

# Building Contractors' Perception Towards Renacon Aac Blocks With Reference To Erode District

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**Abstract- Renacon Autoclaved Aerated Concrete Block is a viable replacement for conventional red clay bricks, which we normally use for our building construction. Red clay bricks are used for load bearing as well as for filler walls of RCC frames in high rise structures. There is difficulty in getting good quality bricks. In addition manufacture of bricks cause depletion of top soil and is considered environmentally unfriendly. Therefore we have recently looked for viable alternatives.**

**The alternative that we propose should be durable and have properties similar or Better than conventional bricks. The Renacon Autoclaved Aerated Concrete (AAC) block is new to the construction professionals in and around of Erode District, which fulfils the need for walls in buildings.**

**The study aims at identifying the Building contractors' Perception towards Renacon AAC Blocks in Erode District. The main aim of the study is to know about the Renacon suitability among building contractors.**

**The study will reveal the awareness level, market challenges, of Renacon AAC Blocks among the construction professionals in Erode District. By this survey relevant suggestions will be provided to the company which helps them in improving the performance of their product.**

## I. INTRODUCTION

### 1.1 General

To address the felt need for alternative construction materials which are environment friendly and energy preserving rather than the traditional clay bricks , Renaatus Procon Private Limited ,a subsidiary of Renaatus Projects Private Limited and belonging to the RPP Group of Companies (Erode) , ventured on a project to manufacture new age of construction material – Autoclave Aerated Concrete Blocks in a scalable production capacity of 21,000

blocks / 500 cum. per day in order to support projects of any size , anytime and anywhere.

Renacon provides optimum field support and relevant technical operation methodology to set high construction standards for builders. Headed by Mr.R.P.Selvasundaram, and supported by a team of qualified professionals and dedicated technicians, Renacon renders unmatched and long-lasting foundations.

The study will be conducted to know the building contractors' perception towards the Renacon AAC Blocks with reference to Erode District.

Since Renacon AAC Blocks is new to the local market of Erode District there are some challenges and competition in the walling materials market. So Renaatus Procon Private Limited is interested to identify builders' opinion and their expectations in new walling materials with reference to Renacon AAC Blocks.

Successful companies take an outside view of their business recognizing that the marketing environment is constantly presenting new opportunities and threat and to understand the importance of continuously monitoring and adapting to that environment.

On the basis of study the company can do future modifications in their product to be an iconic material in market from understanding needs and expectations of the builders' and their customers.

“The most important thing is to forecast where customers are moving and to be in front of them”

The survey will provide insights to improve upon the marketing strategies and to overcome the various problem areas identified during the study. Builders' satisfaction level is also studied to know about the present level of satisfaction about Renacon products.

The information has to be collected through a structured questionnaire using personal interview technique.

The survey focuses on in-depth understanding of client's needs and why the research is required, thus ensuring professional development of projects to generate precise solutions.

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#### 1.2 Statement of the Problem

Since Renacon AAC Blocks is new to market there are many types of bricks and blocks for walling solution were in the market with good strength, price, new features, promotions have made the concern interested to identify the builders expectation towards Renacon.

The firm also has a future plan to introduce new construction materials which will come under the category of eco friendly construction materials and hence the market survey could be the best possible source to know about building contractors' perception and their expectation towards Renacon AAC Blocks products.

#### 1.3 Scope of Study

The study on builders' provides knowledge to improve upon the marketing strategies, and to overcome the various problem areas identified during the study.

The survey throws light upon 4 P's of marketing factors as of product, price, place and promotion. It enables to understand builders' satisfaction level on these marketing factors.

#### 1.4 Company Profile

Renaatus Project Private Limited (Renaatus, the company erstwhile RPP Selvam Infrastructure Private Limited) is a construction company promoted by Mr. P Selvasundaram, Mrs. Padmini Sundaram (his wife), and Mr. C K Venkatachalam (his brother-in-law) in 2006. Based out of Erode, Tamil Nadu, RPP undertakes construction projects like development of government buildings, hospitals, schools, hostels, etc.; infrastructure works such as roads, canals, culverts, bridges, power plants; construction of industrial buildings, low cost housing, etc. Some of the notable clients include Tamil Nadu Public Works Department, Tamil Nadu Police Academy, Tamil Nadu Slum Clearance Board, Tamil Nadu Housing Board, National Building Construction Corporation, BMM Steel Limited, and KGISL IT Park India Limited. For 2010-11, as per the provisional financial figures, Renaatus reported PAT (profit after tax) of Rs. 5.8 crore on an operating income of Rs. 124.8 crore.

