

Effects of Price Fluctuation on the Financial Capacity of “Class A” Contractors

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Abstract: The construction industry is facing problem of price fluctuation in all of its inputs. This major problem is spread all over the country and Nepalese contractors are critically affected. The general objective of the research is to investigate the effect of price fluctuation for improving the financial capacity of Nepalese contractors to enhance the performance of the industry. Questionnaire, scheduled and case studies were used to assess the contractor's perspective.

The research result shows that the problem of price fluctuation occurs in an unpredictable manner. At least 27 % price was escalated of the construction inputs. Contractors lose their at least 52 % of the expected profit. Few contractors are planned to address for the future price escalated situation and remaining others are not concerned about the future situation. Price adjustment clause is not favorable for the contractors. The price fluctuation system that is in place is limited to few construction inputs. Moreover, contractors get compensation only for portion of the price increase of inputs. Project delay was found to be one of the major effects of price increase and delay caused by the contractors is affecting them by making them vulnerable to effects of price increase.

Keyword: *Construction Input, strategy, NRB Index*

INTRODUCTION

As a developing country Nepal, there is a huge development activity yet to be undertaken. Significant amount of investment by the private as well as the public sector has to ensure a desired level of economic growth in a developing country. Infrastructure development is the front line role player for which the Equipped and efficient construction industry is most. Uncertain economic environment is one of the main challenges for the construction sector. Fluctuations in the costs of construction resources in today's volatile market makes difficult to execute construction projects due to significant losses or erosion of anticipated profits.

The construction industry is suffered from various problems, which make hindering the growth of the construction industry. The primary problems of the construction sector can be classified into two main categories. The first is related to the consequences of integrated planning and implementability (Mishra and Magar, 2017). The second problem is related to deficiencies and market price fluctuation of the inputs required for the construction (Paulos, 2002). The deficiencies and market price fluctuation of construction inputs is also greatly hindering the growth of the construction industry. Sharp price increases lead contractors into failure to complete their projects within the acceptable margin of time and quality for the client and fail to complete within the planned cost margin for them.

Contractors are the major actors in any construction project as they are the ones who take up all the responsibility to undertake the whole construction activities and related tasks. These major tasks include procurement of materials, deployment of all the necessary machinery, equipment and human resource, managing the financial resources and converting all resources into the intended project outputs. Therefore, among the various stakeholders involved in the construction industry, contractors are the ones at the front line to play the largest role in realizing projects. Hence, on due course of their operation they are the ones to first face the problems and challenges encountered within the industry. The essential resource ingredients that must be considered in the construction of a project are physical resources (Material and Machinery),

manpower, finance and information. The prevailing unpredicted and erratic price fluctuations of materials, labor and equipment and less satisfactory practice of compensation for the same (FCAN, 2015) are the major issues in the hindrances in the growth of the Nepalese construction industry. This situation makes the construction contractors sustain most of the suffering and losses that could result therein. Accordingly as a result of the resulting losses, the construction contractors face difficulties in building their capacity in any way.

1.1 Research Objectives

The overall objective of the research is to analyze the effects of price fluctuation on financial capacity of contractors with following specific objective.

- To evaluate the price fluctuation pattern of construction inputs.
- To analyze the contractors action and the relation between price fluctuation and capacity of construction contractors
 - To develop strategies or interventions for minimizing the adverse effects of price fluctuation

LITERATURE REVIEW

2.1 Price in Relation to Contractors

The construction industry is a business sector, which carries out a huge amount of turnover. Among the parties involved in civil engineering works, contractors and consultants are purely of business organizations. The others may or may not be of business organizations. Contractor's main business goal is maximization of profits. In other words, a Contractor's goal is to make the positive difference between total revenues and total cost as large as it can (Myres, 2004) And from the contractors and consultants, it is the contractors have to bid competitively for most of their work and at the same time deal with risks and uncertainties connected with bid submission. Contractors are mainly involved in diversified activities that are directly affected by the prevailing market situation. With this respect, the overall business environment comes into picture in affecting the contractors in many aspects; performance and capacity being the crucial ones. This research, however, takes only the financial capacity aspect for consideration. Market price fluctuations at all levels directly affect contractors, since they are the front line role players in the construction business. Contractors are subject to procure and deliver all the necessary labor, material and equipment, the cases depending on the type of contract, required for the completion of the works. This makes them to directly be linked with suppliers, sub-contractors and the labor force. In principle contractors cannot sustain and suffer permanently from price fluctuations on the market. The project owners or clients shall sustain such fluctuations.

2.2 Price Fluctuation and Inflation

Price fluctuation can generally be defined as the rise or fall of price of goods, materials and services on the markets. Price fluctuation can occur at any market, i.e at international markets, local market and/or at the labor market. A contractor who tenders at a fixed price runs the risk that he may later have to pay more for materials and labor than the prices and wages current at the time of his tender. (Conversely he may benefit if those prices and wages go down.).

There are many causes of the recent material price fluctuations in the construction industry. They involve both domestic and international market forces, as well as aspects (Riggs, 2006) of the construction industry that make it particularly vulnerable to average cost fluctuation & Bank Economic Report.

The reasons for fluctuation are several, the major ones being:

- Supply and demand imbalances
- Exchange rate changes - If there is depreciation in the exchange rate, then exports will become cheaper abroad, but imports will appear to be more expensive. Firms will be paying more for their overseas raw materials leading to increase prices of domestic economy.
- Imported inflation: In a global economy, firms import a significant proportion of their raw materials or semi-finished products. If the cost of these imports increases for reasons out of domestic control, then once again firms will be forced to increase prices to pay the higher raw material costs.
- High Energy and Transportation Costs

- External shocks - This could be either for natural reasons or because a particular group or country will gain more economic power. An example of the first was the Kobe earthquake in Japan, which disrupted world production of semi-conductors for a while. An example of the second was the case of OPEC which forced up the price of oil four-fold in the early 1970s.
- Exhaustion of natural resources: As resources run out, their price will inevitably gradually rise. This will increase firms' costs and may push up prices until they find an alternative source of raw materials.
- Taxes: Increase in indirect taxes (taxes on expenditure) increases the cost of living and push up the prices of products.

Inflation has become a chronic problem whose effects permeate the entire construction industry. Contractors are faced with server uncertainty in bidding and financing work on projects. Owners are not only paying for the increased costs of facilities and capital but also for premiums on construction prices because of the uncertainties of inflation and its side effects. Productivity is affected because contractors cannot accurately forecast long-term returns on their investments and are required to divert necessary capital to meet resource costs. In particular, the proper assignment of economic risks in contracting should reduce costs in the long term, although this would entail considerable change in construction industry operations (Makinen, 2003). Many articles address how one may gain limited protection from chronic inflation. Most familiar is indexing which is a means of discounting actual brrr to "real" or inflation-adjusted brrr. But this adjustment infrequently applied amount not account for other effects, such as individual price distortion or hidden costs resulting from the inability to forecast on one's investment. It is common, even with the national attention on focused on the problem, for members of the construction industry in the Nepal to ignore or assume zero inflation perhaps this behavior is due to believing that inflation is a temporary phenomenon and that overcorrecting for inflation may exacerbate the problem (Makinen, 2003) this logic in itself, is even more reason to include the best possible inflation forecasts into all aspects of planning to continue to apply such forecasts consistently, and to revise such forecasts as new data is received. Changes in relative prices result from inflation as well as other causes, such as government regulation or oil price shocks. In every construction contracts, the contractor quotes his rates based on design, specification, available bill of quantities and the market price of the workers and construction materials at the time of bid preparation and submission. If the price of labors and construction materials increase or decrease later on during execution of the works under the contract, then the cost of the construction works get increased or decreased respectively. If the cost of the construction works increases, the contractor claims for increased rate and if the cost of the construction works decreases, the owner claims for reduction in rate quoted by the contractor. This demands clear and unambiguous contract clauses in conditions of contract. There shall be added to or deducted from the Contract Price such sums in respect of rise or fall in the cost of labor and / or materials or any other matters affecting the cost of the execution of the works as may be determined in accordance with the contract.

