

# A Delphi Study on the Price Escalation Clause in a Construction Contract

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## Abstract

The purpose of this study is to suggest policies to improve the price escalation system in a construction contract through a Policy Delphi technique. The Delphi, including two times questionnaires and a group discussion, was conducted by joining 14 experts. Also, the escalation provisions of various countries were examined. Results of the Delphi showed that the minimum fluctuation rate for price escalation was desirable at a level of 3%. To compute the fluctuation rate, calculating the price fluctuation of overall articles was more desirable than using price indices. A bidding date was more reasonable as the initial date of change in price. Losses caused by price change should be shared between contractor and owner; therefore a deduction rate should be introduced in price escalation. Meanwhile, overhead and profit should be adjusted in proportion to the fluctuation rate; but advance payment or the delayed construction amount should be deducted from the adjusted amount.

*Key words : Escalation, Fluctuation Rate, Price Change, Adjustment, Construction Price Index*

## 1. INTRODUCTION

In general, construction projects are usually of quite lengthy ranging from several months to several years. Also, such construction projects are performed according to a pre-confirmed contract amount and contract agreement in principle. Therefore, there is a strong probability that the cost of labor and materials will rise and fall periodically, to a greater or lesser extent, during the life of the project (Goldfayl, 2002).

Often, there is a need that the contract amount may be escalated during construction period. Currently, most countries have rules affecting price escalation, accepting 'circumstance-alteration principle', which is one of the judicial principles. The 'circumstance-alteration principle' states that if a sudden change of social circumstance, which is difficult to forecast in advance, happened after signing a contract, when enforcing and maintaining the contract lead to unfair results, the legal effect of the contract may be altered and terminated to cope with the new circumstances (Davison, 2003; Sierra, 1996).

The above clause referenced to change the contract amount in a construction contract, due to the change in price, is called an Escalation Clause. 'Escalation' is a term used in most countries, including Korea, to indicate the extent of these changes from the commencement of a project through any point during its life. As equivalent terms, 'fluctuations', 'rise and fall' and 'contract price adjustment' are used interchangeably.

There are differences between the escalation provisions of various countries. In the case of some nations, there are unreasonable cases stating that contractors shall bear considerable damage due to the sudden rise of international raw materials or exchange rates under a lump-sum or fixed-price contract.

The purpose of this study is to suggest some policies to improve the price escalation clauses in a construction

contract. To do so, this study investigated and made a comparison of major country's regulations regarding contract price escalation as well as conducted a Policy Delphi, including two times questionnaires of experts on construction contract and a group discussion.

## 2. CASES OF ESCALATION PROVISIONS

In general, escalation provisions are used in lump-sum building and construction contracts to compensate owners and contractors for fluctuations in the prices of labor and materials. The consequence of not using escalation provisions is that contractors must include in their tenders an estimated allowance for escalation to compensate them for fluctuations (Goldfayl, 2002).

The price escalation provisions are different according to contract types by countries. In order to examine the cases, we selected five countries such as the United States, Australia, Korea, Japan, and the Philippines. We also examined two organizations, FIDIC (Federation Internationale Des Ingenieurs-Conseils) and Asian Development Bank (ADB), when considering the facility in collecting data and balance between the East and the West. The escalation provisions that are prescribed in major contract guidelines and laws of such countries and organizations can be summarized as followings.

### (1) Provisions of Major Countries

- Korea: In 'The Act on Contracts to which the State is a Party', a circumstance-alteration principle is applied to prevent loss to the contractor. The Act prescribes that the confirmed contract amount may be changed or adjusted when price changes take place under certain conditions. Unless the budget related to escalation can be secured, the contracted construction amount may be adjusted to compensate the loss to the contractor.

Table 1. Comparison of the price escalation provisions in major countries and FIDIC

	Korea	Japan	FIDIC*	the United States
Preconditions that enables to request the price escalation	In case the construction cost index increases or decreases by 3% or more	In case the fluctuation rate increases or decreases by 1.5% or more	The adjustment by basic prices or base index figure	The price change during construction is forecasted in advance and reflected to the estimate or bidding price
Minimum elapsed period for price escalation	60days since the signing date of a contract	1 year (365days) since the signing date of a contract	28days prior to the bidding date	-
Scope of adjustment in price escalation	Adjust the total contract amount reflecting the price changes	Adjust only the contract amount over 1.5% of minimum fluctuation rate (contractor bears the loss up to 1.5%)	The difference in cost between the basic price (index) and the current price (index)	Increased cost due to delay arising from project owner's faults
Escalation for the price change of the specified materials due to a sudden economic crisis	Impossible	Possible (compensate for 3/4 of losses)	Possible (in case the specified materials stated in Appendix to Tender)	Impossible in principle
Overheads and profits	Included in price escalation	-	Not adjusted	-

\* Conditions of Contract for Works of Civil Engineering Construction (fourth edition).

