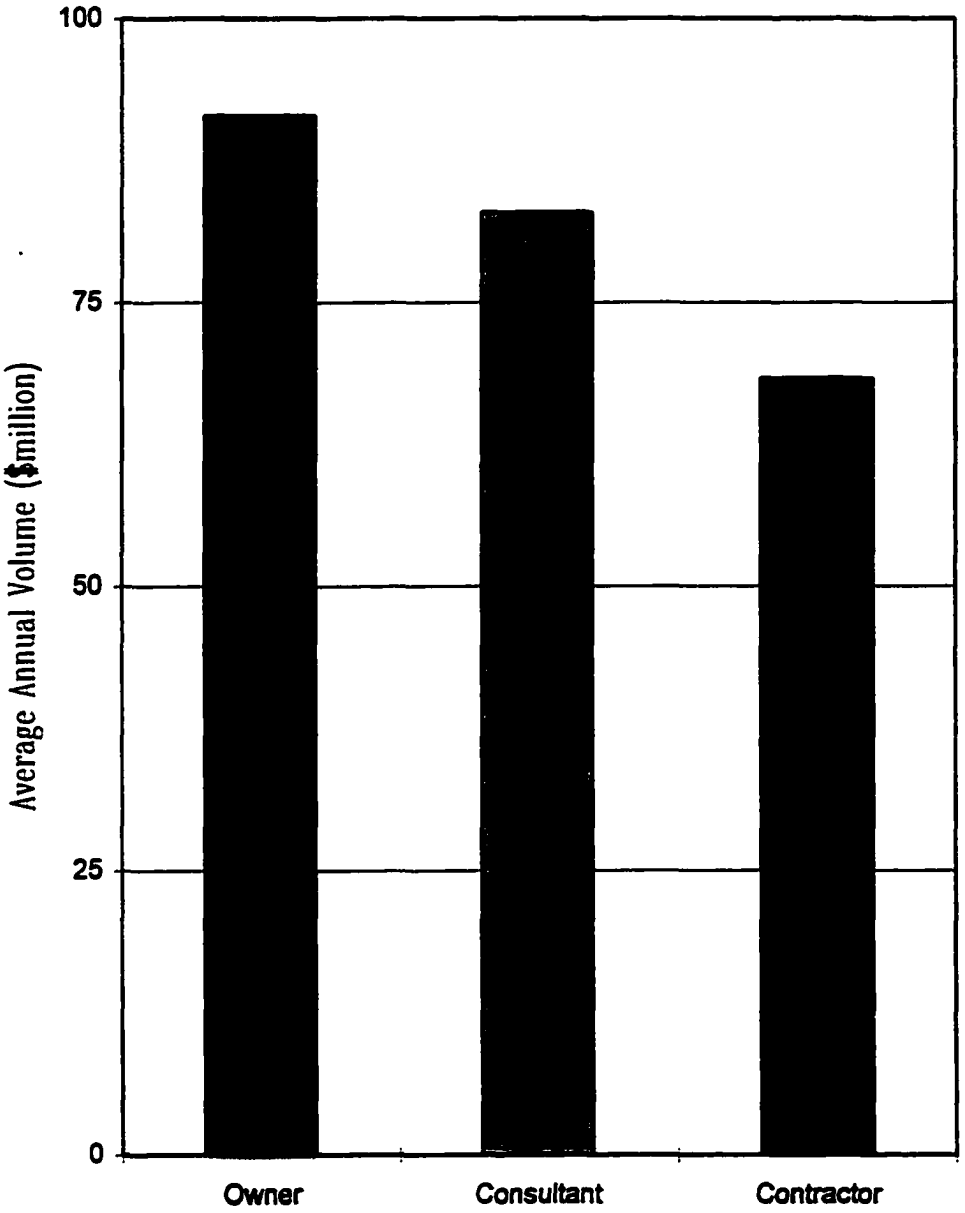


Chart 4- Annual Construction Volume by Respondent Type

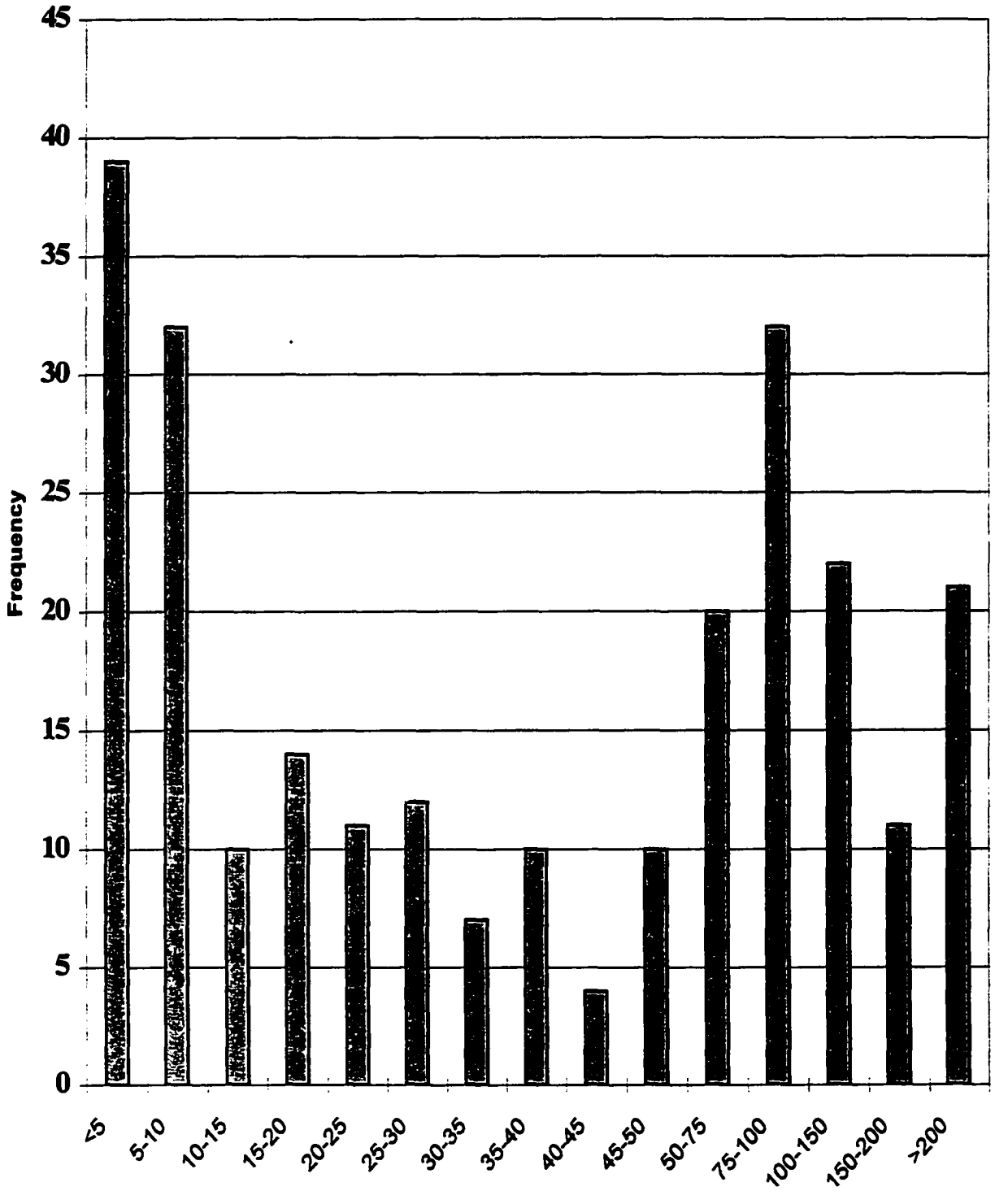


Chart 4A- Annual Construction Volume (in million) - All Parties

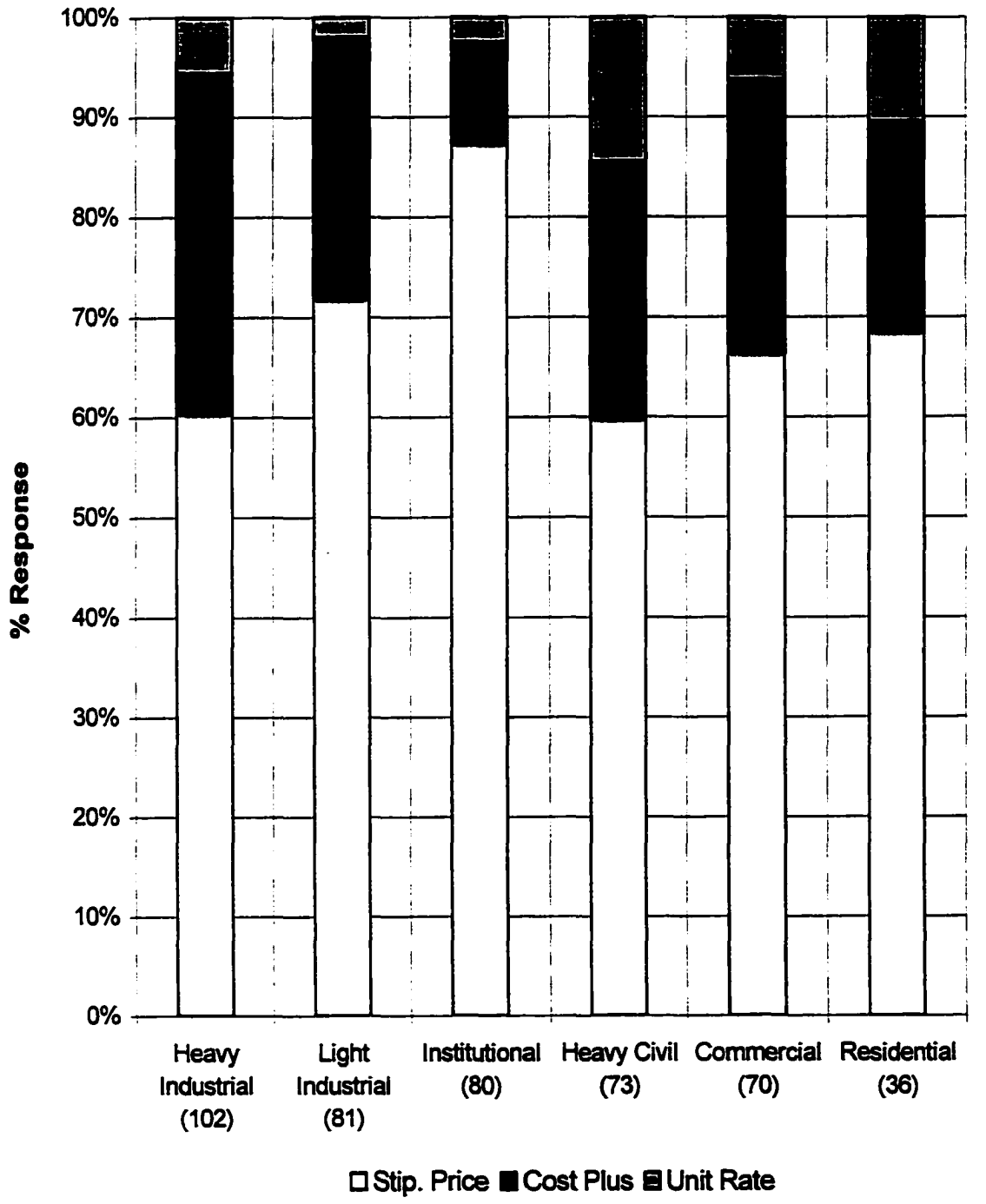


Chart 5- Construction Type v. Usage of Contracts -All Parties

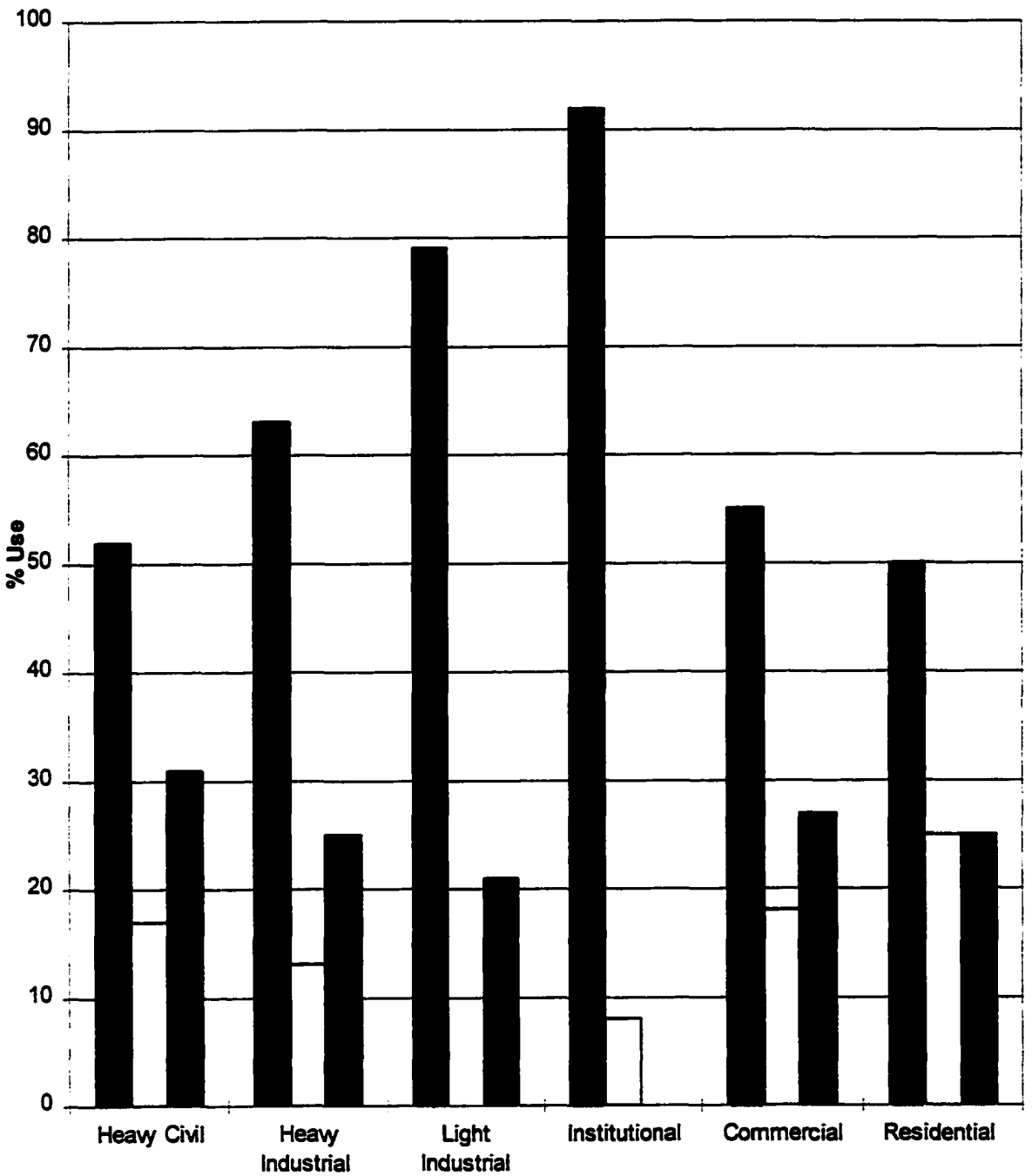


Chart 6- Construction Type v Usage of Contracts by Owners

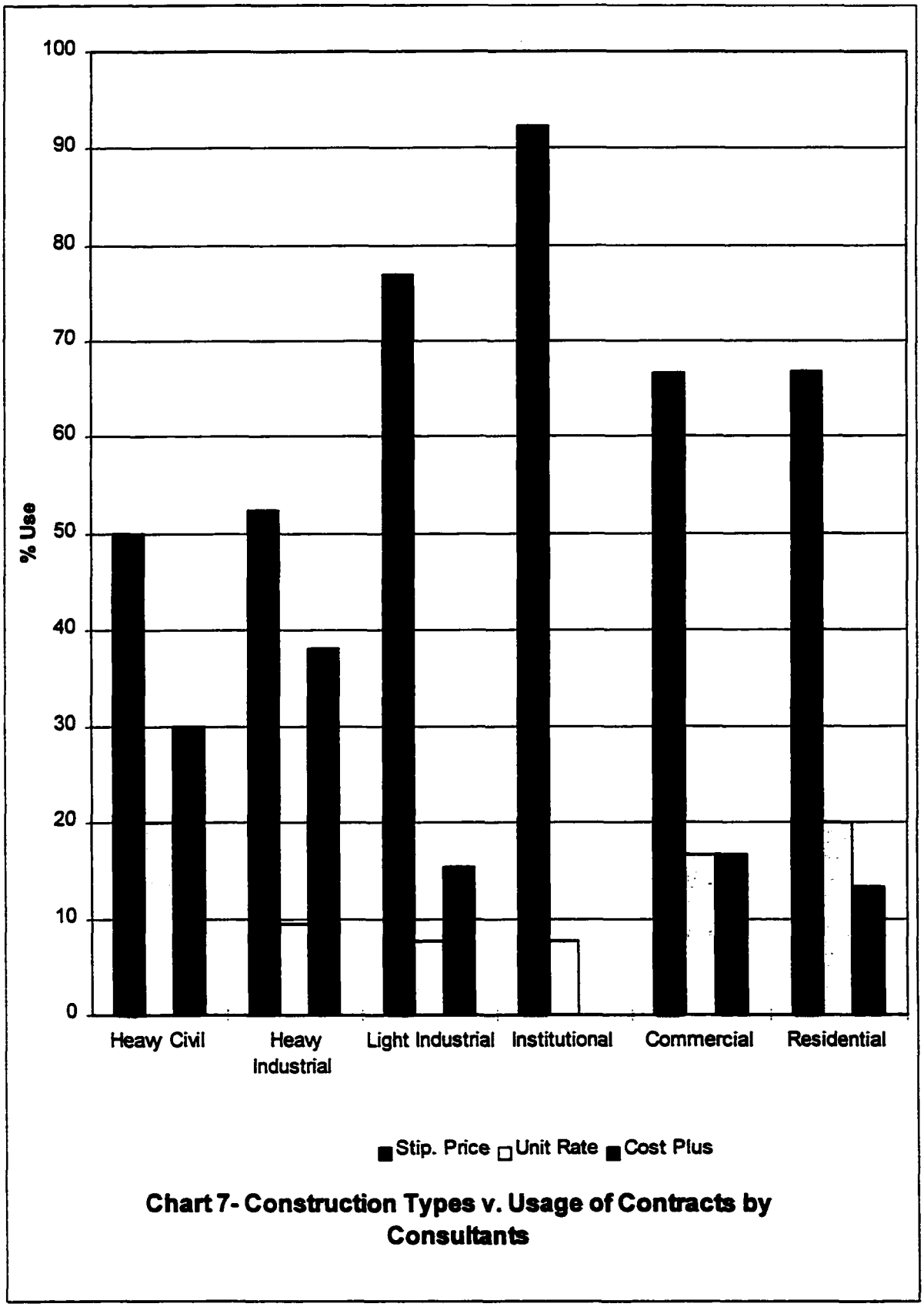


