CONSTRUCTION NEGOTIATION: AN EVEN SWAPS APPROACH

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ABSTRACT
Construction involves the coordinated efforts of a wide range of participants working together to achieve project objectives. Negotiation among these participants is common as group effort deem to involve allocation of resources and settlement of differences arising there from. This paper discusses the concept of Even Swaps, a method that facilitates systematic elimination of alternatives. Even Swaps method is first explained through an example of negotiating the terms of a construction contract. The detail application in construction negotiation is illustrated by a construction dispute involving negotiating a settlement on extension of time, loss and expenses and acceleration costs.

KEYWORDS
Construction Negotiation, Even Swaps

1. INTRODUCTION

Negotiation, being an essential element of construction management, should be given the same level of attention as other management functions. In particular, negotiating contracts and disputes are extremely common in all construction activities. Among the various dispute resolution procedures, negotiation is regarded as the pioneer approach to resolve a dispute before resorting to mediation, arbitration or litigation. In fact, previous empirical studies have stated that negotiation is the most commonly used dispute resolution procedure. Due to the important role that negotiation plays in construction management, the optimization of negotiation processes is not only of academic interest but also of practical value.

Construction involves the co-coordinated effort of a large number of participants working together to achieve project objectives. The forces that bind these parties together mainly come from the contracts they entered into as well as the common goal of getting the project completed. Negotiation as a tool to settle resource allocation or dispute is commonplace. Researches in negotiation are plentiful and mainly focus on the processes, strategies and tactics. Walton and McKensie (1965), in their study on labor negotiation, proposed to distinguish distribution and integrative negotiation. Distributive negotiations have been regarded as win-lose, zero-sum, pure conflict and the objective of the negotiator is to maximize his own outcome.

Other research studies have pointed to the use of integrative negotiation, it is suggested that integrative type of negotiation allows for better compromises, win-win solutions, value creation and expanding the pie (Fisher and Ury 1983, Pruit et al. 1983, Lax and Sebenius 1986, Sebenius 1992, Thompson 1998, Lewicki et al. 1999). The common theme of these studies is the need and skill to compromise during negotiations. In this context, the principles of Even Swaps provide the useful tool to evaluate the available options so as to enable wise choice to effect compromises.

2. THE CONCEPT AND PROCEDURE OF THE EVEN SWAP APPROACH

2.1 The Concept and Procedure

The above-mentioned studies on negotiation suggest that all successful negotiations involves some form of compromise. It is through compromises that settlement can be negotiated. The concept of Even Swaps facilitates negotiators to assess their own options as well as proposals from the opponents. Even Swaps seeks to provide a rational way of thinking towards the strategies and decisions of negotiation, i.e., making trade-off wisely. Even Swaps can provide a practical way of making trade-offs among any set of objectives across a range of alternatives. Hammond *et al.* (1998) stated that '*Even Swap method is a form of bartering which force each party to think about the value of one objective in terms of another*'. FIG. 1 illustrates the three steps involved in a negotiation using the Even Swaps Method.
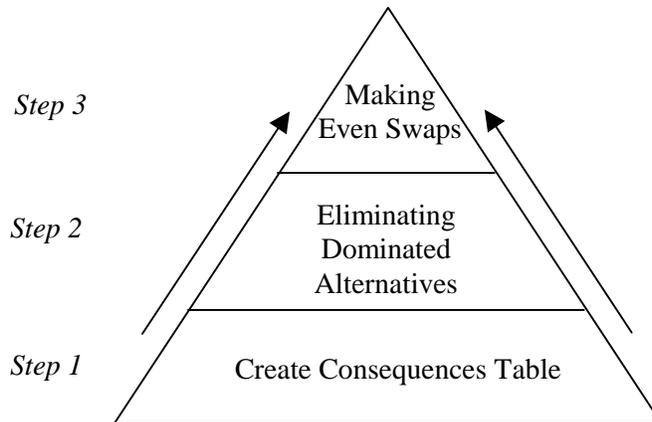

Figure 1: Steps of Even Swaps Method (Hammond *et al*., 1998)

2.2 An Illustration: Negotiating the Terms of a Construction Contract

The following illustrates the working of Even Swaps through a scenario of negotiating the terms of a construction contract. The three steps involved follow the terminology used in Figure 1.

Step 1: Creating a Consequences Table

A clear picture of all alternatives and their consequences must be obtained prior to making trade-offs. It is a good practice to construct a Consequences Table to list the objectives and alternatives available. As an illustration, Table 1 shows the Consequences Table of a hypothetical negotiation between Main Contract and Client on certain terms of a construction contract.

