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# Assessment of Material Quality and Workmanship in Building Construction: A Case Study of Makawanpur District

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**Abstract**

The selection of good-quality building materials is essential in a construction project. One of the important contributing factors to the quality of concrete is the aggregate used in it. This study mainly focuses on identifying and ranking the factors that influence the quality of building construction and workmanship. A questionnaire was developed based on identified factors that were taken based on the literature to obtain opinions from engineers and sub-engineers of the local government of Makawanpur district. This study also analyzes the quality of the coarse and fine aggregates of three rivers used in under-construction public and private buildings in Kailash Rural Municipality through laboratory tests. Then, based on the survey, the identified factors were ranked. From this study the topmost ten influencing factors identified are quality of materials (RII-0.95), availability of finance (money) to the owner (RII-0.93), planning and documentation (RII-0.92), design and construction details (RII-0.92), rules and regulation of government(RII-0.92), experience of labor and contractors (RII-0.91), wages of labor (RII-0.91), management of project (RII-0.89), and management and supervision of contractor (RII Value- 0.89). From this study, it was found that poor supervision (RII-0.85) and lack of motivation in workers (RII-0.84) are the most important factors contributing poor workmanship, compared to other identified factors. Among various properties of the aggregate, only the physical and mechanical properties of coarse and fine aggregates were tested and evaluated. The result indicated that the coarse and fine aggregates of the three rivers as well as the sample of fine aggregate of under construction public and private building meet the requirements specified in Standard Specifications for Road and Bridge works - 2073 (with second amendment 2078) by Department of Roads (DoR), Nepal, except organic impurities presence in the sample of fine aggregate samples from the under construction building.

***Keywords***: Quality, Workmanship, Aggregate, RII

## 1. Introduction

Construction is an ancient human activity. It began with the purely functional need for a controlled environment to moderate the effects of climate. Constructed shelters were one means by which human beings were able to adapt themselves to a wide variety of climates and become a global species. In any construction, quality is an important part of the project. The quality of work depends on both process and material. The selection of good-quality building material is essential in a construction project, as construction work is a high-risk job. In the case of sand, it is mandatory to be free from impurities like clay, silt, salts, mica, shale, iron, pyrites, coal, residue, and organic matter. Excessive presence of these deteriorates the strength, durability, and appearance of mortar, plaster, and concrete. In the context of aggregate, its shape, size, specific gravity, density, void, absorption, and bulking are the main concerns (V.K. Jain, 2018).

One of the important contributing factors to the quality of concrete is the aggregate used in it. Quality is the major concern of construction, and there are various sides that need to be addressed before performing the work. Fine and coarse aggregates are the essential elements of concrete. Therefore, its quality affects the overall work, and it needs to be tested to obtain quality work (Shetty, 2009).

Standards are not adhered to, and construction clients are, many times, dissatisfied with projects done. Stakeholders in the building construction industry have different perceptions of quality standards; this has adversely affected quality standards in the industry. The major cause of building collapse in Nepal is a lack of adherence to standards. It is hoped that the recommendations in this study will be utilized by local authorities in the Makawanpur district to enhance the quality of building construction practices. Additionally, this study examines the properties of coarse aggregate concerning different sources supplied to Kailash Rural Municipality. It supports the identification of suitable sources for good-quality coarse and fine aggregate and analyzes the acceptance criteria of coarse aggregate for building construction projects. Recommendations regarding the suitability of aggregate sources for supply will be provided to Kailash Rural Municipality.

The scope of study is broad and multifaceted. It involves conducting a comprehensive review of literature related to the quality of construction, workmanship, and similar contexts, which will help contextualize the study and provide a foundation for the research. This study is done to compare the properties of coarse aggregate and fine aggregates with respect to different source supplies to Kailash Rural Municipality. Furthermore, it evaluates the fine aggregates from ongoing construction sites of both private and public buildings.

## 2. Research Objectives

The objectives of research are to identify and ranking of factor that affecting the quality of building construction and workmanship; to compare and analysis the quality of source materials used in under construction private and public building in Kailash Rural Municipality based on the experimental studies; and to suggest possible mitigations and provide recommendations for quality and workmanship in current and future building project works.

