

# Causes of Delays in Residential Building Construction at Gaidakot Municipality, Nepal

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**Abstract** - This research is focused to study the causes of delays in residential buildings construction sites which is evaluated from stakeholders. The cause of delays and their responsible components based on rankings are also illustrated in this research. From this study, the mean percentages of the major responsible components of delays in residential building construction are Local Builders which cover 46% of total responsible elements that cause delays. Building owners are also the responsible elements for causes of delays which covers 22% of the responsibility for factors causing delays. Shortage of materials on site is the highest ranked cause of delays in residential building construction projects.

**Key Words** – Delays, Consultants, Local Builders, Owners, Residential building, Construction

## I. INTRODUCTION

Currently, residential building construction projects are rapidly growing in the major cities and municipalities in Nepal. Due to the trend of municipal-based urbanization in the country, many people of remote hilly and mountain areas of Nepal migrate to major cities, terai regions and plain hilly areas where infrastructure facilities are more so that way of living life is easier. Residential buildings are constructed by land owners who build their houses for the residence purpose to spend their life. As the trend of constructing houses are increasing due to foreign employment in the country; the day-to-day activities of construction works and the numbers of construction entrepreneur are also increasing due to the demand in the market. As the number of Local Builders are increasing day by day; unfair and unhealthy competition are also increasing. So, for the good quality and economical construction delays should be minimized to reduce the construction cost and time.

Construction is a risky business; it is a risk that house owners and Local Builders faced that can affect construction time. The cost of a lost day on a residential building construction project may be staggering. However, delay in the construction project is the common issue due to various factors. Materials and equipment should be properly available on the time to reduce the delays in residential building construction. Proper planning and management as well as mitigation of external factors can reduce the delays and help to overcome the delays in residential building construction. Both Local Builders and house owners should be responsible to complete the project on time frame.

Construction processes are impacted by a wide range of unpredictable circumstances. It is uncommon for a project to be finished within the allotted time. There is strong evidence that Indian building projects perform unevenly, and this trend is growing. According to reports, projects are failing on all important performance indicators, such as cost, schedule, and job quality. Delays in construction projects negatively affect the parties involved (owner, Local Builders, and consultant), leading to an increase in adversarial relationships, mistrust, litigation, arbitration, cash-flow issues, concessions in safety and quality, and a general sense of unease. Delay now becomes a very delicate component of this macrocosm. Project delays directly result in schedule overruns and indirectly increase project costs.

The majority of the tasks that construction industry participants are or will perform are residential tasks [4].

## II. LITERATURE SURVEY

[7] identify and evaluate the most significant causes of project delay in Malaysian construction industry, which are improper planning, poor site management, inadequate experience of the contractor, inadequate finance of the client and payments for completed work, problems related to sub-Local Builders, material shortage, labor supply, availability and failure of equipment, lack of communication between parties and mistakes during the construction stage.

[1] identify leading causes of construction project delay in Saudi Arabia by conducting a questionnaire survey administered to Local Builders, consultants and clients. They conclude that the most two significant causes of project delay are lack of finance to complete the work by the client and delay in progress payments by the owner.

[2] reported the factors affecting project delays in Indian construction projects by surveying construction professionals in India. After the factor analysis the most influential factors of project delay were identified as follows: lack of commitment; inefficient site management; poor site coordination; improper planning; lack of clarity in project scope; lack of communication; and substandard contract.

[8] have researched the causes and effects of delay in road construction projects in Cambodia. Based on the importance index of the factors rated by the Local Builders, consultants and clients, the top ten factors found to be related to the contractor and project. In addition, rain and flood factors were also found to be significantly influencing on the main objectives of construction projects, which are time, cost and quality. Thus, a literature review as depicted above has been carried out as the basis for the efforts to identify the main causes of delay in construction projects.

### III. METHODOLOGY

Questionnaire survey among the consultants, Local Builders and house owner were the primary sources of data. Similarly, previous research, reports, documents, relevant websites and municipal data were secondary sources of data to draw conclusions regarding research objectives.

Table 1: Causes of delays along with their factors and responsibility.

