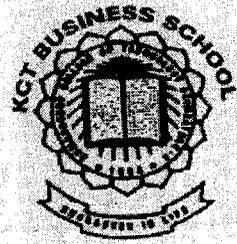
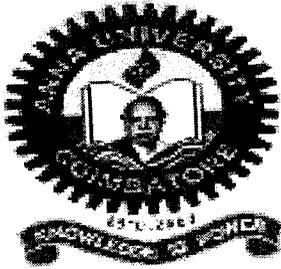


P-3212



**"A Market Feasibility Study on the usage of Paper Honey Comb  
Panels For V3 ENGINEERS PVT LTD, Bangalore"**

By

**SONA SUJANAN**

**Reg. No.0820400049**

Of

**DEPARTMENT OF MANAGEMENT STUDIES  
KUMARAGURU COLLEGE OF TECHNOLOGY  
COIMBATORE**

**A Project report**

Submitted to the

**FACULTY OF MANAGEMENT STUDIES**

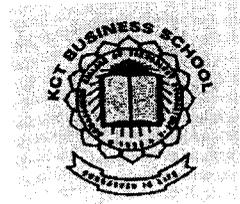
In partial fulfillment of the requirements

for the award of the degree of

**MASTER OF BUSINESS ADMINISTRATION**

JUNE - '10

# *CERTIFICATES*



**DEPARTMENT OF MANAGEMENT**  
**KUMARAGURU COLLEGE OF TECHNOLOGY**

(An ISO 9001:2000 Certified Institution)

Coimbatore -641006

**BONAFIDE CERTIFICATE**

Certified that this project titled **"A Market Feasibility Study on the usage of Paper Honey Comb Panels For V3 ENGINEERS PVT LTD, Bangalore"** the bonafide work of Ms.SONA SUJANAN(Reg no:0820400049), who carried out this research under my supervision. Certified further ,that to the best of my knowledge the work reported herein does not form part of any other project report or desertion on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

*V. Kaarthikheyan*

Mr. V. Kaarthikheyan 14/6/10

Project Guide

.....  
Dr.S.V.Devanathan

Director

Evaluated and viva-voce held on..... 14/6/2010

*[Signature]*  
.....  
14/6  
Examiner-I

*[Signature]*  
.....  
Examiner-II



BETTER SOLUTIONS AT WORK

5<sup>TH</sup> June 2010

The Head of Department  
Department of Management of Studies  
**KUMARAGURU COLLEGE OF TECHNOLOGY**  
Coimbatore  
Tamil Nadu

Dear Sir / Madam,

This is to certify that Ms Sona Sujanan , Final Year Student MBA , ( June 2010) Kumaraguru College of Technoloy, Coimbatore, Tamilnadu, has successfully completed her project in our Organization from April to May 2010.

Her work is appreciated. Some of the strengths as observed by us are

- a) Very disciplined and organized
- b) High on initiative
- c) Excellent people skills

We wish her the very best in all her endeavour's.

Thanking you

Yours truly,

For **V3 ENGINEERS PVT LTD.,**

Anand Vissa

Corporate Head - HR

# *DECLARATION*

## DECLARATION

I, hereby declare that this project report entitled as “**A market feasibility study on the Usage of paper honey comb panels - a green technology**” – conducted at **V3 ENGINEERS PVT LTD**, Bangalore. The study was undertaken for academic purpose submitted to Anna university in partial fulfillment of requirement for the award of the degree of Master of Business Administration .The project report is the record of the original work done by me under the guidance of Mr. V. Kaarthikheyan, Asst. Professor of management studies, Kumaraguru College of Technology, Coimbatore and Mr. Sudheesh PK, Manager - Sales & Marketing (V3 HOMEZONE), **V3 ENGINEERS PVT LTD**, Bangalore during the academic year 2008-2010.

I, also declare hereby, that the information given in this report is correct to the best of my knowledge and belief.

Place: Coimbatore (TN)

.....

Date: 14.06.2010



(SONA SUJANAN)

# *EXECUTIVE SUMMARY*

## **EXECUTIVE SUMMARY**

The project is the result of the study about the usage of paper honey comb panels as a green technology – “A market feasibility study in Bangalore.”