## 3. Literature Review

### *3.1. Factors affecting quality control in building construction*

A summary of Quality Factors in Construction from different Literature is as follows:

Table 1. Identified quality factors from literature

| Quality Factors (Variables) | Author |
|---|---|
| Team building; planning and documentation; leadership; customer involvement; education; culture (attitude change); resources | Hellard (UK) |
| People and customer management; supplier partnerships; communication of improvement; customer satisfaction; external interface management; strategic quality management; teamwork structures for improvement; operational quality planning; quality improvement measurement systems; corporate quality culture | Lai and Cheng (2003), Hong Kong |
| Top management commitment; quality culture; strategic quality management; design quality management; process management; supplier quality management; education and training; empowerment and involvement; information and analysis; customer satisfaction; resources | Metri (2005), India |
| Responding and resolving clients' complaints; continual review of construction safety, work environment, construction quality, culture, and commitment of everyone | Lau and Tang (2009), Hong Kong |
| Top management commitment; customer involvement satisfaction; employee involvement and empowerment; customer-supplier relationships; process improvement | Pheng and Teo (2004), Singapore |
| 7 M Factors (Market, Mean, Money, Management, Materials, Methods, Machine) | Ashworth (2004) |
| Limitation of Finance; Limitation of Communication; Limitation of Labor and Wage; Limitation of Weather; Limitation of Building Plan and Construction Details; Limitation of Time; Limitation of Construction Methodology; Limitation of Rules and Regulations; Lack of Coordination among Departments | D.ashokkumar (2014), India |
| Unskilled trade subcontractors; Poor on-site supervision; Construction labor skills and induction; Commitment by the Supervising team; Poor planning and scheduling; Lack of communication; Project Manager's ignorance and lack of knowledge; Scarcity of resources; Poor material and plant management; Average delays in decision making; Number of projects at hand; Design change; Conforming with specifications; Involvement of End-User client; Assurance with client's funding; Inclement weather conditions | Ayodeji Oke, Clinton Aigbavboa, Ernest Dlamini (2021) |

Maharjan and Tamrakar (2007) evaluated the quality of the river gravels for aggregates and concluded that the majority of gravels had diverse chemical groups, high durability, and good workability for road and concrete aggregates. Tamrakar *et al.* (1999) suggested that the mechanical properties of sandstones and limestone depended on the rock types and content of calcium carbonate, and were independent of the deposition age of rocks.

### *3.2. Workmanship*

Workmanship can describe the hard work and skill that go into making something or working at a task, and it can also describe a quality of a handmade object that is skillfully crafted. It can also be defined as the art or skill with which something is made or executed. Workmanship can also be defined as "the quality of work that is done by a concerned person" (Thamilarasuet*et al.*, 2017). The quality, cost, and time of a building construction are highly dependent on workmanship (Fromsa *et al.*, 2020). Rather, there are a lot of different views on how to define what workmanship truly is.

Keng and Hamzah (2011) stated that workmanship is classified as one of the most frequent non-conformances in construction sites. Furthermore, in the literature, eight variables that were related to the causes of poor quality of workmanship in construction projects had been discovered which are as; Poor Project Management, Complicated Role of Subcontractor, Lack of Experience and Competency of Labors, Language Barrier in Communication and Lack of Communication, Unsuitable Construction Equipment, Poor Weather Condition, Limited Time and Labor Welfare.

According to the research of Salleh *et al.* (2022), these 8 factors affect workmanship in building construction. Lack of experience and competency of labor is the most significant contributor to the poor quality of construction projects, followed by ineffective management of the project, and finally, time shortage. These factors should be taken seriously because if they are left unchecked, there is a possibility that defects in finished construction projects will become even worse in the future and may pose safety risks to the public. As per Ali and Wen (2011) "the factors that contribute to poor workmanship include poor project management, complicated role of subcontractor, lack of experience and lack of competency of labors, language barrier to communication and lack of communication, unsuitable construction equipment, poor weather conditions, limited time and limited cost".

### *3.3. Codal Provision for Quality*

According to the Construction Code 2070 (second revised edition), describes several provisions are outlined to ensure quality control in building construction, like mobilizing skilled Technical Manpower, providing training to the Labor, Quality Testing of Construction Materials, create a Quality Assurance Plan (QAP) by the Employer and Contractor, Give Orientation related to Design, Drawing, and Specification to the Technical Manpower who are involved in the Construction, Use the Construction Materials after approval from the Employer's Requirement, Use the National Building code, Make the Work Schedule by the Employer, and Regularly Inspect the Construction Works, Information Board should be installed in the Construction Site, and a Providing Order Book in the Site.