Causes of delays	Factors	Responsibility
Shortage of materials on site	Material & Equipment	Builder
Late delivery of material	Material & Equipment	Local Builders
Old Machinery	Material & Equipment	Local Builders
Damage in storage	Material & Equipment	Local Builders
Equipment failures	Material & Equipment	Local Builders
Poor site management	Management	Local Builders
Construction method	Management	Local Builders
Lack of labor supervision	Management	Local Builders
Rework due to the construction errors	Management	Local Builders
Late payment by the owner for the completed work	Management	Owner
Personal conflicts among labors	Workforce	Local Builders
Lack of high-technology mechanical equipment	Workforce	Local Builders
Unskilled equipment operators	Workforce	Local Builders
Poor labor productivity	Workforce	Local Builders
Shortage of skilled labor	Workforce	Local Builders
Accidents due to poor site safety	Workforce	Local Builders
Rain effect on construction activities	External	Common
Bad weather conditions	External	Common
Delays in obtaining permit from municipality	External	Common
Legal disputes	External	Common
Unavailability or delay of utilities in site	External	Common
Effect of social and cultural factors	External	Owner
Surroundings	External	Owner
Access to site	External	Owner
Error made by consultant	External	Consultant
Mistake in foundation design	Planning	Consultant
Incomplete building drawings	Planning	Consultant
Design Changes	Planning	Common

Source: [3]

Then after, the relative importance index was computed using the following equation as similar study by [6].

$$\text{Relative importance index} = \frac{\sum W}{AN} = \frac{5n_5 + 4n_4 + 3n_3 + 2n_2 + 1n_1}{5N} \quad \text{Source: [6]}$$

Where, W is the loading given for every factor by the respondent, between 1 to 5.

- $n_1$  = number of respondent who respond on rating scale of 1
- $n_2$  = number of respondent who respond on rating scale of 2.
- $n_3$  = number of respondent who respond on rating scale of 3
- $n_4$  = number of respondent who respond on rating scale of 4
- $n_5$  = number of respondent who respond on rating scale of 5
- A = the first load i.e., 5 in the study

RII is in between 0 and 1.

Table 2: RII Values and their Corresponding Importance Level.

RII values	Importance level	
$0.8 \leq \text{RII} \leq 1$	High	H
$0.6 \leq \text{RII} \leq 0.8$	High-Medium	H-M
$0.4 \leq \text{RII} \leq 0.6$	Medium	M
$0.2 \leq \text{RII} \leq 0.4$	Medium-Low	M-L
$0 \leq \text{RII} \leq 0.2$	Low	L

Source: [6].

#### IV. FINDINGS

Among the 205-respondents selected for the survey including 178 numbers of the house owner, 9 numbers of consultants, and 18 numbers of Local Builders, the Likert scale-based questionnaires were asked to gather the relative importance index and the rankings of causes of delays.

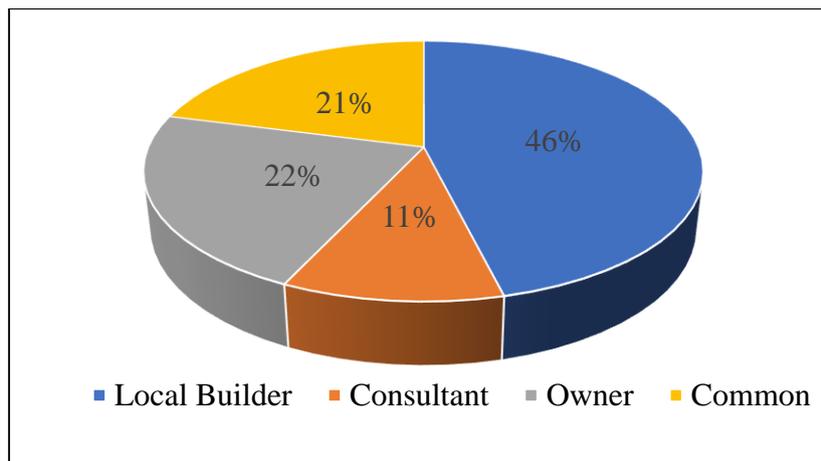


Figure 1: Percentages of responsibility on factors causing delays

From Figure 1, the mean percentages of the major responsible components of delays in residential building construction are Local Builders which cover 46% of total responsible elements that cause delays. Building owners are also the responsible elements for causes of delays which covers 22% of the responsibility for factors causing delays. 21% of the responsibility for delays is common and 11% of respondents are consultants which are illustrated in the above pie chart and are covered in this research study.

From the findings as indicated in Table 3, the study noted that the majority of respondents have given priority to "Important" scale.