- Japan: According to the 'Standard Contract Agreement for Public Construction Works', it is stipulated that the contract amount may be adjusted, if the fluctuation rate rises 1.5% or more, when at least 12 months has elapsed since the signing date of the construction contract.

- The United States: Escalation clauses are different according to state. In general, the construction price includes a forecasted escalation cost in the bidding stage (Lee, 1998, Knight, 2000). However, the construction owners should be compensated for the increased material and labor costs if the construction period is prolonged due to his responsibility. For example, the Department of Transportation provides that contracted construction amounts include both contingency and escalation costs with the initial project amount; even though it is difficult to forecast in the costing stage.

- Australia: Neither MW-1 (Major Works Contract) nor AS4000 (General Conditions of Contract, 1997) have any provision for cost adjustments to compensate either the owner or the contractor for any rise or fall in the market price of labor and/or materials. Under these contracts, a cost adjustment provision may be inserted by the owner, if required (Goldfayl, 2002).

- The Philippines: In accordance with 'Guidelines for Contract Price Escalation', the contract price may be adjusted during implementation of all contracts under extraordinary circumstances. If a contractor requests a price escalation for procuring an entity, the request is reviewed for compliance with technical and legal parameters: extraordinary inflation, deflation and/or fortuitous events.

The cases of price escalation clauses in major countries could be summarized as Table 1.

## (2) Provisions of FIDIC and ADB

### 1) FIDIC

According to sub-clause 13.8 of 'Conditions of Contract for Construction (1st Edition, 1999)' in FIDIC, it is prescribed that the amounts payable to the contractor shall be adjusted for rises or falls in the cost of labor, goods and other inputs to the works, by the addition or deduction of the amounts determined by the formula.

The adjustment to be applied to the amount otherwise payable to the contractor, as valued in accordance with the appropriate schedule and certified in payment certificates, shall be determined from formulas for each of the currencies in which the contract price is payable. No adjustment is to be applied to work valued on the basis of cost or current prices.

Full compensation for any rise or fall in costs is not covered. Therefore, the FIDIC's conditions also recommend that the accepted contract amount shall be deemed to have included an amount to cover the contingency of other rises and falls in costs.

### 2) ADB (Asian Development Bank)

According to the clause 2.29 and 2.30 of the 'Guidelines for Procurement', it is prescribed that the bidding documents shall clearly indicate whether price adjustments are allowed in the event changes occur in the major cost components of the contract such as labor, equipment, and materials, over which the contractor has no control. Price adjustment provisions are not necessary for simple supply contracts involving short delivery periods. However, for contracts with long delivery or completion periods, including major civil works contracts, price adjustment provisions shall be provided

### 3. DELPHI PROCEDURE AND ARGUING POINTS

#### (1) Delphi Procedure

In this study, a 'Policy Delphi Method' of joining experts on construction contracts was used to deduce the solutions that enable us to formulate a ration approach to the escalation system in construction projects. The type of a contract premised in this Delphi was a lump-sum contracts, which is a type widely used world-wide. Moreover, this Delphi dealt with construction work where no price escalation factors were considered in the cost estimation stage; where escalation provisions were reflected in the contracting stage. The Delphi questionnaires were conducted from May to June in 2004 according to a following process.

Step 1: After selecting 20 panelists including cost managers, experts on construction contracts, and civil servants, the preliminary Delphi questionnaire was conducted. In the questionnaire, current provisions regarding price escalation were classified item by item. Then we asked them to list all of their opinions about points at issue and proposals by items.

Step 2: The results of the preliminary questionnaires were classified into arguments and resolutions, and reflect them to the questionnaire. The first round questionnaire was conducted through e-mail or fax. During this step some personal interviews were conducted to give shape to the arguing points.