## 4. Methodology

To achieve the objectives, this study utilizes data collected from various sources, including different journals, websites, literature reviews, laboratory testing and field observations. The research approach is of a mixed type, incorporating both qualitative and quantitative methods. Qualitative methods involve setting up questions to explore possible measures to mitigate issues related to poor quality and workmanship in the Local Governments of Makawanpur district. Meanwhile, quantitative methods involve laboratory testing of aggregates.

### *4.1. Questionnaire Design and Data Collection*

The respondents were asked to rate their responses against a five-point Likert scale. The survey was based on the local level government of Makawanpur district. The population for the study comprised engineers and sub-engineers of the local level governments of Makawanpur District who had executed projects.

### *4.2. Sample Size*

In the Makawanpur district, there are ten local governments. In these local governments, respondents are working in the posts of engineers and sub-engineers. The sample size of a finite population can be calculated as:

**Sample size (n')=** $\frac{n}{1+\frac{z2*p(1-P)}{\varepsilon 2N}}$

When Confidence Level (Z-score) = 95%, Margin of Error (ε) = 10%, Population Proportion (P) = 50%, Population Size (N) = 63, then, sample size is 39 or more calculated from the above formula. The questionnaire was designed to measure and get an opinion about implementing quality in the construction projects in Makawanpur district. A sample of 39 questionnaires was distributed to the participants.

The quantitative study approach has been adopted in order to identify the attributes critical to the quality and workmanship of the construction projects. The questionnaire was distributed to a sample size of engineers and sub-engineers. Out of which 39 responses were received therefore used for data analysis.

Various locations along the three rivers, where large quantities of coarse and fine aggregates are extracted, were observed, and samples from these sites were collected and tested in the laboratory. On the other hand, both private and public buildings under construction in Kailash Rural Municipality have been listed with field observations noting sites where large quantities of fine aggregates have been dumped. The laboratory test for physical properties of the sample was carried out as per the test procedure specified in the Manual for Standard Tests - 2016 of the Department of Roads. The laboratory tests for mechanical properties of the sample, such as the Los Angeles Abrasion Test, aggregate impact test, and aggregate crushing test of coarse aggregate, were carried out as per the method and test procedures specified in the Manual. Similarly, a Sample of fine aggregate from private and public buildings was coded. The samples are collected from different building sites.

### *4.3. Data Analysis*

Various methods are employed in analyzing data, including: Testing the reliability of data to ensure internal consistency of the measurement scale used for assessing factors, comparing rankings, importance indexes, and utilizing the Relative Rank (RII) to measure the agreement in the importance ranking among respondents.

**Relative Importance Index (RII):**

The relative importance index for each factor constituting the quality control in project constructions was calculated as follows:

$$\text{Relative Importance Index (RII)} = \frac{\sum xw}{N} x \frac{1}{A}$$

Where:

A= Largest weight (i.e., 5, in this case)

w = weight of ranked position (1, 2, 3, 4, and 5).

x = response count for answer choice

N = total number of respondents

## 5. Results and Discussion

### *5.1. Category of Quality Factor*

From the literature review following are the categories that affect the quality of construction in building which are as following.

### *5.1.1. Quality Factors and Their Related Variables*

Table 2. Quality factors and their related variables

| S.N. | Factors | Related Variables | S. N | | Related Variables |
|---|---|---|---|---|---|
| 1 | Owner and consultant-related factors | Planning and Documentation Management<br>Communication and coordination<br>Finance (Money)<br>Commitment<br>Experience of a Consultant | 4 | Material and equipment-related factors | Quality of Materials, Availability of Equipment, and Materials Scarcity<br>Specification of Materials<br>Types, Capacity of Equipment<br>Suppliers, Price |
| 2 | Project and design-related factors | Design and Construction Details<br>Methods of Design<br>Short Contract Duration<br>Complexity<br>Construction Methodology | 5 | External-related factors | Rules and Regulations<br>Natural Disaster<br>Conflict and War<br>Accident |
| 3 | Contractor and labor-related factors | Experience<br>Skills and Knowledge<br>Management and supervision<br>Conflict<br>Leadership<br>Attitude<br>Safety<br>Wages<br>Mobilization<br>Environment | | | |

### *5.2. Factor affecting the quality of workmanship*

Among factors, the majority of respondents express their concern about the quality of workmanship, with 56.41% attributing it to poor supervision and followed by lack of motivation in workers, 38.46%. On the other hand, the complicated role of subcontracting, adverse weather conditions, language barrier in communication, and lack of communication are given less importance, each receiving 7.69% of the overall quality of workmanship.