Chart 7- Construction Types v. Usage of Contracts by Consultants

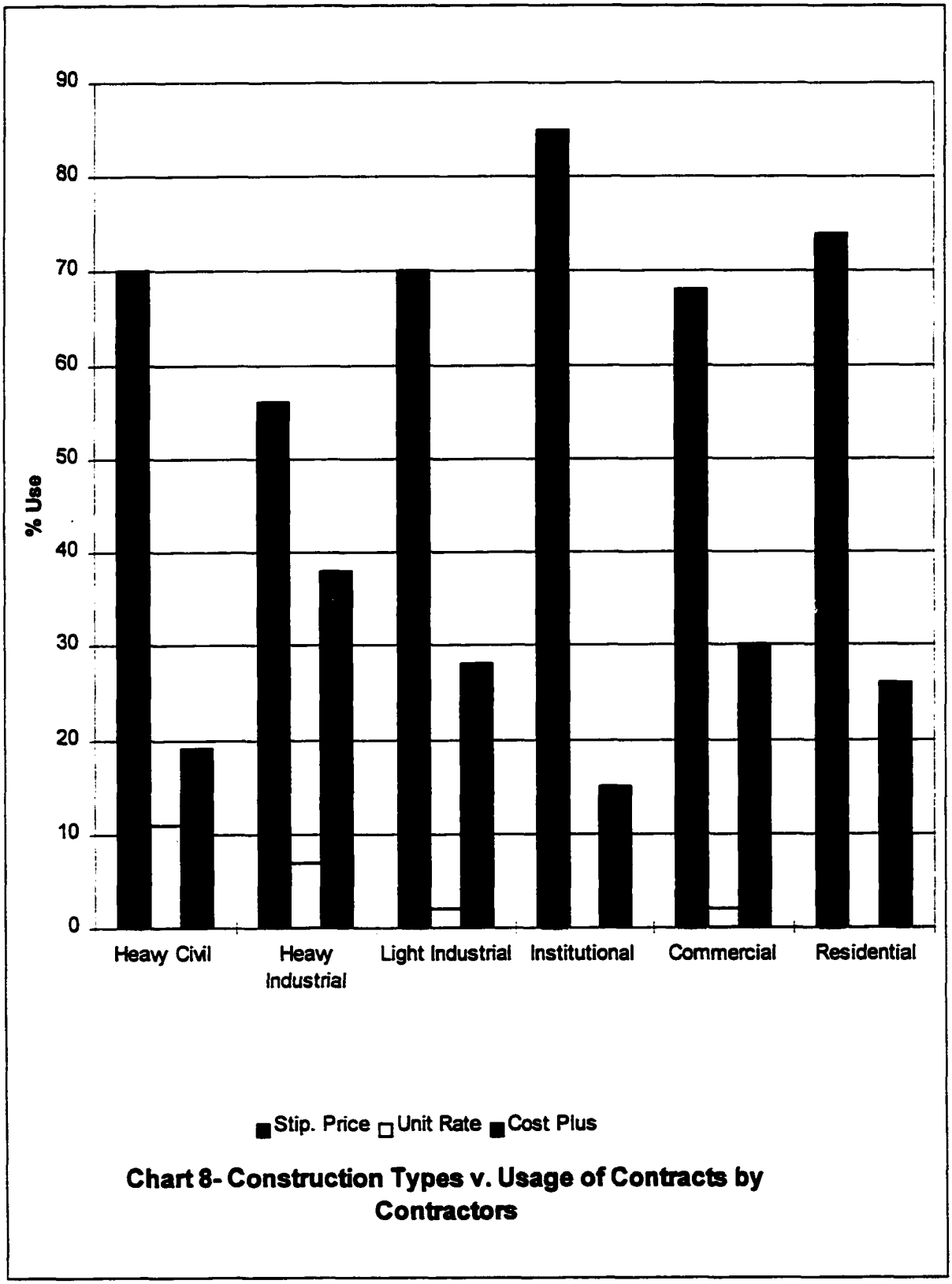


Chart 8- Construction Types v. Usage of Contracts by Contractors

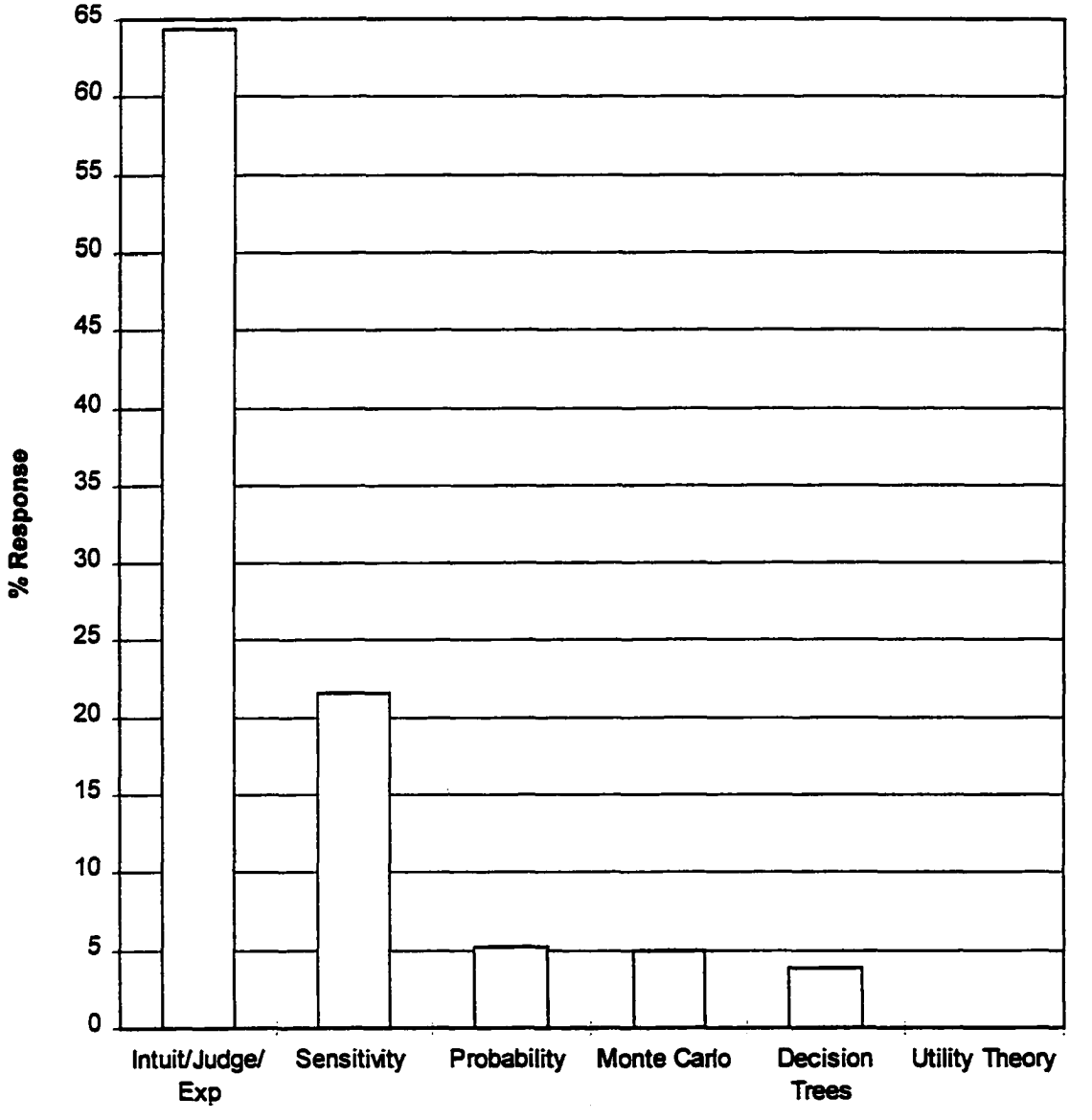


Chart 9 - Use of Risk Management Techniques by ALL Parties

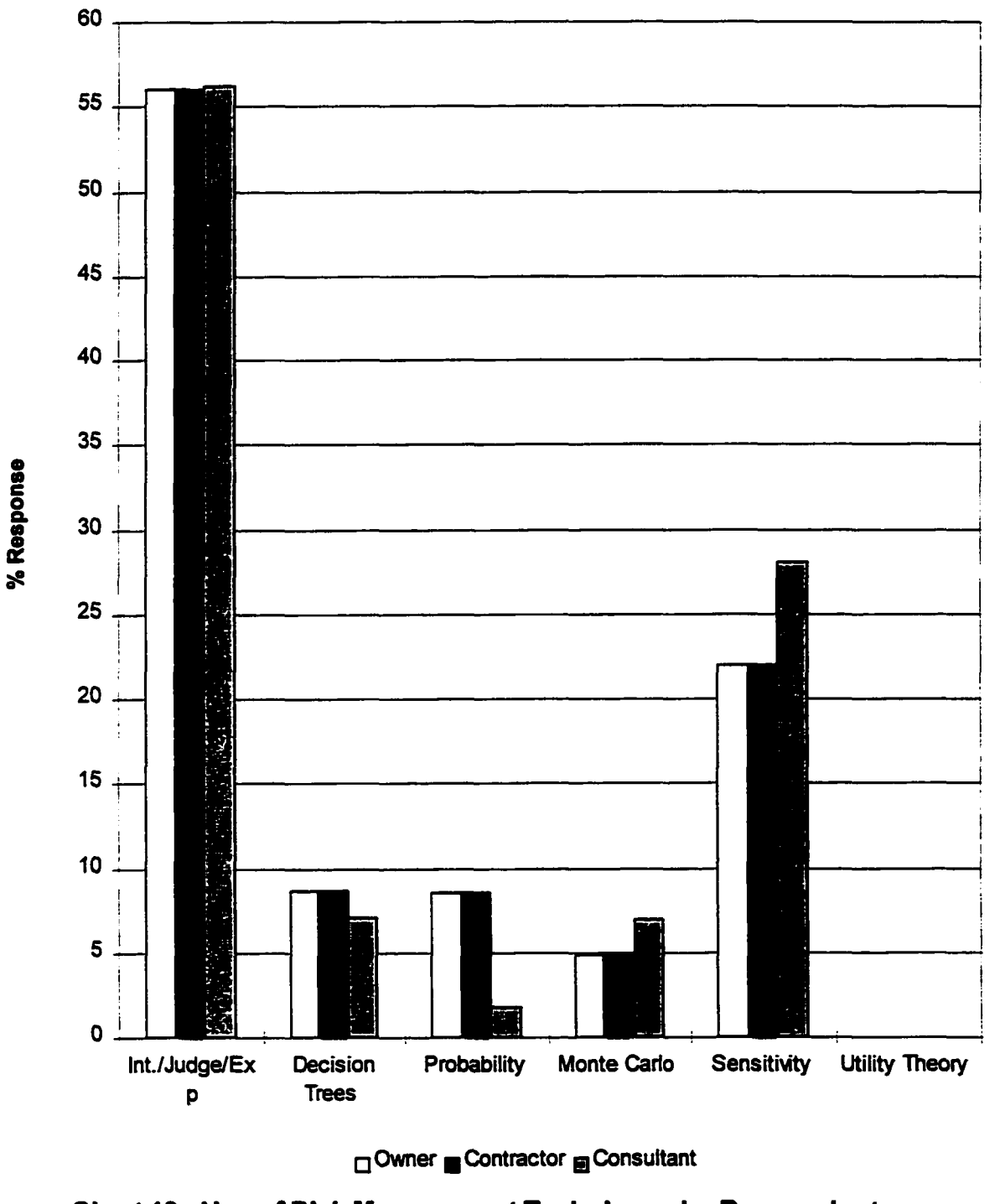


Chart 10 - Use of Risk Management Techniques by Respondent Type

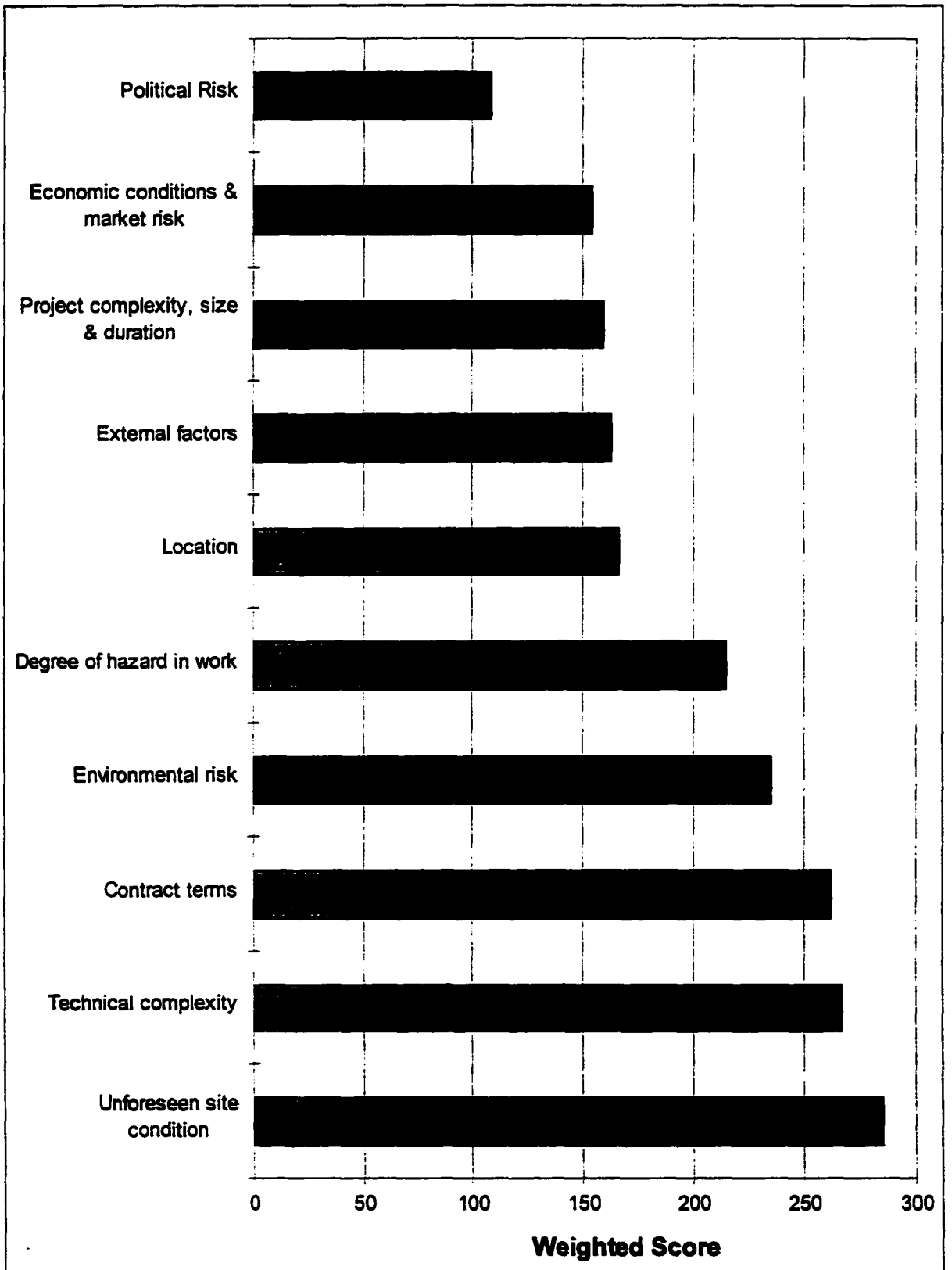


Chart 11-Ranking of Risk Sources to Increase and/or Decrease in Premium-All Parties