##### 1.4.1 Renaatus Clients

- Tamilnadu Public Works Department (State Govt.)
- Tamilnadu Highways Department (State Govt.)
- Tamilnadu Police Housing Corporation Ltd.

- Tamilnadu PWD. WRO (State Govt.)
- Tamilnadu Slum Clearance Board (State Govt.)
- Tamilnadu Horticulture Development Agency (State Govt.)
- JSW Steel Plant, Mettur in Salem District
- BMM Steel Plant, Hospet, Karnataka
- India Land & Properties Ltd., Chennai
- AMPA Housing (P) Ltd., Chennai
- Puducherry Medical College Society, Puducherry
- Rural Development & Panchayath raj Department (State Govt.)
- Lawrence School, Ooty
- Hindustan Institute of Engineering & Technology
- University of Madras (State Govt.)
- Neyveli Lignite Corporation Limited (Govt. of India)
- TVH Energy Resources Pvt. Limited.
- Kannammal Educational Trust, Chennai
- Tamilnadu Housing Board (State Govt.)

##### 1.4.2 Awards

- Indra Gandhi Priyadarshini Award for Outstanding Service and Contributions on 18th November 1996 in New Delhi.
- Prestigious Construction Industry Development Council [Planning Commission/Govt. of India] award for Best Professionally Managed Company for 2011
- Prestigious Construction Industry Development Council [Planning Commission/Govt. of India] award for Best Social Infrastructure Project for 2011.
- Received Award from the Honorable Chief Minister of Tamil Nadu Dr.Selvi.J.Jayalalithaa for Construction of Anna Institute of Management – Chennai during the opening Ceremony Function Dated 25.05.2005.
- Received a shield from Honorable Chief Minister of Tamilnadu Dr.Karunanithi for Construction of Police Academy Project at Vandalur, Chennai on 15.03.2008.
- Received memento from the Honorable Chief Minister of TamilNadu during the Opening Ceremony of the Mother Theresa Women's Building Complex near Valluvarkottam Chennai on 01.11.2010.

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- Best Performance Award for construction of Annal Ambedkar Main Mandabam by the Chief Minister of Tamilnadu Dr.Karunanithi.
- Cash award from Chief Minister of Pondicherry for early completion of Sitheri Anicut across Penniyar.

**1.4.3 Future Plans**

**Vision**

To make Renacon replace all types of concrete blocks and conventional clay bricks in construction industry by offering innovative, eco-friendly, new age of technology along with unmatched service back up to customers.

**Mission**

Our mission is to make every Renacon customer proud to use our product and keep it ahead of competition in technical excellence and after sales service.

**1.5 Research Objectives**

The following are the objectives of undertaking this study:

- (a) To identify the level of awareness on AAC blocks among the construction professionals in Erode district.
- (b) To investigate the marketing challenges for Renacon AAC blocks in Erode district.
- (c) To suggest the strategies for the application of Renacon AAC Blocks into construction industry.

**1.5.1 Research Scope**

The research scope is to study Renacon AAC Blocks market. Comparison is to be made between the Renacon AAC Blocks and other walling materials like Red clay bricks, Fly ash bricks and CLC blocks in construction industry with reference to building contractors in Erode district. Questionnaire is set to find out the awareness among construction professionals in Erode district, challenges and strategies for acceptance of Renacon AAC Blocks. The respondents are mainly construction professionals in Erode District.

**1.5.2 Research Significance**

The research will have a better understanding of local market awareness, the challenges of Renacon AAC Blocks in the construction market by having a better understanding of the market needs.

**1.6 List Of AAC Blocks Manufacturers In India**

Table: 1.1 List Of AAC Blocks Manufacturers In India

Serial no	Brand name	Company	Location
01	Aercon	Aercon India	Rajkot
02	Aerocon	HIL	Golan (Surat)
03	Ascolite	Aswani Construction Pvt.Ltd.	Surat
04	BBEL	Avantha	Palwal (NCR)
05	Xtralite	Ultratech	Hyderabad
06	Renacon	Renaatus Procon Pvt. Ltd.	Chennai
07	Reliconz	Reliconz Brixs Pvt. Ltd.	Hyderabad
08	Ecolite	JVS Comastco	Sinnar (Nashik)
09	JK SMARTBLOX	J K Lakshmi Cement	Jhajjhar (NCR)
10	Magicrete	Magicrete Building Solutions	Surat

There are many more AAC blocks manufacturing plants coming up across India.

