

## AN ASSESSMENT OF RISK MANAGEMENT PRACTICES IN ABUJA HOUSING PROJECTS

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### ABSTRACT

*Construction industry is prone to risk due to the challenging nature of the processes, workers in construction of such projects are bound to face numerous risks in discharging their daily activities. Managing these risks has been problematic over the years because each housing project is associated with one form of risk or the other depending on the nature and size of the project. This challenge keeps on increasing because contractors and clients do not consider risks during bidding and negotiation stages. Thus, the study is aimed at investigating the risk management practices adopted in Abuja housing projects with a view to minimising the risk involved in developing housing projects. To achieve this aim, the study evaluated the importance of selected risk factors in housing projects undertaken by construction firms, evaluated the importance of selected risk preventive measures in housing projects by construction firms, assessed the importance of selected risk management methods in housing projects by construction firms. The research strategy adopted was survey, and structured questionnaire was used to collect data from construction professionals. The data was analysed using percentage frequency and descriptive statistics. The study shows that the first three risks factors in housing delivery are inflation, resource management, and change in management ways. The preventive measures were found to be available labour, material and equipment, awarding the design to qualify designers, and supply of quality materials. While interview was ranked as the most used risk management method. The study also found that most contractors are aware of risk preventive measures but are still not implementing it, risk preventive measures by construction firms are never discussed during bidding and award of contract,*

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*there is less implementation of risk management methods in housing projects by construction firms. It recommends that there should be strict and high level of enlightenment on the effects of risk during the pre and post contract stage. There should be high level of awareness of risk management strategies, preventive measures during the bidding and award of contract stages.*

Keywords: Risk, Management, Preventive, Measures

## **INTRODUCTION**

The construction industry is among the industries that reduces the rate of unemployment amongst the work force of any nation. The risks inherent in the process of construction is enormous that require the attention of every construction practitioner. The construction industry is an employer of labour and it gives thousands of youths and adult in the country an employment opportunity. Also, construction products range from housing to roads, bridges and other infrastructures which are all risks prone in their process of delivery. Shamsuddin, Ani, Ismail, and Ibrahim (2015) opined that the risk level in the construction industry is high due to the nature of the process execution from inception to completion. There is no stage of construction that is risk free, thus, making it difficult for the management to handle as a business (Ibrahim, Dauda & Kagara, 2014). There is great opportunity in the construction industry of any country because it's amongst the major employer of labour. Weak management of risk factors in the Nigerian construction industry has been criticized in recent times. Risk within the construction industry is unfriendly activities that affect the specified project goals.

Construction activities when not properly implemented in terms of ethical standards can expose workers to risk while working on any projects. Risk factors are not uncommon in the execution of construction projects due to the nature of the project and environmental conditions, thereby leading to unnecessary delays and incurring additional costs that were not budgeted at the initial stage. Ali and Kamaruzzaman (2010) opined that the morale of the housing project is affected by the activities of the construction firm as a result of size and calibre, operational environment and the available resources needed for the job, as well as the rate of risks inherent in the activities of the firm. On a similar note, Auguster, Mimi and Kamarizan (2015) noted that the effect of risk in construction projects are either direct or

indirect. The productivity level of a single worker is affected by the direct effect while loss incurred by the client is indirect effect.

In order to reduce losses, risk management practices should be adopted in housing projects based on the fact that, there are too many uncertainties that the construction firm has to deal with. These uncertainties stem from a variety of both external and internal factors, because housing projects entails the involvement of different contractors. These contractors require more coordination and monitoring in every phase of the project thereby increasing the chances of risks occurrence (Lubega, Kiggundu, & Tindinwensi, 2001). In Nigeria, there is scarcity in documenting on-going site activities, thus, risk occurrences are hardly recorded because contractors neither report appropriately nor keep proper records of these incidences affecting the production (Aniekwu, 2007). Construction industry is always known to be associated with one form of risk to another over the years. Awodele, Ogunlana and Motawa (2009) opined that construction industry in Nigeria has poor assessment in risk standards which has been underestimated and has run down the industry by its frequent setbacks, cost overruns and abandonment of housing construction projects. Most of the contractors do not consider risk during the bidding and tendering stage (Tipilli & Yakubu, 2016) because each housing project is linked with one form of risk or the other resulting from the nature and size of the project (Chandra, 2015). Before housing projects are embarked upon, due to the nature of the environment, a lot of possibilities for many political, socio-economy and other risks may occur during pre-contract, contract and post-contract stage. Risk factors in construction projects are too numerous and they require concerted efforts to address them. Therefore, the study seeks to examine the risk management practices in Abuja housing projects, through addressing the following objectives: the evaluation of risk factors in housing projects, the risk preventive measures, and risk management methods used in housing projects by construction firms in Abuja, Nigeria.

