International Journal of Advanced Research in Civil & Structural Engineering
Volume 2, Issue 1 - 2019, Pg. No. 1-9
Peer Reviewed Journal

Research Article

Bidding Trend and its Effects in Implementation on Road Projects of Division Road Offices of Department of Roads, Nepal

Dipendra Bahadur Bista[1], Anjay Kumar Mishra[2]

[1]Engineer, Department of Roads, Government of Nepal.
[2]Faculty of Management Science, Shanker Dev Campus, Putalisadak, Kathmandu, Nepal.

I N F O

Corresponding Author: Anjay Kumar Mishra, Faculty of Management Science, Shanker Dev Campus, Putalisadak, Kathmandu, Nepal.
E-mail Id:
anjaymishra2000@gmail.com
Orcid Id:
https://orcid.org/0000-0003-2803-4918
How to cite this article: Bista DB, Mishra AK. Bidding Trend and its Effects in Implementation on Road Projects of Division Road Offices of Department of Roads, Nepal. *Int J Adv Res Civil Stru Engr* 2019; 2(1): 1-9.

Date of Submission: 2019-02-07
Date of Acceptance: 2019-03-27

A B S T R A C T

Bidding trend in different categories of work in Division Road Offices are different. Data of three fiscal year were used for analysis of bidding trend of Nepalgunj, trend depicts the similar pattern. Low bidding trend was identified using contractor's overhead considering threshold of low bidding and analysis was also done using ranges of low bidding. Regression equation of percentage below engineers' estimate and number of bidders were developed.

The study revealed that 65, 58,62 and 83 percent low bids were found in Nepalgunj and and 84, 35, 56 and 100 percent low bids were found in Mahendranagar for A, B, C and D Category of work based on point threshold of low bid. Similarly, on the basis of range of bidding maximum number of contracts were found at50, 30 and 20 percent below engineers' estimate in A, B and D Category of work. Maximum number of contracts were found at 40 percent below engineers' estimate for C Category of work in Nepalgunj. Percentage below engineers' estimate depends 67 percent on number of bidders in Nepalgunj.

Keywords: Bidding Trend, Competitive Bidding, Low Bidding, Collusive Bidding

Introduction

Background

The construction of physical infrastructures, their rehabilitation and maintenance has become an important aspect of national economy. It has an enormous impact on everyday lives because its ultimate goal is to satisfy public interest by creating physical and socio-economic infrastructure (Rimal, 2009). For the development and maintenance of infrastructures an economic, efficient, effective, fair and transparent public procurement system is necessary and there should be a capable, self-sustained, well managed and sustainable construction industry. The construction sector is a gradually growing industry in Nepal (Bhattarai, 2015). Nepalese Construction Industry contributed around 10 to 11 percentages to GDP of the country and it uses around 35 percent of government budget and about 60 percentages of the nation's development budget is spent through the use of contractors (FCAN, 2012).So, public procurement is an essential government activity that affects a country's economy.

According to PPA (2007) and PPR (2007) public procurement system is based on low bid award system. It is important to evaluate and review the current performance of procurement process to work toward the public sector obtaining greater value for taxpayer's money in their

construction projects. The low bid award system fosters competition amongst contractors attempting to secure the projects (Bhattarai, 2015). This competition can have positive as well as negative effects to the clients. Selecting the contractors based solely on bid price greatly reduces willingness of the contractors to complete the projects within the intended completion period, stipulated cost and expected quality. Source?

Construction industry is trying to apply value management in Nepal for cost effectiveness (Mishra,2019) as it has found adequate number of human resource with A class contractors (Mishra,2018) though time extension is not an exception but norms of the industry(Mishra et.al., 2018) which shows the poor performance of the industry based on Town Development funded projects of Nepal(Mishra and Bhandari,2018). Mishra and Malik (2017) established the risk management practice of Building construction of Nepal need to be improved which may increase cost where as Contractors are not gaining profit as per expectations though their business is profitable(Mishra and Regmi, 2017). According to Mishra, (2018) Bidding is one of the significant reason for dispute and impacting road projects in terms of time and cost.

Statement of the Problem

The average delay in implementation of construction projects is about three years in Nepal. Sometimes it jumps over eight years for energy projects and seven years for irrigation and transport projects (Khadka, 2014). In Nepal the contract is generally awarded to the lowest bidder. Due to low bidding, performance of the contractors may be reduced.

Huge financial investments are made in road projects and contract price is inversely proportional to the financial risks involved. However, low bidding creates financial problems to the contractor and its impact on time, cost, quality and overall performance of the project, therefore it seems necessary rectification on current public procurement system of the country to select the appropriate contractors for the execution of the road projects.