Step 3: Based on the results of the first round questionnaire, the experts met and debated on the final unresolved issues that failed to reach an agreement.

Step 4: After reviewing discussion results, a second round Delphi questionnaire was conducted. As a result of the second questionnaire, the opinions of participants tended to be remarkably concentrated. We terminated the Delphi process at the second questionnaire.

In our first round, 20 experts took part in the Delphi questionnaire; by the second Delphi questionnaire and discussion, 14 panelists remained. The panel was comprised of civil servants (2), project owners (2), researchers (3), professors (3), constructors (2), and quantity surveyors (2).

#### (2) Arguing Points deduced from the Delphi

Through first and second round questionnaires, and several interviews with experts, we were able to draw out 10 items of contention regarding the escalation system as follows:

- What grade is reasonable as a MFR (minimum fluctuation rate) and a minimum elapsed period, which are the requirements to request a price escalation?
- Which index is more rational to adopt as the base for specifying the MFR; choosing from a) the consumer's price fluctuation rate, b) the construction cost index and c) the average profit rate of construction companies?
- If an escalation amount is required, which method is

more useful between FRCA (the fluctuation rate for the categories of articles) and FRI (the fluctuation rate for an index) as the preferred method to calculate the fluctuation rate? Moreover, is it necessary to specify the amount on the concerned agreement in the contract stage?

- Is it desirable to adjust the entire contract amount reflecting the change in price, if a certain level of fluctuation is surpassed? Or, is it more appropriate for the contractor to bear the loss up to a certain price fluctuation rate?

- Which is more rational as the starting point to calculate the price change? At the time of a) design completion, b) bidding and c) signing the contract.

- When the contract amount is adjusted, which is desirable as a criterion to calculate completed construction amounts: scheduled construction rate or actual construction rate?

- When adjusting the contract amount according to price changes, is it necessary to adjust overhead and profit?

- Is it necessary to adjust the contract amount, even if some advance payment has been made?

### 4. DELPHI RESULTS (1) : FLUCTUATION RATE AND DEDUCTION RATE

#### (1) A criterion for the MFR

##### 1) Arguing Points and Discussion

In order to reflect an escalation provision in a construction contract, there is a need to recommend the specific level of a MFR (minimum fluctuation rate) that enables a contractor to request a price escalation. However, when deciding the appropriate level of MFR, there were some arguments about what indicator was most reasonable. The alternatives that were suggested in the first and second Delphi questionnaire were following three (3) items: 1) the consumer's price fluctuation rate, 2) the construction cost index and 3) the average profit rate of construction companies.

When looking at the situations in major countries, in Korea, MFR was recommended at 5% during the time when the escalation provision was introduced. Considering that the average profit rate of construction companies was around 10% at that time, it was considered reasonable that constructors shall bear the loss up to 50% of the profit rate. Japan also fixed the MFR on the basis of the profit rate of construction companies when introducing an MFR of 1.5% (Wada et al., 1996).

The profit rate of construction companies is apt to change according to business fluctuation and alteration of bidding systems, for example, a lowest price award system. Consequently, if the MFR is fixed on the basis of the profit rate of construction companies, there are some valid points to argue that the MFR shall be changed frequently according to the fluctuation of construction business.

## 2) Delphi Results

For the question asking which indicator is most reasonable as a criterion to determine the MFR, an average fluctuation rate of consumer's price index in the last several years showed 57.1% and ranked first; followed by, a construction price index showing 35.7%. Only 7.1% of our panelists believed the most reasonable criterion was an average profit rate of constructors. Based on the Delphi results, it is desirable to decide the MFR on the basis of the inflation rate, for example, a consumer price index or construction cost index.

### (2) Optimum Level of the MFR

Referring to the major countries, Korea stipulated that the contract amount may be adjusted, when the fluctuation rate has increased or decreased at least 5%. Japan stipulated that the contract amount may be adjusted if the fluctuation rate rises 1.5% or more. In the Philippines, according to 'Guidelines for Contract Price Escalation' published by NEDA (The National Economic and Development Authority), if price increases exceed 10%, the contract price may be adjusted. On the contrary, 'Conditions of Contract for Construction (1st Edition, 1999)' in FIDIC doesn't prescribe a limit of increases or decreases in the contract price, but the project owner and contractor shall state the limit clearly in the Appendix to Tender.