## **LITERATURE REVIEW**

## **RISKS IN BUILDING CONSTRUCTION**

Construction projects do not exist in isolation, they are normally started to achieve a certain need and exploit opportunities that exist before the projects. The construction industry is prone to new development and technologies because it keeps on growing with time and not static (Koota, 2003). It is a significant sector in the Nigerian economy (Ibrahim et al., 2014). The industry contributes about three percent to the nation's Gross Domestic Product. The chances of risks are always increasing in the construction industry because it involves numerous professionals having a single aim, working together to achieve this aim but individual perceptions to issues differ. As construction process involves different contractors and subcontractors, the chances of risk occurrence will increase (Mishra & Mishra, 2016).

The importance of providing safe workplace has been emphasized by various studies. According to Wiguna and Scott (2005), each project has a different level and combination of risks and sites should adopt different strategies to minimise them because the characteristics of projects are unique and dynamic. Hence, managers should encourage creativity in safe construction and innovation in decision making to avoid risk. Risk is the possibility that a person will be harmed or experience an adverse health effect if exposed to a hazard while hazard on the other hand refers to the situation or source (which could be biological, chemical, physical or ergonomic) of potential damage to a person, property or equipment (Olutuase, 2014). To attain a good construction site, management has to reduce risk occurrence because these events have the potential to cause more harm than good which may results in project delay (Carter & Smith, 2001).

It is therefore imperative to undertake risk assessment. A risk assessment is a careful examination of those things in the process of work or in the workplace that could cause harm to people. It also covers finding out whether adequate precautions have been taken or more should be done to prevent harm. The essence is to ensure that no one gets hurt. What is most important is deciding if risk is significant and if it is covered by satisfactory precautions so that the risk is minimised. The project supervisory team and their styles can also influence the risk vulnerability during construction process. The construction industry is accountable for the production and manufacturing of construction products such as roads, buildings, dams, tunnel,

railway lines/tracks, airports and harbours. Construction and maintenance are hazardous by nature, and there is need for increased emphasis on health and safety in order to reduce and prevent the rate of injury (Falemu, 2009).

The construction industry is considered as one of the most industries that has high chances of accident occurrence. The fact that a construction work environment is considered highly risky does not mean that it is uncontrollable.

Risk Management Methods.

The following are the methods; brainstorming, interview, project personnel/ using experience and lessons from past projects, historical data and checklist.

### **Brainstorming:**

This method triggers people's concerns, areas of uncertainty/ hazard, potential risks, probability of occurrence and, the potential impacts of these risks. Bernard, Nigel and Denise (2011) state that brainstorming sessions were held where the consultants asked questions to list out the project risk. One of the most effective techniques, this method involves open, frank and in-depth discussion. It takes the form of informal meeting and an experienced chairman should be appointed to facilitate a meaningful discussion and to document the proceedings. This meeting should be attended by all project parties and participants.

### **Interviews**

The format of the interview should be pre-prepared and preferably passed to the interviewees prior the interview date. Bernard et al. (2011) states that interviewees and the Delphi experts wary of the impact that changes in government policies can have on the vision, aspiration and the programme, for example, the education and health policies which were generally geared towards centralized delivery shifted towards more local autonomy for services and related infrastructure along with the implications. Interviews should be coordinated by an

experienced manager who would be responsible for providing documents to interviewees and keeping and analysing their responses.

### **Expert systems**

Historical data as well as the experiences of professionals may be used to develop expert systems. The data is used in the expert system to provide the basis of the risk identification exercise. The danger resides here, as the expert systems do not attempt to reveal any hidden previously unobserved risks. They only identify the risks that previously supplied to their knowledge basis.