In Division Road Offices, contractors bid differently in various categories of contracts according to the nature of works. Several research has been conducted in this sector without separating the bidding trend based on its nature of work. So, it is necessary to study and analyze the bidding trend of such works along with its effects and remedial.

Research Objectives

The overall objective of this research is to analyze the trends of bidding in terms of categories of works in road projects. The research aims to rationally represent the bidding conditions by analyzing the contracts made in Division Road Office of Department of Roads.

Literature Review

Bidding decision of bidders includes internal(expertise, experience, resources, capabilities, etc.), external(number of bidders, bidding risk, type of project, cash flow requirements, bid related factors etc.) and environmental factors(social and economic condition, include availability of other projects, availability of qualified labor, availability of qualified staffs, availability of qualified subcontractor, availability of equipment). These three factors interactively affect the strategic decisions of competitive bidding in construction industry (Banki, Esmaeeli, & Ravanshadnia, 2008).

One of the most frequently used procedures for selecting contractors is competitive bidding. Instead of accepting low bid, some states in the USA are adopting the provision of surety bond from surety companies which are available entities that can share responsibility with contractors in front of owners. Some of public owners in USA resort to surety companies alone, which can pay a maximum liability reaching 100% of the contract amount (Bajaber & Taha, 2012). However, there are some modifications to this single objective decision–making procedure based on lowest bid price. For instance, in France and Portugal, bid prices that one considered abnormally lower than the engineer's estimate by the project owner are excluded. They define abnormally low as any bid whose price appears very lower than the engineer's estimate and consequently may cause implementation problems (Herbsman &Ellis, 1992). Hong and Shum(2002) cited in Bhattarai (2015) state an increase in the number of bidders have two counteracting effects on equilibrium bidding behavior. First, the increased competition leads to more aggressive bidding, as each potential bidder tries to maintain her chances of winning against more rivals: this is the competitive effect. Second, the winner's curse becomes more severe as the number of potential bidders increases, and rational bidders will bid less aggressively in response: this is the winner's curse effect.

Highway road construction projects that were awarded to low bidders that were significantly lower than the median bidder experienced 3.5 to 4 times the cost escalation (from the low bid) than projects where the low bidder was close in price to the median bid price (Crowley & Hancher, 1995). According to Bedford(2009), an open bidding process unrestricted by prequalification of contractors did not provide a public sector client with increased value. Prequalification is correlated with lower cost escalation and avoiding low bids. Rimal (2009)states that tendency of contractors to bid lowering the bid price is high in road construction projects and found that such tendency is even higher in the case of new construction type road projects in comparison to other types like rehabilitation, maintenance etc.

According to Bhatta (2014), there is no any uniformity in the definition of low bids and abnormally Low Bids (ALBs). In India, the bid is considered low bid that vary from the estimated rates by more than 25 %, even after updating the scheduled rates to match the prevailing cost index. In Taiwan, the total Bid Price less than 80% of the estimate is considered an ALB. According to National legislation of United Kingdom low tender abnormally is the one which deviates by 10% - 15% from the average price tendered. Luxembourg law defines a low bid in terms of a price which leaves no margin for a normal level of profit. A law adopted in Lithuania in 2009 provides that a tender is abnormally low either if it is 15% or more lower than the average of the other tendered prices, or if it is 30% or more lower than the authority's original estimate. According to European Commission's Europa report, a tender is assumed to be abnormally low if: it is not providing a margin for a normal level of profit; and the bidder cannot explain its price on the basis of the economy of the construction method, or the technical solution chosen, or the exceptionally favorable conditions available to the bidder, or the originality of the work proposed.

Bhattarai (2015) concluded regarding low bidding as result showed that trend of low bidding was higher. The frequency of bid ranging 30 % to 50 % low with respect to engineer's estimate was the higher. Low bidding trend suffers the project which is recommended by Khadka (2014) as the research reveals that there is low level of time and cost performance of DUDBC construction projects awarded to the lowest responsive bidders. Kadariya (2011) concluded the impact of low bidding in time and cost. Competitive low bidding believes to give everyone an equal chance to bid, eliminates collusion, and optimally utilizes tax-payers money. It fosters honest competition in order to obtain the best work and supplies at the lowest price. It is also necessary to guard against favoritism, imprudence, extravagance, fraud and corruption (Sweet, 1989).

So, it is essential to have a set of well-defined criteria to determine that the bids are responsive and the bidders are responsible (Topcu, 2003). Under the competitive low-bid method, the qualified (responsive) bidder who submits the lowest bid that meets the specifications must be awarded the contract. Competitive bidding system forces contractors to continuously lower the costs by adopting cost saving technological and managerial innovations. These savings are then passed to the owner through the competitive process (Ioannou & Leu, 1993).