Table 3: Frequency of responses to the Likert scale-based questionnaire for delay factors

Causes of delays	Not important	Slightly important	Moderately Important	Important	Very Important
Shortage of materials on site	5	16	17	72	95
Late delivery of material	5	12	20	88	80
Old Machinery	3	16	41	104	41
Damage in storage	0	17	46	104	38
Equipment failures	6	26	38	102	33
Poor site management	3	17	50	88	47
Construction method	4	17	47	84	53
Lack of labor supervision	4	16	49	85	51
Rework due to the construction errors	5	14	54	87	45
Late payment by the owner for the completed work	3	15	57	78	52
Personal conflicts among labors	0	19	56	79	51
Lack of high-technology mechanical equipment	3	23	54	92	33
Unskilled equipment operators	2	25	58	74	46
Poor labor productivity	3	19	74	69	40
Shortage of skilled labor	5	13	71	82	34
Accidents due to poor site safety	3	18	82	75	27
Rain effect on construction activities	3	18	87	60	37
Bad weather conditions	4	21	66	71	43
Delays in obtaining a permit from the municipality	1	35	52	81	36
Legal disputes	5	23	53	96	28
Unavailability or delay of utilities on site	4	14	63	100	24
Effect of social and cultural factors	1	22	64	81	37

Causes of delays	Not important	Slightly important	Moderately Important	Important	Very Important
Surroundings	3	20	63	71	48
Access to site	4	31	52	65	53
The error made by the consultant	4	16	72	54	59
Mistake in foundation design	4	16	56	71	58
Incomplete building drawings	3	11	81	59	51
Design Changes	4	21	55	40	85

Source: (Field survey results, 2022)

**Top ten causes of delays in residential building construction**

From the survey of data as illustrated in Table 4, the top ten causes of delays in residential building construction were identified. From the study it was found that shortage of material at site is the major concern of respondents which plays vital role in delay of work during building construction. The other causes of delays relating to Material and equipment factors like Late delivery of material, old machinery, Damage in storage are also the top ten causes of delays. From the research it was investigated that five major causes of delays among top ten causes of delays in residential building construction work was the responsibility of Local Builders. Lack of supervision and construction methods are also the cause of delays. Owners related responsibility of late payment of completed work is the top ten cause of delays in residential building construction.

Local Builders have more responsibility on the causes of delays in residential building works which was identified from the questionnaire survey among the clients, consultants and local Builders. Owners are also responsible for the causes of delays. Common and consultant related responsibilities are found to be the major causes of delays which are gathered from the responses of respondents from the questionnaire survey.

Table 4: Top ten causes of delays in residential building construction

Causes of delays	Factors	Responsibility	RII
Shortage of materials on site	Material & Equipment	Owner	0.83024
Late delivery of material	Material & Equipment	Owner	0.82049
Design Changes	Planning	Common	0.77659
Construction method	Management	Local Builders	0.76098
Old Machinery	Material & Equipment	Local Builders	0.76
Damage in storage	Material & Equipment	Local Builders	0.75902
Lack of labor supervision	Management	Local Builders	0.75902
Mistake in foundation design	Planning	Consultant	0.75902
Personal conflicts among labors	Workforce	Builder	0.75805
Late payment by the owner for the completed work	Management	Owner	0.75707