The primary data was collected from the various architects, builders, interior designers and event management consultancy in and around Bangalore with a structured interview schedule.

For this study, questionnaire was prepared to conduct survey to find out the spot light on the areas that management need attention.

The study uses percentage analysis, weighted average and chi-square test to analyze the data collected.

The conclusion of the study reveals that the target audience seems to have less awareness about paper honey comb and they are quite satisfied with the various other panels which they currently in use in projects.

# *ACKNOWLEDGEMENT*

## ACKNOWLEDGEMENT

I adore the almighty and extol his glory by paying my contribution of thankfulness for blessing me with all knowledge required to complete this project successfully. I express my sincere gratitude to our revered chairman **Arutselvar Dr.N.Mahalingam**, who helped me to undergo this masters degree and aquire a lot of knowledge. I thank co-chairman **B.K Krishnaraj vanavarayar**, correspondent **Sri.M.Balasubramaniyan**, for their kind blessings and moral support for carrying out this project. I thank our principal -incharge **Dr.A.Annamalai**, for giving me this opportunity to gather experience of doing a project at a corporate.

I would like to thank **Dr.S.V.Devanathan** ,Ph.D, Director, KCT Business school, Department of management studies for the help and guidance rendered. I am very thankful to my guide **Mr. V. Kaarthikheyam**, Asst. professor ,KCT Business school, Coimbatore for his valuable guidance. I would like to thank all the staff members of the Department of Management studies for their help and support.

Also, I express my sincere thanks to **Mr.Anand Visa**, Manager - Human Resource - V3, TD, for granting permission to do my project work under his concern in V3 ENGINEERS PVT LTD, Bangalore. I am deeply indebted to **Mr. Sudheesh PK**, Manager – Sales & Marketing (V3 HOMEZONE) - V3, whose assistance and encouragement made this work possible till the end.

# *LIST OF CONTENTS*

## TABLE OF CONTENTS

CHAPTER NO	TITLE	PAGE NO
1	<b>1. Introduction</b> 1.1 Background of the study 1.2 Review of literature 1.3 Statement of the problem 1.4 Objectives 1.5 Scope of the study 1.6 Research methodology 1.7 Limitation of the study	1 19 30 30 31 31 33
2	<b>2. Introduction about the company</b> 2.1 History of the company 2.2 Management 2.3 Future plans 2.4 Product profile 2.5 Competitors 2.6 Awards and recognitions 2.7 Corporate responsibility	34 36 37 39 41 41 42
3	3.1 Data Analysis and Interpretation  3.2 Findings  3.3 Recommendations  3.4 Conclusion	43  130  132  132
4	4.1 Annexure	133
5	5.1 Bibliography	135

# *LIST OF TABLES*

## LIST OF TABLES

DESCRIPTION	PAGE NUMBER
3.1.1: TYPE OF ESTABLISHMENT	41
3.1.2: PERIOD OF PRESENCE	43
3.1.3: AMOUNT OF INVESTMENT	45
3.1.4: NATURE OF PROJECT	47
3.1.5.a: FREQUENCY OF PURCHASE: Particle board	49
3.1.5.b: FREQUENCY OF PURCHASE: Aluminum honeycomb	51
3.1.5.c: FREQUENCY OF PURCHASE: timber wood	53
3.1.5.d: FREQUENCY OF PURCHASE: Plywood	55
3.1.5.e: FREQUENCY OF PURCHASE: MDF Panel	57
3.1.5.f: FREQUENCY OF PURCHASE: Solid wood panel	59
3.1.6.a: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Durability	61
3.1.6.b: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Price	63
3.1.6.c: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Quality	65
3.1.6.d: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: High Demand	67
3.1.6.e: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Availability	69
3.1.6.f: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Strength property	71
3.1.6.g: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Density	73
3.1.6.h: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Pressure Resistance	75