### *5.3. Ranking of Quality Factors*

From the given ranking table top two co-factors related to Owner and consultant were availability of finance (money) with RII value 0.93 and planning and documentation with RII value 0.92. Similarly, design and construction details of the project have RII value 0.92, and short contract duration has RII value 0.88, which are the top two co-factors related to project and design-related factors. The questionnaires highly believe in the wages of labor with RII value 0.91, and experience of contractor and labor & management, and supervision of contractor have the second highest RII value 0.89, which are the top three co-factors related to contractor and labor-related factors. The top two co-factors related to materials and equipment are the quality of materials used in construction and the types of materials used in construction, which have RII values of 0.95 and 0.87, respectively. In the side rules and regulations of the government, co-factors have RII value 0.92, which is related to external factors of the quality of the building. Overall, the top and lowest five co-factors, which have the highest and lowest RII value, are tabulated in Tables No. 3 and 4, respectively.

Table 3. Top five quality-related co-factors

| S.N. | Co-factors | RII value | Rank |
|---|---|---|---|
| 1 | Quality of Materials | 0.95 | 1 |
| 2 | Availability Finance (Money) | 0.93 | 2 |
| 3 | Planning and Documentation | 0.92 | |
| 4 | Design and Construction Details | 0.92 | 3 |
| 5 | Rules and Regulations of the Government | 0.92 | |
| 6 | Experience of Labor and Contractors | 0.91 | 4 |
| 7 | Wages of Labor | 0.91 | |
| 8 | Management of a Project | 0.89 | 5 |

| S.N. | Co-factors | RII value | Rank |
|---|---|---|---|
| 9 | Management and Supervision of Contractor | 0.89 | |

Table 4. The lowest five quality-related co-factors

| **S.N.** | **Co-factors** | **RII value** | **Rank** |
|---|---|---|---|
| **1** | Conflict between the contractor and the laborers | 0.71 | 1 |
| **2** | Attitude of the contractor | 0.71 | |
| **3** | Capacity of Equipment | 0.75 | 2 |
| **4** | Availability of suppliers | 0.76 | 3 |
| **5** | Leadership | 0.78 | 4 |
| **6** | Conflict and War | 0.78 | |
| **7** | Commitment of the owner and consultant to the project | 0.81 | |
| **8** | Experience of a Consultant | 0.81 | |
| **9** | Complexity | 0.81 | 5 |
| **10** | Construction Methodology | 0.81 | |
| **11** | Environment | 0.81 | |
| **12** | Natural Disaster | 0.81 | |

### *5.4 Ranking the factors of workmanship*

The following table indicates the factors that affect the quality of workmanship with their RII values, which shows poor supervision is the most important factors that highly affect the quality of workmanship and has the highest RII value, which is 0.85 and followed by lack of motivation for the workers, which has 0.84 RII value.

Table 5. Ranking of factors affecting workmanship

| S. N | Factors | RII | Rank |
|---|---|---|---|
| **1** | Poor Supervision | 0.85 | 1 |
| **2** | Complicated Role of Subcontractor | 0.74 | 7 |
| **3** | Lack of Experience and Competency of Laborers | 0.82 | 4 |
| **4** | Language Barrier in Communication and Lack of Communication | 0.73 | 8 |
| **5** | Unsuitable Construction Equipment and Materials | 0.79 | 5 |
| **6** | Poor Weather Conditions | 0.73 | 8 |
| **7** | Limited Time | 0.83 | 3 |
| **8** | Labor Welfare | 0.75 | 6 |
| **9** | Lack of Motivation in Workers | 0.84 | 2 |

### *5.5 Physical properties of fine and coarse aggregate*

Aggregate size that lies between 20 mm to 4.75 mm sieve is coarse aggregate. It is used in structural concrete. The gradation of coarse aggregate in this study is provided. But the standard specifications for road and bridge Works specified that the coarse aggregate should be limited to 20 mm down for structural concrete. Well-graded aggregates enhance better results in greater workability and durability of concrete. In concrete mix proportions, the well-graded aggregates pack together efficiently, thus reducing the volume between aggregate particles that must be filled by cement paste. The average value of specific gravity and water absorption of coarse aggregates is tabulated in Table no. 6. It shows that water absorption and specific gravity of coarse aggregates of all the rivers lie within the limit as per the Standard, i.e., specific gravity lies within 2.5 - 3 and water absorption have values less than or equal to 2%.