### **Questionnaires**

. They are prepared by a manager in a structured manner and then distributed to the whole project team members. The questionnaire can take two forms; the general form (with no specific prompts or questions) or the detailed form. Yongjian, Shou, Albert and Patrick (2010) states that questionnaire survey is the common research technique used to obtain a risk sharing scheme. These are usually obtained from previous experience to specific project criteria. It is recommended that this method should be used in combination with other methods. The main advantage of using questionnaires is that they allow open and frank disclosure of risk without the domination from stronger personalities. They also allow for a consistence of answers, ease of analysis and a relatively short response period.

## **RISK FACTORS**

Different sources of construction risk have been identified in previous studies. Many approaches have been suggested in the literature for classifying risk. Saminu, Prasad and Thamilarasu (2015) stated that the success of every construction project mostly is determined by the ability of the construction team to manage the risk and the process of implementing the project. Nieto and Ruz (2011) suggested four ways of classifying risk: project management risk, Engineering risk, execution risks and suppliers' risk. Kuo and Lu (2003) group risk into five sub-sets: Engineering design, Construction management; construction safety-related,

natural hazards and socio and economic. According to El-Sayegh (2008), the following are risk factors; social and cultural, Owners, design, contractors, sub-contractors, suppliers, political, economic, natural and others. In this study, risk will be grouped using Enshassi and Mosa (2008) method that has classified typical risk groups that are associated to developing countries. The table below shows the various groups and the associated risk categorised.

<b>Risk group</b>	<b>Risk factors</b>
Physical risk	Occurrence of accident because of poor safety procedures Supplies of defective materials Varied labour and equipment productivity Environmental factors (flood, earthquake etc.) Difficulty to access the site (very far, settlements) Adverse weather conditions
Environmental risk	Defective design (incorrect) Not coordinated design (structural, mechanical, electrical, etc.) Inaccurate quantities
Design risk	Lack of consistency between bill of quantities, drawings and specifications Rush design Awarding the design to unqualified designers
Logistics risk	Unavailable labour, materials and equipment Undefined scope of working High competition in bids Inaccurate project program Poor communication between the home and field officers (contractors side)
Financial risk	Inflation Delayed payment in contracts

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	Financial failure of the contractor
	Unmanaged cash flow
	Exchange rate fluctuation
	Monopolizing of materials due to closure and other unexpected political conditions
Legal risk	Difficulty to get permit
	Ambiguity to work legislations
	Legal disputes during the construction phase among the parties of the contract
	Delayed dispute resolutions
	No specialized arbitrators to help settle fast
Construction risk	Rush bidding
	Gaps between the implementation and the specification due to misunderstanding and specification
	Lower work quality in presence of time constraints
	Design changes
	Actual quantities differ from the contract quantities
	Segmentation of construction process
Political risk	Working at hot (dangerous) areas
	New governmental acts or legislations
	Unstable security circumstances (invasion) closure
Management risk	Ambiguous planning due to project complexity
	Resource management
	Changes in management ways
	Information unavailability (include uncertainty)
	Poor communication between involved parties

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**Enshassi and Mosa (2008); Karim et al (2012)**



## RISK FACTORS PREVENTIVE MEASURES

According to Ibrahim, Dauda, and Kagara (2014) viewed and brought out risk factors affecting construction industry in Nigeria. In their study, they were able to identify the preventive measures of these risk factors in accordance to the circumstances surrounding the projects. This study adopts these preventive measures, the table below shows the different preventive measures depending on the different risk group.

### Risk Preventive Measures

Risk group	Preventive measures
Physical risk	<p>By introduction insurance premiums for accidents and injuries</p> <p>By applying effective training and increasing awareness of safety perceptions</p> <p>Increase manpower and/or equipment</p> <p>Available labour, materials and equipment</p> <p>Supply of quality materials</p> <p>Provision of adequate and proper safety procedures</p> <p>Easy accessibility to the site</p>
Environmental risk	Good design correct
Design risk	<p>Well ordinate design (structural, mechanical, electrical)</p> <p>By updating project information and add risk premiums to time estimation at the project planning stage.</p> <p>By paying true attention and coordinate correctly between design discipline</p>