3.1.6.i: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Moisture Resistance	77
3.1.6.j: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Present demand	79
3.1.7.a: OPINION OF CURRENTLY USED PANELS: Expensive	81
3.1.7.b: OPINION OF CURRENTLY USED PANELS: Swells , break/ splits	83
3.1.7.c: OPINION OF CURRENTLY USED PANELS: Low moisture and heat resistance	85
3.1.7.d: OPINION OF CURRENTLY USED PANELS: Limited selection	87
3.1.7.e: OPINION OF CURRENTLY USED PANELS: Unrelated stated thickness	89
3.1.7.f: OPINION OF CURRENTLY USED PANELS: Not easy to handle( heavy)	91
3.1.7.g: OPINION OF CURRENTLY USED PANELS: Non bio degradable	93
3.1.7.h: OPINION OF CURRENTLY USED PANELS: Non recyclable	95
3.1.7.i: OPINION OF CURRENTLY USED PANELS: Low strength	97
3.1.7.j: OPINION OF CURRENTLY USED PANELS: Less durable	99
3.1.8: PAPER HONEY COMB SUBSTITUTES WOOD:	101
3.1.9.a: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Strength property	103
3.1.9.b: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Quality	
3.1.9.c: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Eco friendly / bio degradable	107

3.1.9.d: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Availability	109
3.1.9.e: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Low price	111
3.1.9.f: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Light weight	113
3.1.9.g: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Moisture resistance	115
3.1.9.h: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Durability	117
3.1.9.i: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Pressure resistance	119
3.1.9.j: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Market demand	121
3.2 WEIGHTED AVERAGE RANKING:	123
3.2.1: FREQUENCY OF PURCHASE OF VARIOUS PANELS:	123
3.2.2: LEVEL OF ACCEPTANCE OF PAPER HONEYCOMB:	124
3.3.1: Level of awareness of paper honeycomb and level of acceptance of paper honeycomb.	125
3.3.2: Investment Vs Frequency of purchase of conventional panels.	127
3.3.3: Nature of the projects Vs frequency of purchase of various conventional panels.	129
3.3.4: Period of presence Vs Paper honeycomb substitutes wood	131

# *LIST OF CHARTS*

## LIST OF CHARTS

DESCRIPTION	PAGE NUMBER
3.1.1: TYPE OF ESTABLISHMENT	42
3.1.2: PERIOD OF PRESENCE	44
3.1.3: AMOUNT OF INVESTMENT	46
3.1.4: NATURE OF PROJECT	48
3.1.5.a: FREQUENCY OF PURCHASE: Particle board	50
3.1.5.b: FREQUENCY OF PURCHASE: Aluminum honeycomb	52
3.1.5.c: FREQUENCY OF PURCHASE: timber wood	54
3.1.5.d: FREQUENCY OF PURCHASE: Plywood	56
3.1.5.e: FREQUENCY OF PURCHASE: MDF Panel	58
3.1.5.f: FREQUENCY OF PURCHASE: Solid wood panel	60
3.1.6.a: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Durability	62
3.1.6.b: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Price	64
3.1.6.c: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Quality	66
3.1.6.d: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: High Demand	68
3.1.6.e: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Availability	70
3.1.6.f: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Strength property	72
3.1.6.g: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Density	74

3.1.6.h: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Pressure Resistance	76
3.1.6.i: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Moisture Resistance	78
3.1.6.j: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Present demand	80
3.1.7.a: OPINION OF CURRENTLY USED PANELS: Expensive	82
3.1.7.b: OPINION OF CURRENTLY USED PANELS: Swells , break/ splits	84
3.1.7.c: OPINION OF CURRENTLY USED PANELS: Low moisture and heat resistance	86
3.1.7.d: OPINION OF CURRENTLY USED PANELS: Limited selection	88
3.1.7.e: OPINION OF CURRENTLY USED PANELS: Unrelated stated thickness	90
3.1.7.f: OPINION OF CURRENTLY USED PANELS: Not easy to handle( heavy)	92
3.1.7.g: OPINION OF CURRENTLY USED PANELS: Non bio degradable	94
3.1.7.h: OPINION OF CURRENTLY USED PANELS: Non recyclable	96
3.1.7.i: OPINION OF CURRENTLY USED PANELS: Low strength	98
3.1.7.j: OPINION OF CURRENTLY USED PANELS: Less durable	100
3.1.8: PAPER HONEY COMB SUBSTITUTES WOOD:	102
3.1.9.a: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Strength property	104
3.1.9.b: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Quality	