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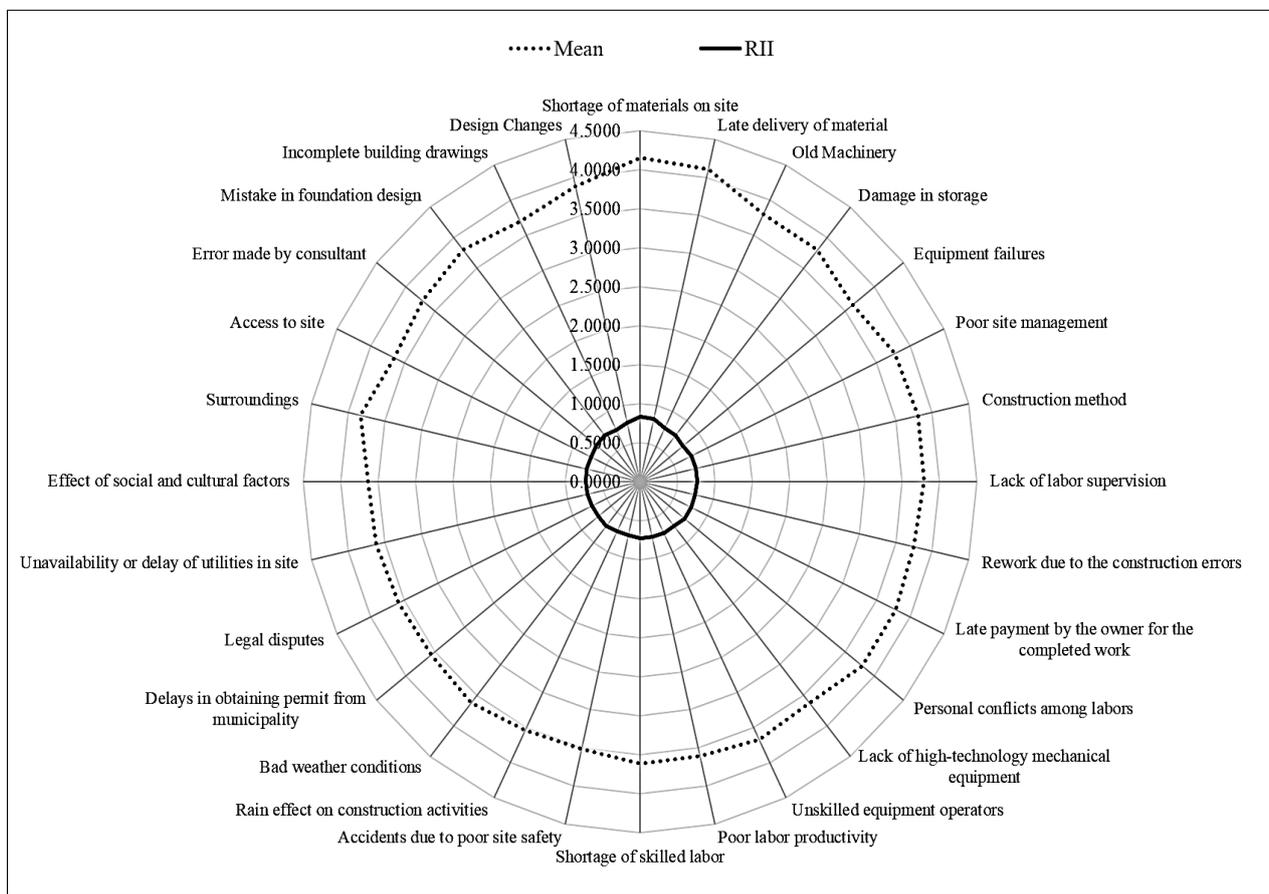


Figure 2: RII and Mean score of Delay causes in radar chart

In Figure 2; the RII and mean of 28 different parameters of causes of delays in residential buildings show that the results from the survey are relatively consistent in both respects. There are no more variations among the causes of delays in residential building construction. The radar chart shows that the mean of different parameters lies between 3.5 to 4.2 and the RII of causes of delays lies between 0.7 to 0.85.

From the survey of research, it is found that major causes of delays in residential building construction are the major responsibility of Local Builders and house owners. However, consultant-related factors and common factors are seen as the least responsible for the causes of delays.

Material and equipment factors are the highest-ranking factors of delays in residential building construction. Planning and management factors are the other highest-ranked factors of delays in residential building construction. Workforce and external factors are the least ranked factors of delays in residential building construction.

The similar research studies in India; shows that the most important cause of delay in residential structures occurs due to owner-related factors. The RII index of study has shown owner, contractor, and consultant as the major responsible elements for causes of delays. Here, in this study, the results and outcomes are seen as similar to the research study as the study has identified the owner responsibility, common responsibility and local builder's responsibility are the major elements of causes of delays in residential building construction.

[3] has studied in causes of delays in residential construction projects in Cambodia. The study concluded that the ten influential factors agreed by the contractors and consultants as the main causes of project delays are: the shortage of materials on-site; unrealistic project scheduling; late delivery of material; shortage of skilled labor; the complexity of the project; labor absenteeism; rain effect on construction activities; design changes; delay by a subcontractor; accidents due to poor site safety. Whereas in this study the top ten causes of delays in residential building construction are tabulated in Table 4. The findings in this research were also alike similar to the previous findings. However, some parameters are different as per the different conditions and environments.

## V. CONCLUSIONS

Delays in residential building construction are investigated as the major responsibility of Local Builders and house owners. Management and planning factors play important role in the cause of delays. Material and equipment factors are the highest rank factors of delays in residential building construction. From the study, it was found that better management of materials and equipment can reduce the delays in residential building construction to some extent.

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