Table 6. Specific gravity and water absorption of coarse and fine aggregates

| River Name | Kali Khola | Manahari Khola | Gorangdi Khola | Standards Value | Remarks |
|---|---|---|---|---|---|
| Specific Gravity | 2.651 | 2.62 | 2.601 | 2.5-3 | CA |
| | 2.707 | 2.681 | 2.772 | 2.5-3 | FA |
| Water Absorption | 0.661 | 0.606 | 0.58 | 2% | CA |

| River Name | Kali Khola | Manahari Khola | Gorangdi Khola | Standards Value | Remarks |
|---|---|---|---|---|---|
| | 1.359 | 1.144 | 1.421 | 5% | FA |

The above table shows that the water absorption and specific gravity of fine aggregate of all rivers lie within the limit as per the Standard, that is, specific gravity lies within 2.5 - 3, and water absorption has a maximum value of 5%.

### *5.6 Flakiness index of coarse aggregate*

The average value of the flakiness index of coarse aggregate is shown in Table No. 7. The flakiness Index of coarse aggregate from rivers lies within the limit as defined by the Standard. The standard value of the Flakiness Index of coarse aggregate is 25% maximum.

Table 7. Flakiness index of coarse aggregate

| River Name | Kali Khola | Manahari Khola | Gorangdi Khola | Standards Value | Remarks |
|---|---|---|---|---|---|
| Flakiness Index Value (%) | 13.12 | 12.64 | 13.15 | 25 % Max | |

### *5.7 Mechanical properties of coarse aggregate*

Those properties that govern the behavior of coarse aggregate when external forces are applied. The indices of coarse aggregate, which attribute the resistance of a construction material to a load acting on it during the process of failure, indicate the degree to which it may deform under the load and its behavior. The rate at which the development of the process of failure takes place may be under a static load or a repeated load. The mechanical properties of coarse aggregate are determined by making representative specimens of the required and standard shapes for mechanical tests. Los Angeles Abrasion Value, Impact Value, and Crushing Value are the mechanical properties of coarse aggregate. The mechanical properties of coarse aggregate are tabulated in Table No. 8.

Table 8. Mechanical properties of coarse aggregate

| **River Name** | **Kali Khola** | **Manahari Khola** | **Gorangdi Khola** | **Standards Value** |
|---|---|---|---|---|
| LA value (%) | 18.11 | 18.03 | 20.46 | 35-45% Max |
| AIV value (%) | 9.85 | 9.1 | 10.89 | 30-45% Max |
| ACV value (%) | 18.06 | 17.87 | 18.43 | 30-45% Max |

LA = Los Angles Abrasion Value, AIV = Impact Value, ACV= Aggregate Crushing Value

This table attributes that the Los-Angeles Abrasion value of coarse aggregate from the entire river sampled lies within the limit defined by the Standard, that is, not more than 45% in ordinary concrete, and not more than 35% in high-quality concrete. Furthermore, the aggregate impact value of coarse aggregate from all the sampled rivers lies within the limit defined by the Standard, that is, not more than 30% for pavement structure and not more than 45% for other structures. Similarly, the aggregate crushing values of coarse aggregate from all the sampled rivers are found to be within the limit defined by the Standard, that is, not more than 30% for pavement structure, and not more than 45% for other structures.

### *5.8 Physical properties of fine aggregate*

#### *5.8.1 Gradation*

All of these six samples lie in Zone I of grading as per IS 383, where the fines content is very low, ensuring good workability and economy in concrete. They are specified to ensure that the concrete mix has well-graded aggregates that can be compacted effectively and produce a dense and durable concrete structure.