3.1.9.c: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Eco friendly / bio degradable	108
3.1.9.d: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Availability	110
3.1.9.e: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Low price	112
3.1.9.f: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Light weight	114
3.1.9.g: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Moisture resistance	116
3.1.9.h: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Durability	118
3.1.9.i: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Pressure resistance	120
3.1.9.j: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Market demand	122

# *CHAPTERS 1*

# CHAPTER 1

## 1. INTRODUCTION:

### 1.1 Background of the study:

#### What is paper honey comb?

Paper honeycomb is made from strips of recycled paper materials, bonded together such that when expanded into sheets, the result is a cellular honeycomb structure that has great strength combined with extremely light weight. The honeycomb sheets can be made in a range of thickness and honeycomb-cell sizes to cater for a huge variety of applications.

Its an eco friendly replacement to plywood/ thermocole etc. It is made of 100% recycled paper which is known as kraft paper which has much lesser chemical content than the regular white papers. Thus no trees are being cut to make this paper.

#### Evolution of paper honey comb:

##### *1950*

After the second world war the paper honeycomb is introduced from the airplane industries (fuel tanks for Dakota's) as a cost and material saving product for the reconstruction of Europe. Because at that time there was a shortage of building material (wood, bricks, ets.) the paper honeycomb was an excellent alternative for solid material like wood.

##### *1960*

In the 60's the paper honeycomb was mainly used in the inner doors, separation walls and furniture (kitchen cabinet). At the end of the 60's more and more companies changed over to produce on large scale honeycomb doors.

## ***1970***

Because in the 70's the chipboard was becoming cheaper and cheaper the paper honeycomb was pushed out of many applications. Since then it was mainly used in inner doors. Several doors companies invested in high speed production lines, in which they used continuous paper honeycomb to produce up to 10,000 doors a week. Besides that, the paper honeycomb was also used as a packaging material. On both sides glued with a paper it gives an excellent protecting material for all kinds of materials.

## ***1980***

In the 80's some big knock down manufacturers were producing some of their products more and more with paper honeycomb. Because by using the paper honeycomb as a constructive filling the products were more than 70% lighter than when using for example chipboard. This was convenient for their clients to take away the article to their homes, where they build the cabinet or bookshelf by themselves.

## ***1990***

In the 90's the paper honeycomb was also introduced in the automotive industry. For example for the trunk plate it is used as a substitute for a wooden plate with a steel frame. Also the use of the paper honeycomb in the furniture industry increased a lot.

## ***2000***

Until 2000 the paper honeycomb was seen as a cheap and not so stable product. But because the material was used more and more and people saw that this material was stronger than they thought, the negative image was turned over to a material everybody expects as a good building material. Even big chipboard manufacturers which were in the past the competitors of paper honeycomb produce now big sandwich elements (up to 2200 x 6000 mm) for reselling to their clients (furniture and door manufacturers).

## ***Future***

Because there are many people living on our planet whose standard of life have increased and need more and more material, but there will be huge shortage of wood which can be replaced by the paper honeycomb in future.

## **Uses of paper honey comb:**

In the nineties paper honeycomb was introduced in the **automotive industry**. Also the use of paper honeycomb in **furniture** was greatly increased. It is greatly used for **construction** purpose also. Paper honeycomb use expanded into many protective **packaging applications** such as rail car dunnage, truck dunnage and inner pack for both consumer and industrial goods. In Switzerland and Germany, paper honeycomb has become an important material in home construction.

## **Technical properties of paper honey comb panels:**

The pressure strength of paper honeycomb is depending on 3 basic values:

### ***1. The cell size***

How smaller the cell size, how higher the pressure resistance will be. The most common cell sizes are 10, 15, 20, 25 and 40 mm.

### ***2. The paper grammage/quality***

The honeycomb is made of 100% recycled paper. The most common grammage is 140, 170 and 200 gram/m<sup>2</sup>. The higher the paper grammage, the higher the pressure strength will be.

### ***3. The moisture content***

During the production process of paper honeycomb the paper will reach a moisture content of about 14% (8% of the paper and 6% of the glue). If the honeycomb is not dried with an expander/dryer the pressure strength will be about 50% lower. The highest pressure strength will be at 3% moisture content. When the dried honeycomb is placed in an area with a humidity of 70% the paper will absorb the moisture and after 30 minutes the paper honeycomb will have a moisture content of 8%.