2.3 Minimizing the Adverse Effects of Price Fluctuation

Even though price fluctuation cannot be accurately predicted, its impact can be minimized. In addition to risk management literatures suggest the following methods (Eshofonie, 2008)

- Value engineering concept
- Comprehensive and error free designs and specifications
- Reducing site wastes
- Effective human resource management

The first is the application of a value engineering concept, which aims at a careful analysis of each function and the elimination or modification of anything that adds to the project cost without adding to its functional capabilities. Carefully investigating costs, availability of materials, construction methods, procurement costs, planning and organizing, cost / benefit values and similar cost influencing items, an improvement in the overall cost of project can be realized. The second is to provide comprehensive and error free designs and specifications to avoid misinterpretations by the contractor or delay due to missing details. Reducing site wastes through the formulation and implementation of effective material policy and material management. Cost reduction measures also include: establishing firmly the requirements and features of the

project at the onset before getting started, preparing the project team to do its best by getting members to sign off on capabilities and responsibilities, staying diligent about keeping the project the project on the right path through contract clauses that disallow significant changes once the project is underway, effective human resource management through effective motivation, and project tracking involving discerning early what area or paths are leading to dead ends and applying early corrective action.

METHODOLOGY

3.1 Research Approach

The research variables of this research are analyzed in terms of Effects of price fluctuation on the Financial Capacity of the Domestic Contractors. The research is assessed in terms of the following variables shown in table 1 below:

Table 1 Research variables and method of assessment

Variable	Method of Assessment
Market price fluctuation trend/pattern	Analysis of market price fluctuation trend/pattern of construction inputs from NRB publications, District Rates and market survey for past 5 years from 2008 AD to 2017 AD.
Price estimation and setting of price	Price estimation for the construction inputs by using the Standard Norms of Department of Roads and other organizations such as Department of Urban Development and Building Construction, District Development Committee, DoLIDAR etc
Effect of price fluctuation and contractors action	Financial effect of price fluctuation that causes the impact of project performance and the difficulties to enhance the personals involve in the construction company and capacity of the company itself.
Price fluctuation compensation	Reviewing whether there are sufficient legal provisions to support the price fluctuation compensation and the amount of compensation.
Minimizing the adverse effect of price fluctuation	Improvement in compensation system and Improvement in planning and financial utilization of the company.

3.2 Data Collection and Analysis

Primary data: The research instrument in this research is used two case studies of civil engineering projects. These two case studies are taken from the Nepal Council of Arbitration (NEPCA). The research work is analyzed in such a way that the first part deals with the base price during bidding process, the second part deals with the market price fluctuation and pricing issues. The third part deals with compensation related issues and the last part capacity related issues. In addition to the case studies questionnaire survey are included to back the case studies. The questionnaires are distributed to the general managers, deputy managers, engineering department heads, office engineers and contract administrators in different construction companies of class A.

Secondary data: The collections of secondary data are done before starting the field survey. The data are collected focusing on objective of the study. Government policy documents, laws, literature, books, manual,

guidelines, directives, journals, project document, etc. have been studied. Similarly, reference materials from Internet, information from key informants have also been collected.

Content Analysis and Trend Analysis were done.

RESULTS AND DISCUSSION

4.1 Market Price Fluctuation and Pricing

Price fluctuation of Material , Labour and Equipment were analysed.

4.1.1 Market Price Fluctuation Trend

According to the response of the contractors’ representative who responded to the questionnaire survey, it can be seen that the degree of predictability of construction material price fluctuation is very low. The result shows that contractors cannot easily determine how the price of materials behaves in future. Degree of unpredictability in construction materials price is higher than that of construction labor and Construction equipment shown in figure 1.

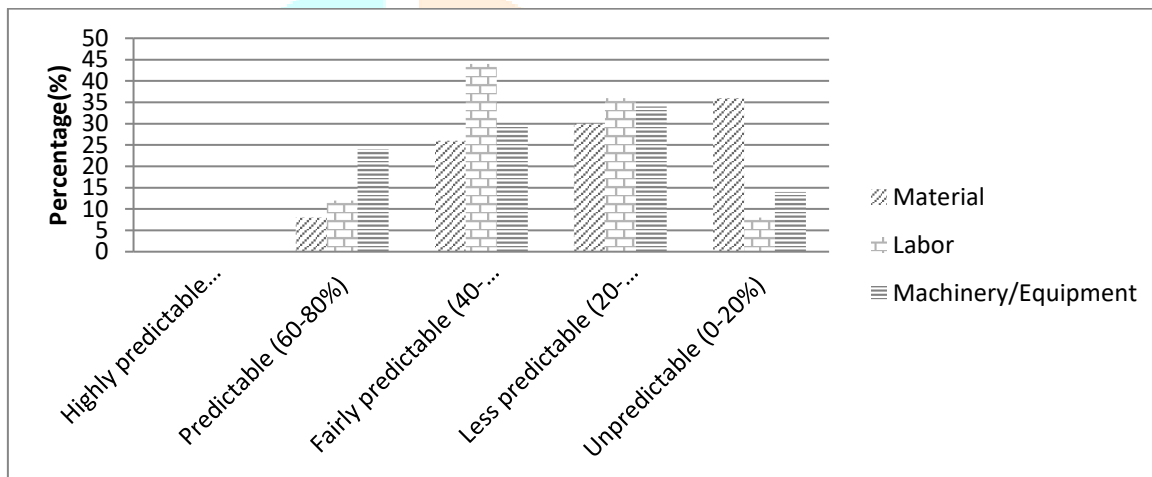


Figure 1 Degree of predictability of price fluctuation of construction inputs

From the above figure 1, it can be seen that the occurrence of price fluctuation on construction inputs especially on construction materials is unpredictable because the construction materials price is increasing and decreasing for short period of time due to social geographical complexity though on quarterly basis it consistently increases at a lower rate. It was found that most of the construction materials and its raw materials are imported which makes the chain longer resulting into high price fluctuation whereas labors are not having much more options to create their high demand so they want to grow with the industry resulting into lesser price fluctuation comparatively though the increment is higher. As discussed by Chan it was also found that the High degree of difficulty high complexity, need to adopt special construction method, likely to have better management for overcoming the problem of price fluctuation which is difficult for the developing country as most of the problems in those countries are managerial.

4.1.2 Major Construction Inputs Whose Prices Fluctuate

The construction project requires materials, labor, equipment, and money and takes time to complete. Out of these resources money is used to buy the resources for the construction ie. Materials, Labor, Equipment. Price Fluctuation of the construction resources directly impact to the allocated amount and delay may occur due to the extreme condition. The response of the contractor about the amount of the price fluctuation of construction resource between 2008-2013 AD is shown in figure 2.

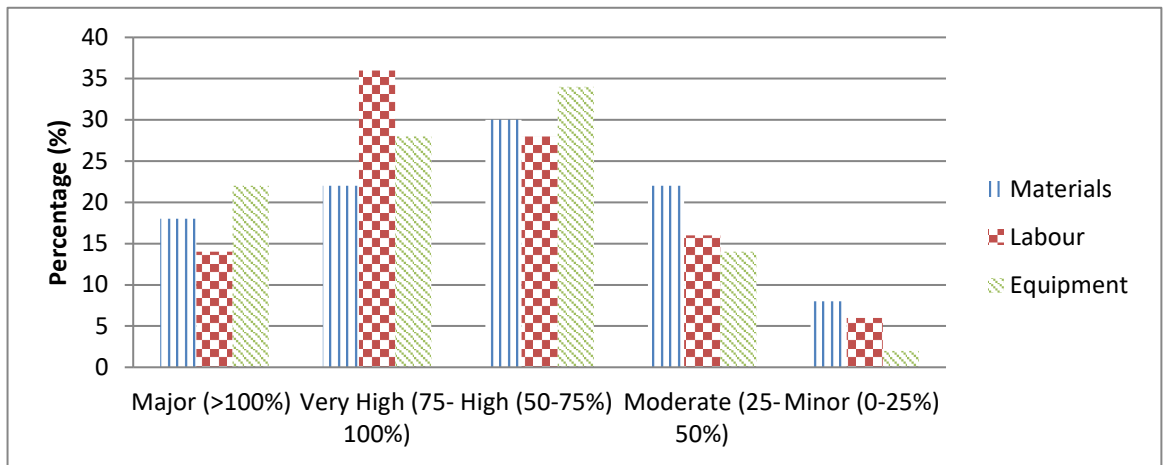


Figure 2 Price fluctuation patterns of inputs of construction industry.