Khadka (2014) states that competitive low bid method is favored for saving a considerable amount of money and minimizing the level of favoritism and corruption and by the application of such method, found negative impact on contractor's profit, disputes/claims, coordination, quality control, project cost and duration. Low bidding causes time overrun, increase disputes and claims, non – compliance on specification declines the reputation of contractor, harms construction industry and reverse impact on the economy of nation (Lama, 2014).According to Ioannou and Awwad(2010) to address this problem, some countries have adopted variety of bidding methods based on the average of the bids submitted or consideration for quality apart from cost estimate.

Methodology

Study will adopt qualitative as well as quantitative approach. Data will be collected from office record of Division Road Offices and analyzed. Qualitative data acquired from the clients' and contractors' respondents were analyzed. Research is based on the database collected from primary as well as secondary sources and infer characteristics or relationships of population. So, this research is more close to quantitative inferential approach.

Study Area and Population

The study area covers Division Road Office, Nepalgunj and Division Road Office, Mahendranagar. The rationale behind the selection of these public entities under DoR is that similarities among the project is more because of similar geographical coverage. DoR, Division Road Office, Nepalgunj is one of the thirty four division road offices working throughout the country under DoR. It is located in headquarter of Banke district and its working area extends to two districts, Banke and Bardiya. In other hand Division Road Office, Mahendranagar is located in Kanchanpur District and its jurisdiction area is Kailali and Kanchanpur Districts. Rehabilitation, maintenance and construction works of national highways and feeder roads are major part of Division Road Office's responsibilities; in addition to that probable strategic roads, others urban roads, and regional and touristic importance roadsare the additional responsibility.

The targeted population consists of Engineers and Division Chiefs who work for Division Road Offices and have experience in their jobs to the contractor's evaluation, awarding committees, and to the supervisions and management of public construction projects all over Nepal. Also, this research targets, as study population, all contractors working for Division Road Offices.

To analyze bidding trend, researcher first categories the work in four category

- **A Category**: Includes the contracts where less expertise, less sophisticated equipments are used. Work can be done by normal/general contractors using easily available resources.
- **B Category**: Need equipments, need cash flow in short period time, difficult for ordinary level contractors,

contractors should depend on availability of equipments, environment.

- **C Category**: It includes contracts of culverts, rigid pavement work, bridges, Retaining works, Gabion protection work, masonry works.
- **D Category**: It includes special types of work which need huge cash flow in short period of time, need various types of equipments, experienced manpower etc.

Data Collection

For primary data collection a structured set of questionnaire was developed in order to assess the perceptions of clients and contractors on the present status of bidding trend and low bidding in procurement of works under study.

For secondary data collection from Division Road Offices, regarding estimated cost, bid price and non-price information (number of bidders, bid prices of bidders, contract price, scheduled contract duration, actual cost and actual duration incurred for each project) of fiscal year 2013/14, 2014/15 and 2015/16 for Nepalgunj and 2013/14 and 2014/15 for Mahendranagar were collected. Several related literature were reviewed before the start of research work. Reports and documents relevant to the projects were studied to generate idea about the research problems and issues at the same time to get the ideas of data needs for the research work. Journal articles, publications, text books, online reading materials, websites, social medias were used for the collection of secondary data.

Data Processing and Analysis

The study is descriptive as well as quantitative. Descriptive research study is the basis of describing the characteristics of a particular data by using statistical approach (frequencies, average, mean, correlation coefficients, trend etc.). On the other hand, quantitative research study determines whether variables under the study are associated or not. Calculation of percentage below engineer's estimate, cost overrun and time overrun is done.

A structured questionnaire survey approach was used to assess the respondent's attitude or perception about the relative importance of the views of respondents regarding current bidding trend on road projects of DROs and improvement suggestions for better performance of construction projects under study. Likert-type Scale (Summated Scale) was used in analyzing qualitative data obtained from the questionnaires, which is suitable for ranking the statements of respondents' views by using the relative importance index. Likert's scale of five ordinal measures of agreement towards each statement (1=Strongly Disagree, 2=Disagree, 3=Undecided, 4 =Agree and 5=Strongly Agree) was used to calculate the mean score for each factor which was subsequently used to determine the relative ranking.

Results and Discussions

Data were analysed to explore bidding trends and its consequences in low bidding in road projects of Division Road Office Nepalgunj and Division Road Office Mahendranagar by conducting quantitative data analysis for the previous construction projects that were awarded to the contractors.

Bidding Trend

Bidding trend of overall projects and on the basis of work categories were assessed first based on the contractors' overhead as a threshold. Furthermore, categorical bidding trend were also assessed on the basis of ranges of percentage below engineers' estimate. Data of fiscal year 2013/14, 2014/15 and 2015/16 of Nepalgunj and fiscal year 2013/14 and 2014/15 of Mahendranagarwere used for analysis.