Table 1: Consequences Table Of A Hypothetical Construction Negotiation Case

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Objectives				
Retention (%)	9	12	5	10
L.D. Amount ($/day)	80,000	60,000	72,000	45,000
Inclement Weather clause	Unchanged	Deleted	Unchanged	Amended
Interim Cert. Period	3 weeks	1 month	2 weeks	1 month
Date of Possession	2 Jan 2001	5 Feb 2001	7 March 2001	5 Feb 2001
Prime Cost Sum Amount	1,000,000	900,000	1,000,000	680,000

Relevant information is entered into the Consequences table in an orderly format regarding the issues that need to be negotiated. In the absence of this table, important information may be ignored and trade-offs may be made unsystematically resulting in unwise decisions.

Step 2: Eliminating Dominated Alternatives

A simple rule suggested by Hammond *et al.* (1998) for the elimination of one or more of the alternatives is that " If alternative A is better than alternative B on some objectives and no worse than B on all other objectives, then B can be eliminated from consideration". In such cases, B is dominated by A. In practice, however, the decision in relation to relative importance of alternatives against objectives is a subjective one. Negotiators should always attempt to eliminate one or more of the alternatives in a logical and impartial manner. To simplify the process, numerical rankings are used instead to replace text descriptions of consequences. For example, the best alternative to an objective would be given a number of 1, second-best with 2, third with 3 and fourth with 4 and so on. In doing so, dominance is much easier to determine by this simple ranking order.

Table 2: Consequences Table In Simple Rankings Of Objectives (1- The Best And 4- The Worst)

Objectives	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Retention (%)	3	1	4	2
L.D. Amount ($/day)	1	3	2	3
Inclement Weather clause	3(tie)	1	3(tie)	2
Interim Cert. Period	2	3(tie)	1	3(tie)
Date of Possession	1	2 (tie)	3	2 (tie)
Prime Cost Sum Amount	1 (tie)	2	1 (tie)	3

In Table 2, Alternative 4 is dominated by Alternative 2 in respect of objectives *Retention*, *Inclement Weather clause* and *Prime Cost Sum Amount*, therefore, is crossed out. In comparing Alternative 1 and Alternative 3, by observation, Alternative 3 is dominated by Alternative 1 and, therefore, is eliminated.

Step 3: Making Even Swaps

As shown in Table 2, the remaining alternatives are not dominated by each other; each has its advantages over the other. In order to even out the advantages and disadvantages systemically until a clear choice is found, Even Swap Method is applied. The Even Swaps Method is based on the principle that 'If every alternative for a given objective is rated equally, one can ignore that objective in making your decision' (Hammond *et al.,* 1998).   In practice, it is achieved by increasing the value of an alternative in terms of one objective while decreasing its value by an equivalent amount in terms of another objective. Table 3 shows the remaining alternatives in detail.

Table 3: Remaining Alternatives

Objectives	Alternative 1	Alternative 2
Retention (%)	9	12
L.D. Amount ($/day)	80,000	60,000
Inclement Weather clause	Unchanged	Deleted
Interim Cert. Period	3 weeks	1 month
Date of Possession	2 Jan 2001	5 Feb 2001
Prime Cost Sum Amount ($)	1,000,000	900,000

The trade-off method is applied to the remaining alternatives in Table 3. In this case, the Prime Cost Sum Amount of Alternative 1 is decreased from 1,000,000 to 900,000 (100,000 decrease in prime cost sum is compensated for by a 10,000 increase in L.D. amount) so that to even out with Alternative 2's 900,000. Such swapping of figures is made to render the objective Prime Cost Sum Amount irrelevant, leaving **fewer objectives for comparison.** The result of the first swap is provided in Table 4.

Table 4: Result after First Swap

	Alternative 1		Alternative 2
Objectives			
Retention (%)	9		12
L.D. Amount ($/day)	~~80,000~~	**90,000**	60,000
Inclement Weather clause	Unchanged		Deleted
Interim Cert. Period	3 weeks		1 month
Date of Possession	2 Jan 2001		5 Feb 2001
~~Prime Cost Sum Amount~~	~~1,000,000~~	**900,000**	~~900,000~~

The swapping exercise continues until the stage where a clear advantage over an alterative can be seen. In the example given in Table 5, the Second swap is made by a 3 % increase in Retention and a modification of the Inclement Weather clause in exchange.

Table 5: Results after Second Swap

	Alternative 1		Alternative 2
Objectives			
~~Retention (%)~~	~~9~~	**12**	~~12~~
L.D. Amount ($/day)	90,000		60,000
Inclement Weather clause	~~Unchanged~~	**Amended**	Deleted
Interim Cert. Period	3 weeks		1 month
Date of Possession	2 Jan 2001		5 Feb 2001
~~Prime Cost Sum Amount~~	~~900,000~~		~~900,000~~

After the first two rounds of Even Swap, the remaining objectives are L.D., Increment Weather Clause and Interim Cert. Period and Date of Possession. At this stage, it is up to the negotiators to decide whether to go for another round of Even Swap or decision can be made as to which alternative prevails. In this example, Alternative 1 prevails because the fact that the negotiators find the terms in objectives L.D., Date of Possession and Interim Cert. Period are most favourably; hence Alternative 2 is dominated by Alternative 1.