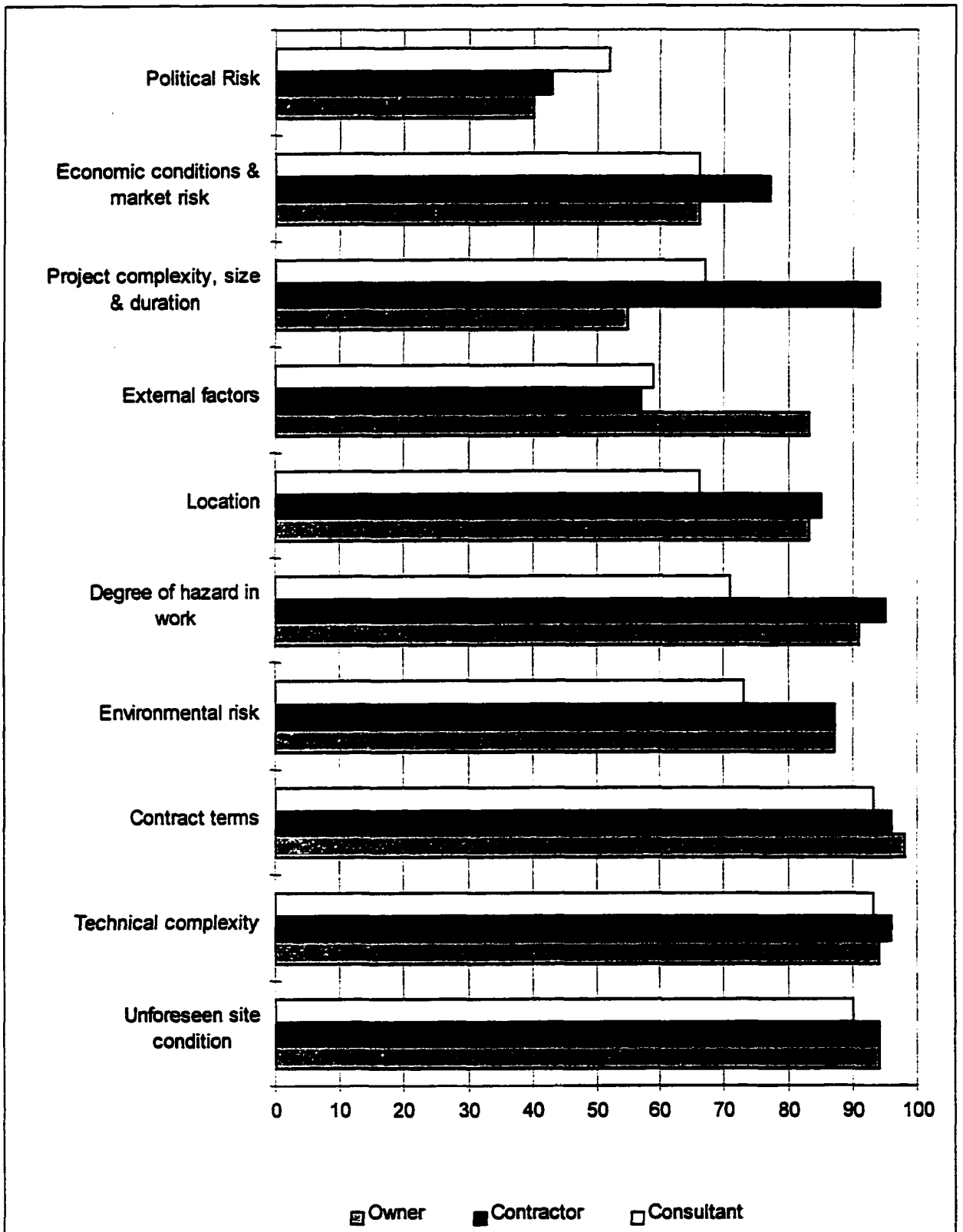


Chart 12-Factors Increasing/Decreasing Risk Premiums by Respondent

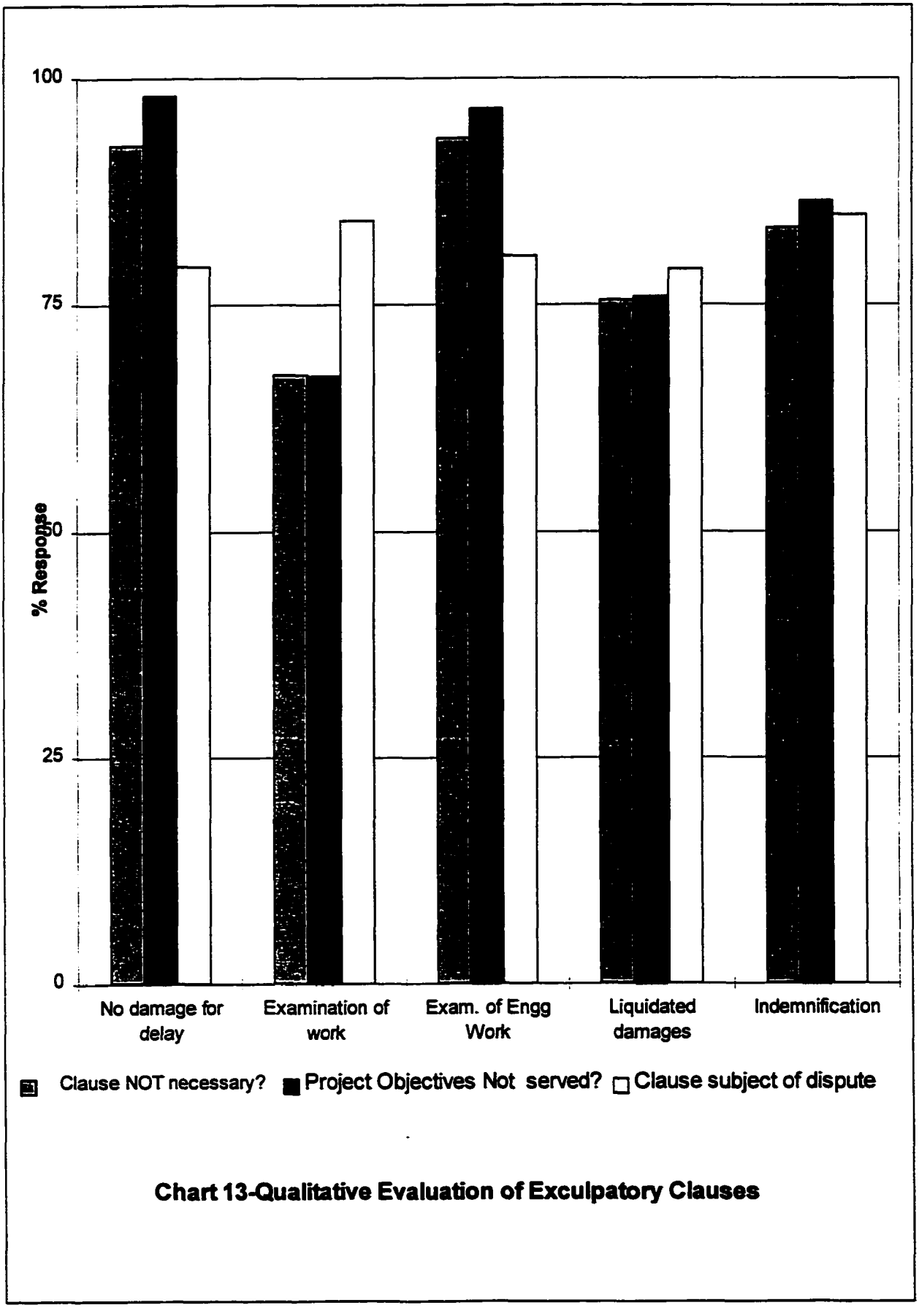


Chart 13-Qualitative Evaluation of Exculpatory Clauses

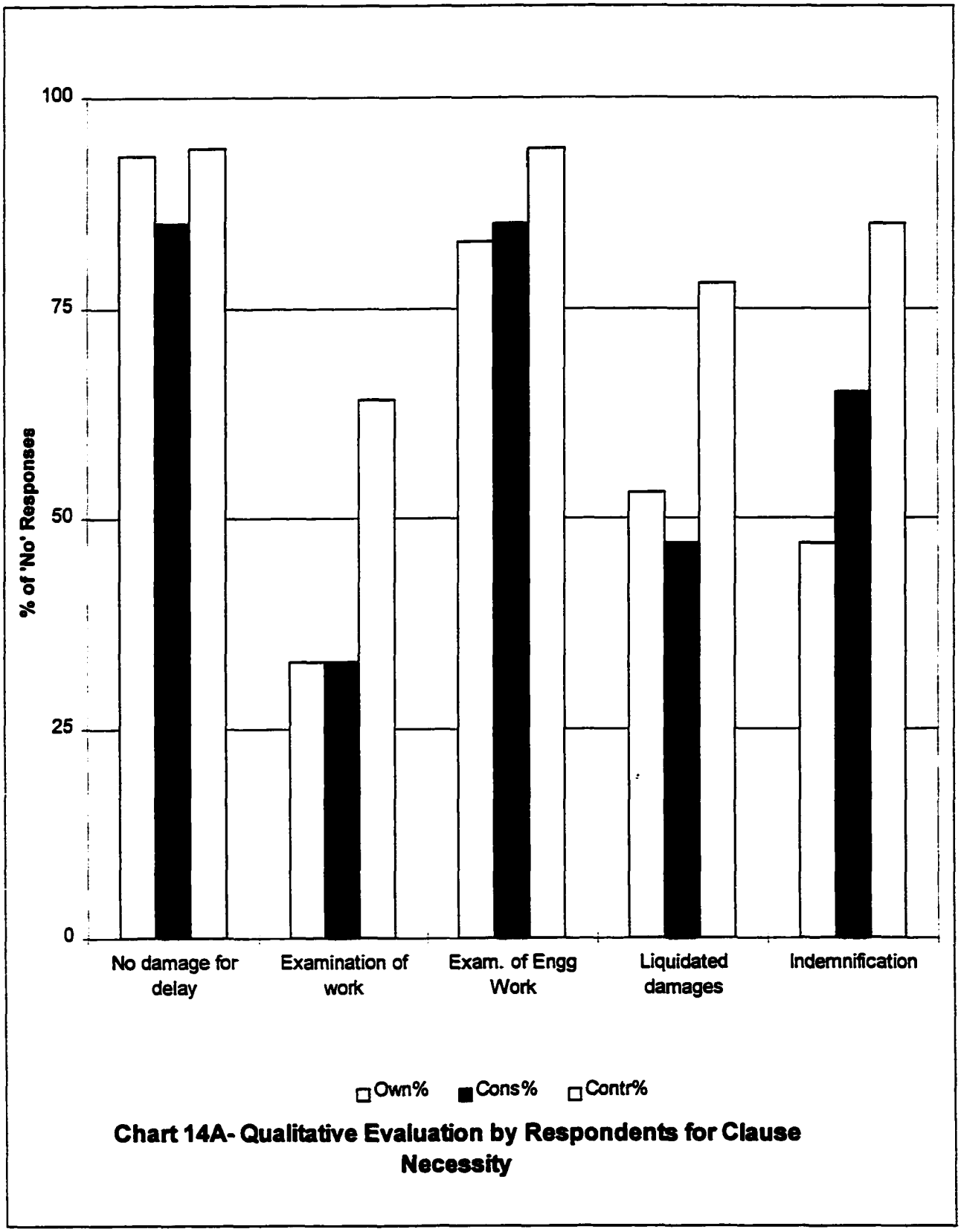


Chart 14A- Qualitative Evaluation by Respondents for Clause Necessity

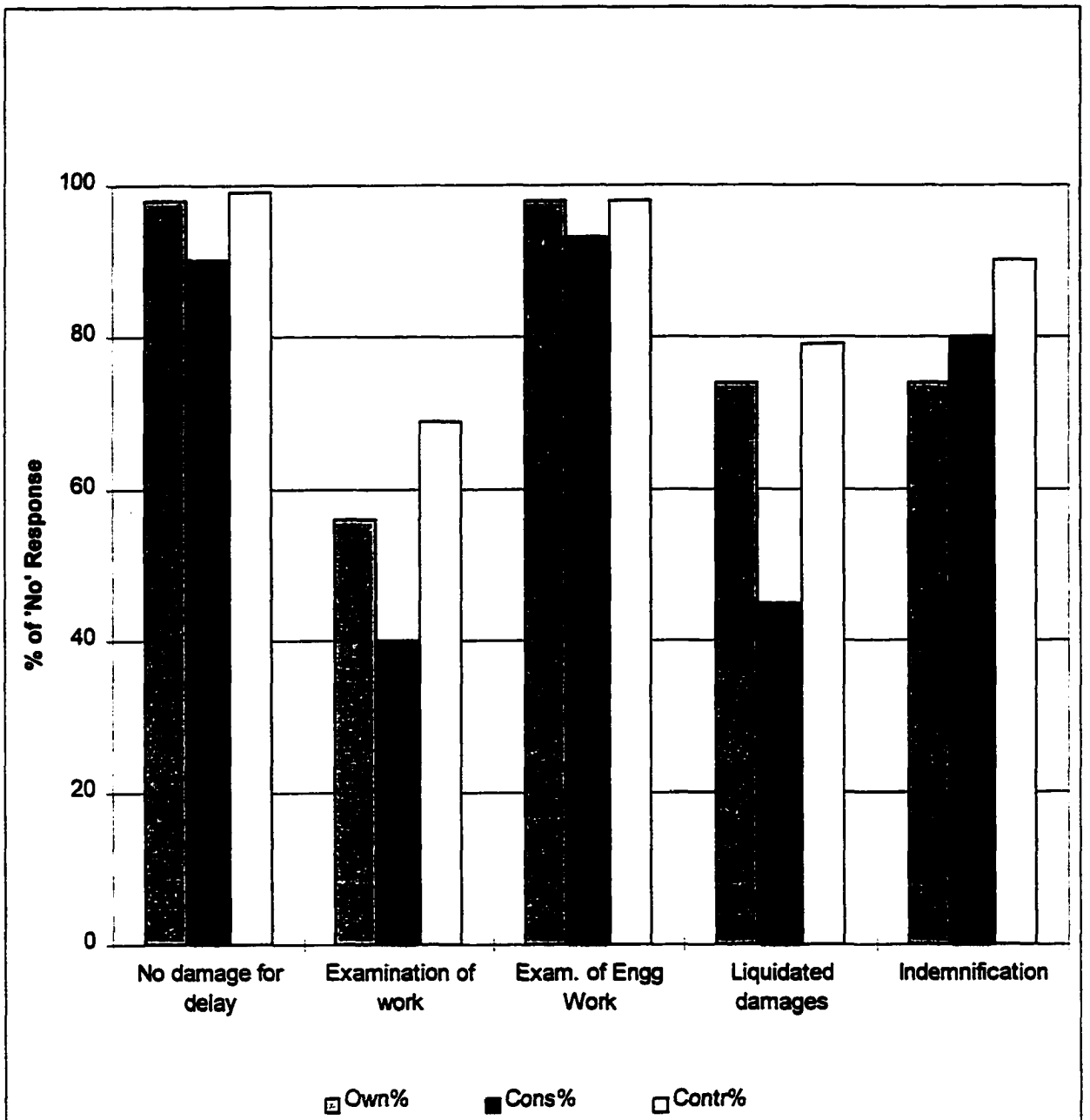


Chart 14B- Qualitative Evaluation for Project Objectives by Respondents

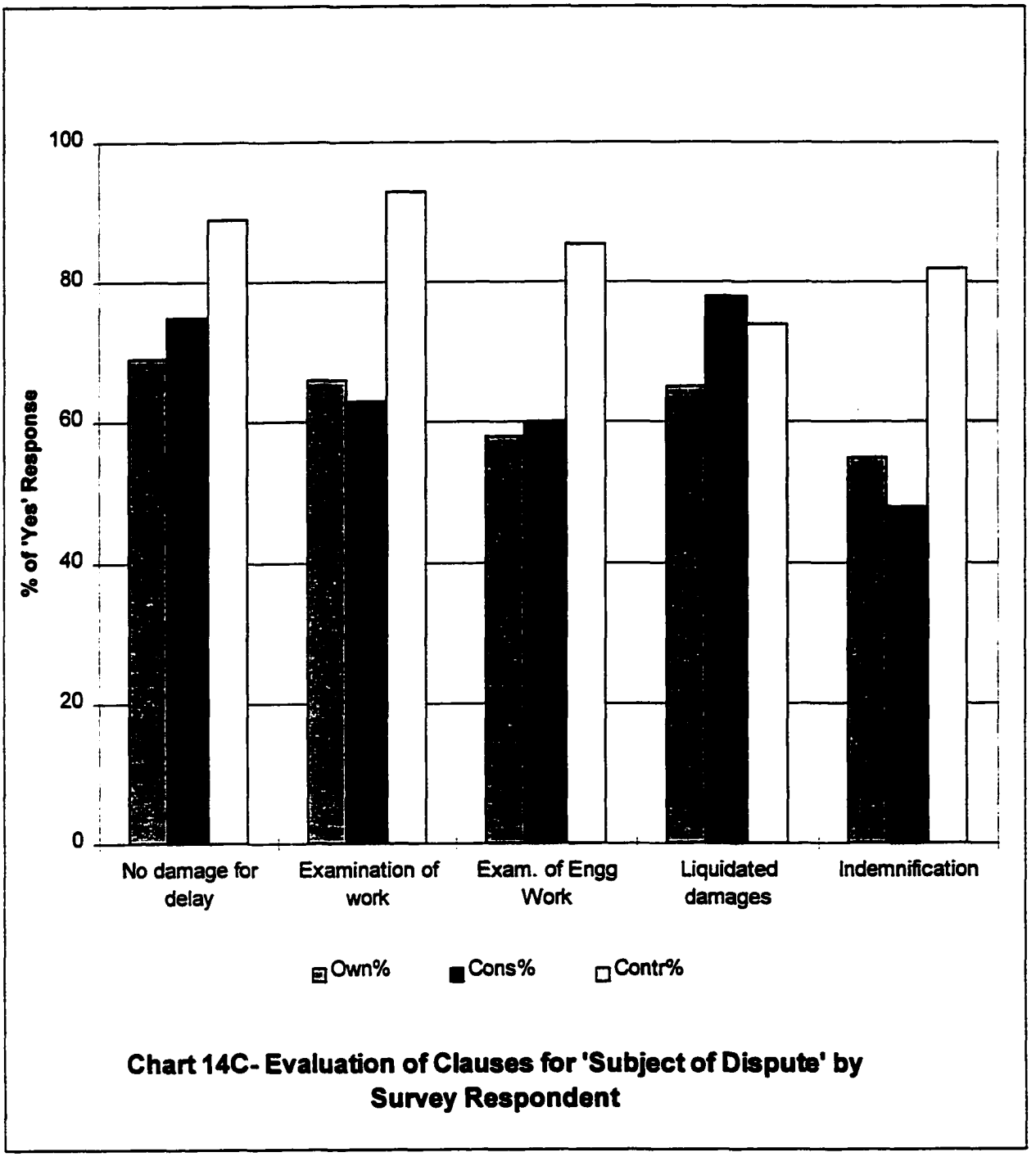


Chart 14C- Evaluation of Clauses for 'Subject of Dispute' by Survey Respondent

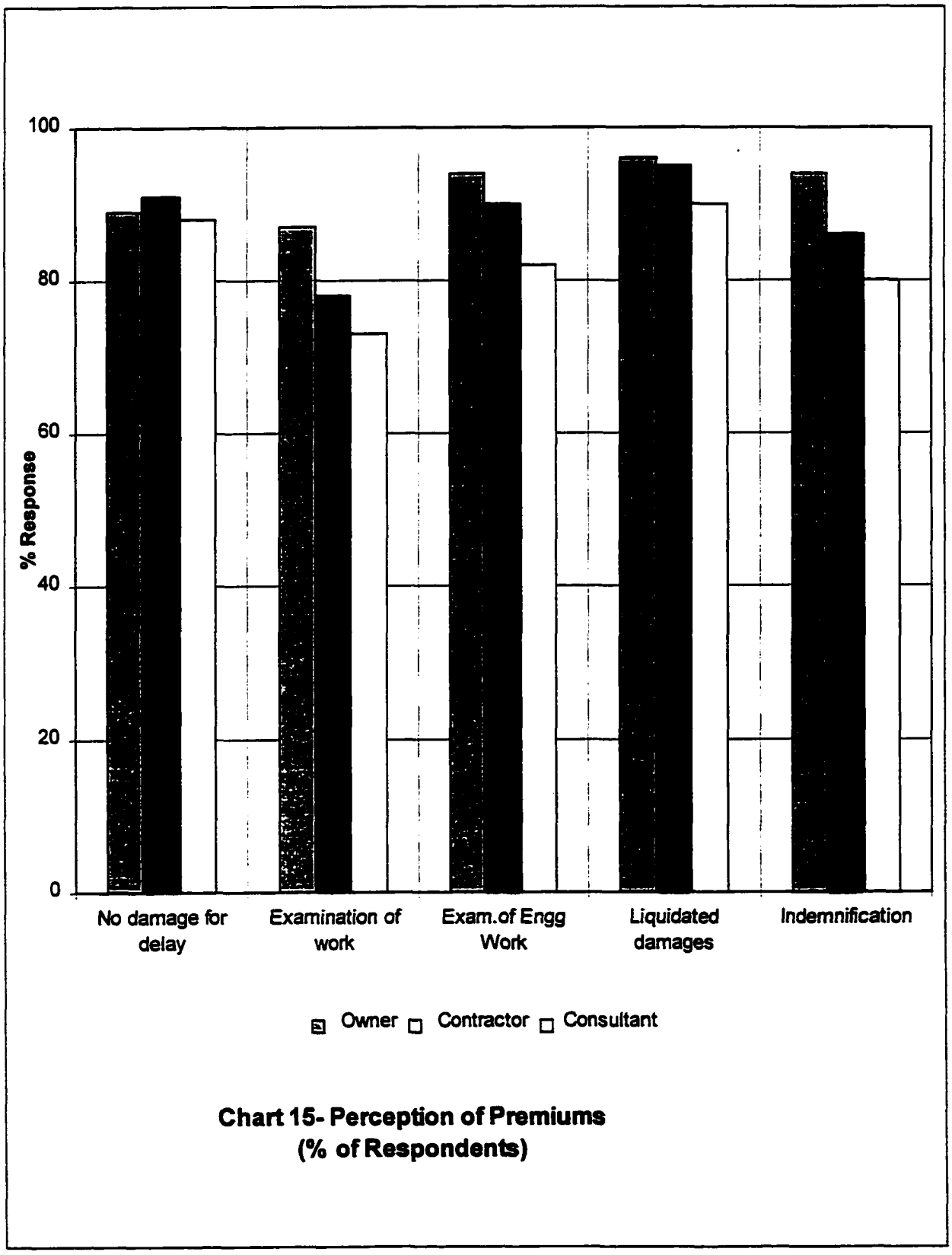


Chart 15- Perception of Premiums (% of Respondents)