### *5.8.2 Specific gravity and water absorption of fine aggregates*

Table 9. Specific gravity and water absorption of fine aggregates

| S.N. | Types of Tests | Name of Sample | | | | | | Standards Values | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F | | |
| 1 | Natural Moisture Content Test (%) | 4 | 3.35 | 5.11 | 4.57 | 5.45 | 4.02 | 5% | |
| 2 | Specific Gravity Test | 2.63 | 2.59 | 2.63 | 2.57 | 2.62 | 2.62 | 2.5-3 | |

The average value of specific gravity and water absorption of fine aggregates is tabulated in the Table above. It shows that water absorption and specific gravity of fine aggregates of all samples lie within the limit as per the Standard, i.e., specific gravity lies within 2.5 – 3, and water absorption has values less than or equal to 5%.

### *5.8.3 Bulking density test*

Table 10. Bulking density of fine aggregates

| S.N. | Types of Tests | Name of Sample | | | | | | Standards Values | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F | | |
| 1 | Bulk Density Test(kg/m3) | 1674 | 1586 | 1605 | 1636 | 1616 | 1585 | 1500-1700 kg/$m^3$ | |

The above shows the bulk density measurements of six samples collected from under-construction public and private buildings in Kailash Rural Municipality. All samples fall within the specified range of 1500 – 1700 kg/$m^3$, as per the IS code. This consistency in bulk density suggests uniformity in the composition and compaction of the sand used in the construction projects within the municipality.

### *5.8.4 Bulking of Sand and Organic Impurities Test*

Table 11. Organic impurities and bulking of sand or fine aggregates

| S. N | Types of Tests | Name of Sample | | | | | | Standards Values | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F | | |
| 1 | Bulking of Sand (%) | 32.46 | 29.46 | 34.23 | 36.52 | 32.9 | 32.03 | 20-40% | |
| 2 | Organic Impurities Test | P | P | P | P | P | P | Free from organic impurities | |

P= Presence

The test results indicate that the bulking of the sand falls within the acceptable range, signifying favorable conditions for quality control and maintenance. However, it is noteworthy that organic impurities are detected in the fine aggregate, posing a potential risk to material quality. To mitigate this issue, appropriate treatments must be administered to reduce impurities before use.

## 6. Conclusion

The most important factors that affect the quality are contractor and labor-related factors. Five factors have been studied, and a total of nine cofactors have been identified, among which the most important ones are ranked based on their RII values

Furthermore, by the study of literature related to workmanship mainly nine factors were identified for workmanship. The level of workmanship has been observed to be equally low, with many defects appearing on the work. From the study, it is obtained that poor supervision is the most important factor for poor workmanship, which has the highest RII value of 0.85 and followed by lack of motivation to workers has 0.84 RII value than other factors. These factors should be taken seriously because if they are left unchecked, there is a possibility that defects in finished construction projects will become even worse in the future and may pose safety risks to the public. Therefore, it is imperative for construction management to put all these factors into consideration for better workmanship in building construction in the future.

From this study, it can be concluded that out of the three rivers of coarse and fine aggregates in the Kailash Rural Municipality, all three rivers comply with the specification as prescribed by the Standard Specifications for Road and Bridge Works (2073). AIV and Los Angeles values suggest that the gravels are mechanically sound. They have a normal density of medium-weight aggregates. The water absorption value is also low and is less than the standard. The results from different tests fall within the specified values of standards, suggesting that all three-river gravel (FA and CA) materials are appropriate for concrete and road aggregates.

In the construction of buildings within Kailash Rural Municipality, the fine aggregate meets only out of the five standard criteria, including bulking of sand, specific gravity of sand, gradation of sand, and bulk density. However, special attention is warranted regarding the presence of organic impurities in the sand. To address this concern, special treatments such as washing with clean water, drying in natural light, and incorporating admixtures are recommended before usage. By implementing this measure, the fine aggregate can be effectively utilized, leading to desirable outcomes in construction projects.

**Recommendation**

It is essential to pay more attention to contractor and labor-related factors for better quality and workmanship. Among the 32 co-factors examined, this paper identifies nine critical factors as pivotal for attaining optimal quality in building construction. Consequently, in current and forthcoming construction projects within the Makawanpur district, heightened attention is warranted towards these nine paramount factors. Vigilant monitoring and supervision of these factors by authorized personnel during the construction phase are imperative to ensure enhanced quality outcomes. It is crucial to implement strategies for motivating workers before, during, and after construction activities, coupled with consistent and thorough monitoring of worker performance. Such measures not only foster improved performance but also contribute to enhanced workmanship quality.

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