**1.7 Renacon AAC Blocks**

AAC was founded in Sweden by an architect called A.J.Ericksson and is now being produced in more than 420 factories around the world. It is made from fine ground silica sand, Fly ash, and Portland cement, Lime, water and aluminum powder. The production process is very carefully monitored to ensure a controlled consistency in the proportions and timing of all ingredients that are used in every batch.

The materials are first mixed into slurry and then poured into large moulds where the expansion agent reacts with the alkalis in the cement and lime to produce millions of small hydrogen gas bubbles. The mix expands and raises almost twice its initial volume. The hydrogen evaporates and the 'cake' sets up and hardens into a stable closed cell matrix which is made as blocks or panels, using precision wire cutting. The green aerated concrete is then steam cured in pressurized autoclaves for several hours where upon it undergoes a second chemical reaction and transforms into

the mineral Tobermorite or calcium silicate. The finished materials are palletized and delivered by truck directly to the project site.

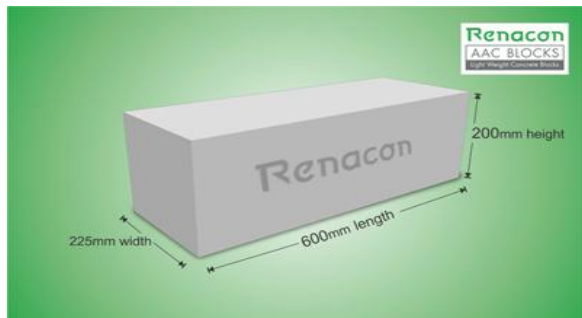


Figure: 1.1 Renacon AAC block

The Renacon plant is designed to produce around 21000 blocks / 500 Cum. per day in its state of art plant with scalable equipment and infrastructure.

#### 1.7.1 Renacon AAC Blocks Technical Data

Table: 1.2 Renacon AAC Block Technical Data

Dimensional Precision	+/- 2mm
Precision in Size	Variation 2mm (+/-)
Compressive Strength	35kg to 40kg per Cm <sup>2</sup> / 3.5 to 4.0 N/mm <sup>2</sup> conforming to IS 2185/1984
Fire Resistance	1600° Celsius for 6 hours for a block with 200mm thickness
Density	600-650 kg/m <sup>3</sup> (dry)
Sound Reduction index (db)	45db for 200 mm thick wall
Thermal Conductivity	Low / 0.16 Kelvin per meter.
Colour	Light Grey

#### 1.7.2 Advantages Of Renacon AAC Blocks

For a good product, it should be quality assured as per BIS standards. In case of AAC Block, IS code 2185: Part III: 1984, defines all the quality parameters. The adoption of AAC block in building construction will lead to the following advantages,

- It reduces the load on the foundation and other structural components in a structure due to its self weight of 600 to 800 kg/cum, as compared with the self weight of brick masonry of 1900-2000 kg/cum.
- Because of reduction in self weight, AAC block

construction attracts, Less Earthquake load.

- The output of the mason will increase because of less number of joints.
- The AAC block is thermally better and hence when adopted leads to less energy for air-conditioning.
- The AAC Block has better sound insulation properties, Due to its air voids presence
- The AAC block is dimensionally more accurate as it is produced with wire cut technology in a certified factory.
- The normal brick wall has considerably more joints, Due to small wall size of brick. On the other hand, Due to longer size, AAC block has less joints and Hence less mortar consumption.
- The AAC Block, When built has both faces as fair faces, Unlike brick work, Which has only one face as a fair face? Hence if plastered, the thickness of Plaster for AAC block is much less compared to conventional bricks.
- The AAC block is light, Has air voids and hence has better fire resisting property compared to red clay bricks.
- The product being produced in a factory, Has uniform quality and hence is more durable.
- The raw materials used for the production, Has been found to be eco – friendly, As very little cement is used. The use of fly ash in this venture, Makes us to Utilize a waste material from thermal plants.
- The red clay bricks now available in many parts of India are Classified as Class A, class B and Class C bricks. The bricks available in South India is of much poor quality because of the type of clay available here. Therefore we are able to produce only Class C bricks, which accounts for strength of about 30 to 40 kg/sqcm. This strength range of 35 to 40 kg/sqcm, and hence is much better then undependable red bricks strength.
- Based on all the above, I have no hesitation in recommending the use of AAC Blocks for building construction in the following areas of work, where usually red clay bricks are now being used.
- Load Bearing masonry up to 2 to 3 storey's.
- Partition walls in Load Bearing and Framed Structures.
- 11/19/13 Testimonial - Renacon AAC Blocks - Light Weight Concrete Blocks