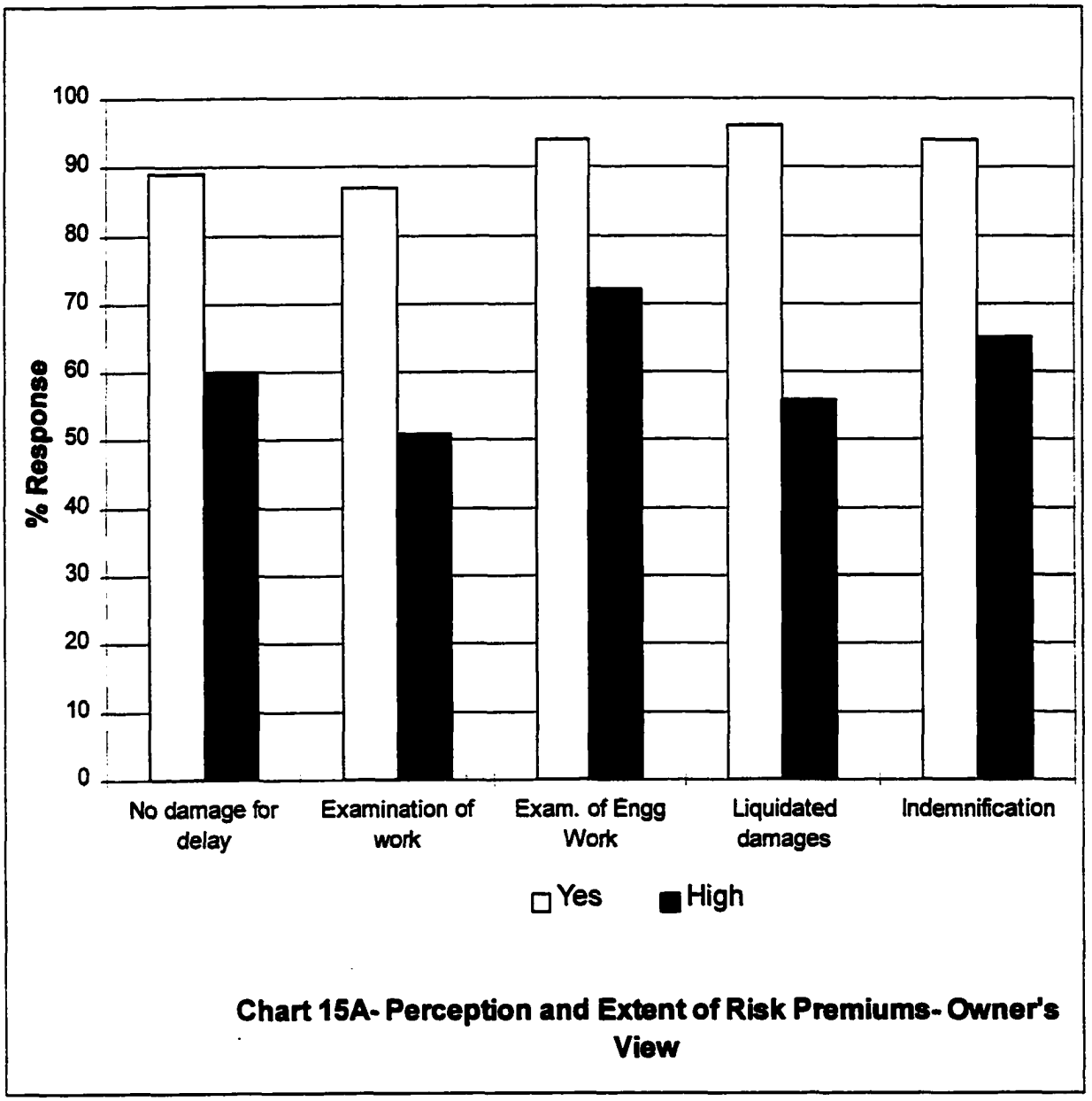


Chart 15A- Perception and Extent of Risk Premiums- Owner's View

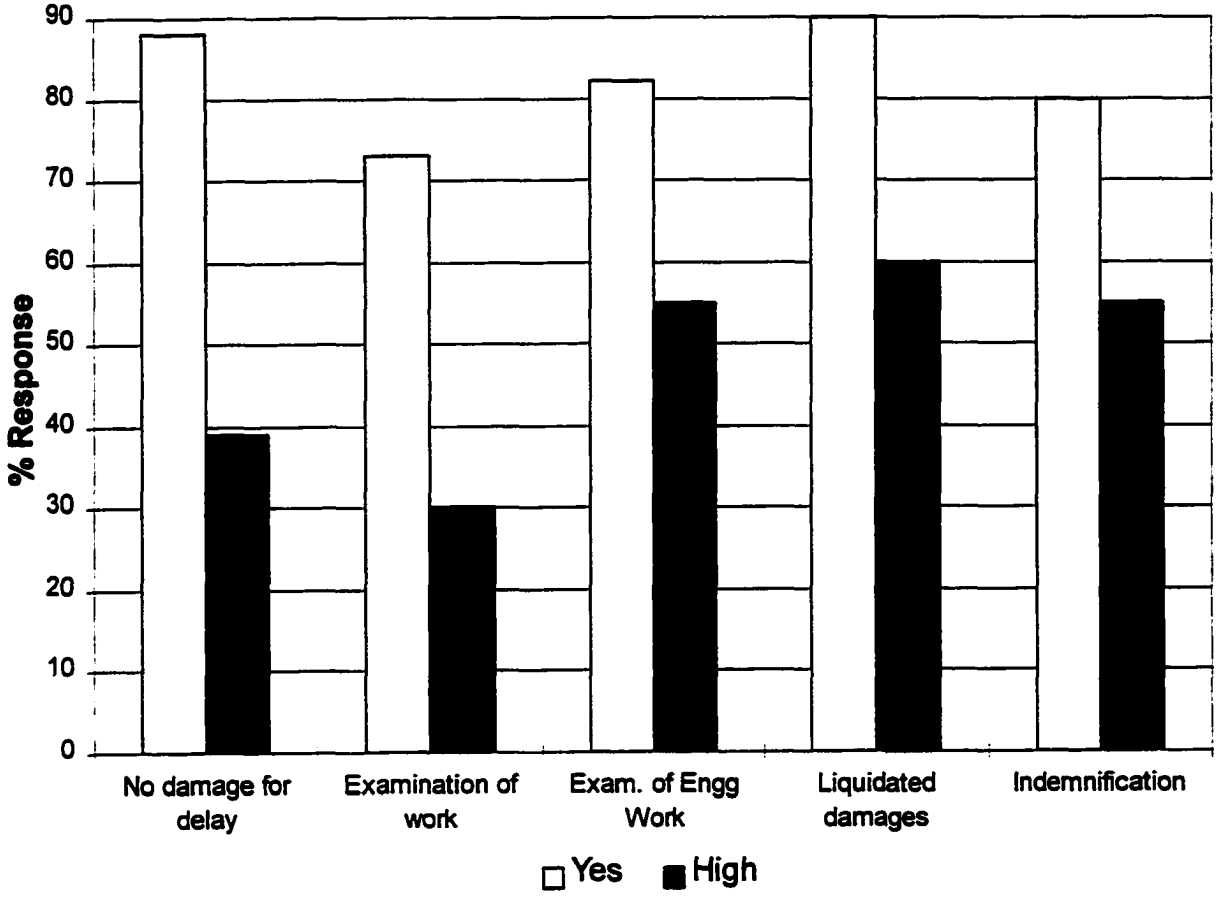


Chart 15B- Perception and Extent of Risk Premiums- Consultant's View

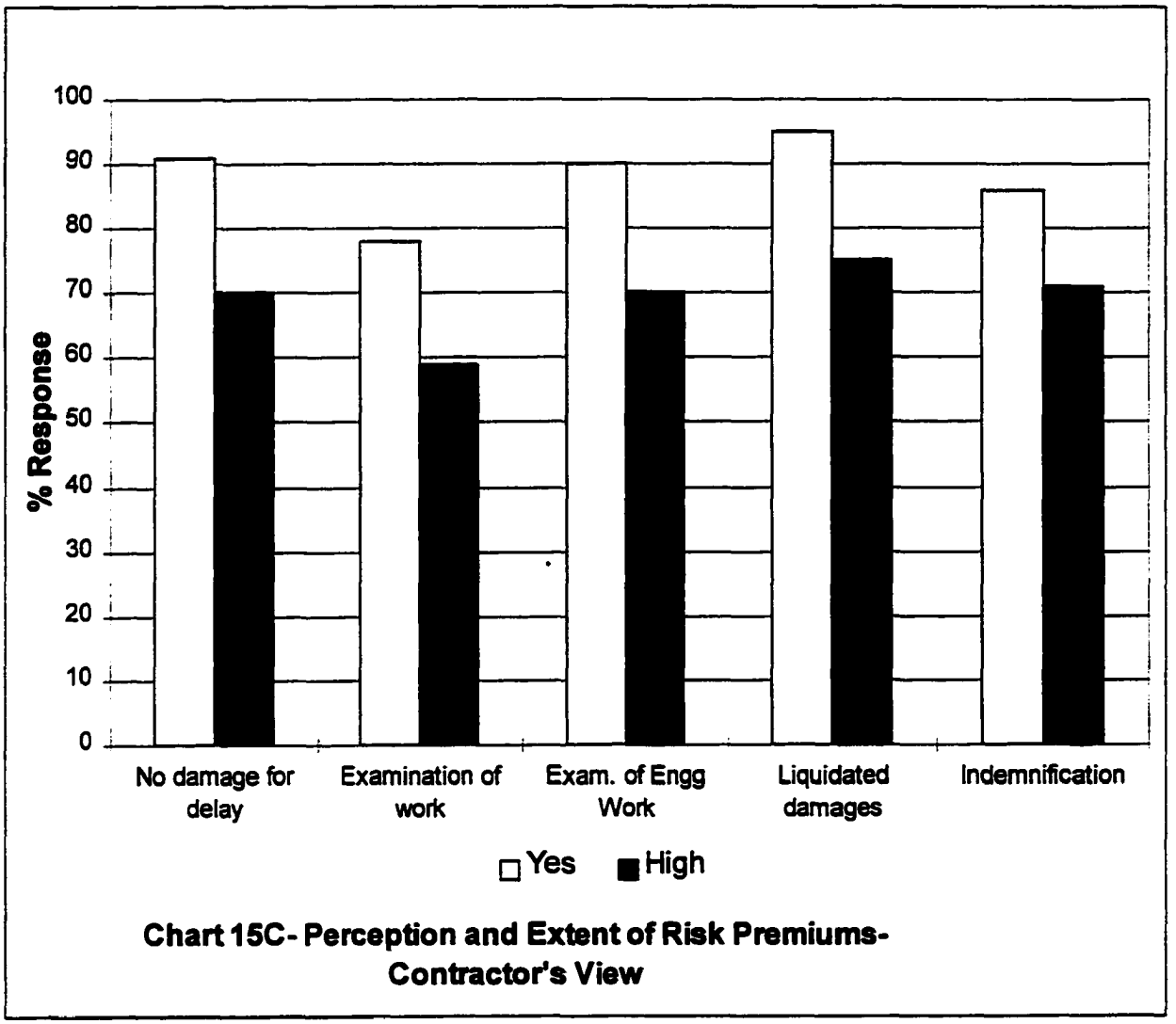


Chart 15C- Perception and Extent of Risk Premiums- Contractor's View

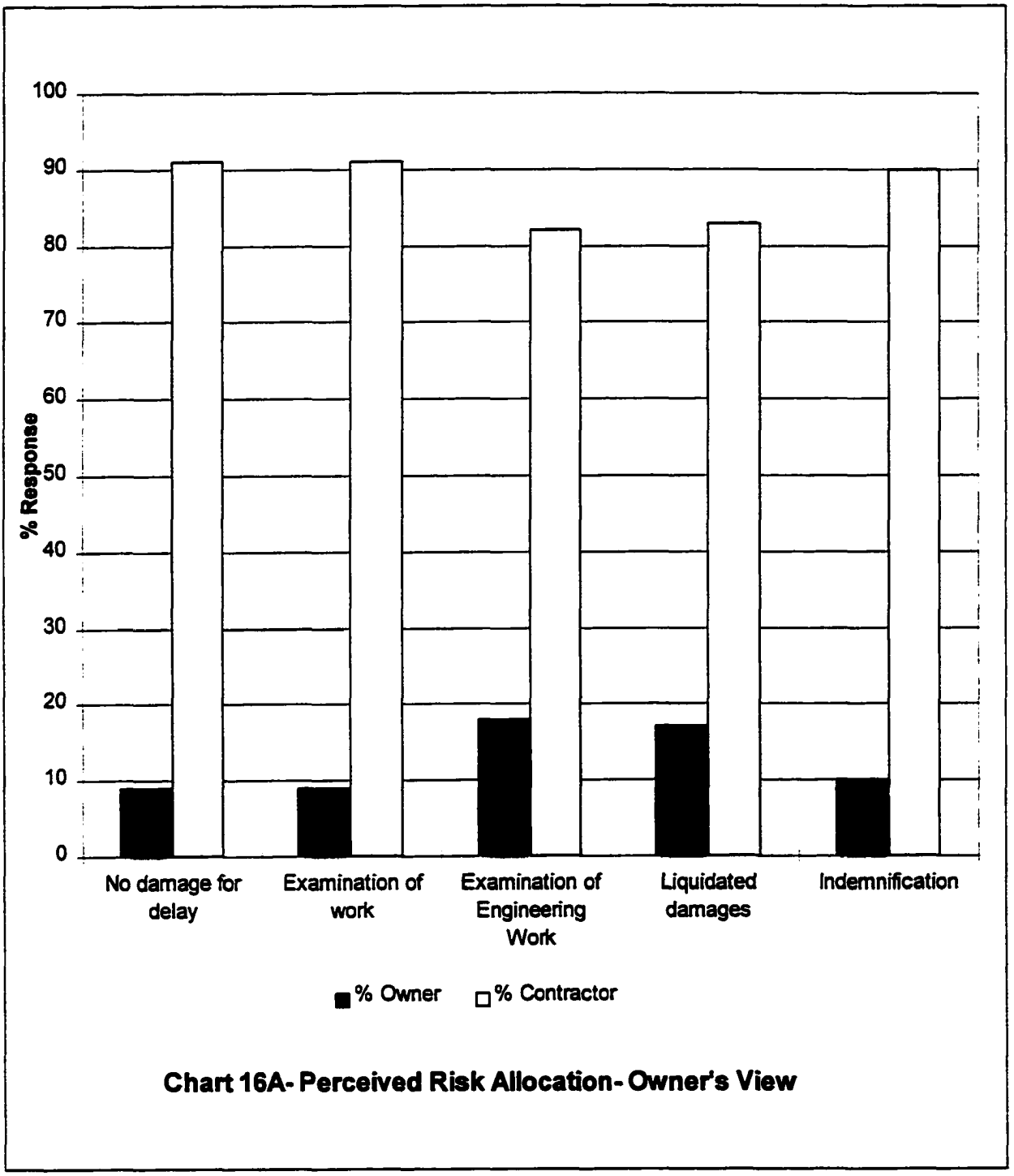


Chart 16A- Perceived Risk Allocation- Owner's View

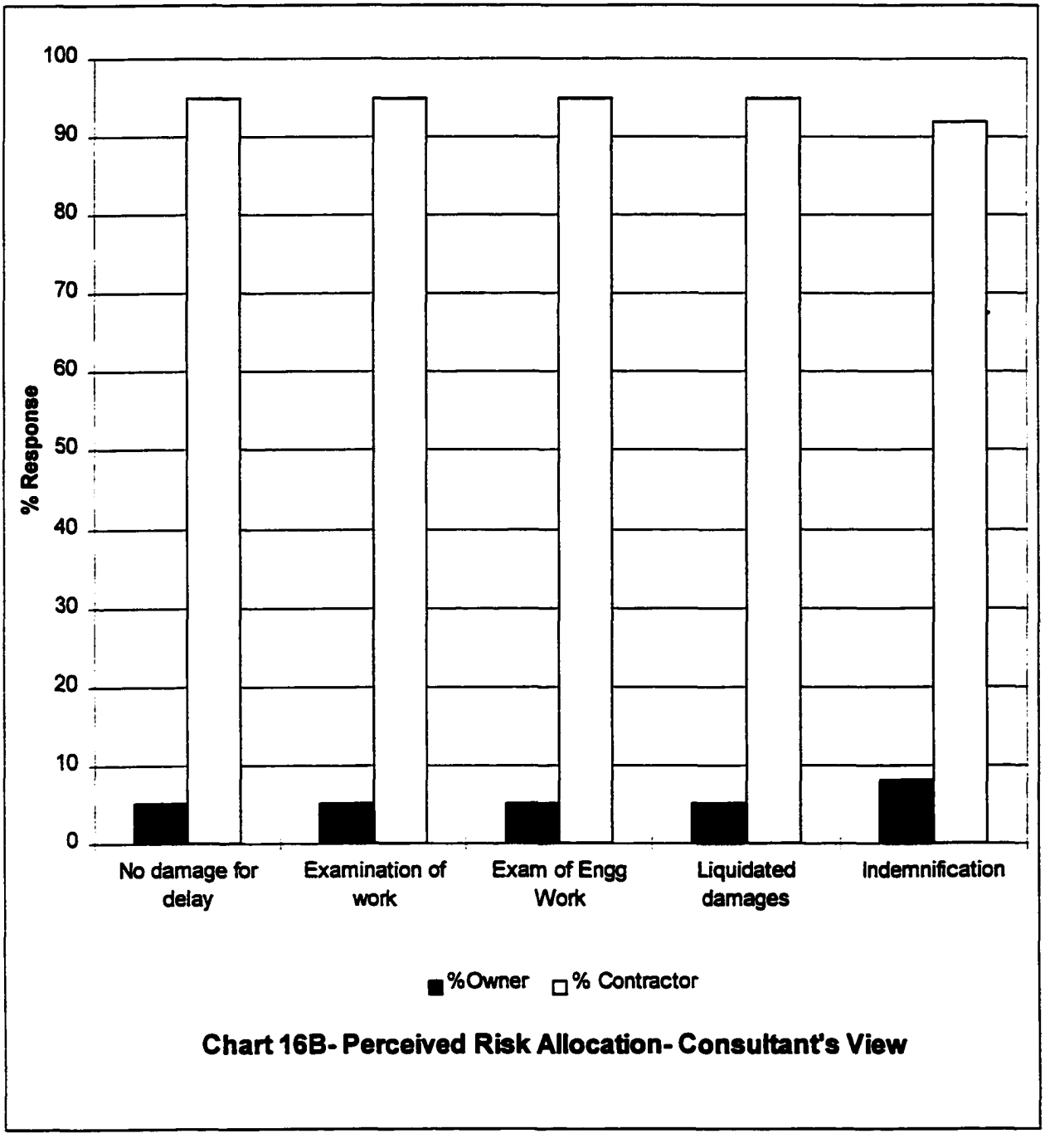


Chart 16B- Perceived Risk Allocation- Consultant's View

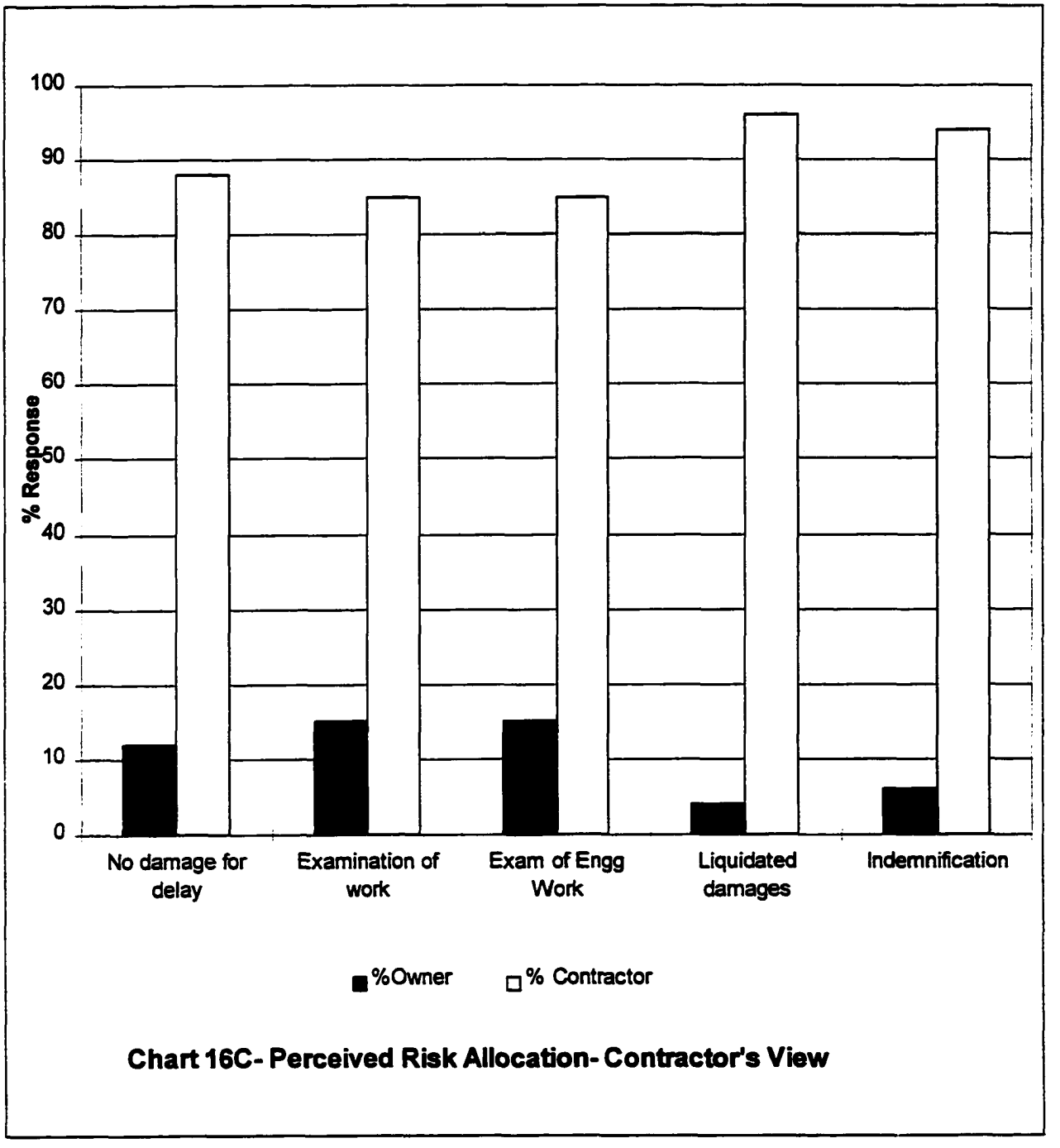


Chart 16C- Perceived Risk Allocation- Contractor's View

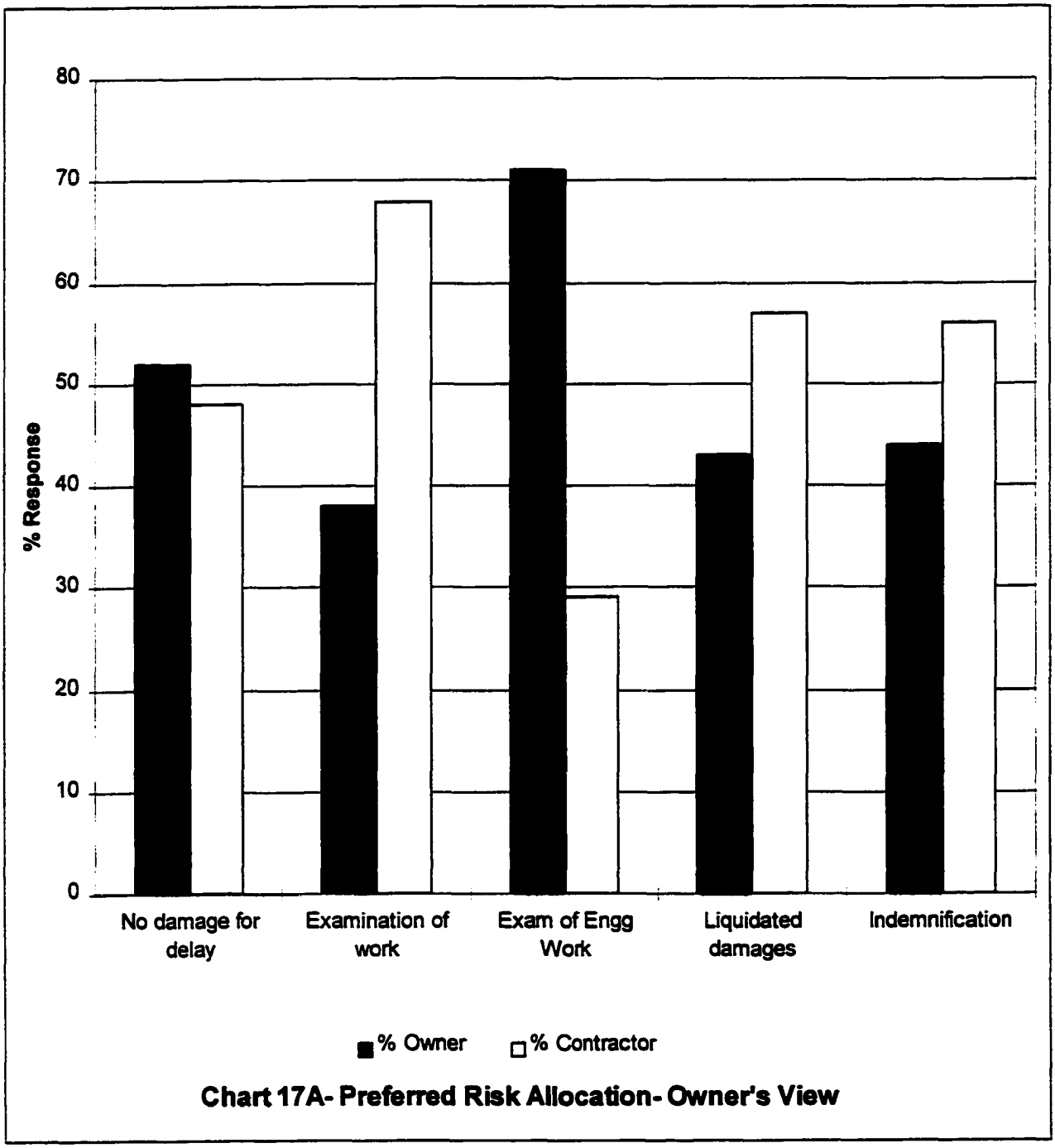


Chart 17A- Preferred Risk Allocation- Owner's View

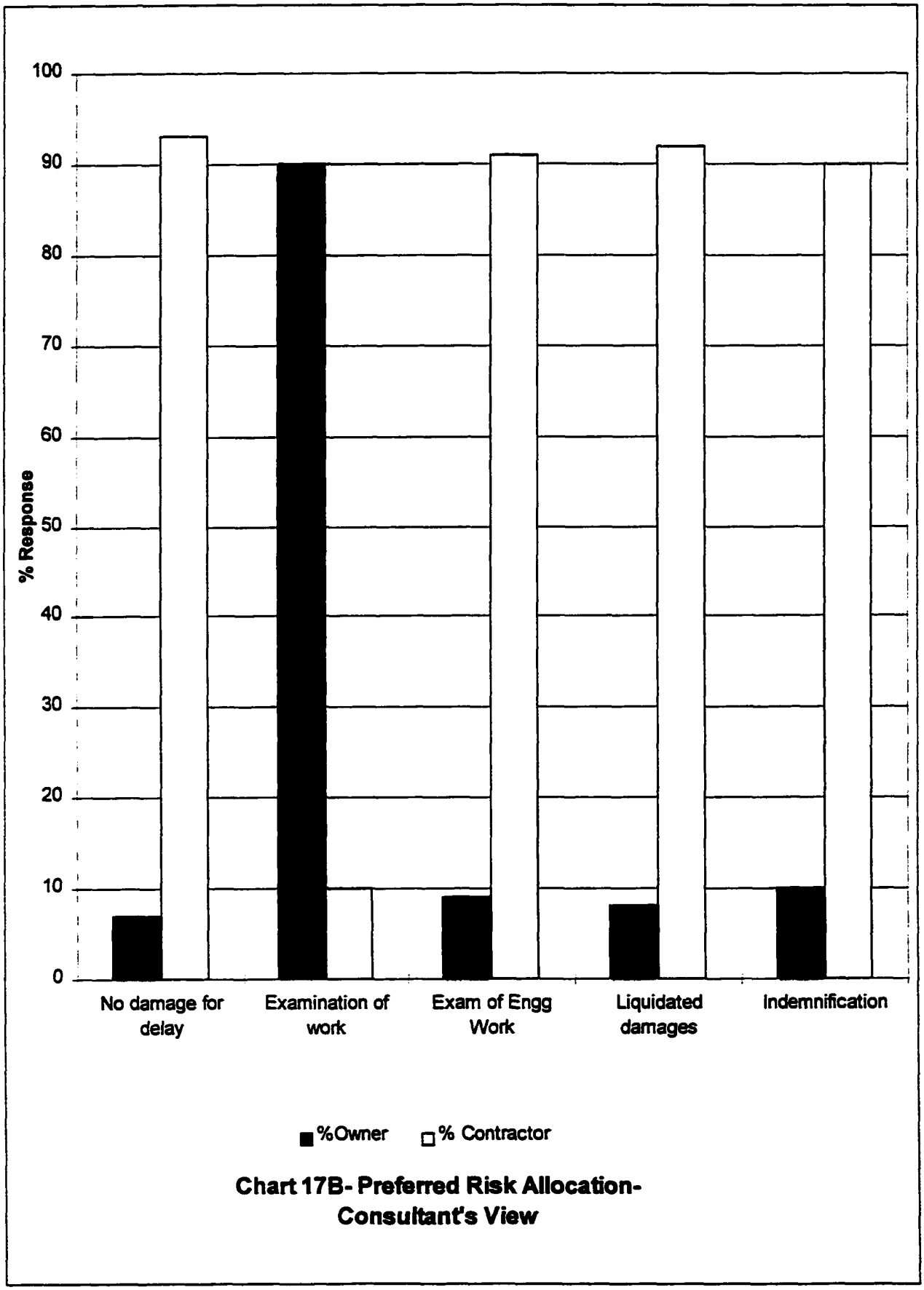


Chart 17B- Preferred Risk Allocation- Consultant's View

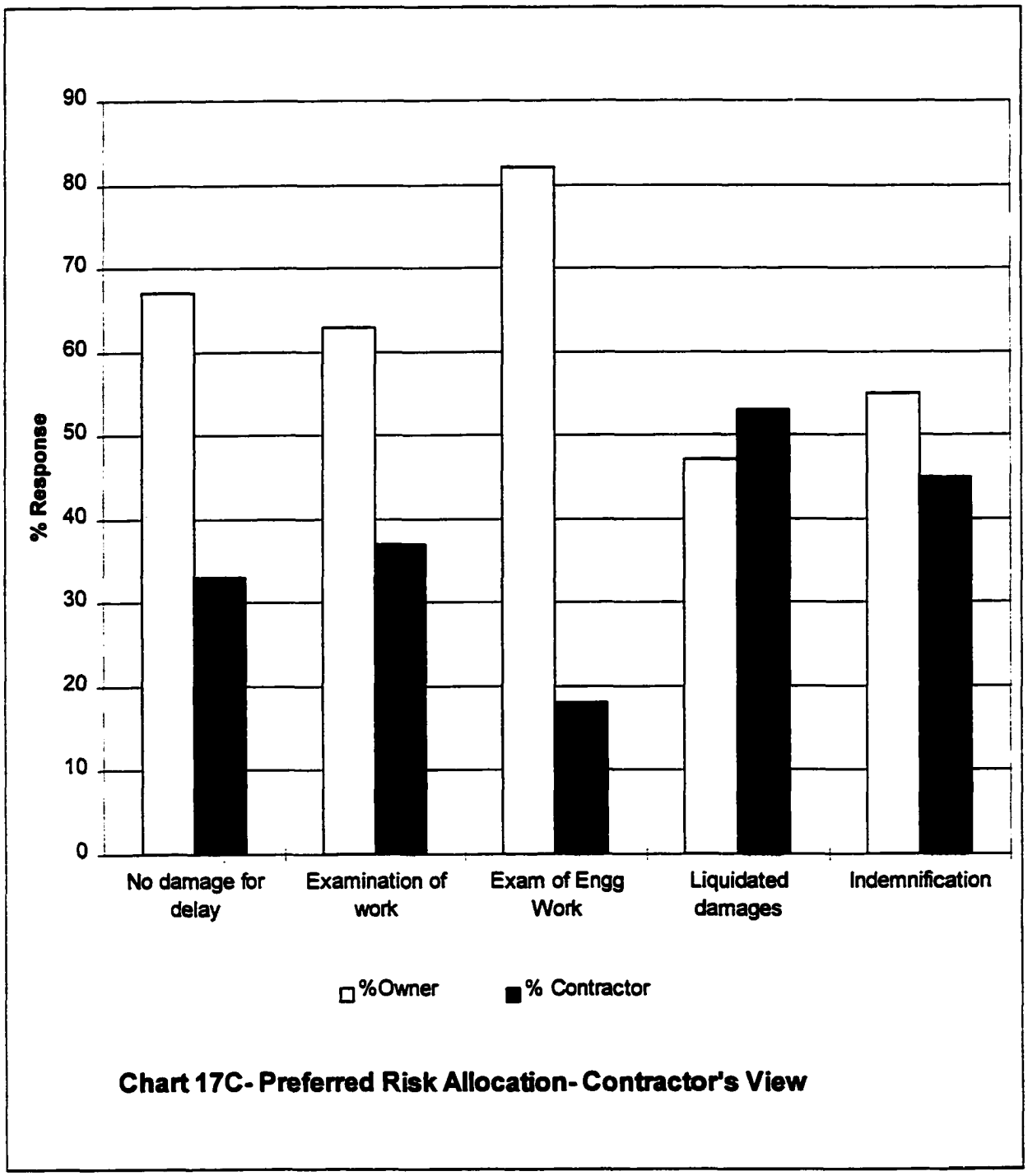


Chart 17C- Preferred Risk Allocation- Contractor's View

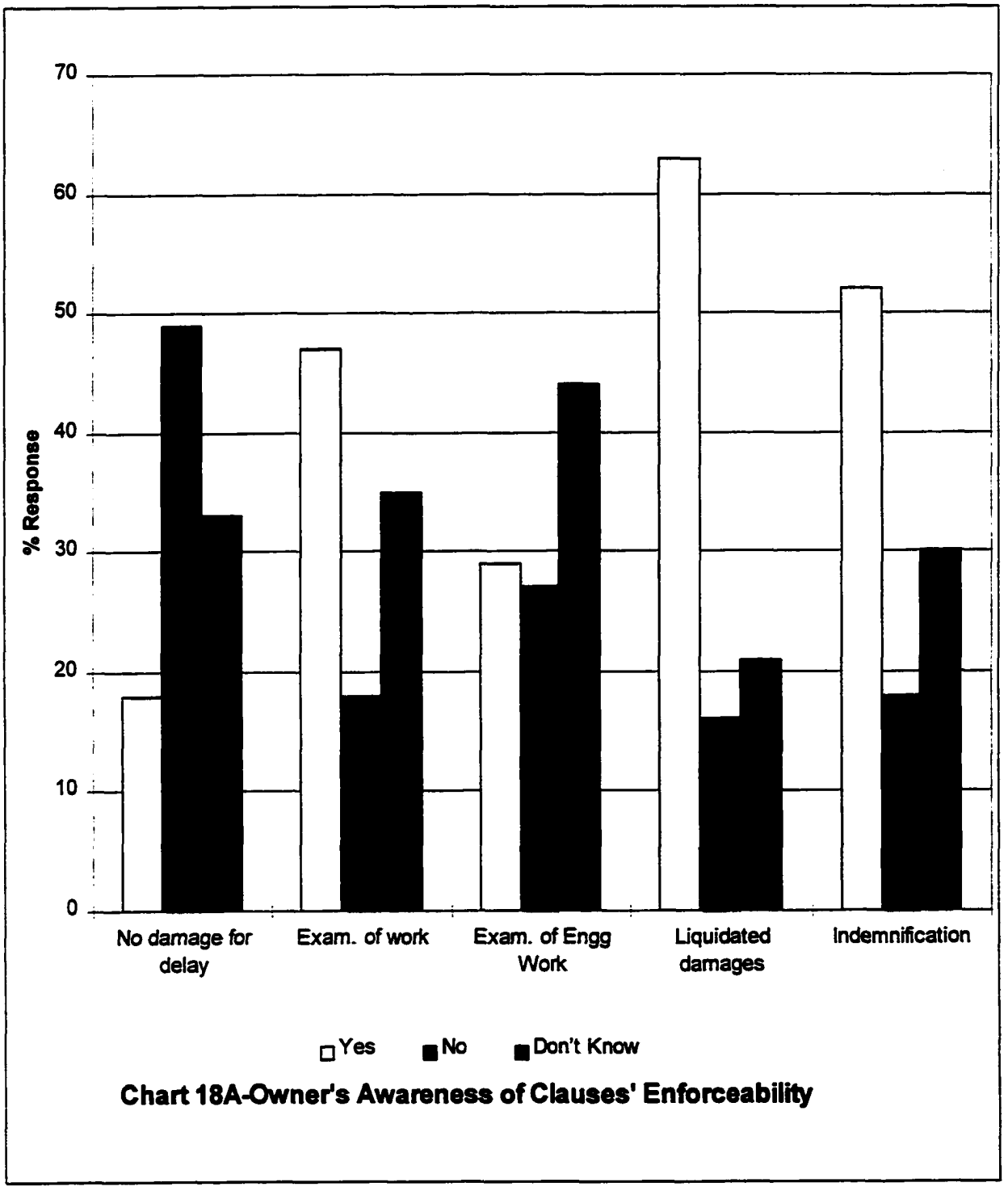


Chart 18A-Owner's Awareness of Clauses' Enforceability

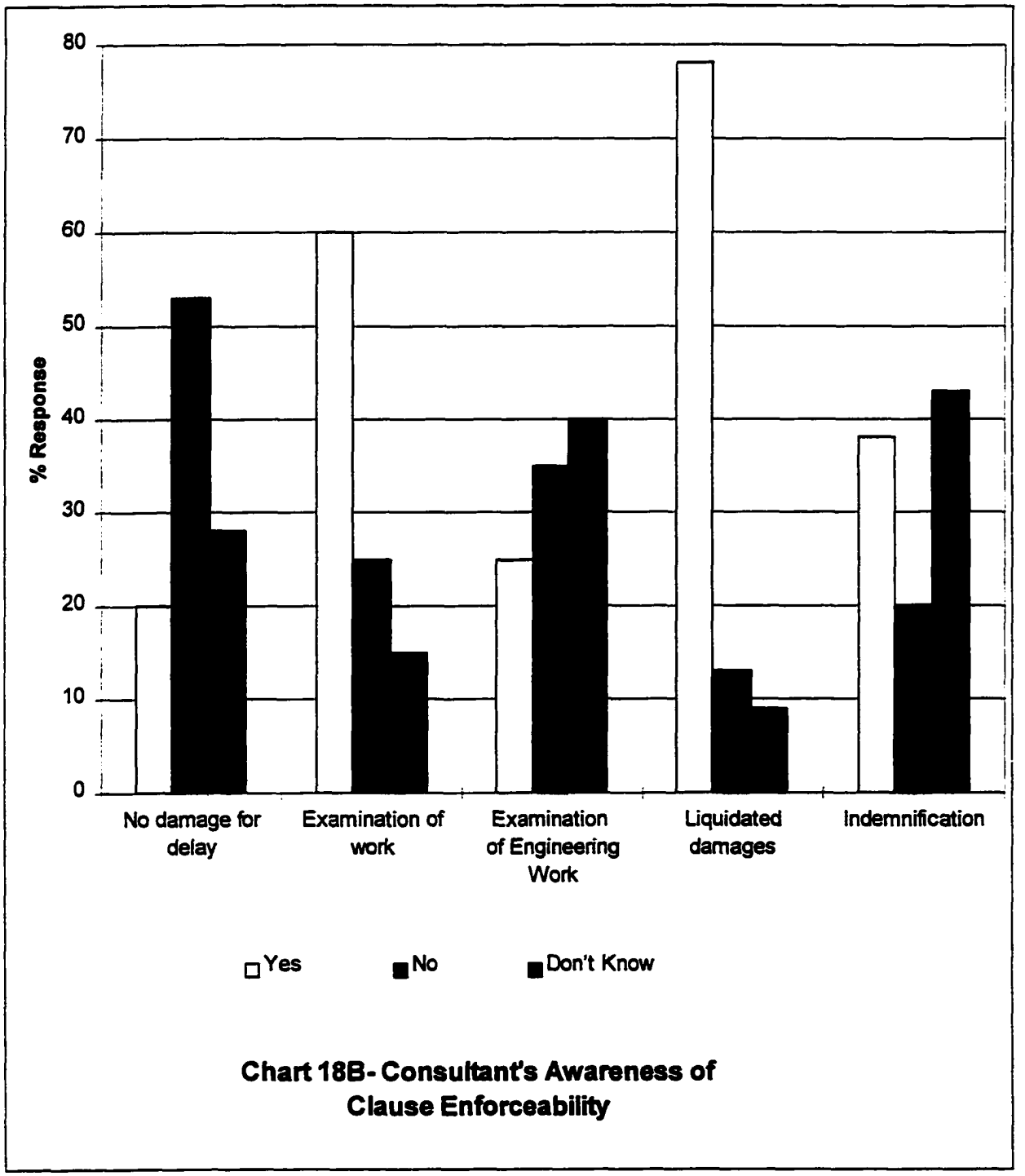


Chart 18B- Consultant's Awareness of Clause Enforceability

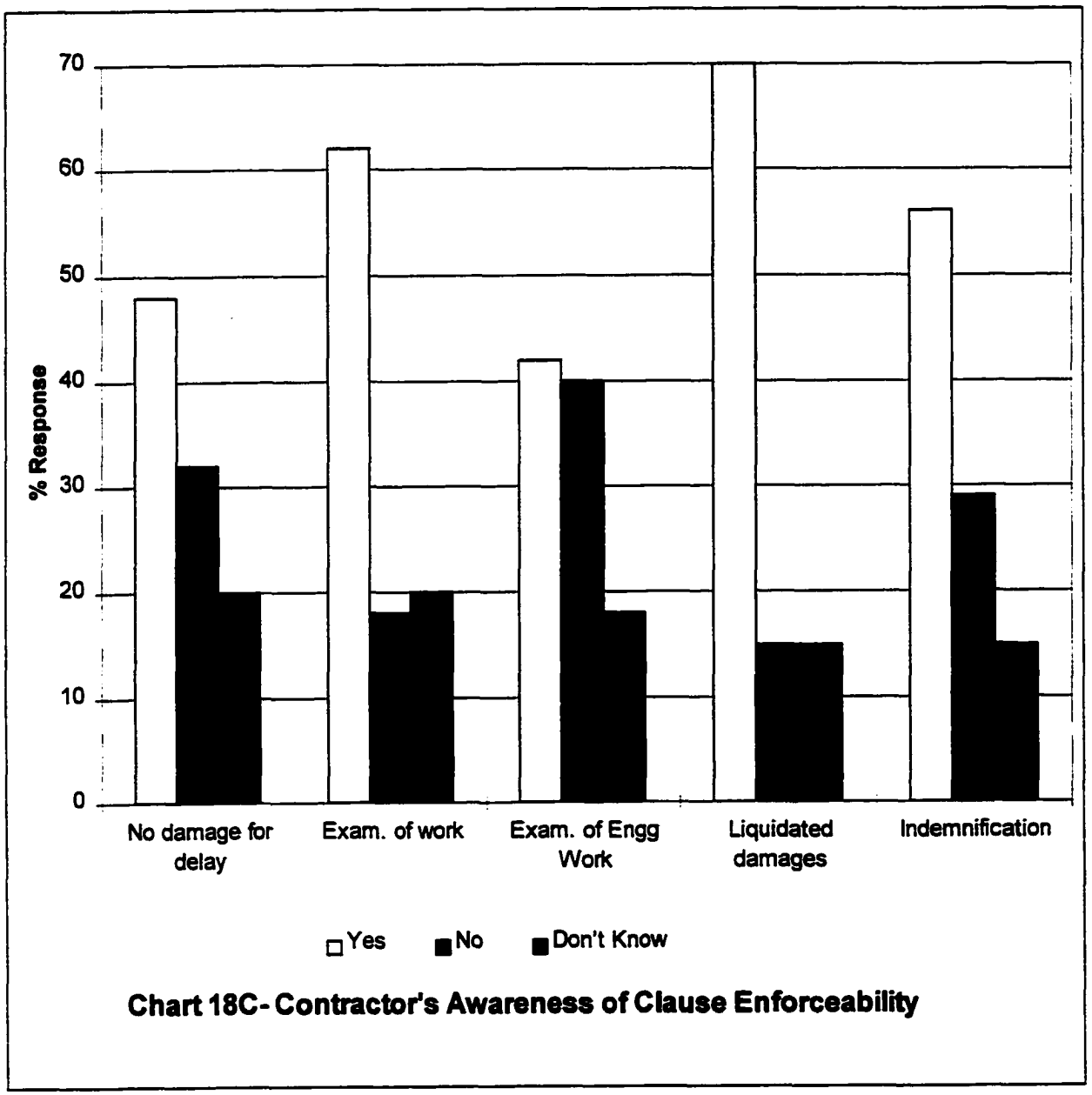


Chart 18C- Contractor's Awareness of Clause Enforceability

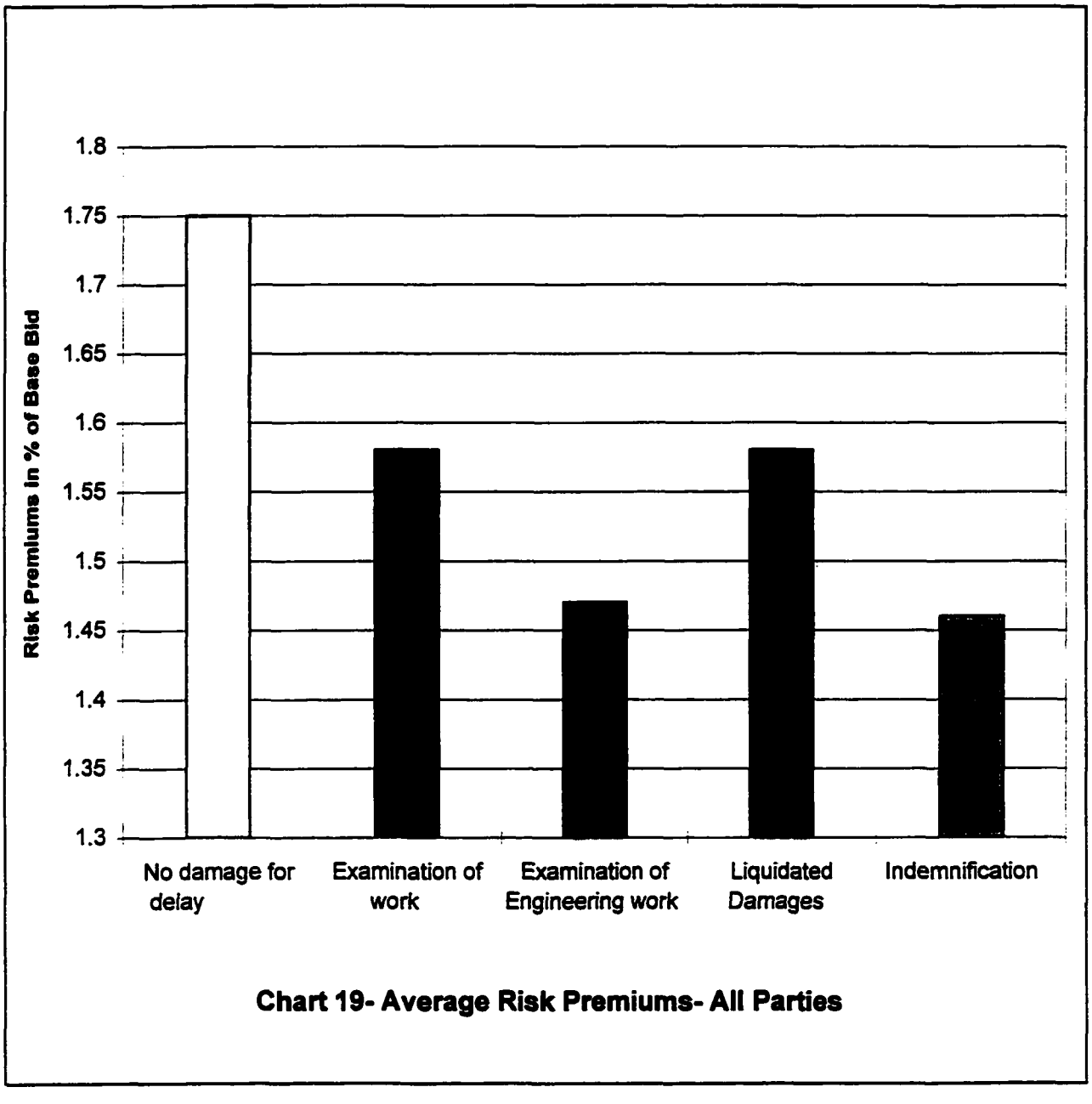


Chart 19- Average Risk Premiums- All Parties

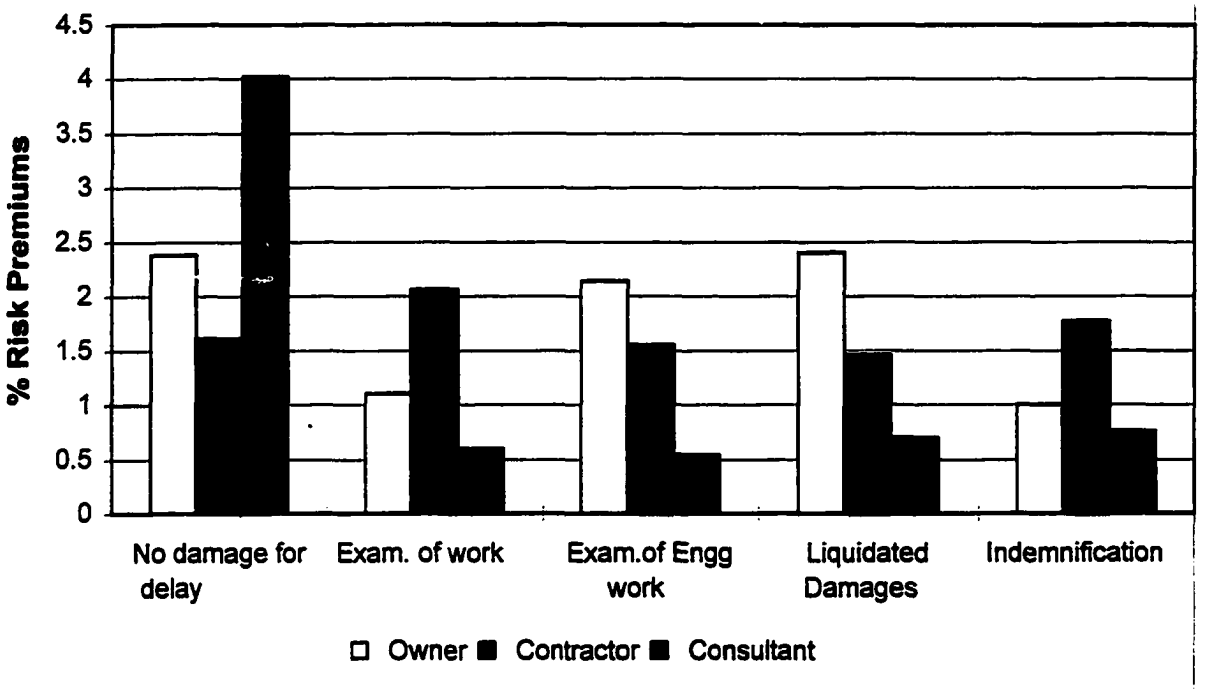


Chart 20- Risk Premiums associated with Exculpatory Clauses

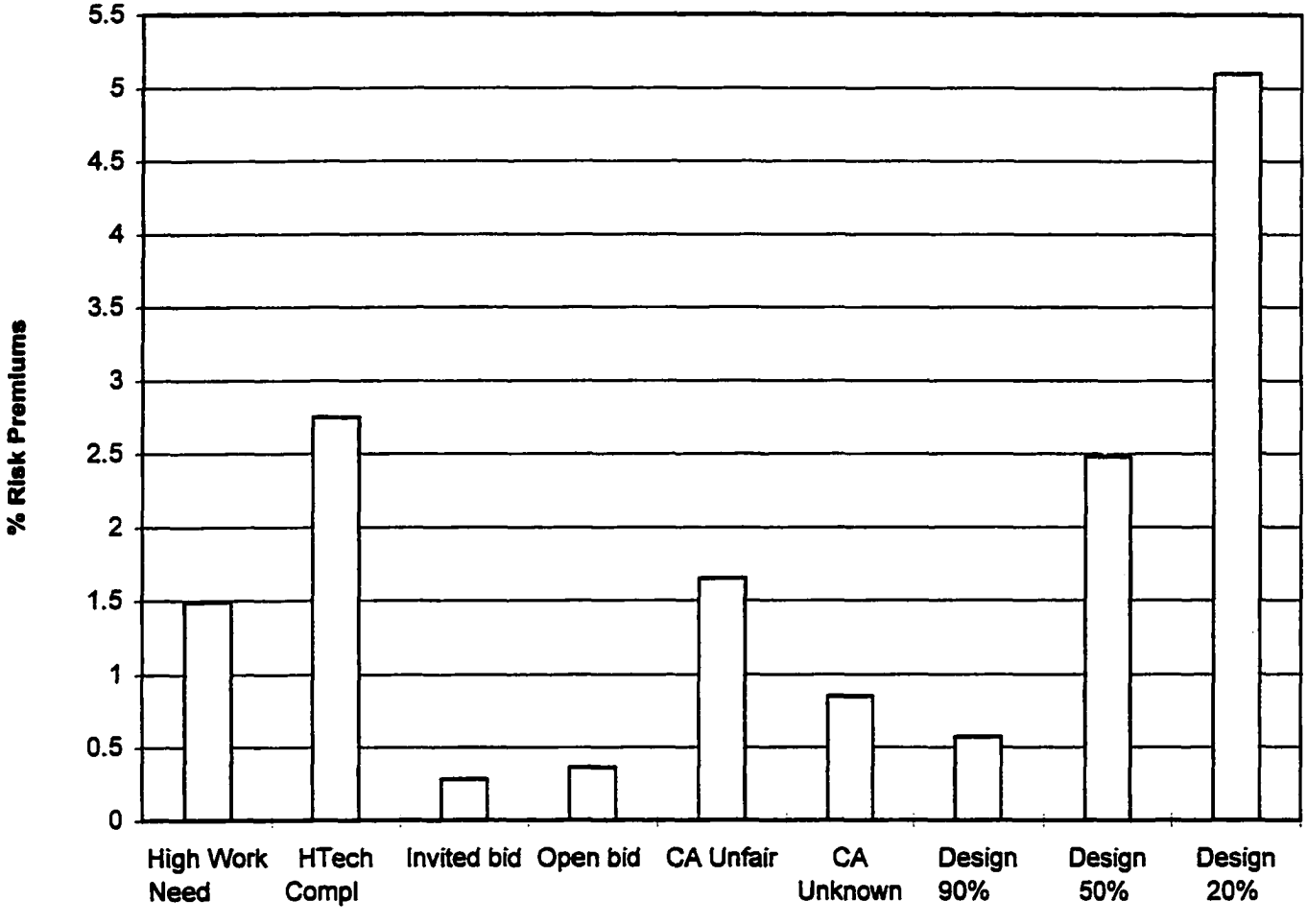


Chart 21- Risk Premiums associated with Risk Sources- All Parties

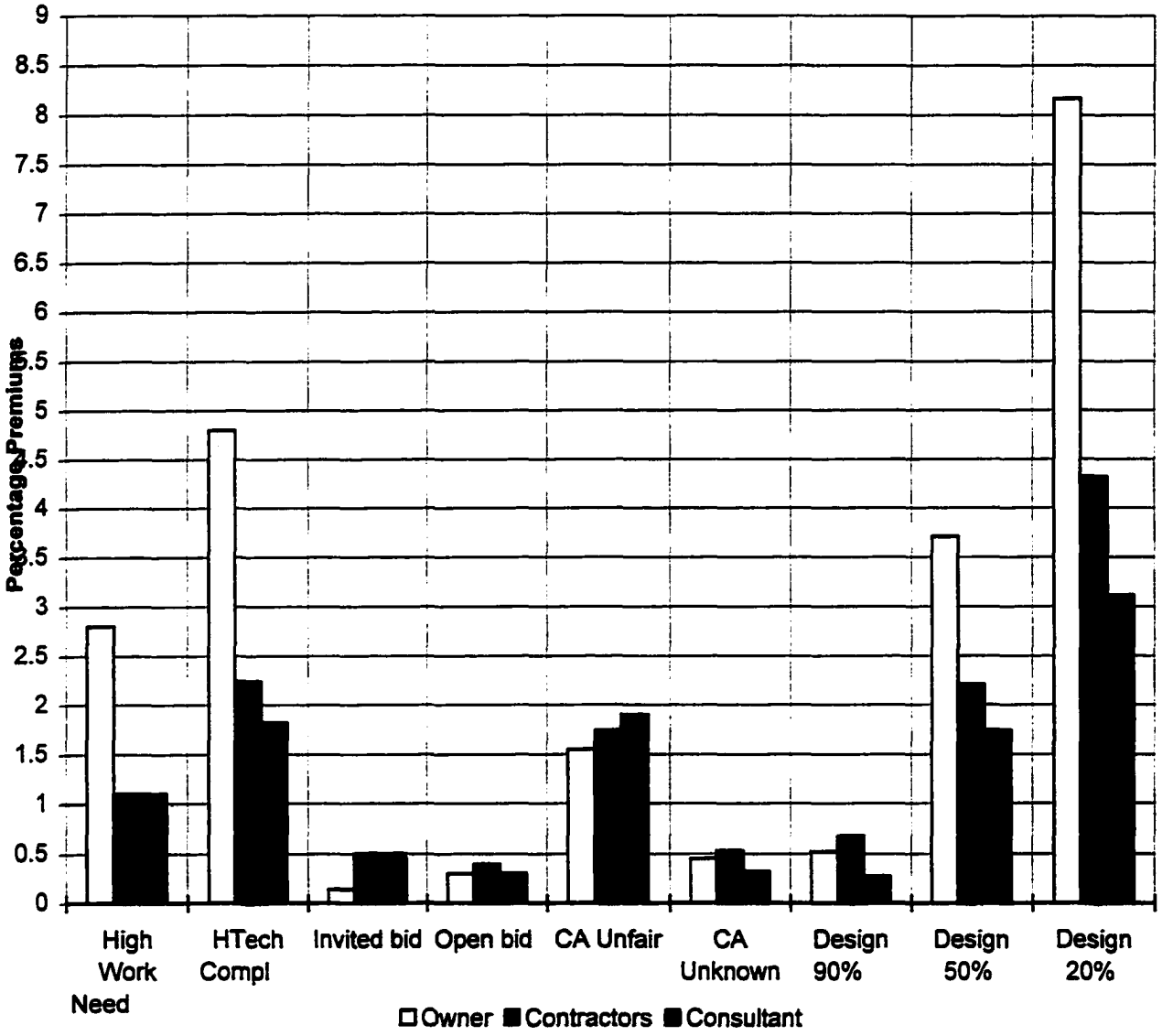


Chart 22- Risk Premiums associated with Specific Risk Factors

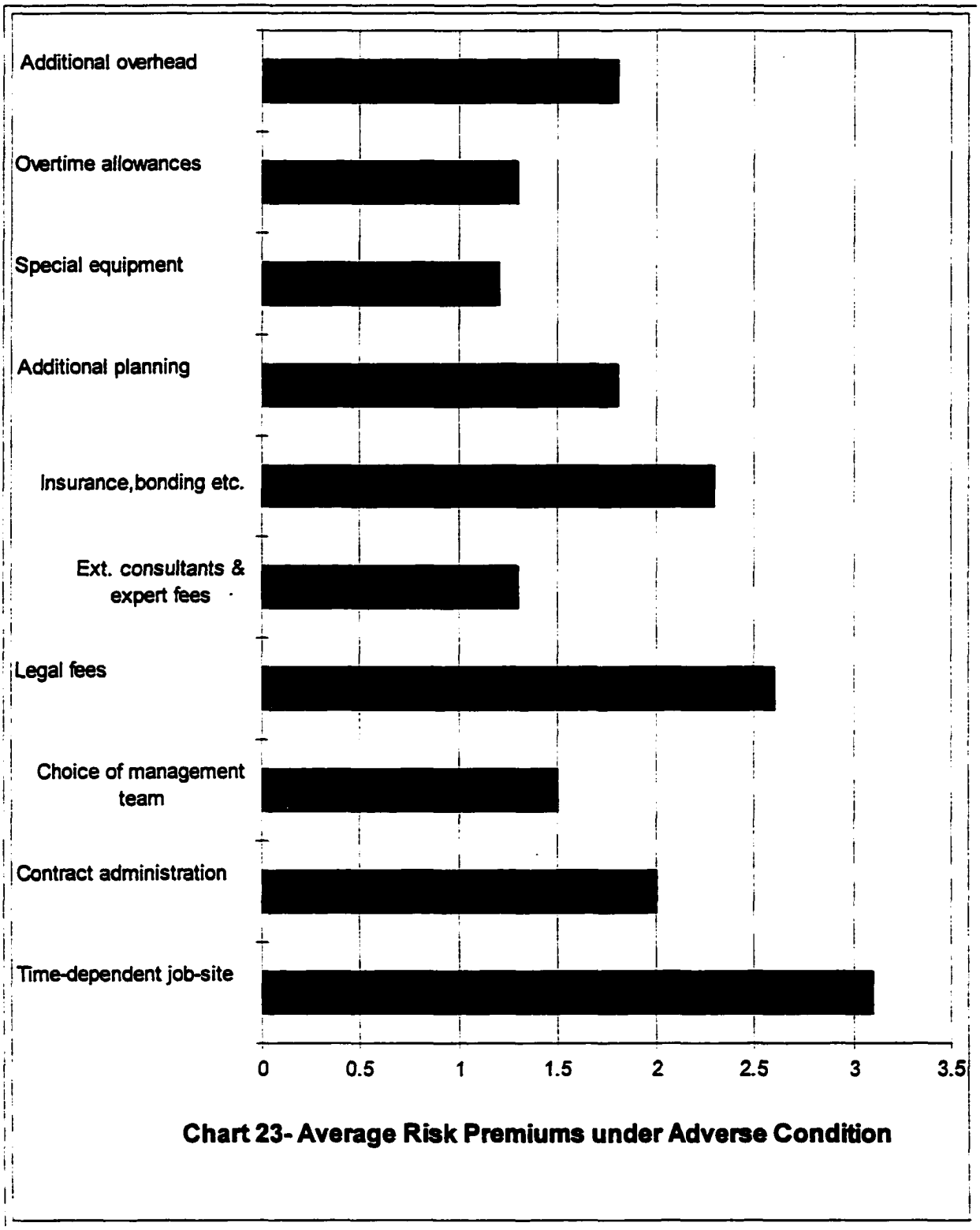


Chart 23- Average Risk Premiums under Adverse Condition

APPENDIX C- SURVEY RESPONDENTS' COMMENTS

1.0 GENERAL COMMENTS

(1) Avoid the use of exculpatory clauses. Such clauses are often subject of disputes, claims and litigation.
(2) We (5 contractors) are presently involved in litigation arising of these clauses.
(3) Risk premiums information are proprietary in nature. We do not provide such information.
(4) We (25 contractors) have stopped bidding on a project which contains these clauses. This is our company policy for the last ten years. In fact, we had suffered a lot before. That's the reason we have formed alliances with owners.
(5) Contractors should not bid on a project which contain these clauses simply because they are hungry for work. In the long run it is not cost effective for both parties.
(6) Develop an alliance with owners based on trust and mutual respect for each party's objectives.
(7) Effective communication is key to project success.

2.0 SPECIFIC COMMENTS

- **INDEMNIFICATION**

Owners

(1) Each party should assume their own negligence risk because cost is a major concern associated with indemnification.