### **Different Types of Wall Panels:**

Wall panels serve many functions, from providing descriptions of exhibits in museums and galleries to hiding away electronics such as stereo speakers. As a decor element, wall panels are an excellent way to break up wall space. This can be achieved by paneling the upper or lower half of the wall, installing wainscoting, creating a faux finish, or one of several other methods.

In the business setting, there are portable or temporary wall panels that can be used to divide a space into cubicles. Modular wall panels may be constructed of wood or metal and are often covered with textured materials, fabrics, paneling or wallpaper to make them more aesthetically pleasing. There are also acoustical and sound absorbing wall panels that are perfect for the studio.

In the home, wall panels are usually used for visual appeal. If a homeowner prefers something less extensive than paneling or wainscoting, faux finishes or even faux panels may work well. A faux finish can be used to create the look of wood, stone or fabric panels. Alternatively, trim can be added to a wall to create the look of inlaid panels. Creating a line of faux wall panels and painting the molding to match the wall color creates an architectural element that looks as if it has always been there.

Other types of temporary wall panels are employed in the home. Many homeowners do not want or cannot afford modular panels, but they may use fabric wall panels to quickly and inexpensively give a basement, attic or garage a finished look. This type of wall panel is made from heavy fabric such as canvas, and can be easily hung in a matter of hours to cover unfinished ceilings and walls, giving any space a clean, refined look.

There are other types of wall panels that help lessen the time and cost of construction. Contractors can order framed out wall panels for nearly any project. Proper measurements, layout and special requirements such as frames for windows are necessary to produce these panels. They arrive on the job site ready to go up, accompanied by details as to the placement of each one.

### **Introduction of paper honey comb panels:**

The industries of the present age are getting responsible. They are more environment conscious than ever before. They are supported by the Governments across nations and problems like Global Pollution and Global Warming are being given some serious thinking. As an effort to contribute to the environment v3 Engineers Pvt Ltd have come up with the light weight, presentable, environment-friendly products with Paper Honeycomb Technology: manufactured at the-art plant at Bangalore on Imported machinery specially designed to deliver outstanding quality in production and international standards.

### **Characteristics:**

- Paper Honeycomb Core has core  $t=0.28$  and diameter=19mm.
- Its core material is light with nonflammable feature. Primary used in the office partition and cleanroom system.
- Paper honeycomb panels are comprised with high standard adhesives. The adhesive is non-outgassing and non-pollutions with zero chemical reaction under uncertain environment such as high range of temperature and humidity.

- Paper Honeycomb has same sonic resistance as PU and PF panels; However, its heat resistance has lower capability than others. Paper honeycomb panel can promise the highest standard features with low cost in critical cleanroom environment when heat resistance is out of concern.

### **Advantages of paper honey comb panels:**

- Proved to be very durable all over the world
- Light weight paper honeycomb was an excellent alternative for solid materials like wood.
- Economical in terms of hardware and fixing costs.
- Easier handling for retail customers of commercial installers.
- Panels lower transportation costs and are more environmentally friendly.
- Reduced freight and packaging costs
- Less damage to the panels during transportation.
- Improved ergonomics on the shop floor and lower production costs.
- Replaces wood, thermocol & foam in many applications
- Flexible
- Bio-degradable
- Easy disposal
- The huge pressure resistance;
- The high shearing resistance
- The durability effects and saving on raw materials (like wood) resulting from the use of recycled paper

## **Myths about paper honey comb panels:**

- People think its not strong and easily breakable.
- When knocked the hollowness can be heard.
- Strength property is less than hardwood.
- Its not as cost effective as it is projected.