Average Percentage below Engineers' Estimate

According to the methodology set out in section 3.7, calculation of average percentage of bidding amount was done assuming the mid value, A is 15%(percentage below engineer's estimate).Table 4.1shows the calculation of average percentage of bidding amount using data of fiscal year 2013/14of DRO, Nepalgunjare taken for the analysis.

From the data analysis, average percentage of bidding amount was found to be (100%-29.54%) 70.46%.Among 54 contract of fiscal year 2013/14, 19 bids (i.e.35%) in respective contracts are normal bids and 35 bids (i.e. 65%) in respective contracts are low bids.

For DRO, Mahendranagar value of average percentage of bidding amount is calculated using data of fiscal year 2013/14. From the calculation, average percentage of bidding amount was found to be (100%-29.96%) 70.03%. Among 75 contract of fiscal year 2013/14, 28 bids (i.e.37%) in respective contracts are normal bids and 47 bids (i.e.63%) in respective contracts are low bids.

For fiscal year 2013/14, percentage of normal bid in DRO, Nepalgunj was 35% whereas in DRO, Mahendranagar was 37%. Analysis of data of both DROs reveals that percentage of low bid was high which was65% for DRO, Nepalgunj and 63% in DRO, Mahendranagar. The weighted average of low bid in both the cases is around 63%. Which means 37 % bids are normal for fiscal year 2013/14.

Researcher interested to know the low bidding trend of DRO, Nepalgunj and data of fiscal year 2014/15and 2015/16 are taken for the analysis. From the calculation, average percentage of bidding amount was found to be (100%-23.98%) 76.02%Among 88 contract of fiscal year 2014/15, 32 bids (i.e.36%) in respective contracts are normal bids and 56 bids (i.e. 64%) in respective contracts are low bids.

Data of fiscal year 2015/16 are taken for the following

analysis. From the calculation, average percentage of bidding amount was found to be (100%-20.34%) 79.66% Among 37 contract of fiscal year 2015/16, 16 bids (i.e.43%) in respective contracts are normal bids and 21 bids (i.e.57%) in respective contracts are low bids. In three fiscal year of DRO, Nepalgunj the percentage of normal bid and low bid can be tabulated as follows. In an average of three fiscal year 38 % bids are normal and other 62% bids are low bids.

Table 1.Normal Bid and Low Bids of Overall Contracts (Nepalgunj)

Fiscal Year	Total number of contracts	Average %age below engineers' estimate (y)	Normal Bids		Low Bids	
			No.	%	No.	%
2013/14	54	29.54 %	19	35	35	65
2014/15	88	23.98 %	32	36	56	64
2015/16	37	20.34 %	16	43	21	57

Based on the category of work average percentage below engineers' estimate were calculated using bidding data of fiscal year 2014/15for Nepalgunj and 2013/14 for Mahendranagar and presented in table 2 below.

sions. Though it seems high, percentage below engineers' estimate was found slightly more than threshold of percentage below engineers estimate. If we consider the threshold of low bids and normal bids in a range, result would be reversed i.e. tendency to bidding low bid price in D category work would be minimum. Reasons of low bidding were collected through schedule questionnaire as presented in figure 2 below.

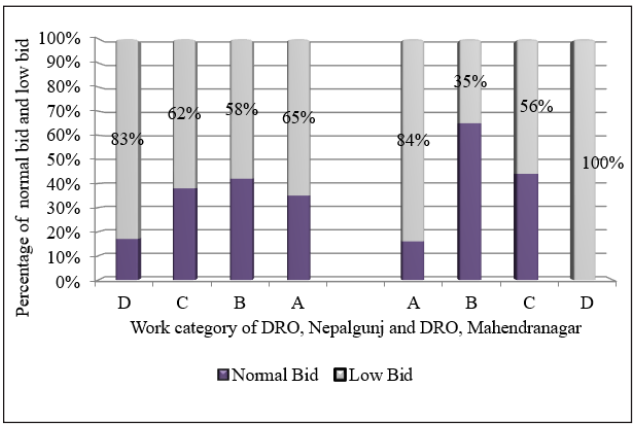

Figure 1.Normal Bid and Low Bid of two DROs

Table 2.Category wise Normal Bid and Low Bids (Nepalgunj and Mahendranagar)

Work Category	DRO, Nepalgunj					DRO, Mahandranagar				
	y	Normal bid		Low bid		y	Normal bid		Low bid	
	%	No.	%	No.	%	%	No.	%	No.	%
A	29.79	8	35	15	65	45.24	5	16	26	84
B	19.17	15	42	21	58	13.68	11	65	6	35
C	25.00	6	38	10	62	22.90	11	44	14	56
D	25.00	2	17	10	83	24.17	0	0	9	100

Table 2 reveals that, D category works are suffering from low bid while threshold is taken as a point. If threshold of average percentage of bidding amount could be taken as a range, the scenario would be reversed. It can be stated that average percentage below engineers' estimate in D category work for both division were found similar. Whether in A category work average percentage below engineers' estimate was found to be higher in Mahendranagar. In B category work average percentage below engineers' estimate was found less in Mahendranagar that might be due to the unavailability of workers, equipments and materials required for this category of work. Which was also discussed in FGD and was discussed during scheduled questionnaire. Graphical representation of percentage low bids under different work category is as follows.