- Partition walls in Load Bearing and Framed Structures.
- Infill walls in Multistory Building Frames both internal and external walls.
- All Filling areas including in flat slabs and instead of brick bats in weathering course, over roof.
- By proper design, The use of Autoclaved Aerated Concrete ( AAC ) Block, Will result in economy on overall cost.



Figure: 1.2 lesser weight than bricks

### 1.7.2 Comparison Of AAC With CLC Blocks And Red Clay Bricks

**Table:1.3 Comparison Of AAC With CLC Blocks And Red Clay Bricks**

S. no	Parameter	Auto Claved Aerated Concrete Blocks	Cellular Light Weight Concrete Blocks	Red Clay Bricks
01	Basic raw materials & other inputs	cement, pfa/sand , gypsum and aluminum as aerated compound	Cement, Aggregate, Fly Ash, Water & Foam chemical Compound	Top Soil & Energy
02	<b>General Properties</b>			
	Dry Density kg/m <sup>3</sup>	650-750	750-800	1900
	Compressive Strength in kg/cm <sup>3</sup>	30-40	25-30	40-75
	Range of applications / utility	Non-load bearing blocks	Partition	Load bearing and non load bearing
	Aging	No gain in strength in age	Gains strength in age	No gain in strength in age
	Thermal Conductivity (W/m.k.)	0.132-0.151 for 600kg/m <sup>3</sup>	0.132-0.151 for 800kg/m <sup>3</sup>	0.184
	Sound	Superior than	Superior	Normal

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	Insulation	burnt clay & hollow concrete	than burnt clay & hollow concrete	Normal	06	<b>Productivity</b>	Output 100% more than brick work	Output 100% more than brick work	Normal
	Ease of Working	Can be cut, nailed & drilled	Can be cut, nailed & drilled	Moulding-heat Treatment.	07	<b>Eco Friendliness</b>	Pollution free, normal energy requirement, Open process uses fly ash or sand-lime	Pollution free, Least energy requirement, Can consume fly ash around 33%	Creates smoke, uses high energy, spoils agricultural land
	Process	Casting-rising-pre curing	Casting-Rising-conventional curing		08	<b>Structural saving due to dead weight reduction</b>	55% reduction in weight of walls. Tremendous structural saving for high rise buildings in Earthquake / Poor soil area	55% reduction in weight of walls. Tremendous structural saving for high rise buildings in Earthquake / Poor soil area	No additional saving
03	<b>Shape &amp; form</b>	600x200x100 /150/200 mm	600x200x100/150/200 mm	230 x 100 x 70 mm	09	<b>Delivery</b>	Pre-Cured and ready for delivery	Conventional curing required. Not ready for delivery in post production	Seasonal
	Pre-cast Brick size	Any size of elements	Any size of elements	Not feasible	10	<b>Automization</b>	Automated manufacturing process accurate design mix	Semi automization	Manual
	Pre-cast elements	Not feasible	Any shape & size in any density	Not feasible					
	Cast in shape								
04	<b>Water Absorption %by weight</b>	Less than 20% by volume	12% for 800 kg/m <sup>3</sup> density (by volume)	20% by volume					
05	<b>Drying Shrinkage mm/meter</b>	Shrinkage after maturing 0.011 (for 600 kg/m <sup>3</sup> ) 0.058 (for kg/m <sup>3</sup> )	0.10	No shrinkage					

## 2 RESEARCH METHODOLOGY

### 2.1 Introduction

Research methodology is a systematic way to find out the result on the research problem. It is a science of studying how research is to be carried out. Research methodology describes the work plan of the research. In this chapter, the research methodology of this research is described.