Table 6: Final Results

	Alternative 1	Alternative 2
Objectives		
Retention (%)	12	12
L.D. Amount ($/day)	90,000	60,000
Inclement Weather clause	Amended	Deleted
Interim Cert. Period	3 weeks	1 month
Date of Possession	2 Jan 2001	5 Feb 2001
~~Prime Cost Sum Amount~~	~~900,000~~	~~900,000~~

In simple terms, Dominance Assessment principle is used to eliminate alternatives to a negotiation. Whereas the Even Swaps Method is applied to eliminate objectives amongst alternatives.

3. APPLICATION OF EVEN SWAPS: NEGOTIATING A CONSTRUCTION DISPUTE

To further illustrate how Evan Swaps can be used in construction negotiation. A hypothetical construction dispute scenario is used. The brief of the case is as follow:

" The date of completion in the contract is 1st January 2002.Due to delay of some of the subcontractors and late instructions the completion date anticipated is 31st March 2002 i.e. the project is to be delayed by 3 months. However, as one of the reasons for the delay is due to late instructions, the main contractor claimed 90 days. The Architect's initial assessment is that 40 days of extension of time can be granted. The client wants to complete the project as soon as possible and is prepared to pay certain acceleration cost for that. The client and the main contractor are negotiating a supplementary agreement to settle the extension of time, loss and expenses and acceleration cost."

The negotiators first complete a Data In-take Form (D.I.F.). The form is designed to record their bargaining ranges in numeral values. Table 7 and Table 8 show the Client and Contractor acceptable bargaining ranges. Figure 2 shows the overlapping between the bargaining ranges.

Table 7: Client's Acceptable Value

Pessimistic Value	Optimistic Value
E.O.T. (Unit: day)	
40	30
L/E Pay to contractor (Unit: $ '000)	
6,500	3,200
Acceleration Cost Pay to Contractor (Unit: $ '000)	
13,000	7,000

Table 8: Contractor's Acceptable Value

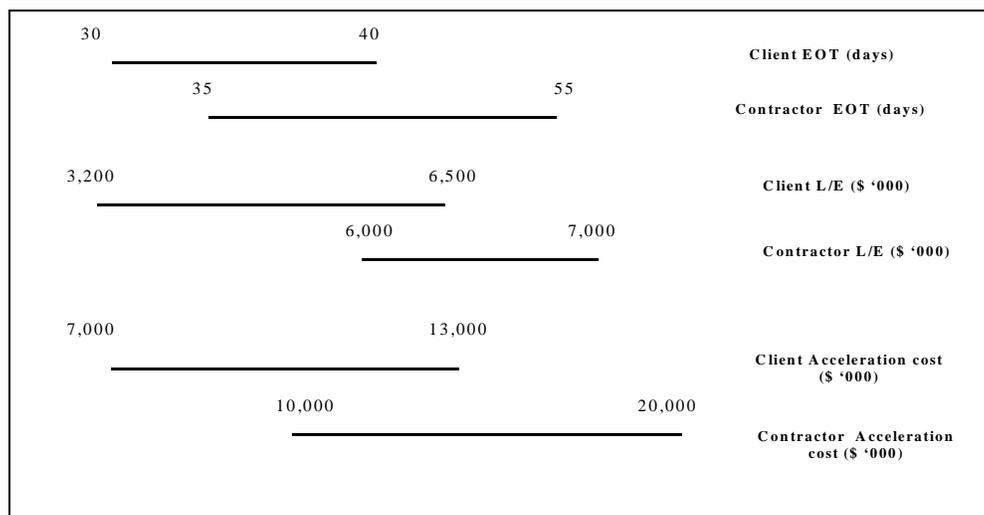| Pessimistic Value	Optimistic Value
E.O.T. (Unit: day)	
35	55
L/E to receive from the Client (Unit: $ '000)	
6,000	7,000
Acceleration Cost to receive from the Client (Unit: $ '000)	
10,000	20,000

Figure 2: Over-lapping of Bargaining Ranges

Having established the acceptable range for each issue, the negotiators then need to assess the relative importance of the issues. In simple terms, relative importance is an indication of how important one issue over another. Table 9 and 10 show the D.I.F. with relative importance weights included.