From the above analysis, in both Division Road Offices, percentage of low bids were found to be high. Categorically, low bids were maximum in D category works in both divi-

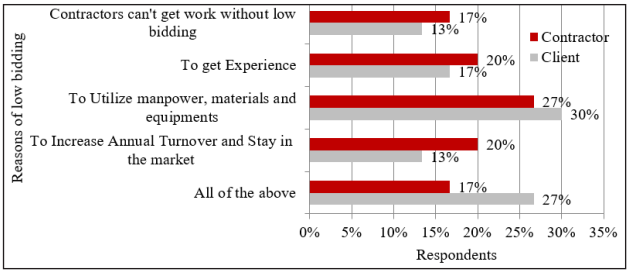

Figure 2.Responses Regarding Low Bidding

Clients' and contractors' respondents were focused on the reason of low bidding as "to utilize manpower, materials and equipments". Clients focuses on other reasons of low bidding such as overhead management, engineering optimization. FGD also emphasized on these reasons. Contractors performing D category work have more equipments and personnel with view to use these resources optimally they try to win the contract by compromising with bid price up till a certain minimum range below which

with a view to avoid losses they were found to be restrict with their prices.

Frequency of Contracts under various Bidding Ranges

Frequency of contracts under various bidding range of three fiscal years of DRO Nepalgunj is given below. Graph shows in bidding range 0-5% percentage below engineer's estimate, there are maximum number of bidders. In fiscal year 2014/15 there were about 33% contracts within bidding range of 0-5%i.e. in collusive bidding range.

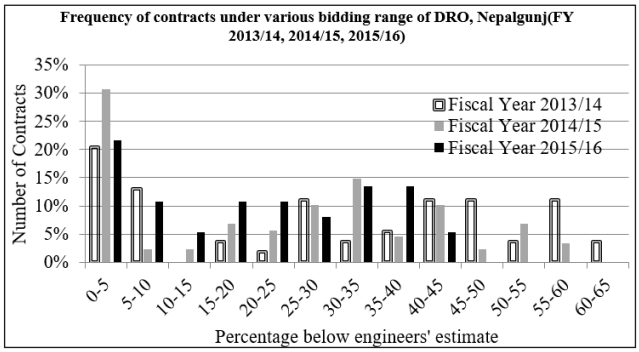

Figure 3.Contracts vs Bidding Ranges (DRO, Nepalgunj)

In all three fiscal years maximum number of contracts were occurred in 0 to 5% percentage below engineers' estimate which is collusive bidding range. Beyond collusive bidding range maximum number of contracts were occurred in between 20 to 40% percentage below engineers' estimate. Rimal (2009) found this range between 25 to 40% for road projects. Whereas the scenario of frequency of contracts under various bidding ranged in DRO, Mahendranagar can be shown as follows.

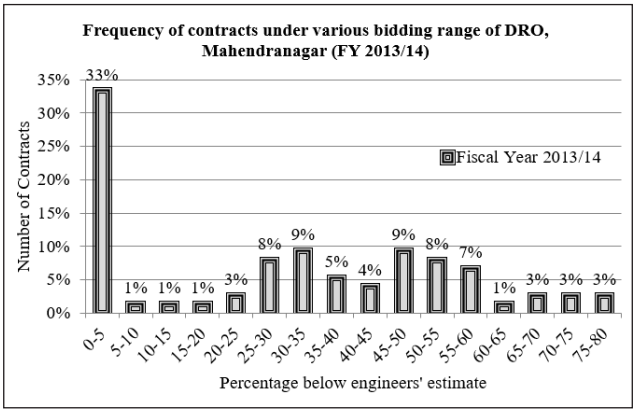

Figure 4.Contracts vs Bidding Ranges (DRO, Mahendranagar)

Maximum number of contracts were occurred in 0 to 5% percentage below engineers' estimate. After the normal bidding range, maximum number of contracts were occurred in 30 to 35 % and 45-50 % percentage below engineers estimate.

Relation between No. of Bidders and Percentage below Engineer's Estimate

To analyze relation between number of bidders and percentage below engineer's estimate, contract data of DRO, Nepalgunj are used. Correlation calculation among overall contracts for the different three fiscal years with percentage below engineer's estimate was carry out and analysis of bidding trend of whole contracts in three fiscal years is done. Later bidding data of fiscal year 2014/15 are taken to analyze bidding trend of different works category. Researcher interested to know the overall trend of bidding using bidding data of fiscal year 2013/14 to fiscal year 2015/16. Which is shown in graph below.