The graph depicts that for moderate and minor condition

material cost is higher whereas labor cost is higher for very high and equipment cost is higher for high and major. The further verification of the result was done with the NRB records.

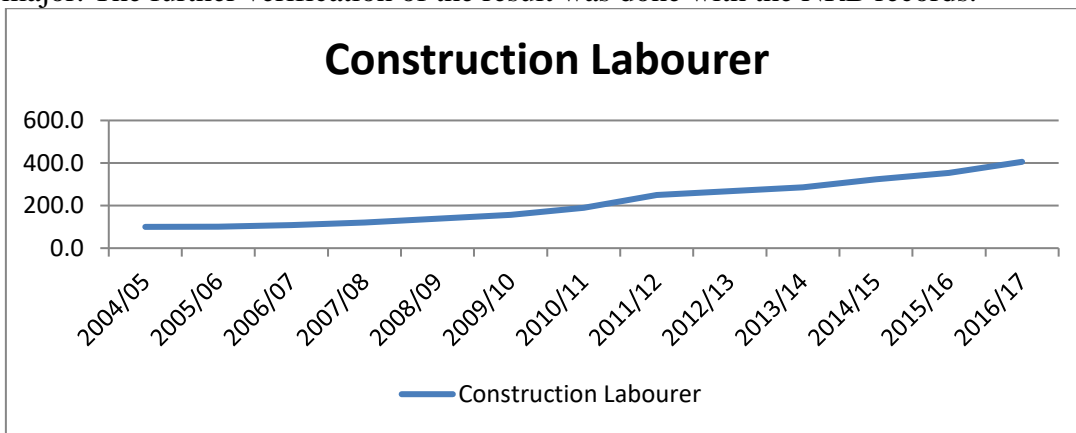


Figure3 Price index for construction Labourer published by NRB

The graph depicts that construction labourer index is increased gradually based on the base value 100 of base year 2004/5 and crossed 400 in year 2016/17. In construction remarkable portion of the construction cost occupied by the labour portion. This scenario having gradually increment of the construction labour indicate the losses in the construction activities.

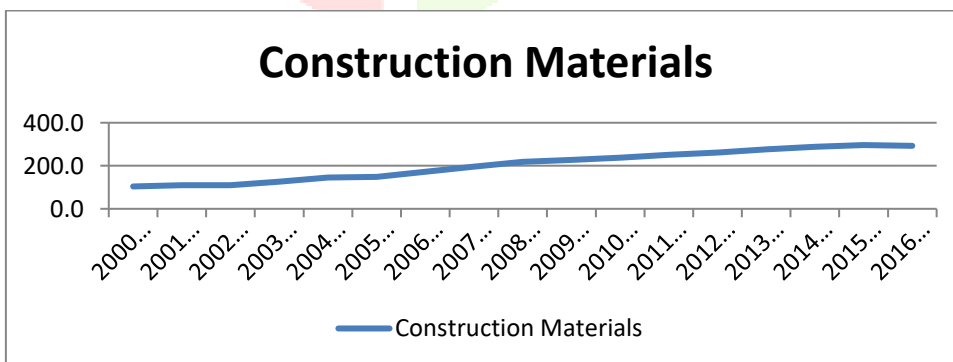


Figure4 Price index for construction materials published by NRB

The graph depicts that construction materials index is increased gradually based on the base value 100 of base year 2000/1 and arrived around 300 in year 2016/17. In construction around 70% portion of the construction cost occupied by the construction materials.

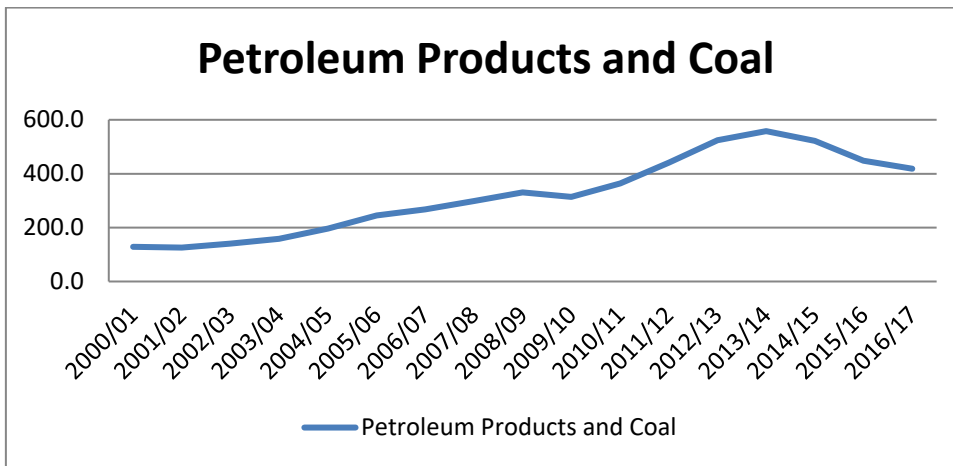


Figure5 Price index for Petroleum Products and Coal published by NRB

4.1.3 Market Survey and Pricing

As construction is a risky business, contractors should take a good care while giving their offer. The offer i.e. bid price, preparation by contractor requires detailed market survey of the construction inputs. The pricing does not only require the study of the market, but also requires the consideration of other factors that affect the price like risks of price fluctuation and contingencies. This part of the research deals with how Nepalese construction contractors prepare their offer and give their prices. Also it deals with how they deal with risks of price fluctuation.

4.1.4 Data Sources for Pricing

The first step in pricing is to collect reliable market data from market and other data sources. Similarly the surveyed contractors have also agreed that they conduct price data collection to be used for pricing. To this end, from the survey, it can be seen that all the surveyed contractors take data from various sources for pricing and some contractors develop their own pricing strategy for bidding. Figure 4.5 represents the summary of price data collection methods adopted by contractors.



Figure 6 Market price data collection methods adopted by contractors

From the above figure, it can be seen that data sources like District rates prepared by District Development Committee (DDC) are widely used by most contractors. The reason was, as described by some of the respondents, the price data from DDC were more reliable as this the nearest point to be assessed data in comparison to other sources. Whereas some of the contractor developed his own pricing strategiest because the district rate could not cover all area around the district, DDC rates gives idea about few specific area or place. Some of the contractors use Nepal Rastra Bank (NRB) index for construction materials for pricing.

4.1.5 Methods of Price Estimation

The next step after price data collection is price estimate. Price estimate is a process whereby an organization interested in the construction of a project attempts to determine the expenditure of resources such as materials, manpower, machine, money and minutes (time) (5M) necessarily to realize the intended project. There are different methods that can be used for estimating. The major ones are: analogous estimation, parametric estimation, bottom-up estimation and computerized tools (PMI, 2000). In addition, the contract types also govern the contract price in relation to price fluctuation. For contracts, which allow compensation for escalation and for those, which do not, contractors give different prices or offers? Accordingly, the surveyed contractors were asked which method they used to estimate price for bidding. In addition, they were asked whether they predict price fluctuation or not and which methods they adopt to adjust price fluctuation. Figure 4.6 represents the summary of responses on cost estimation method adopted by contractors.