(2) Better overall project risk management would obviously improve both owner & contractor situations. To the extent insurance is available, owners could look more to insurance markets directly... rather than indirectly, through contractors.
(3) -Owner should take major risks and carry adequate insurance.
-Contractor should take some risk to assure acceptable performance.
- Contract price reflects market conditions. Owner should not guarantee a profit to the contractor on a lump sum contract.
(4) The primary purpose of indemnification clauses is to make contractors liable for losses which arise out of their own performance of work. That is fundamentally an equitable concept. Inequity would result from a lack of good indemnification clauses, since many legal theories would result in our company incurring losses which resulted from situations under the contractor's control.
(5) Contractor is unwilling to "bet his company" on a project. We generally agree to a limit of liability.
(6) Use high safety standards. Use contractors of proven quality. Use of a strong safety program which the contractor must adhere to. Owner must be willing to accept its risks. Only ask contractors to assume those risks they can control.
(7) Why not silent on the subject and let each side bear its own costs?

Contractors

(8) There is no real need for indemnification clauses. The only equitable clauses are those which are consistent with common law liability, which will be applied if the contract does not contain such a clause. In the absence of an indemnification clause all parties are forced to evaluate the risks of their actions. Society is better served since the negligent party will be held accountable and if several parties were negligent there will be a correct and more efficient sharing of the risks.
(9) The owner needs to understand the ability or inability of different contractors to losses in excess of required insurance.

(10) Owner should be willing to limit contractor's total exposure; this alone allows the contractor to price the risk assumed.
(11) Owners are trying to substitute contractor's indemnification for their own insurance policies. Owners will have to recognize that inherent risks of doing business include activities not only in ownership/ manufacturing/ leasing /etc., but also in construction.
(12) Clearly separate engineers responsibility from contractors, defending the engineer's from claims due to physical acts at the site (provided he's not responsible) is a lot different from indemnifying engineer flat out for a claim- included possibly his professional acts.
(13) Explain to owner that (it is) unfair for contractor to take 100% of loss if only 10% at fault and owner 90% at fault. Also, even though enforced, retroactive premium adjustments and future premium rate increases are good reasons to negotiate fair indemnity clauses. In most cases, such negotiations are successful. Only publicly bid projects which are competitively bid are hard to negotiate.