64.3% of our experts recommended that the MFR is desirable at a 3/100 level provided that the total amount increased shall be adjusted. Judging from the Delphi results and major countries' cases, the desirable MFR should be at a 3% level. However, this result may be biased on the basis of the current economic/construction state of Korea. Accordingly, it is desirable that the MFR should set on the basis of a consumer price index or construction price index by independent nations.

### (3) Initial Date in Reckoning the Price Fluctuation

#### 1) Arguing Points and Discussion

In general, when calculating the fluctuation rate, it is necessary to compare the base date with the current date. However, there were some arguments regarding the base date (or initial date). From the Delphi questionnaire, the following three options were suggested as based date: 1) design completion, 2) bidding and 3) signing the contract.

When looking over the cases of major countries, while it is regulated that price changes initiate from a contracting date in Korea, the Philippines and Japan, in the case of the FIDIC conditions (the old version), the initial date of the price change was prescribed as 28 days prior to the bidding date, when viewing when the construction cost was originally calculated.

In fact, the price change can happen after the time when the construction cost was calculated. In general, about 2~3 months is required from the bidding date to the contract

date. In some cases, bidding can take place one to two years after the concerned design has been completed. Consequently, some insist that the bidding date is desirable as an initial date of price change, rather than the contract signing date.

Meanwhile, there is an opinion that construction contracts have characteristics of informal and consensual contracts that can be validated just by consenting between the two parties concerned (Cha, 2004). Here, 'informal and consensual contracts' states the contract founded upon and completed by the mere consent of the contracting parties, without any external formality or symbolic act to fix the obligation.

Therefore, the contract may become valid from the moment when a successful bidder is decided upon at bidding stage and the contract is awarded. If the successful bidder refuses the contract, the bid bond is confiscated to the project owner. Accordingly, in terms of a general contract theory, it is possible that we can regard a bid announcement as an 'offer', and bidding as 'acceptance'; thus, it can be understood that an actual contract was completed prior to the contract signing date.

## 2) Delphi Results

As for the initial date in reckoning the price fluctuation, 42.9% of the respondents indicated the design completion date, another 42.9% believed bidding date was more applicable, while 14.3% of the respondents indicated a contract signing date. This result seems to be appropriate when taking into account that the price fluctuation may arise from the design completion stage. Therefore, a contract signing date is not considered appropriate to use as the initial date of the escalation, but a bidding date was more appropriate when referring to Delphi results, as well as taking the legal characteristics of informal and consensual contracts into consideration.

### (4) Calculating Method of the Fluctuation Rate

#### 1) Arguing Points and Discussion

In general, if price escalation is necessary, there are two methods to calculate the fluctuation rate: one is FRCA (the fluctuation rate for the categories of articles), the other is FRI (the fluctuation rate for an index). FRCA is a method to compute the fluctuation rate directly by calculating the price fluctuation of the total amount of all articles which comprise the contract amount. FRI is a method to compute the fluctuation rate indirectly by using authorized price indices by contract items (for example, materials, labor, etc.).

In general, while using FRI is easy and convenient to calculate the fluctuation rate, it is difficult to reflect the characteristics of each specialized construction work (Capano, 2003; Knight, 2000). Meanwhile, FRCA can be used to actually reflect the effects caused by the price fluctuation of each article.

In Korea, both FRCA and FRI can be used. In public construction projects, the public official in charge of

Table 2. Results of the Delphi Survey on the Issues in Contract Price Escalation

Questions	Replies	Frequency	%
A criterion to determine the MFR (minimum fluctuation rate)	Fluctuation rate of consumers price index	8	57.1
	Fluctuation rate of construction price index	5	35.7
	Average profit rate of constructors	1	7.1
Optimum level of the MFR that enables to request the price escalation	5/100	5	35.7
	3/100	8	57.1
	10/100	1	7.1
Initial date in reckoning the price fluctuation	Design completion date	6	42.9
	Bidding date	6	42.9
	Contract signing date	2	14.3
Method to calculate a fluctuation rate	FRCA(fluctuation rate for the categories of articles)	9	64.3
	FRI(fluctuation rate for index)	5	35.7
Specifying the method to calculate the fluctuation rate in a contract document	Needed	13	92.9
	Not needed	1	7.1
Reasonable deduction rate	0/100	5	35.7
	1/100	1	7.1
	1.5/100	1	7.1
	2/100	3	21.4
	3/100	4	28.6
Minimum elapsed period for price escalation from the prior adjustment date	30 days	1	7.7
	60 days	5	38.5
	90 days	3	23.1
	120 days	2	15.4
	180 days	1	7.7
	1 year	1	7.7
Progress rate to be adopted in price escalation	Actual progress rate	4	28.6
	Scheduled progress rate	10	71.4
Escalation clause for the sharp price change of the specified materials	Needed	6	46.2
	Not needed	7	53.8
Overhead and profit in price escalation	Include	12	85.7
	Exclude	2	14.3
Advance payment in price escalation	Necessary to deduct	13	92.9
	Unnecessary to deduct	1	7.1