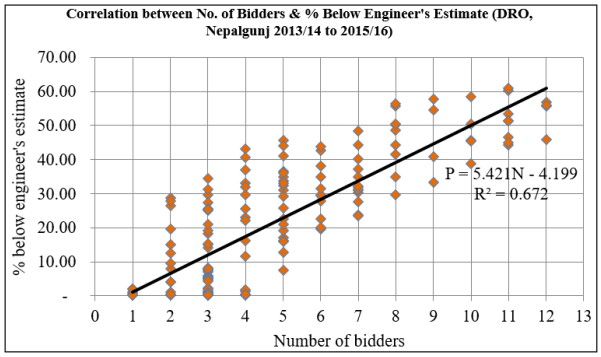

Figure 5.Trend of Bidding (Nepalgunj, FY 2013/14-2015/16)

Analysis of bidding data of three fiscal year reveals that number bidders are 67% responsible to low bidding. Remaining 33% are other causes for low bidding. Study to determine causes of low bidding other than number of bidders is beyond the scope of research. It can be concluded that the association between number of bidder and percentage below engineer's estimate is strong (coefficient of correlation is 0.82) i.e. increase in number of bidder increases the percentage below engineer's estimate (promote low bid).

Result of the study is in line with Hong and Mathew (2002) cited in Khaki (2014)who mention that the increased competition in existing competitive bidding leads to more low bid price, as each potential bidder tries to maintain his/her chances of winning against more rivals. However, there can be other reasons of low bidding. Rimal (2011) found that the contractors tend to increase annual turnover of their firms and stay in the market; utilize their idle manpower, materials and equipment and get experience by low bidding. In the context of public procurement in Nepal, there is rare chance for contractors to get work if they do not bid low price (FCAN, 2012).

From the above trend analysis of DRO, Nepalgunj and DRO, it might be said that increase in number of bidders increases the percentage below estimate. In case of DRO, Nepalgunj overall data analysis, it might be claimed that,

number of bidders are 67.2% responsible for increasing the percentage below engineer's estimate and it might be suggested that the equation to calculate percentage below engineer's estimate with the help of number of bidder as follows.

For DRO, Nepalgunj, P=5.421N-4.199; and (R^2=0.67)

Where, N=number of bidders for a particular contract and P=percentage below engineer's estimate.

Bidding Trend under Different Category of Works

DRO, Nepalgunj

Analysis of bidding data under four work category were done. Data taken from fiscal year 2014/15 of Division Road Office, Nepalgunj. Among 88 bidding data (contracts), 24 under A category, 36 under B category, 16 under C category and 12 under D category.

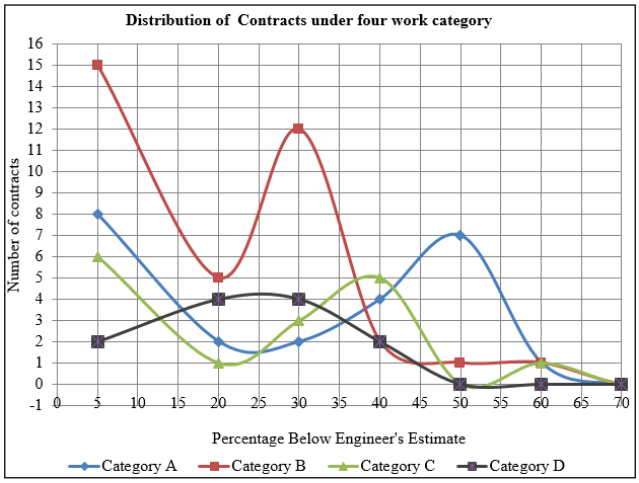

Figure 6.Categorical Distribution of Contracts (DRO, Nepalgunj)

In A category work maximum number of contracts were occurred in between 45-55% below engineers' estimate. Similarly for B category work maximum number of contracts were occurred in between 25-35% below engineers' estimate; likewise for C category work maximum number of contracts were occurred in between 35-45% below engineers' estimate and for D category work maximum number of contracts were occurred in between 20-30% below engineers' estimate.

During focus group discussion (FGD), it was found that, the contractors analyze the risk of contract and D Category works are of high budgeted projects and need high level of expertise and cash flow in short period of time. They go for low bid only up to minimum level which could be recovered from overhead management and engineering optimization. Similarly, with the decreasing technicalities the range of low bid increases for C, B and A category of work. It was also focused that in D category works extra qualification criteria is also assessed which may cause the rejection of disqualified bids resulting into low range of percentage below engineers' estimate. They also focused for the increment of performance bond based on percentage below engineers' estimate.