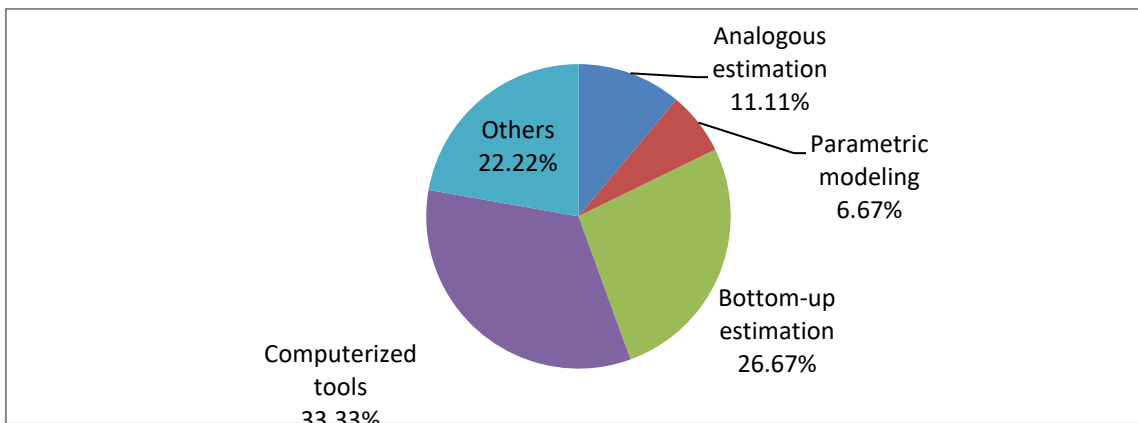


Figure 7 Price estimation methods adopted by contractors

It can be seen that the majority 33.33% of the respondents use computer-based tool for estimation of bid price. In fact, it should be known that the computer-based tools that the contractors’ use are spreadsheet-based program of Microsoft Excel. And these computer-based tools are developed mainly for cost breakdown of work items. Here it can be seen that the degree of how detail that particular work item is broken down depends on the estimator. Therefore, even though same computer based tool can be used, the inputs to the adopted tool make quite remarkable difference on the outputs of the price estimation or pricing process. Estimation accuracy is a most though they believe that the level of competition, viability of work, respect and fame and their strategy influence more to contractor at time of bidding as the banker, supplier and developer stated during FGD which is accepted by contractor also. Even though it has been briefly discussed about the methods of price estimation, the major concern is how Nepalese contractors handle bidding during price fluctuation situations or in situations where there is a possibility of occurrence of unstable market. To this end the respondents were asked whether they try to anticipate or predict price fluctuation of any kind to use it as one input in bidding. Accordingly, 40% of the respondents have said they predict the possible fluctuation that would occur and use it as an input for bidding.

Here also another question arises, “How contractors who tried to anticipate the price fluctuation handle the anticipated price fluctuation during bidding?” From the surveyed contractors, it was found that 40 % of them convert the result of their prediction into percentage risk factor which is then applied on top of the result of their pricing. Here they adopt a simple process that they study the trend of the fluctuation, if any, and use their own decision to reach to the risk factor to be applied. This risk factor is introduced to accommodate any possible price fluctuation, after the work is started, without affecting the planned project budget and profit margin. In fact, this risk factor is not such a huge percentage, which amplifies the overall price.

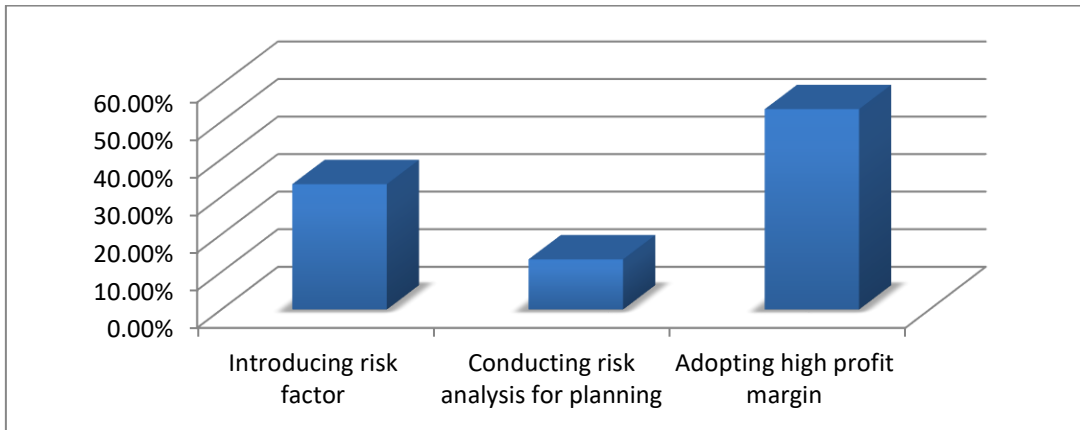


Figure 8 Methods adopted by contractors to accommodate anticipated price fluctuation

Other 50% of the respondents said rather than introducing risk factors to their pricing, they adopt high profit margins or contingency. And the rest 11.11% said that they conduct risk analysis to reach to a decision on how to handle the pricing, where they predict price fluctuation. It can be seen that contractors use different ways of predicting price fluctuation and pricing because of the fact that they expect price would fluctuate but they are not quite sure with the magnitude of its occurrence. The other group of the respondents, 60% of the respondents who said they do not try to predict price fluctuation have given their argument, in one voice, why they do not try to predict price fluctuation. They said, in the first place predicting price fluctuation is difficult. And if they try to predict the possible fluctuation any way, and do their pricing using the predicted increased price, they said they would be out of competition. Here, one critical lesson can be drawn from both groups of respondents, that is: both observed that they anticipate the occurrence of price fluctuation but it is difficult to determine or compute. And this makes the price fluctuation that occurs on the course of the project works to be unpredictable. And the case beings so, then how are the other actors of construction projects: clients and consultants, handling unpredictable price fluctuation situations. Also how are construction contractors being compensated in such situations? The findings and analysis on these issues are presented in the following sections.

The chart below shows the average use of each type of contracting method for the contractors surveyed. Of those surveyed, contractors working in Nepalese’s construction market utilize a unit price contract for the majority of their work (68.88%). The remaining work is divided closely between fixed price (17.77 %) and cost plus (6.66%) contracts, with the minor remainder being guaranteed maximum price contracts (2.22%) and other methods (4.47%) shown in figure 9.

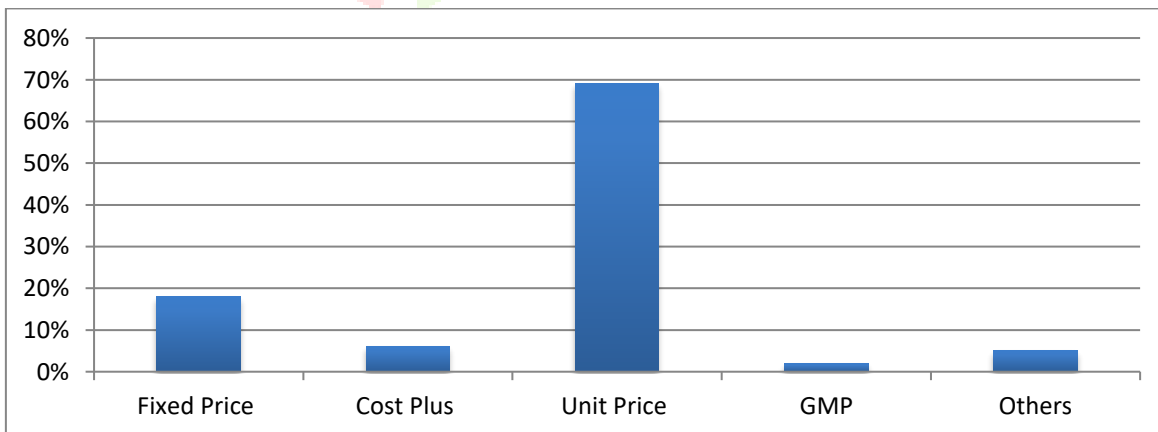


Figure 9 Average use of contracting methods for contractors surveyed

4.1.6 Risk Allocation of the Various Contracting Methods

The various contracting methods allocate or divide the risks associated with construction amongst those involved in the process. The questions included in the research were devised to ascertain how effective respondent found the various methods to be at spreading the risk of price fluctuation. They were asked to assign the level of risk they feel on the various contracting methods. Additionally, they were asked to assign the level of risk they feel *should be* placed on each contracting methods. Respondents were also asked to rate the various methods as to their ability to spread or share the risk of price fluctuation using a 1-5 scale where 5 is extremely equitably, and 1 is extremely inequitably. On average, the respondent as a whole rated cost plus contracts highest on this scale with a score of 4.03. Also, despite being the most used overall, fixed price contract's average score was 3.28 placing it in 3rd out of the 4 contracting methods Shown in figure 10.