contracts shall indicate clearly on the contract, the calculating method of the fluctuation rate discussed with the constructor at the time of concluding the contract. Up until now, FRI which depends on consumer's price index, has been widely used as a method for calculating the fluctuation rate.

FIDIC prescribed that not only current cost indices but also reference price can be used when calculating the adjustment multiplier. ADB prescribed that the method of adjustment, which shall be indicated in the bidding documents, may provide for adjustments to be made on the basis of documentary evidence provided by the contractor or calculated by the use of a price adjustment formula.

## 2) Delphi Results

As a method to calculate the fluctuation rate, panelists favored FRCA with a result of 64.3% which proved higher than FRI. Most experts felt FRCA to be more reasonable in

the long run. Meanwhile, 92.9% of the respondents replied that it is required that the project owner and contractor choose between FRCA and FRI, and specify it clearly in the contract document in the contract stage.

Judging from the Delphi results, there is a need to apply the FRCA in order to reflect the precise characteristics of each specified article and the effect according to the price change. However, because there are a lot of cases which cannot use FRCA to reflect the overall articles, the calculation need to be more computerized or standardized. Additionally, actual transaction prices of major materials should be announced periodically from the authorized public agency.

Meanwhile, in order to expand the application of the FRI, there is a need to announce the wage index, material index and machinery expense index through a detailed classification by construction type. In addition, announcement of a monthly material price index is

required. The period of wage surveys and announcement periods should also be shortened.

#### (5) Necessity of Deduction Rate

##### 1) Arguing Points and Discussion

If the price fluctuation rate of a construction project is above a certain level, there is some dispute whether or not the entire construction amount should be adjusted. In general, there were two different viewpoints when compensating the loss to a constructor provided that price escalation is needed. One is to adjust the remained amount of the contract fully, and the other is to adjust only some part of the increased amount. The latter case means that contractor also shall bear some loss as it would then be necessary to introduce a deduction rate.

In Korea, provided that the fluctuation rate surpasses the 5% level, the remaining contract amount may entirely be adjusted. On the contrary, the FIDIC's conditions recommend that full compensation for any rise or fall in costs is not covered. Japan prescribes that the fluctuation rate for escalation is 1.5%. But, the meaning of fluctuation rates is different country to country. That is, the 1.5% is both a minimum fluctuation rate and also serves as a deduction rate. Therefore, the remaining construction amount is adjusted for only costs above 1.5% of the fluctuation rate.

While FIDIC conditions are based on a unit price contract, Korea and Japan generally use a lump-sum contract system. Taking the characteristics of the lump-sum contract into account, it seems reasonable that Japan adopt a deduction rate when the construction amount is escalated (Park, 2001).

##### 2) Delphi Results

As a reasonable reduction rate, 35.7% of the experts replied 0%, meaning that they felt the deduction rate was unnecessary. The remaining majority of 64.3% felt a deduction rate was necessary. Accordingly, it can be concluded that the deduction rate should be introduced to share the risks inherent upon a sudden price fluctuation between the owner and contractor. In addition, 50% of respondents recommended a grade from 2/100 to 3/100 as a reasonable reduction rate.

In principle, if the loss in relation to the change in price imposed to only a project owner (or client) is not reasonable in terms of the characteristics of a construction contract, it is reasonable to recognize that the loss caused by the change in price be shared between the contractor and the project owner.

Consequently, if the fluctuation rate is at a 3% level, we need to review a policy that a contractor shall bear the loss up to 2% of the total construction cost. In addition, we may unify the minimum fluctuation rate and the deduction rate to 1.5% like Japan, rather than to separate them.