(14) Everyone bears the action and responsibility of their own people and scope of work.
(15) Each party should the responsibility for their own acts and not require any other party to assume a share of the responsibility.
(16) A viable contractor with assets to protect will not accept uninsurable risk over which he has no control. Owners who wish to transfer risk should thus make the indemnity fully insurable and subject to a limitation of liability. In fact, the best approach would be to specify the insurance coverage required and include an indemnity which just serves to further implement the coverage. Owners should investigate direct procurement of a "wrap-up" insurance carriers, who are set up to evaluate and cover these risks, rather than the contractors.
(17) Write in a manner to be insurable and cap liability for owner property.

- **LIQUIDATED DAMAGES CLAUSE**

Owners

(1) Owner should bear most or all risk for consequential damages unless Contractor is negligent.
(2) Give contractors a firmer schedule and insist on its being met.
    Provide firm, complete design.
    Ensure material and equipment are delivered as scheduled.
    Ensure that tie- in points are shown correctly and can be made when scheduled.
    Improve day- to -day communication with contractor so both parties are kept fully informed.
(4) We do not want allowances included in our costs for potential of consequential damages. We would rather spend a much smaller amount to reduce their probability this includes paying a premium for a capable effective contractor.
(5) The best approaches are to ask risk vs. reward for both contractor and owner. Try to find use for incentives.
(6) If contractors can assume the risk of consequential damages, then they should pass that on to the owner in the bid price. Likewise, if owner is budget constrained, he needs to relive contractor of delay responsibility and pay the loss of production or use costs that go with delay.

Contractors

(1) Cost incentives to meet schedule minimize a majority of problems. Enforceable and clear warranty clauses minimize the remainder.
(2) Owner purchases overall project insurance, including damages for delay coverage, enter into more pure turnkey projects where contractor has entire control.
(3) Owners should not attempt to shift loss and consequential damage risk to contractor except for gross mis-management or negligence.

(4) -100% completed design.
-100% funding in hand
-Realistic schedule.

(5) An aggregate dollar limitation associated with a fraction of the contractor's profit as well as a deductible (either in dollar amount or time buffer) are possible alternates. Offering bonus for early completion would help take the sting out of liquidated damages liability.