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Logistics risk	Proper and effective communications between the home and field offices contractor side Well defined scope of working Accurate project program
Legal risk	By including contract clauses that define the require parameters and conditions for sharing
Construction risk	Proper documentation of change orders Awarding the design to qualified design Consistency between bill of quantities, drawings and specification Accurate quantities
Political risk	Stable securities Consistence in government
Management risk	Change the sequence of work by overlapping activities By close supervision to subordinates for minimizing abortive work. By increasing the working hours By coordinating closely with sub-contractors
Financial risk	Good management of cash flow Prompt payment of contract By sharing inflation and exchange rate fluctuation risks

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**Sourced: Ibrahim, Dauda and Kagara (2014)**

## RESEARCH METHOD

Literatures were reviewed to identify the risk factors, preventive measures and method of management and these were used to develop the instrument for data collection. A structured questionnaire survey was used to collect data from the respondents among the construction firms in Abuja. The questionnaire was divided into two, section A covers the respondents' demographic information while section B contains the questions that the research intends to address. Respondents were asked to rate the degree of importance with respect to the risk factors, preventive measures and management methods from the views of the respondents using a 5-point Likert scale, 1 not important to 5 very important.

Non probability sampling technique was employed because only the professionals that are experienced in all phases of construction from tendering to operation were selected to participate in the research (Kothari, 2004). The research strategy adopted was survey, a survey is a technique for gathering information by questioning individuals, who are the object of research and who belong to a representative sample, through a standardised questioning procedure, with the purpose of understanding the existing relationships among the variables (Corbetta, 2003). Percentage of frequency was used to analyse the section of the questionnaire which contains the general information about the research participants. Descriptive statistical technique was used to analyse the opinions of the participant and ranked appropriately. A total of 100 questionnaires were administered among the professionals, out of the 100 administered questionnaires, 80 questionnaires were retrieved which represent 80% response rate and this rate was found to be adequate and was used for the study. The Chronbach's alpha value was 0.79 which is acceptable for the study. According to Bolarinwa (2015), a reliability coefficient (alpha) of 0.70 or higher is considered acceptable reliability in research. This was done by the aid of statistical Package for Social Sciences (SPSS). Therefore, the instrument is reliable and indicates evidence of internal consistency. Danraka (2012) and Mangai (2016) employed mean in data analysis using the following formular

$$\text{Mean Sum} = \frac{\sum X_i}{n} = \frac{X_1 + X_2 + X_3 + \dots + X_n}{n}$$

Where  $X_i$  = value of  $i$ th item where  $i = 1, 2, 3, 4, \dots, n$ ,  $n$  = the sum of the responses

## RESULTS AND DISCUSSIONS

**Table1: Respondents' Profile (Professionals)**

Description	Options	Frequency	Percentage(%)
Gender	Male	59	73.8%
	Female	21	26.3%
	Total	80	100%
Discipline	Builder	22	27.5%
	Architect	31	38.8%
	Civil. Engr.	14	17.5%
	Quantity Surveyor	13	16.3%
	Total	80	100%
Qualification	HND	21	26.3%
	B.Sc.	49	61.3%
	Missing	10	12.5%
	Total	80	100%
Years of experience	<5 years	74	92.5%
	6– 10years	6	7.5%
	Total	80	100%
Professional Affiliation	MNIOB	22	27.5%
	MNIA	31	38.8%
	OTHERS	27	33.75%
	TOTAL	80	100%

In profiling the respondents, the result showed that 73.8% of the respondents are male while 26.3% are females. This indicates that both male and female actively participated in the research. Architects and Builders top in the professional discipline of respondents with 38.8% and 27.5% respectively. The result also showed that in educational qualification, respondents with B.Sc. (61.3%) and HND (26.30%). Most of the respondents are degree holders which make them qualify to participate in the research. 92.5% of respondents have less than 5 years of experience and 7.5% have between 6-10 years of working experience. Also, 27.5% of total respondents are Member Nigeria Institute of Building (MNIOB), 38.8% of Member Nigeria Institute of Architecture (MNIA) while others have 33.75%. This shows that the participants are professionally qualified and experienced to understand the processes involved in housing projects from tendering to operation stage within Abuja metropolis.