As discussed above based on threshold point, D category works are having maximum low bidding but if it could have been taken in range, D category works are having lowest low bidding. Based on the technicalities of works the contractors do not compromise with bidding price though they try to win the contract going below acceptable range of engineers' estimate.

Distribution of Contracts w.r.t Number of Bidders in DRO, Nepalgunj

In different work category (i.e. A, B, C and D), distribution of contracts with respect to number of bidders can be shown below to analyze level of competition in different work category.

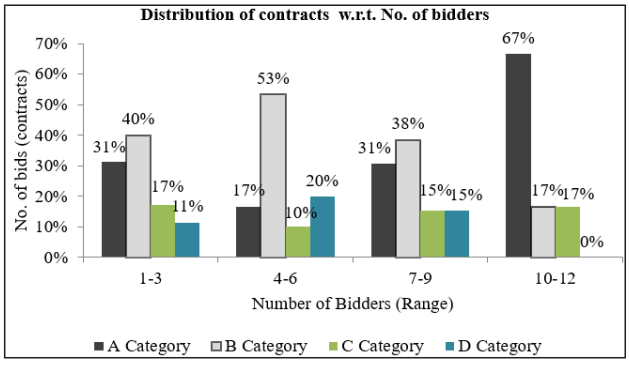

Figure 7.No. of Contracts vs Range of Bidders (Nepalgunj)

From analysis it can be stated that maximum competition were occurred in A Category work because, maximum number of contracts corresponding to maximum number of bidders were occurred in A Category work in both Divisions.

From schedule questionnaire, responses were analyzed which was about the ranking of the given work category by indication with face to face discussion and clarification of any confusion are made by researcher. Responses were given with the ranking of road type with respect to low bidding. Responses were predominant in giving the A type of road work which contractors bid low price in DROs. Brief discussion were done about association between low bid and work category during schedule questionnaire. In A category road work, no need of specialized manpower, equipments, locally available materials are used and no need of cash flow in short period of time so, contractors bid low price. In this category of work, such contractor which have no liquidity, no equipments, no provision of manpower are more for bidding.

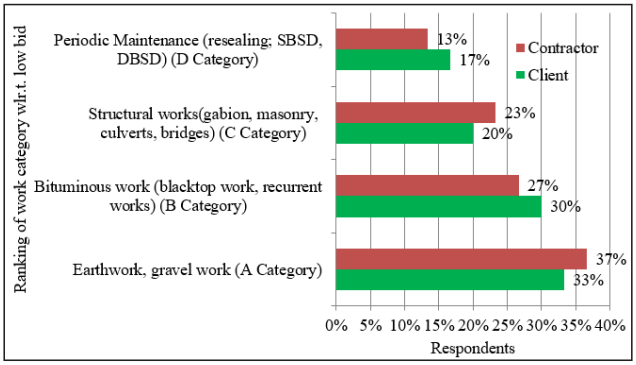

Figure 8.Response of Ranking of Work Category

During focus group discussion and discussion made during schedule questionnaire, in B category work contractors are sincere rather than contractors in A category work. Reason behind it was revealed that, to carried out B category work, contractors need cash items such as bitumen, chips for premix carpeting, base course materials are needed along with equipments such as roller, grader and specialized manpower are needed. During working seasons there was scarcity. It was found that, manpower required for bituminous work are not available in that region. No Nepalese workers are found for this nature work. Almost all workers were coming from India. So, during working season there is a scarcity of workers, equipments and materials too. So, in this category of work contractors do not bid low price than A category work.

Responses shows third priority goes to C category work and then to the D category work. In C category, contractors are serious about road structures such as culverts, side drain, retaining structures, gabion works and materials used for these types of work are not available locally. D category works are highly sophisticated than others. Sufficient liquidity, various types equipments (distributor, compressor, chip spreader, pneumatic rollers), materials (bitumen, chip for surfacing), specialized manpower are used so, contractors which are sound in above stated resources, bid for this type of work. At the time of bidding, they try to avoid low bidding below the range of 25% as they assume, this could be recovered from engineering optimization and overhead management.

Conclusions

The trend of low bidding exists in all categories of work in descending order of earthwork or gravel work, bituminous work, structural work and sophisticated work respectively. Based on the technical nature of work the contractors do not compromise with bidding price and with the increasing technical nature of work number of participating bidder decreases though they try to win the contract going below acceptable range of engineers' estimate. Number of participating bidders are responsible for increasing percentage below engineers' estimate. Effect of low bid in time and cost of project is more in low bids than normal bids in both Divisions.