(6) When consequential damages are a concern to owner, owner should write the contract to be sure contractor has a reasonable incentive to perform. Placing unlimited consequential damages on contractor simply invites inclusion of extraordinary contingencies and/or refusal to bid by low capitalized firms.

(7) Loss of use & profits are most difficult issue. Contractor is not in the insurance business for the owner-consequentials can be stretched to cover almost any thing. A cap on such damages, by equating to liquidated damages appears to be the only way to define what the owner anticipates as a reasonable level of responsibility that the contractor should assume.

(8) There should be **liquidated damage clause**, if absolutely necessary. And they should operate both ways: if time is money, then completion ahead of schedule should be rewarded. I don't believe a consequential damage clause is ever fair to a contractor.

(9) Identify the potential for consequential damages and establish a liquidated damages clause to describe the contractor's responsibility for the owner's consequential damages. It is impossible for a contractor to evaluate and quantify the risk of the owner's consequential damages. A liquidated damages clause in lieu of liability for the owner's consequential damages will give the contractor incentives to complete the work on schedule without the risk of unlimited consequential damages.

(10) Owners should take this risk. It is usually remote and difficult for contractors to price. If contractor does price it and it doesn't occur owner has unnecessarily paid for it in the price.

(11) Cause the contractor to assume enough risk to ensure incentive to perform, but not so much that competition is restricted. Include a cap. In some cases, such as electric utilities, only the owner can obtain insurance coverage. Owners should attempt to extend this coverage to the contractor.

(12) Rarely do contractors have enough profit potential to even consider taking on the risk of consequential damages. Insurance/bonding companies will limit the ability of owners to get contractors to accept consequential damages unless they are limited, defined and related to performance bonus/penalty clauses.

- **EXAMINATION OF WORK CLAUSE**

Contractors

(1) The risk of differing site/soil conditions to be the responsibility of the owner. It is cost effective and equitable. If owner assigns these risks to the contractors, they will end up paying more than is necessary.

(2) Realize that changed conditions are inevitable on construction projects and work with contractors to set up a mechanism to deal with them.

(3) Unforeseen differing conditions should be treated as changes. Basic to this is the fact that the owner should commission an adequate investigation and then assume responsibility for its adequacy.

Owners

(1) Owner should assume the risk of differing conditions.