Table 9: Client Side –D.I.F. with Relative Importance Weights

| Issue Abbreviation | RI | Bargaining Range | |
		Worst	Best
1. EOT	30	40	30
2. L/E	40	6,500	3,200
3. AccCost	30	13,000	7,000
Total	**100**		

Table 10: Contractor Side –D.I.F. with Relative Importance Weights

| Issue Abbreviation | RI | Bargaining Range | |
		Worst	Best
1. EOT	60	35	55
2. L/E	30	6,000	7,000
3. AccCost	10	10,000	20,000
Total	**100**		

The next task was to define Tradeoffs by using the Even Swaps Method mentioned in earlier sections. This stage of the process allows the negotiators to rationally access the trade-off among the objectives so that a range of settle patterns can be developed. These allow the generation of alternatives that are acceptable to the negotiators. In addition, because the value of trade-off of the two negotiating parties may not be the same and hence a compromise is possible if both parties can find what they want (in a relative sense). Table 11 and 12 show the values of one settlement pattern each for the negotiators. The trade-off starts from the least acceptable.

Table 11: Client Side – Even Swap Exercise.

Issue Abbr.	Ref.	Swap 1		Swap 2		Swap 3	
EOT	40	-1	39		40	-1	39
L/E	6,500	-100	6,400	-200	6,300		6,500
AccCost	13,000		13,000	-2,000	11,000	-1,000	12,000

Table 12: Contractor Side – Even Swap Exercise.

Issue Abbr.	Ref.	Swap 1		Swap 2		Swap 3	
EOT	35	+1	36		35	+1	36
L/E	6,000	+100	6,100	+200	6,200		6,000
AccCost	10,000		10,000	+1,500	11,500	+750	10,750

It is necessary also at this stage that the negotiators should check any irregularity in his trade-off as far as the relative importance inserted by him. If necessary, he may re-assess the relative importance inserted in Table 9 and 10. The whole process therefore systematically allows the negotiators to establish a range of settlement arrangements so that he can assign certain satisfaction levels. Table 13 and 14 show the settlement arrangements with satisfaction levels.

Table 13: Settlement Arrangement within the overlapping range (Client)

Issue Abbreviation	0% satisfaction	25% satisfaction	50% satisfaction	75% satisfaction	100% satisfaction
EOT	40	39	39	38	35
L/E	6,500	6,400	6,400	6,300	6,000
AccCost	13,000	12,000	11,500	11,000	10,000

Table 14: Settlement Arrangement within the overlapping range (Contractor)

Issue Abbreviation	0% satisfaction	25% satisfaction	50% satisfaction	75% satisfaction	100% satisfaction
EOT	35	36	37	39	40
L/E	6,000	6,100	6,200	6,300	6,500
AccCost	10,000	10,750	11,500	12,000	13,000

From Tables 13 and 14, it can be noted that a settlement can be reached if both parties can lower their satisfaction level from 100% to somewhere between 50% to 75%. This is exactly the need of a compromising attitude as discussed in the early part of this paper. The above example illustrates how Even Swaps can be used in negotiating a settlement arrangement. The systematic approach as described can be used to assist management to narrow down the alternatives.

4. CONCLUSIONS

Negotiation is an important management function in construction. Construction activities need the joint effort of a large number of participants working together to achieve project objectives. They usually come form different organizations and hence serving both the interest of their own organization and the project. As resources are confined, negotiating for resources as well as settlement of dispute arising there from are common in construction. The Even Swaps method, a rational method to apply trade-off to evaluate objectives, enables elimination of alternatives in a systematic manner. Negotiations in construction typically involve inter-linked objectives and hence fit nicely with the Evan Swaps framework. Through an example of contract terms negotiation, the concepts and procedures of using Even Swaps are explained. The application of the method in construction dispute negotiation is also illustrated by a dispute scenario involving extension of time, loss and expenses and acceleration costs.

5. REFERENCES

Fisher, R. & Ury, W. (1986) Getting to yes: negotiating agreement without giving in, Hutchinson Business, London.

Hammond, J.S., Keeney, R.L. & Raiffa, H. (1998) Even Swaps: A Rational Method for Making Trade-offs. *Harvard Business Review*, March-April, pp 137-148.

Lax, D.A. and Sebenius, J.K. (1986) The Manager as Negotiator: Bargaining for Cooperation and Competitive Gain, The Free Press, N.Y.

Lewwicki R.J. & Saunders D.M. (1999), Negotiation, Boston, MA, McGraw Hill.

Pruitt D.G. and Carnevale P.J. (1983) "Incentives for Cooperation in Integrative Bargaining" in Aspiration Levels in Bargaining and Economic Decision Making, Springer Verlag, New York.

Sebenius J. K. (1992), "Negotiation Analysis: A Characterization and Review", Management Science, Vol. 38(1) pp. 18-38.

Thompson L. (1998), " The Mind and Heart of the Negotiator", Upper Sadle River, Prentice Hall N.J..

Walton R.E. & McKersie R.B. (1965) A Behavioral Theory of Labor Negotiations, McGraw-Hill, New York.