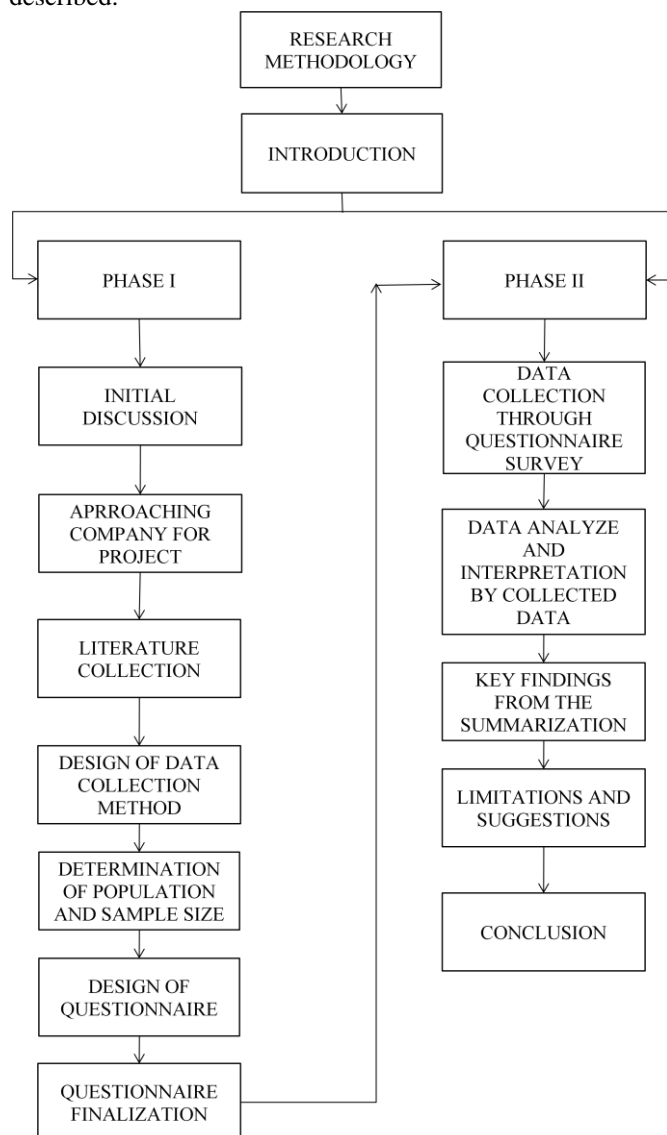


Figure: 1.3 Research Methodology Flow Chart

### 2.2 Research Design

Research design is a framework explaining the collection and analysis of data. The research design is essential to provide the foundation of the entire research work. There are many types of research design for example experimental design, cross-sectional design, longitudinal design, case study design and comparative design. Both cross-sectional design and longitudinal design employ self-completion questionnaire or interview. However, main distinction between the two designs is the time frame. Longitudinal design takes longer duration and more costly than cross-sectional design but it allows study of phenomenon to be made.

In this research, due to the limited time frame, cross-sectional design was chosen. Mixed methods which combined the application of questionnaire and semi-structured interview will be employed in the data collection.

### 2.3 Data Collection Method

#### 2.3.1 Questionnaire

The questionnaire includes both open ended and closed ended questions with multiple choices, Open-ended questions enable wide range of responses, and this enables the respondent to express their views in their own words. However this is difficult to tabulate and analyze.

Closed-ended questions offer a limited choice of response. Respondent find it easy as compared to open ended questions. Closed-ended questions can also be tabulated and analyzed more easily. The copies of the questionnaire to be used for contractors in the study are in the Annexure.

#### 2.3.2 Mixed Method Approach

Mixed method approach is the combination of both quantitative and qualitative research methods. Mixed method was employed in this research as it provided a more comprehensive data for the enquiry.

Quantitative research involves the collection of numerical data which aims to find out the relationship between the variables. It is measured with numbers and analyzed using statistical techniques. In this research, questionnaire will be used as the tool for quantitative data collection.

Qualitative research allows researchers to explore and understand the social behaviors through empirical inquiry with individuals or groups. The qualitative approach

used in this research is semi-structured interview. The greatest advantage of semi-structured interview is it allows for flexibility.