(2) Owners should allow the contractor to bid using unit prices based on various quantity ranges for lump sum scope items that can not be bid with lump sum prices. Using a method of this nature requires that the owner develops a long term alliance with a reputed contractor with proven integrity.

- **NO DAMAGE FOR DELAY CLAUSE**

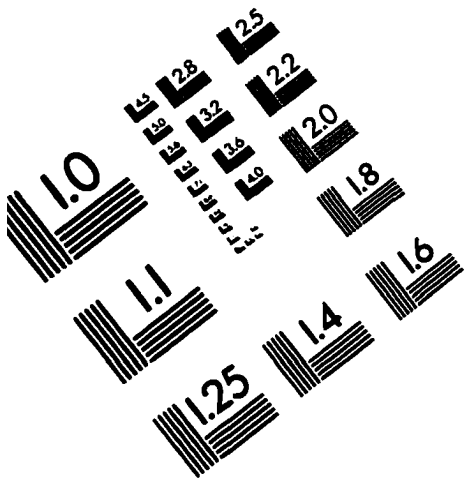
Contractors

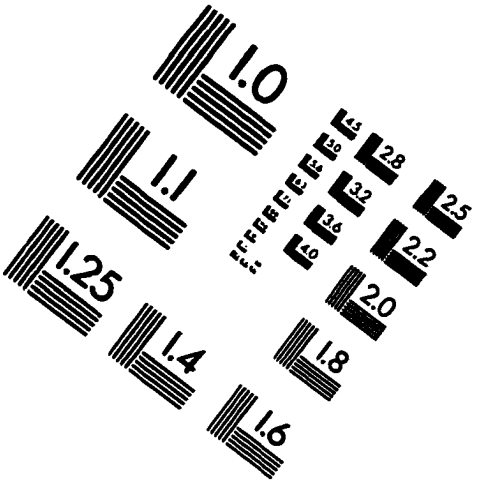
(1) Deal with the allocation of delay risks within the contract.
(2) Delay risks cannot be transferred beyond the owner or the contractor.
(3) The risks are not insurable so their costs must dealt with directly by the contract participants. The party best equipped to control the risk should bear the risks. Owners must bear the costs of their own actions and in actions as must the contractors.
(4) Responsibility for concurrent delays should be shared to the extent each party is responsible.
(5) Use of **"no damage for delay"** clauses should be restricted where there is significant risk of delays , e.g. - multiple prime projects. If owners plan the project better by accounting for possible delays (e.g. - late delivery of materials) in the schedule, clearly defining responsibilities, and carrying an adequate contingency, delay clauses would be more equitable and effective. Contractors are not gamblers and their profit margins are too thin to take on liability for uninsurable events beyond their control. The owner benefit from the project through the project's life but the contractor lives or dies during the construction period. A few suggestion to improve the risk situation include: 100% design complete before award, 100% plans and specifications complete before award, realistic schedule, and a seven day notice requirement.

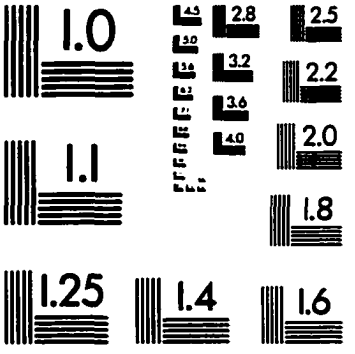
Owners

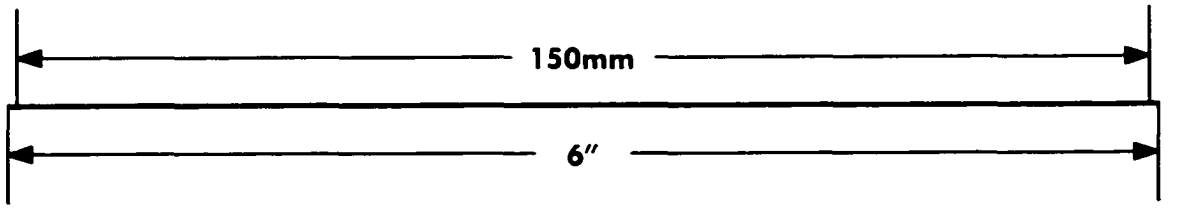
Two major points concerning ways to improve delay clauses to make them more equitable and effective for owners and contractors:
(1) educate the parties involved in the contract @ the implications of the clause so that both parties know what the clause means to them and how it can effect their project performance. The owner to provide a clear definition of delays, costs of delays, and how these costs are calculated.
(2) Provide a mechanism for sharing delay risks. For example, make the contractor responsible for delays which are within his contemplation . For delays beyond the contractor's control, the owner agrees to pay him $ X per month as a general conditions fee. Also provide a method in the contract to control changes. For example, a formal procedure that includes contractor notification, owner verification, and negotiation of an equitable settlement for all delays.

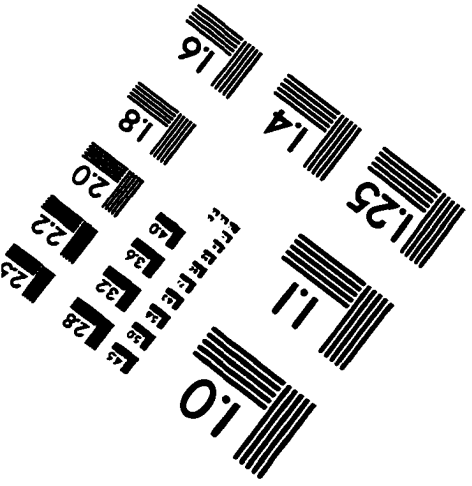
IMAGE EVALUATION TEST TARGET (QA-3)











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