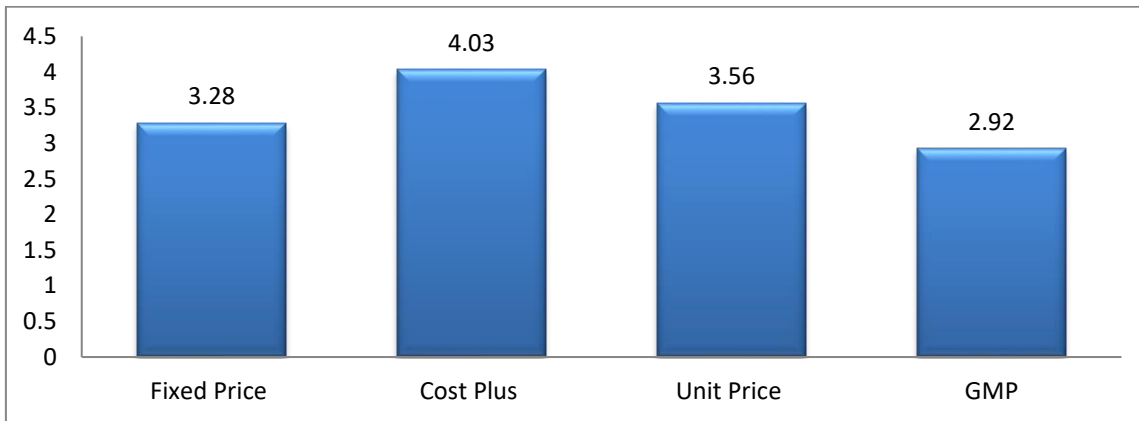


Figure 10 Average overall equitability rankings by contracting method

On the Other hand 26.67% of the respondents said that price adjustment clause in contract addressed the price fluctuation risks 20 % of them adopted well managed inventory management procedure 15.56 % said that accelerated schedule of project activities minimized the risk of price fluctuation, 20 % said timely buyout the required recourses for the execution of the project minimize the further risk of the unpredictable price fluctuation of the volatile market, 8.88 % said that good relationships between contracting parties and suppliers makes easy to handle the adverse situation and remaining 8.88% recommended for the increasing the bid price for addressing the risk during execution of the project.

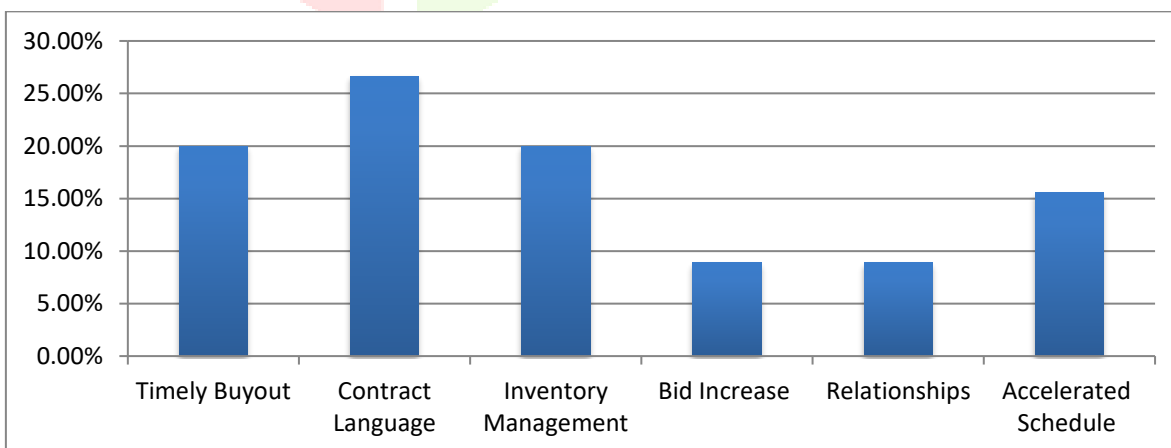


Figure 11 Methods should be adopted by contractors to accommodate anticipated price fluctuation During FGD, they agreed that these all are the option, which could be applied, however, they are not applying here as they lack healthy competition.

4.2 Assessment of the Compensation System and its Effect

The Standard Bidding Document by PPMO generally governs construction projects undertaken by contractors. In addition to this, FIDIC Condition of Contract, Asian Development Bank and World Bank established a Bidding Document for the Procurement of Works. And these conditions of contracts contain provisions that clearly give way to compensate price fluctuations that occur on due course of construction projects.

4.2.1 The Prevailing Practice

According to the contractors the compensation for the price fluctuation in SBD does not favors the contractors. There are three methods of price adjustment are explained in previous section. These methods do not adjust the all amount of escalated resources. On calculating the escalation amount the average escalation of construction inputs does not reflect the actual amount the method of price calculation for compensation is also worth discussing. In calculating the amount of compensation to be paid to contractors during price increase or the amount from contractors during price decrease, the prices at two critical times are the leading variables i.e the price of the inputs during bid pricing and the current price. But one very crucial thing to consider is also the source of these materials. As it is said earlier, central government, except for fuel, does not govern the market and the current market price is not considered for compensation. The approved government rate of inputs is taken for price fluctuation compensation, which is far different from the market.

4.2.2 Contractors' Experience with Compensation

As contractors are continually acting in the construction industry, they also pass through a lot of experience related to price fluctuation. The surveyed contractors were asked about what they do when they face price increase. And the response was that 51.11% of them were claimed for compensation. Even though they claim for compensation payment, the whole requested compensation was not paid to them for many reasons, which will be discussed later. During FGD also, it was found they know what should be done though they did not do as they are not proactive due to lack of healthy competition.

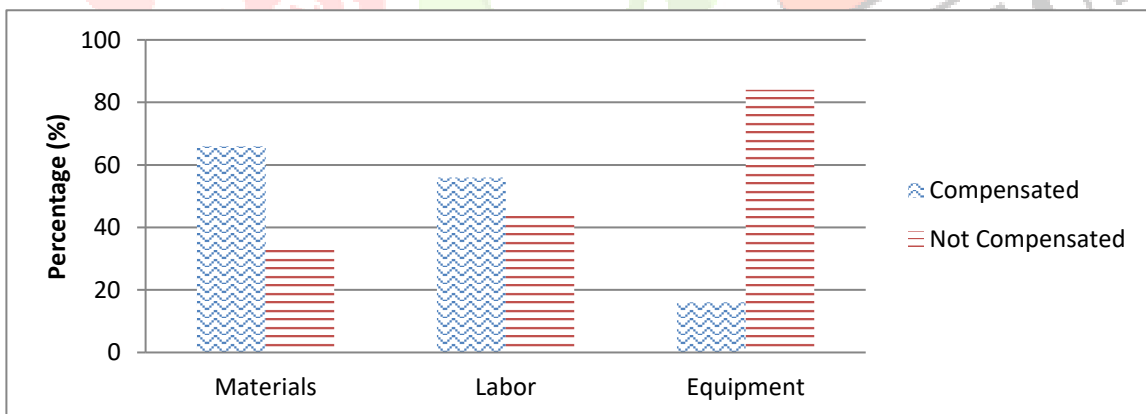


Figure 12 Summary of contractors who were compensated and not compensated

The above figure 13 shows the contractors were compensated and not compensated for the construction resources which were fluctuated during the project execution. 66.66 % respondents were compensated for materials 55.55% were compensated for labor and only 15.55% were compensated for equipments consumables.

The detail experience of the contractors who are surveyed in this study in relation to the compensation is discussed as follows:

4.2.3 Denied Compensation

The surveyed contractors have shown that the difference between the requested and the paid amounts was because of the reason that consultants and/or clients did not accept contractors' justification for compensation. The other reasons were lack of clear method of tracking, market price is not accepted for compensation and that contractors have requested compensation for items which are not allowed for compensation. And the result was that contractors were forced to bear the price increases occurred on these inputs. During FGD, it was also found that as per FIDIC contract contractors submit their schedule within 28 days which does not even maintain holidays in schedule as well as site condition and resource planning. Contractor tries to claim based on social issues, which do not have any hard evidences. Figure 13 illustrates the summary of the responses.