**Table 2: Risk Factors Associated with Housing**

Risk factors	Ranks					N	TS	MS	R
	1	2	3	4	5				
Inflation	35	13	12	20	0	80	177	2.21	1
Resource management	19	46	24	0	0	80	174	2.18	2
Changes in management ways									
Varied labour and equipment productivity	44	16	1	12	8	80	167	2.09	3
Defective design (incorrect)	1	15	34	8	0	80	165	2.06	4
Financial failure of the contractor	37	29	0	0	15	80	165	2.06	4
Exchange rate fluctuation	16	37	13	14	0	80	162	2.03	6

Not coordinated design (structural, mechanical, electrical, etc.)	33	17	15	15	0	80	157	1.96	7
Gaps between the implementation and the specification due to misunderstanding and specification	23	37	20	0	0	80	157	1.96	7
Undocumented change orders	38	25	0	17	0	80	156	1.95	9
Design changes	33	26	13	8	0	80	156	1.95	9
Lack of consistency between bill of quantities, drawings and specifications	31	29	20	0	0	80	149	1.86	11
Awarding the design to unqualified designers	31	29	20	0	0	80	149	1.86	11
Segmentation of construction process	33	35	2	10	0	80	149	1.86	11
Rush design	32	28	20	0	0	80	148	1.85	14
Inaccurate project program	40	24	8	4	4	80	148	1.85	14
High competition in bids	33	25	18	0	2	80	147	1.84	17
Supplies of defective materials	32	32	16	0	0	80	144	1.80	18
Adverse weather conditions	37	22	21	0	0	80	144	1.80	18
Difficulty to get work permit	32	32	16	0	0	80	144	1.80	18

Rush bidding	32	32	16	0	0	80	144	1.80	18
Poor communication between involved parties (involved)	37	22	21	0	0	80	144	1.80	18
Monopolizing of materials due to closure and other unexpected political conditions	45	19	8	4	4	80	143	1.79	23
Undefined scope of working	31	43	0	5	1	80	142	1.78	24
Working at hot (dangerous) areas(condition)	34	32	14	0	0	80	140	1.75	25
Information unavailability (include uncertainty)	32	36	12	0	0	80	140	1.75	25
Difficulty to access the site (very far, settlements)	36	33	10	1	0	80	136	1.70	28
Unavailable labour, materials and equipments	40	30	9	1	0	80	131	1.64	29
Delayed payment in contracts	28	12	14	0	6	80	124	1.55	30

N= Number of Respondents, TS= Total Sum, MS= Mean Sum, R= Order of Ranking

Table 2 shows the ranking of the respondents view about risk factors that occur in their respective firms. It was assigned a scale ranging from 1 not important to 5 very important. From the Table, inflation was ranked first with a mean sum of 2.21, resource management was ranked second with a mean sum of 2.18, varied labour and equipment productivity was ranked third with a mean sum of 2.09, defective design (incorrect) and financial failure of the contractor were both ranked fourth, exchange rate fluctuation was ranked sixth with a mean sum of 2.03, not coordinated design and gaps between the implementation and specification due to misunderstanding and specification were both ranked seventh while working at hot (dangerous)

areas and information unavailability were ranked twenty fifth with a mean sum of 1.75, difficulty to access the site was ranked with a mean sum of 1.70, unavailable labour materials and equipments were ranked twenty ninth with a mean sum of 1.64. Delayed payment in contracts was ranked the last amongst the risk factors with a mean sum of 1.55.

**Table 3: Preventive Measures of Risk Factors in Housing Projects**

Preventive measures	Ranks								
	1	2	3	4	5	N	TS	MS	R0
Available labour, materials and equipments	0	0	0	20	60	80	420	5.25	1
Awarding the design to qualified designers	0	0	0	22	58	80	378	4.73	2
Supply of quality materials	0	0	8	14	58	80	370	4.63	3
Good design	0	0	0	38	42	80	362	4.53	4
Accurate quantities of materials	0	0	6	26	48	80	362	4.53	4
By applying effective training and increasing awareness of safety perceptions	0	0	7	29	44	80	357	4.46	6
Consistency between bill of quantities, drawings and specification	0	0	6	37	37	80	351	4.39	7
Well ordinate design (structural, mechanical, electrical)	0	0	0	52	28	80	348	4.35	8
Well defined scope of working	0	0	38	20	22	80	344	4.30	9