## 5. DELPHI RESULTS (2): SUPPLEMENTARY CONDITIONS FOR PRICE ESCALATION

### (1) Minimum Elapsed Period

#### 1) Arguing Points and Discussion

When considering the administrative procedure for escalation or the stability of a contract, it is necessary to prescribe a minimum elapsed period that enables one to request the escalation from the initial date or from the adjusted date (meaning the date on which the grounds for adjustment have occurred).

Some experts argue that the minimum elapsed period for escalation should be a year after the initial date (for example, a bidding date), taking into account the accounting and budgeting systems of the public project owners. Also, although some material costs go up rapidly, there is an opinion expressed in the panel that the escalation should be conducted after the prices of the materials become considerably stabilized.

In case of the FIDIC conditions, the minimum elapsed period to adjust the contract amount is prescribed as a month unless otherwise stated in the Appendix to Tender. Additionally, the minimum elapsed period is regulated at 60 days in Korea, 6 months in the Philippines, and 1 year in Japan. But, in Japan, a partial escalation is possible against a sudden rise in the price of specified materials within the year.

The reasons that the minimum elapsed period was recommended as 12 months from the initial date in Japan are as follows: a) The result of the national wage survey is announced in December every year, b) the accounting system of public agencies is based on an annual budget in principle and c) major materials can be purchased at the early stage of construction work in advance because advance payment is required in most public construction projects (Wada et al., 1996).

#### 2) Delphi Results

Various opinions were stated in relation to the minimum elapsed period. Though 38.5% of the respondents answered 60 days; historically it was showed to be approximately 106 days on average. In conclusion, generally three or more months is required to adjust the contract amount, due to administrative procedures. Therefore, unless the exceptional provision is introduced to reflect the price change of specific materials, the 90 days regulation as a minimum elapsed period might be a necessary restriction.

### (2) Progress Rate to be applied to Escalation

#### 1) Arguing Points and Discussion

When adjusting the contract amount completed works shall be excluded from the escalating amount. However, the question was raised: which is more desirable between actual progress rate and scheduled progress rate as a criterion to calculate the completed works.

Looking over the related regulations in major countries, in Korea, the part of construction that was projected as complete before the adjustment date shall be excluded from the adjusting contract amount. However, if construction is delayed, if a project owner is responsible for the delay, or due to force majeure including a natural disaster, that part shall be included in the adjusted amount.

In the Philippines, in case the project is behind schedule based on the approved PERT/CPM network or schedule, price escalation is allowed on the portion of work that should have been, but was not, actually accomplished within the period based on the applicable price index for the period in which it should have been accomplished.

## 2) Delphi Results

In relation to progress rates to be applied to escalation, 71.4% of the experts responded that the escalation should be carried out based on the scheduled progress rate. It was felt that, in case of adopting the actual progress rate, it is complicated to calculate the amount of actual completed work and there would be a possible delay in the escalation based on figuring out who was in charge of the delay, if the construction period has been prolonged. Therefore, judging from the Delphi, the remaining construction work that became escalation-targeted parts should be estimated on the basis of the scheduled construction rate. But, it is necessary to include the delayed construction amount, arising from faults of the project owner.

## (3) Overhead, Profit, and Advance Payment in Escalation

When adjusting the contract amount according to price change, there are some arguments whether overhead and profit should also be adjusted or not. Looking over some cases, when adjusting the contract amount, overhead and profit are excluded in FIDIC conditions, but included in Korea.

In relation to escalation when advance payment has been made, Korea stipulated that if any advance payment has been made to a relevant constructor, the amount of advance payment shall be deducted from the adjusted amount. In the Philippines, no price escalation shall be granted for the portion of work accomplished during the period corresponding to a value to the amount of advance payment.

Looking over the Delphi results, when the contract amount is adjusted, most experts (85.7%) responded that while overhead and profit should be included in escalation, the advance payment should be deducted from the adjusted amount. In conclusion, considering that the overheads and profits are automatically calculated by multiplying a direct construction cost by a certain rate, it is desirable to be adjusted the overhead and profit in proportion to the fluctuation rate. But, if advance payment is supplied, considering that contractor can purchase the materials in advance, before being subjected to price fluctuations, the equivalent payment should be deducted from the adjusted amount.