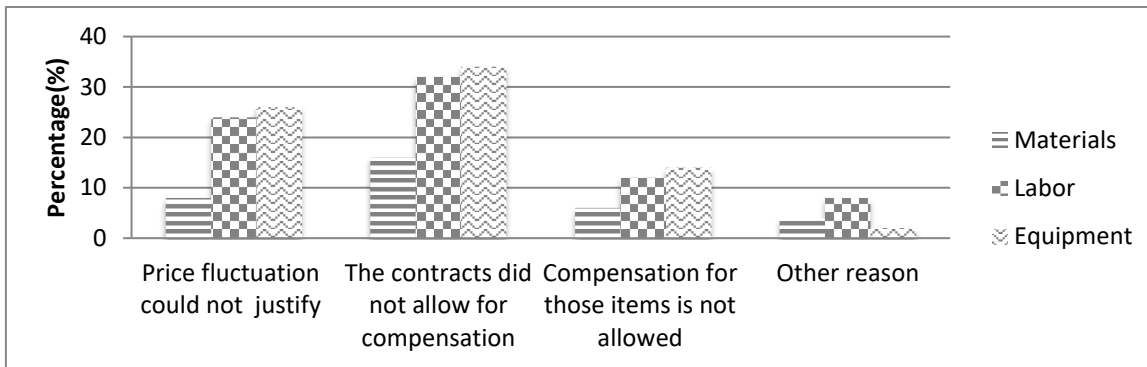


Figure 13 Reasons why contractors couldn't get full compensation for price fluctuation

4.2.4 The Effect of the Price Fluctuation

So far it has been discussed what the current price fluctuation compensation provisions are there in the contract documents of projects, what the practice/system is there and what the experience of the Nepalese contractors in relation to price fluctuation compensation is. In line with this, it is worth to see what effect does unpredictable price fluctuations have on the contractors and the projects as well. Accordingly, the surveyed contractors have indicated that the price fluctuations that occur unpredictably have impact both on the capacity of the Contractors to undertake their projects and on the overall performance of the project itself. To this end, 51.11% of the surveyed contractors have shown that such price fluctuations result in delay of the projects. Here it can be seen that price fluctuation is also on cause of delays in projects, which is one of the major problems in our country's civil engineering construction projects. Figure 14 represents the summary of the responses on the impacts of price fluctuation on projects' performance.

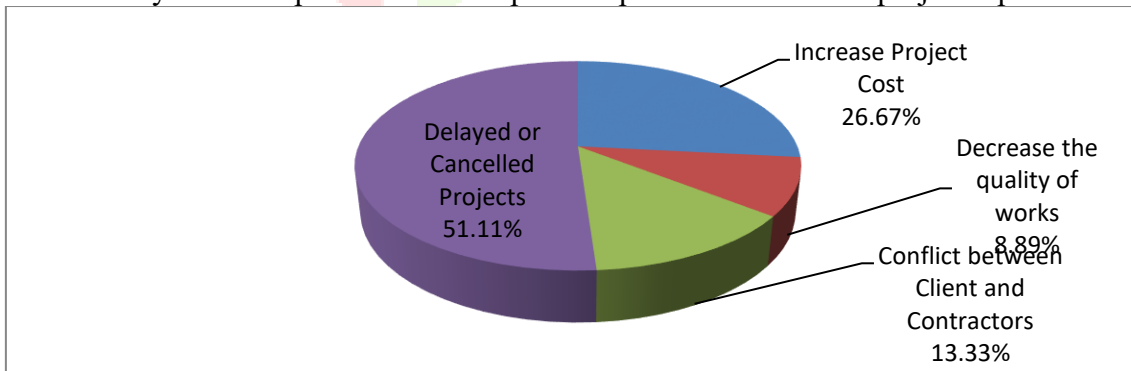


Figure 14 Impact of price fluctuation on project performance

In addition to the delay, it was also found that cash flow problem of contractors; profit loss and poor quality output might result as a result of unpredicted price fluctuation. Therefore, it can be that price fluctuations can result in poor project performance by delaying project time, by increasing the project cost and by making contractors to deliver poor quality projects. On the other hand, the surveyed contractors also indicated that unpredictable price fluctuations also greatly affect their capacity to complete the projects and

it endangers even their capacity to stay in the industry. Contractors who are forced to suffer the negative consequences of unpredictable price fluctuation also face profit losses and cash flow problems. This finding can be related to the cause of slow growth of domestic construction contractors. Figure 16 represents the summary of the responses on the impact of price fluctuation on contractors.

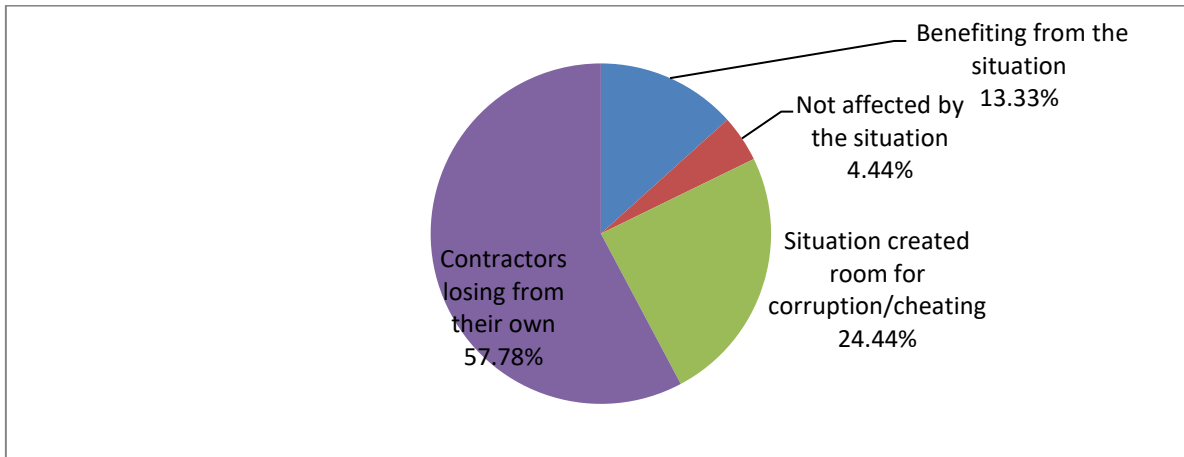


Figure 15 Impact of price fluctuation on construction contractors

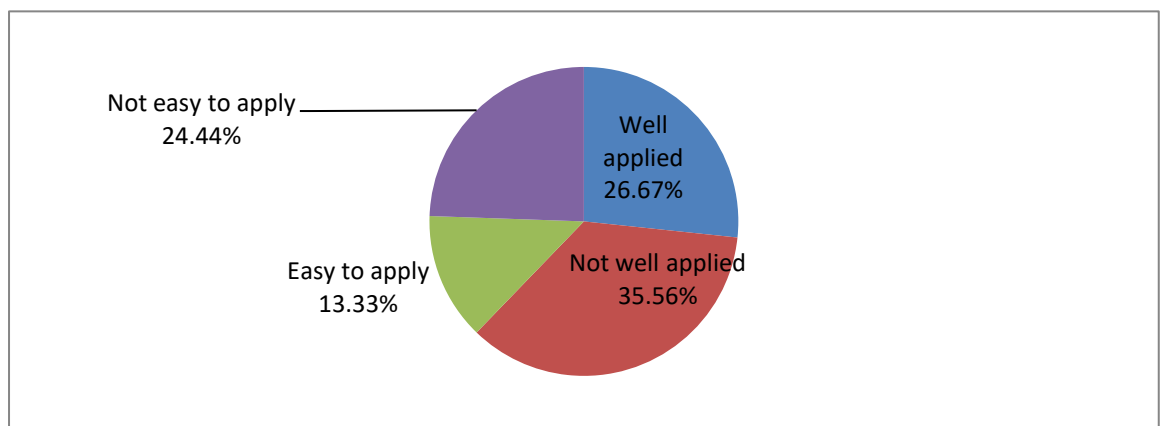
The profit losses, time delay and financial problems on due course of project can force contractors to shift to other businesses. On the other hand 8.88 % of the surveyed contractors have said they have other side businesses, like construction materials production or importation, to build their financial strength. The surveyed contractors were also asked about the year they last upgraded their capacity in any form: by adding machineries, expanding staff, upgrading grade and category etc. accordingly it was found that 53.33 % of the surveyed contractors upgraded their capacity before five years. The reason they gave was that the recently happening price fluctuation could not allow them to expand their capacity. During discussion, it was found it is obvious to have some profit to sustain which can be obtained from engineering optimized through engineering value without compromising quality for which positive communication is most among involved parties but it does not happen as all party started focusing on contract language to avoid the risk of fluctuation resulting in conflicts and poor quality.

4.3 Compensation Provisions in SBD of PPMO

The price escalation provisions in the relating GCC of Standard Bidding Document have been discussed in previous section, in this section; the opinion of the respondent contractors on these provisions was discussed. The first step to assess through this issue was to see how the surveyed contractors feel about the application of the Clause 45 of GCC of the SBD. To this end, 35.56% of the respondents agreed that it is not well applied.