Contractor winning the contract through traditional bidding procedure generally raises dispute and tends to compensate the loss through claims, traditional bidding procedure guarantees the lowest cost project, but not necessarily the best and higher the number of bidders, higher will be the chance of low bidding were emphasized as a views of representatives of employers and contractors.

For the successful completion of the project use realistic project monitoring and evaluation method, to calculate duration of project, use scientific method of project planning and for the successful completion of project, external project environment other than project environment should be assured by government were focused as a suggestion by representatives of employer and contractors.

References

1. Bajaber M, Taha M. Contractor Selection in Saudi Arabia. *World Academy of Science, Engineering and Technology* 2012; 6(11): 966-971.
2. Banki M, Esmaeeli B, Ravanshadnia M. The Assessment of Bidding Strategy. *International Journal of Management Science and Engineering Management* 2008; 4(2), 153-160.
3. Bedford T. *Analysis of the Low-bid Award System in Public Sector Construction Procurement.* Master's Thesis, University of Toronto. 2009.
4. Bhatta I. Issues Related to Selection of Contractors in Public Construction Procurement. *Rural Infrastructure* 2014; 5(5): 184-189.
5. Bhattarai B. *Effects of Low Bidding in Public Owned Construction Projects: A Case Study of Rural Reconstruction and Rehabilitation Sector Development Project (RRRSDP).* Master Thesis, Nepal Engineering College, Changunarayan, Bhaktapur, Nepal. 2015.
6. Crowley LG, Hancher DE. Risk Assessment of Competetive Procurement. *Journal of Construction Engineering and Management* 1995; 121(2): 230-237.
7. FCAN. *Federation of Contractor's Associations of Nepal (FCAN)* 2012. Retrieved August 12, 2015, from http://fcan.org.np/pages.php?pid=83
8. Herbsman Z, Ellis R. Multi-Parameter Bidding System-Innovation in Contract Administration. *Journal of Construction Engineering and Management* 1992; 118(1): 32-39.
9. Hong H, Shum M. Increasing Competition and the Winner's Curse:Evidence from Procurement. *Review of Economic Studies* 2002; 69(4), 871-898.
10. Ioannou P, Awwad R. Below-Average Bidding Method. *Construction Engineering and Management* 2010; 136(9): 143-148.
11. Ioannou P, Leu S. Average-Bid Method: Competitive

Bidding Strategy. *Journal of Construction Engineering and Management* 1993; 119(7): 131-147.
12. Kadariya PP. *Impact of Low Bidding on Schedules and Costs: Study on Public Building Construction Projects.* Master Thesis, Nepal Engineering College, Balkhu, Kathmandu, Nepal. 2011.
13. Khadka B. *Analysis of Competitive Bidding System for the Department of Urban Development and Building Construction Projects in Nepal.* Master Thesis, Nepal Engineering College, Changunarayan, Bhaktapur, Nepal. 2014.
14. Lama A. The Contractor and Low Bidding: An Analysis. *Nepalese Construction Souvenir* 2014; 16(23): 25-30.
15. Rimal AM. *Impact of Low-Bidding in Road Projects in Nepal.* Master Thesis, Nepal Engineering College, Balkumari, Lalitpur. 2009.
16. Sweet J. *Legal Aspects of Architecture, Engineering, and the Construction Process.* St. Paul, MN: West Publishing Company. 1989.
17. Topcu Y. A decision model proposal for construction contractor selection in Turkey. *Management Faculty, Building and Environment Journal* 2003; *39*: 469-481.
18. Mishra AK. Implementation Status of Value Management in Project Management Practice in Nepal. *International Journal of Management Studies* 2019; 6(1).
19. Mishra AK. Assessment of Human Resource Capacity of Construction Companies in Nepal. *J Adv Res Jour Mass Comm* 2018; 5(4): 14-25.
20. Mishra AK, Bhandari S, Jha T. Factors Affecting Performance and Time Extension of ongoing Construction Projects under Town Development Fund, Nepal. *J Adv Res Const Urban Arch* 2018; 3(4): 7-25.
21. Mishra AK, Bhandari S. Performance Assessment of Ongoing Construction Projects under Town Development Fund, Nepal. *Int J Adv Res Civil Stru Engr* 2018; 1(1&2): 27-39
22. Mishra AK, Mallik K. Factors and Impact of Risk Management Practice on success of Construction Projects of Housing Developers, Kathmandu, Nepal *International Journal of Sciences: Basic and Applied Research (IJSBAR)* 2017; 36(7): 206-232.
23. Mishra AK, Regmi U. Effects of Price Fluctuation on the Financial Capacity of "Class A" Contractors. *International Journal of Creative Research Thoughts* 2017; 5 (4): 1920 - 1937.
24. Mishra AK. Dispute Resolution Practice of Project Management in Nepal. *J Adv Res Busi Law Tech Mgmt* 2018; 1(4): 1-11