## 2.4 Data Collection Tool

### 2.4.1 Population

Here the target population is 149 building contractors' in Erode District. This was suggested by the Renaatus Procon private limited for their experiment.

### 2.4.2 Sample Size

The number of samples selected from the population constitutes the sample size.

$$\text{Sample size} = \frac{z^2 \times (P) \times (1-P)}{C^2}$$

Where, z-95% confidential level constant value  
1.96

P-percentage expressed constant value  
0.5

c- Confidential interval constant value  
0.05

Sample size constant value-384

$$\text{New sample size} = \frac{\text{sample size}}{1 + \frac{(s-1)}{P}}$$

Where, s- sample size

P - Population size (149)

From the above calculation the sample size obtained is 108 numbers out of 149 populations.

### 2.4.3 Semi-Structured Interview

In this research, two semi-structured interviews will be conducted with two interviewees. The semi-structured interviews will be conducted face to face. Face-to-face interview or in-person interview is the most common form of survey data collection (Lavrakas, P. J., 2008).

A structured questionnaire will be used in this research. The questions are framed to find out the awareness of Renacon AAC Blocks among construction professionals, challenges and strategies of it in Erode District.

An introduction will be given to brief the respondents on the research topic, aim and objectives. It will be then followed by a quick summary of Renacon AAC Blocks made based on the brochure. This could make the respondents to have a brief knowledge on Renacon AAC Blocks.

There were two sections for the self-administered questionnaire. Questionnaire includes the personal particulars of the respondents and it mainly includes the questions to achieve the research objectives. Rating questions and multiple choices with multiple answers are used in the survey questionnaire.

### 2.5 Data Analysis

Statistical Package for Social Sciences (SPSS) is software for data analysis with comprehensive statistical tests. SPSS 20.0 will be used in carrying out the data analysis in this research.

### 2.6 Relative Importance Index (RII) Analysis

Relative Importance Index (RII) analysis was employed to measure the Likert (ordinal) scale. In this study, five scale rating was used and the weight was give as below:

**1** – Strongly Disagree/ least Important; **4** – Agree/ Important;

**2** – Disagree/ Of Little Importance; **5** – Strongly Agree/ Most Important

**6**– Neutral/ Neither Important;

1 The RII was calculated by using the formula as below

$$RII = \frac{\sum w}{AN}$$

Where, w = weight of scale; A = highest weight ('5' in this case);

N = total number of respondent.

## 2 CONCLUSION

The study titled "Building contractors' perception towards Renacon AAC Blocks with reference to Erode District" will reveals the perception of the builders'. The survey may show the satisfactory level of builders' towards various walling materials features as of quality, strength, price, distribution, promotion, credit period etc.

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- Defence
- 3. What types of bricks you are using for your construction projects?
  - Red bricks hand/sulai finish
  - Red bricks wire cut finish
  - Fly ash bricks
  - CLC blocks
  - AAC blocks
  - Others,

Specify.....

- 4. Where do you purchase wall bricks from?
  - Dealers / intermediates
  - Kiln/ sulai / company directly
  - Others,

Specify.....

- 5. At what price do you purchase brick for your construction?

- 6. How much more would you be willing to spend for bricks offering superior quality?

- 7. Do you feel construction industry consumes vast amount of natural resources and raw materials?

- Strongly disagree  Disagree
- Neutral

- Agree  Strongly agree

- 8. Do you feel there should be some alternative to Red clay bricks?

- Strongly disagree  Disagree
- Neutral

- Agree  Strongly agree

- 9. From your experience give in terms of percentage for the following products used in construction?

A) Usage preference

Product	percentage
Usage of Bricks in construction	
Usage of Blocks in construction	

B) Normal usage level

**APPENDIX  
QUESTIONNAIRE**

**BUILDING CONTRACTORS' PERCEPTION  
TOWARDS ACCEPTANCE OF RENACON AAC  
BLOCKS WITH RESPECT TO ERODE DISTRICT.**

1. How long you are in the construction industry?
  - a) Below 2 yrs
  - b) 2 up to 5yrs
  - c) 6 up to10 yrs
  - d) 10 up to 15 yrs
  - e) 15 up to 20 yrs
  - f) above 20 yrs
2. In which of the following sectors you have been sailing in your business?
  - Residential
  - Commercial
  - Industrial
  - Institutional
  - Public
  - Private