Figure 16 Contractors’ opinion on the application of Clause 45 of GCC

The reason was that, there are only labor and construction materials allowed to be considered in cases of price fluctuation while there are many construction inputs whose



prices can fluctuate unpredictably. The nature of the market and the economic policy governs the price of inputs. This clause was developed with the assumption of the mixed economy where government and

private sector co-exist together to control the market price. During the implementation of this policy price could not be control as per expectation resulting in contractor's loss as the variation of the price is not covered accurately on a daily basis. All the materials indexing were done in an integrated way on a monthly basis without considering a very short term temporally fluctuation. Rather the demand and supply relation strongly governs the prices of materials, especially the price fluctuation. Since the application of the clause under consideration requires action from legislative bodies it becomes difficult to apply it. It can also be seen that it may be for some reason that some particular Contract has limited the inputs that are allowed for compensation. Those materials whose price can be easily set like for cement reinforcement, fuel and asphalt.

On the other hand, regarding price adjustment provision of SBD, some of the respondents observed that they are not well familiar with it but have positive expectations. Among the surveyed contracts, 26.66% have agreed that the pertaining Clause 45 of SBD should not be avoided; rather it should be amended to encompass wide range of inputs to be considered for compensation in cases of price escalation.

4.4 Assessment of Contractors' Observations and Suggestions

In the previous sections, it has been able to see that price fluctuation has been occurring in an unpredictable manner. The type of fluctuation was observed to be only increase in costs of all inputs of construction. In addition to this, it has been assessed how the contractors are being compensated in cases of price fluctuation. The surveyed contractors were asked to give their suggestion to the contractors, consultants, clients and regulatory bodies to minimize the adverse effect of price fluctuation.

4.4.1. Contractors' Efforts

Since contractors are being the first victims of price fluctuation, a lot is expected from them. In this regard, 35.56% of the surveyed contractors have said that to minimize the adverse effect of price fluctuation, they should struggle for risk sharing clause on Standard Bidding Document, which is favorable for contractors. And the other 26.67% said that contractors should try to complete the works within time. These groups of respondents were concerned that shortening the contract period can minimize fluctuation effect. 17.78 % respondents were suggested for hiring experts for preparing bidding according to bid document. During bid preparation possible risk must be analyzed, and also propose other improved favorable methods of compensation. Others also suggested that the claiming behavior and capacity of contractors against price fluctuation must be well developed to challenge the project stakeholders. Figure 17 represents the result.

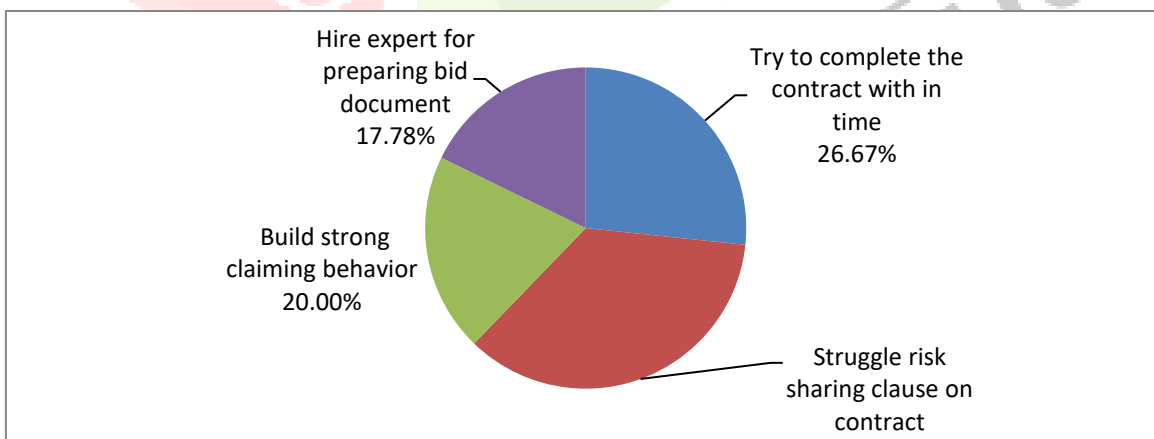


Figure 17 Contractors' suggestion to the contractors

Even though all the contractors agree that they are victimized by the unfavorable compensation practice, it was surprising to see no one contractor who wants to refrain from the construction business.

4.4.2. Consultants' Effort

Consultants play a vital role in civil engineering projects from inception to the final commissioning. They also play the biggest role in linking the contractor and the client. Therefore, in case any thing happens to a

particular project, it is the consultant who can advise and consult the client to take any action. And in price fluctuation cases also, the consultants are expected to act accordingly. To this end, 53.33% of the surveyed contractors suggested that consultants should prepare contract documents allowing for price adjustment. And the other 35.56% said that consultants should develop and propose other favorable compensation methods to their clients to be applied in cases of price fluctuation.

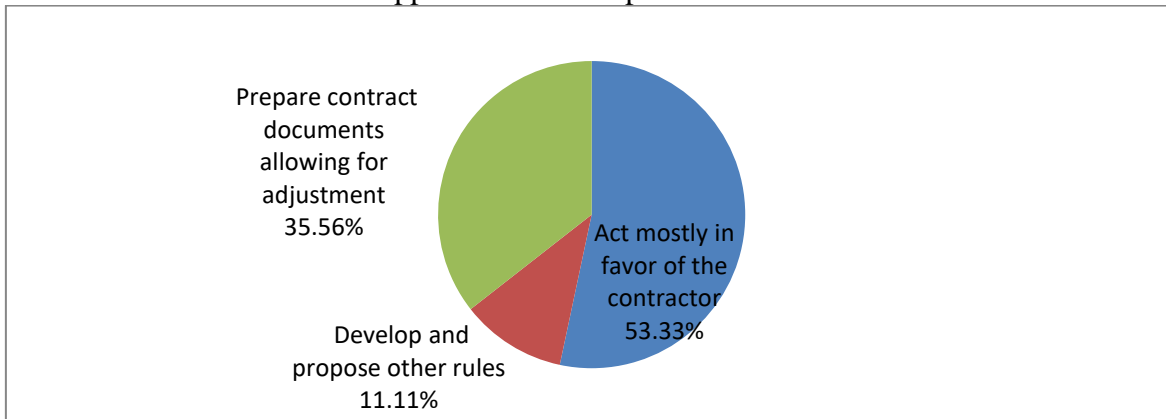


Figure 18 Contractors’ suggestion to the consultants

4.4.3. Client Efforts

Clients usually seem to throw the burden or consequences of price fluctuation to the contractors undertaking their projects. And this makes contractors to suffer consequences, which they are not supposed to take.

Therefore, the surveyed contractors were asked to give their suggestion on what clients should do to minimize or avoid the adverse effect of price fluctuation. 22.22% of the surveyed contractors suggested that payment should be done on time. 28.88 % of them suggested for the quality based selection method, which should not compel to the contractors for low bidding or having less profit. 35.55 % of the respondent suggests encouraging the consultant for preparing risk sharing contract document with client and contractor. And remaining 13.35 % suggested for coordinating to critical issues during construction that makes timely completion of the project and which reduces the impact of price fluctuation to the contractor.

4.4.4. Regulatory Bodies Efforts

Regulatory bodies may not directly interfere in projects, but they have the power to set standards, rules and regulations through which contractors, consultants and clients should act. They also have the authority to establish price database to be used across the nation. Figure 4.20 shows 44.44% of the surveyed contractors suggested that regulatory bodies should regularly review and amend regulations to make them easily applied and satisfy the need for proper compensation to contractors. 31.11% of the respondents said that reliable price database should be developed and updated regularly to be used across the country. And 24.44 % of the respondent said that the regulatory body should be prepared the contractor favorable price adjustment method on the Standard Bidding Document.