## (4) Escalation for Specified Materials (ESM)

### 1) Arguing Points and Discussion

There are two ways to reflect a price change in a construction contract. One is to reflect price changes of all articles which compose the construction contract, based on the contract amount, and the other is to reflect the price change of specific articles such as major construction materials.

Although escalation provision for the total amount is in existence, there are some disputes whether an exceptional provision like escalation for specified materials (ESM) is necessary or not. Those who approve to introduce the ESM recognized that there is a need to introduce it to minimize contractor's loss caused by extraordinary circumstance, for example, a sudden rise of oil price etc. On the contrary, those who oppose the ESM indicate that there might be occurred an illogicality in handling the escalation affairs. For example, although a price of specified material goes up, provided that labor cost more decreases than the material cost, the total amount of contract can be decreased; thus, they insist the ESM is a little illogical.

There are some arguments that the sudden increase of the price of materials, however, arising from the short-term shock factors such as the exchange rate and the interest rate, may be regarded as a force majeure. The reason is because it is difficult for contractors to forecast additional burdens during construction stage and include them with bidding price. Also, it is difficult for construction companies to cope with such extraordinary circumstances in advance. Contractors are apt to be confronted with unreasonable state according as the scale of construction work is getting larger and the construction period tends to be prolonged. Therefore, there are some arguments that the effort on the part of the project owner to bear the loss is required (Wada et al., 1996).

According to Article 25 of the "Contract Agreement for Public Construction Works" in Japan, the contract amount may be adjusted on the basis of special agreement, provided that prices of specified materials rise rapidly within 12 months since the signing date of a construction contract. Since the escalation is possible a year after the signing of a construction contract, the partial escalation system for specified articles maybe required in Japan, in preparation for the sudden rise of material prices.

The specified materials are restricted to the materials which are directly impacted by the oil price and which are difficult to secure and reserve in advance. For instance, they are oil for fuel, asphalt, cement, ready-mixed concrete and so on. Also, under the escalation system for specified materials, the contract amount shall be adjusted up to 3/4 of the material's price change.

### 2) Delphi results

Looking over the result of the second round questionnaire conducted after above discussions, 53.8% of the experts answered that the ESM is unnecessary, but

46.2% still approved the introduction of it

Judging from the Delphi results, provided that the escalation provision for total amount, as well as if there is a minimum elapsed provision like 3-6 months, the ESM provision is unnecessary. But, if the minimum elapsed period is prescribed as a long term like 1 year, the ESM provision should be introduced to minimize the unreasonable loss of contractor, due to extraordinary circumstances.

It is necessary to restrict the specified materials, when application of ESM is allowed as follows: materials greatly impacted by oil price, exchange rates and interest rates, and the materials greatly impacting the construction cost to rise more than 5%, such as ready-mixed concrete, steel and asphalt concrete. The causes for implementing the ESM provision should include the increase in the price of oil, the rise of international raw materials' prices, and the sudden rise of imports arising from exchange rate.

## 6. CONCLUSIONS

In conclusion, Delphi questionnaires and panel member interviews noted there are considerable differences between escalation systems of major countries and improvement is required for various systems. These items, as well as a comparison of escalation systems in major countries, are summarized as follows;

- The minimum fluctuation rate, which is the precondition for price escalation, should be decided on the basis of the change rate of the consumer price index or construction cost index in averaged over recent years. Judging from the Delphi results, the suggested minimum fluctuation rate is at the 3% level.

- It is desirable that the loss caused by a change in price is shared between the contractor and the project owner. Accordingly, the deduction rate should be introduced in estimating the contract amount.

- A bidding date is more reasonable as the initial date of price change when regarding a bid announcement as an 'offer', and bidding as 'acceptance'. Moreover, the 90 days' regulation should be necessary as the minimum elapsed period that enables a contractor to request an escalation adjustment.

- The application of the FRCA should be expanded in order to reflect the characteristics of each article included in the contract price and monitor their fluctuation effects exactly against the price changes.

- Construction work that was supposed to be completed before the adjustment date should be excluded from the escalation-targeted construction cost.

- It is appropriate to adjust overhead and profit in proportion to the fluctuation rate. But any advance payments should be deducted from the adjusted amount.

- Finally, provided that the escalation provision for total amount, the price escalation clause for specified materials is unnecessary.

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(Data of Submission : 2005.12. 7)