Increase manpower and/or equipment	0	0	0	60	20	80	340	4.25	10
Provision of adequate and proper safety procedures	0	0	16	26	38	80	334	4.18	11
Accurate project program	0	0	14	58	8	80	314	3.93	12
By close supervision to subordinates for minimizing abortive work.	22	0	22	52	6	80	304	3.80	13
By coordinating closely with sub-contractors	0	22	0	34	24	80	300	3.75	14
Proper and effective communications between the home and field offices contractor side	0	16	28	3	33	80	293	3.66	15
By updating project information and add risk premiums.	0	0	35	45	0	80	285	3.56	16
Easy accessibility to the site	0	0	44	30	6	80	282	3.53	17
By paying true attention and coordinate correctly between design discipline	0	0	46	27	7	80	281	3.51	18
Stable securities	0	0	42	38	0	80	278	3.48	19
Consistence in government									
Good management of cash flow	20	41	20	41	19	80	277	3.46	20
By including contract clauses that define the	0	0	61	12	7	80	266	3.33	21

require parameters and conditions for sharing									
Proper documentation of change orders	0	8	42	24	6	80	252	3.15	22
By sharing inflation and exchange rate fluctuation risks	0	18	44	12	6	80	246	3.08	23
Prompt payment to contractors	8	20	38	0	14	80	232	2.90	24
By increasing the working hours	6	12	62	0	0	80	216	2.70	25
Change the sequence of work by overlapping activities	0	34	40	6	0	80	212	2.65	26
By introduction of insurance premiums for accidents and injuries	22	15	43	0	0	80	181	2.26	27

N= Number of Respondents, TS= Total Sum, MS= Mean Sum, R= Order of Ranking

For Table 3, the ranking of the respondents view about preventive measures of risk factors that are applied in their respective organisations. It was assigned a scale of 1-5 to represent not important, less important, uncertain, important and very important. Available labour, materials and equipment was ranked the most with a mean sum of 5.25, awarding the design to qualified designers with 4.73, supply of quality materials with 4.63, good design and accurate quantities of materials with 4.53 while increasing the working hours with 2.70 was ranked twenty fifth, change the sequence of work by overlapping activities with 2.65 was ranked twenty sixth, introduction of insurance premiums for accidents and injuries with a mean sum of 2.26. This is so because labour and material are the most important aspect of construction, machine breakdowns result to low morale amongst the workers, probably that is why it is seen as most way of preventing risk is to make it be in good shape all the time. The finding is in line with Ibrahim et al. (2014), which found that amongst contractors and site

engineers, unavailable labour, material and equipment is the major risk factor in the Nigerian construction industry, however, paying insurance premium is the second ranked second in their work while insurance was the least ranked in this study probably because the respondents comprises of all the professionals in the industry and most of them are private sectors and individual freelancers with different views in regards to insurance premium payment.

**Table 4: Risk Management Methods**

RISK MANAGEMENT METHODS	1	2	3	4	5	N	TS	MS	RO
Interview	0	0	0	15	65	80	385	4.81	1
Questionnaire	0	0	0	44	36	80	356	4.45	2
Brainstorming	0	0	0	32	12	80	326	4.08	3
Experts systems	6	0	0	62	12	80	314	3.93	4

For Table 4, the ranking of the respondents view about risk management methods that are applied in their respective organisation. It was assigned a scale of 1-5 to represent not important, less important, uncertain, important and very important. From the table, interview takes the lead with a mean sum of 4.81, questionnaire with 4.45, brainstorming with 4.08 and experts system with 3.93. Based on the order of importance as described.

## CONCLUSION

The study on the assessment of risk management practice in Abuja housing projects. The Nigerian housing sector is facing serious problems of professionalism, integrity and

standard practices. In most construction firms, the major stakeholders in the construction industry have overtime neglected their roles and responsibilities towards ensuring full implementation and practices of risk management in any housing construction project. The study evaluated the importance of selected risk factors in housing projects undertaken by construction firms, evaluated the importance of selected risk preventive measures in housing projects by construction firms, assessed the importance of selected risk management methods in housing projects by construction firms. The study found that among the preventive measures of risk factors, available labour, materials and equipment was ranked as the most preventive measure in reducing risks. Also, this research study found out that the implementation of risk management has become a major problem facing the housing sector. Most indigenous construction firms handling housing projects in the federal capital territory are adamant and ignorant of the possibility of risk. These risks have led to the abandonment of many housing projects. Stakeholders should ensure the availability of all the resources in terms of the funds, human capacity and equipment required for the project before commencement.

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