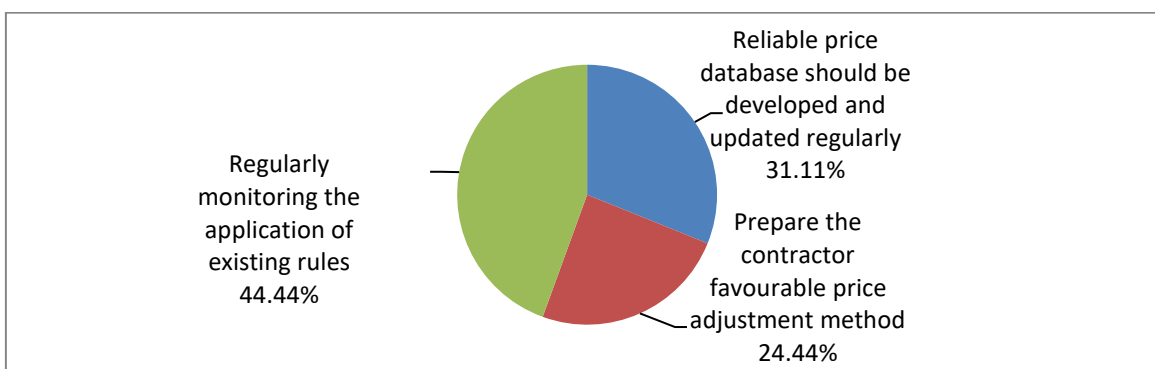


Figure 20 Contractors’ suggestion: what regulatory bodies should do

The suggestions from the contractors for the regulatory bodies to regulate the market and regularly monitor the application of existing rules, which can give them feedback for further improvement of the rule.

4.5 Validation of the Research through Case Studies

Two case studies were selected to back up the research basic information showing the level and effect of price fluctuation on the two projects and the construction contractors. One building construction and one road construction project were considered for the case study. Both projects were conducted under the Unit Price Contract type. The study is conducted by collecting data from the projects base price, material requirements and materials procurement costs. The study focuses on the projects planned and actual expenditures for the major inputs of the construction projects under study. For the building project, the major input is material and for the road project, the major cost goes to inputs for materials and equipment. Moreover, the problem of getting data on planned and actual expenditure on labor, equipment (for building) and indirect costs puts a limit to focus only on the above said inputs of the projects. Therefore, data are collected from these documents to see the projects' planned and actual financial expenditure on major construction inputs of the respective projects.

The study is conducted by collecting the data from various reports and information. The study focuses on the planned and actual expenditure

4.5.1 Case Study 1- Building Project

Building Project

Project Name: Building Project

Location: Mid Western Region

Contract Amount: NRs.3, 09,53,667.70 (Including VAT)

Contract Period:2 years

Project Start Year: 2008 AD

I. Major Construction Inputs of Building Project During Bidding

The major inputs in the building construction are different construction materials, labors and equipment. The project under study is around 90 % completed. The total cost construction resources are compared during bidding time and at the time of execution of executed items. The quantifying of the resources of executed items are done by the help of rate analysis prepared by Department of Road, and Department of Building. The prices of construction resources during bidding are taken from the contract document and during execution are taken from the various sources ie. from contractor, market survey, past records, Nepal Oil Corporation and Nepal Rastra Bank etc. Utilized cost of construction resources were compared during bidding period and that of execution period.

II. Price Adjustment

According to the contract the prices of the construction inputs stated in the contract is increased by greater than ten (10%) percent in comparison to the base price of the construction material of this project and the contractor has received NRs.16, 57,723.00 compensation for price increase of construction input. The total increase of cost of the labor and materials of the executed quantity is NRs. 34,60,454.50 and the total compensation amount the contractor received is NRs.16, 57,723.00 which is only 48 % of the price increase is compensated. The summary of the executed quantity is shown in table 4.1 below:

Table 2 Summary of price adjustment of building project

S.N	Particulars	Planned Amount	Actual Amount	Amount Difference	Price Adjustment	Percent (%)
1	After 1 st year completion	3,915	4,241	326	27	8%
2	After 2 nd year completion	15,037	18,171	3,134	1,630	52%
Total		18,952	22,412	3,460	1,657	48%

(Note: Amounts are in*000)

From the above tables, it can be seen that the actual price of labor and materials of building project has increased by NRs 3,460,454.50 on executed quantity of the project, which is 18.25 % of the planned amount of executed quantity. The actual proportion of cost of materials and labor is 82.81% to that of total cost of executed quantity. It has shown that remaining 17.19 % cost of the project was equipment cost and company overhead. During the execution of the project the labor cost has shown 30.64% increased, whereas the cost of the materials has 10.35 % increased. According to the contract the contractor claimed for compensation and received the 48 % of escalated amount. During execution of project it was found that the material cost and labor cost surged and became 89.19 % and equipment cost and overhead has decrease to 8.67 % from 17.19 % . This result shows that this particular project, the contractor suffered from no profit or loss. And still, for the contractor, no profit means a substantial loss for the company has not get financial input to further build its capacity and loss makes more negative impact on the company.

4.5.2 Case Study 2: Road Project

Project Name: Road Project

Location: Mid Western Region

Contract Amount: 20, 74, 37,884.5

Contract Period: 3 Year

Project Start Year: 2010AD

I. Major Construction Inputs of Road Project During Bidding

As it is discussed in the first section of this chapter, the major inputs in this road project are the different labor, equipments and materials like cement, reinforcement and bitumen. The amounts of these construction resources were calculated by the help of rate analysis prepared by Department of Road (DoR). The average fuel consumption by equipments is calculated with the help of the fuel consumption rate prepared by Mechanical branch of DoR of executed quantity. The estimated price and actual price of executed construction resources are presented in the following tables 5.4 (a) and 5.4 (b). The price of the materials and cost of equipments are the ones that the contractor used for pricing. It was found from the contract document and actual price of different materials, labor and fuels are taken from the information of contractor, market survey, rates from Nepal Oil Corporation (NOC) and Nepal Rastra Bank (NRB).

II. Price Adjustment

According to the contract the prices of the construction inputs stated in the contract is increased by greater than ten (10%) percent in comparison to the base price of the construction material and The contractor has received compensation for price increase of cement, fuel and bitumen only. The total increase of cost of the major inputs of executed quantity is NRs 2,43,43,347.00. The contractor has received price escalation compensation of NRs. 5,92,440.00, which is just 2.43 % of the increase occurred.

Table 3 Summary of price adjustment of road project

S. N.	Particular	Planned amount	Actual amount	Difference	Compensation	Percent (%)
1	After 1 st year completion	31,195	33,914	2,719		0.00%
2	After 2 nd year completion	46,793	58,949	12,156	225	1.85%
3	After 3 rd year completion	31,195	40,663	9,467	366	3.88%
	Total	109,184	133,527	24,343	592	2.43%

(Note: Amounts are in*000)

From the above tables, it can be seen that the actual price of labor and materials of road project has increased by NRs 2,43,43,347.00 on executed quantity of the project, which is 22.30 % of the planned amount of executed quantity. According to the contract the contractor get compensation 2.43 % that of the escalated amount. The remaining escalated amount of construction resources has to be paid by the

contractor only. This result shows that this particular project, the contractor suffered from loss. And still, for the contractor, no profit means a substantial loss for the company has not get financial input to further build its capacity and loss makes more negative impact on the company

4.6 Conclusions

Followings are the conclusion of the study

The price fluctuation of construction industry is unpredictable because in long term it depicts gradual increment though in short term it decreases also which is difficult to be addressed accurately.

The contractors are well known to overcome the problem of price fluctuation however they are not applying it in their cases due to lack of healthy competition which is affecting them negatively in their financial capacity along with poor performance of contractors and projects.

The Cost Plus contract divides the risk equitably.

5.1. Recommendations

- The contractor should try to cope with the problem of price fluctuation by timely buyout.
- With a view to accurately address the problem of price fluctuation daily and weekly price index separately for different construction materials depending upon its sources should be developed to control the price of construction materials.
- Contractors, consultants, owners and regulatory bodies should work together to improve the compensation system in which a wider range of inputs will be allowed for compensation. The method of price fluctuation compensation estimation/calculation should be clear and consistent across all contractors, consultants, regulatory bodies and clients.
- Adopting the Cost-plus, or cost-reimbursement, contracts pay a contractor for all of its actual expenses, typically up to a set limit. The 'plus' refers to an additional payment that allows a contractor to recover overhead and profit.
- Closely analyze payment schedules. Contractors can suffer severely under price fluctuation and high interest rates if payments are delayed. Owners should be committed to effect payments timely.

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