## **Applications of paper honey comb panels:**

- Signage and Graphic Backings
- Fixture Bases
- Portable Stage Decks
- Trade Show Partitions
- Theatrical Lighting Reflectors
- Honeycomb cartons
- Thermal insulation
- False ceiling

### **Small Panels -**

- Modular bookcase
- Lightweight shelving
- Insulated window frame
- Modular desk
- Sign board
- frame sign board
- Park bench & Park table

### **- Standard Panels -**

- Flooring
- Wall panel
- Roof panel

- Lightweight folding table
- Billboard sign
- Sign Substrate
- Conference Table
- Portable Storage Shed

**- Over size Panels -**

- Carriage Doors
- Large Doors

**Scope of paper honey comb panels in India:**

With the advent of modern civilization and development of scientific knowledge, there has been an upsurge in demand for developing newer materials for novel applications. In fact, with the technological leaps in recent times, focus has been on developing the materials required to perform in stringent conditions - high temperature & pressure, highly corrosive environment, higher strength but without much weight implications etc. which the conventional materials failed to service. This ushered in 'engineered material', devising material properties catering to the application needs. And the innovation was not limited to developing materials with novel properties alone but it also addressed the method of manufacturing - improved processing techniques, effective use of energy while processing and more importantly with the least environmental impact. Advanced materials with combination of properties for specific end uses became a reality.

**Comparison with other panel types:**

**Particle board:**

Particle board, or particleboard is an engineered wood product manufactured from wood particles, such as wood chips, sawmill shavings, or even saw dust, and a synthetic resin or other suitable binder, which is pressed and extruded. Particleboard is a composite material. Particleboard is cheaper, denser and more uniform than conventional wood and

plywood and is substituted for them when appearance and strength are less important than cost. However, particleboard can be made more attractive by painting or the use of wood veneers that are glued onto surfaces that will be visible. Though it is denser than conventional wood, it is the lightest and weakest type of fiberboard, except for insulation board. Medium-density fibreboard and hardboard, also called high-density fiberboard, are stronger and denser than particleboard.

A major disadvantage of particleboard is that it is very prone to expansion and discoloration due to moisture, particularly when it is not covered with paint or another sealer. Therefore, it is rarely used outdoors or places that have high levels of moisture, with the exception of some bathrooms, kitchens and laundries, where it is commonly used as an underlayment beneath a continuous sheet of vinyl floor coverings.

Though it is denser than conventional wood, it is the lightest and weakest type of fiberboard, except for insulation board. Medium-density fibreboard and hardboard, also called high-density fiberboard, are stronger and denser than particleboard.

### **Aluminum honey comb panels:**

Aluminum honeycomb panel is made of excellent aluminum honeycomb cores, superior quality aluminum alloy panel and special glue, in normal temperature and vacuum condition. The routine thickness of front panel is 0.5 mm to 1.0mm .The total thickness of panel are 6mm to 100mm.The front panel and bottom panel of the aluminum honeycomb can use different material according to different needs, for example stainless steel panel, fireproof panel, color steel panel, natural stone ,etc. The concrete specifications, structure and dimension can be designed and produced according to customer's requirement.

### **Drawbacks of Aluminum honey comb panels:**

- Its thinner surface is subject to surface denting.
- It must be handled with care.
- Inability to hold up well to heat of flashing.

- It takes longer time to cool down than solid aluminum.
- Excessive heat can cause delimitation of the sandwich.
- Heat retention.

## **MDF PANELS:**

Medium-density fibreboard (MDF) is an engineered wood product formed by breaking down hardwood or softwood residuals into wood fibres, often in a defibrator, combining it with wax and a resin binder, and forming panels by applying high temperature and pressure. MDF is more dense than plywood.

It is made up of separated fibers, (not wood veneers) but can be used as a building material similar in application to plywood. It is much more dense than normal particle board.

### **Drawbacks of MDF:**

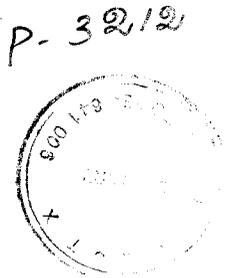
- More dense than plywood or chipboard (the resins are heavy)
- Swells and breaks when saturated with water
- May warp or expand if not sealed
- Contains urea-formaldehyde which may cause eye and lung irritation when cutting and sanding
- Dulls blades more quickly than many woods
- Though it does not have a grain in the plane of the board, it does have one *into* the board. Screwing into the edge of a board will generally cause it to split in a fashion similar to delaminating.
- Subject to significant shrinkage in low humidity environments.
- Trim (i.e. baseboards) comes pre-primed but this is insufficient for fine finish painting. Painting with latex paints is difficult due to rapid water absorption. Most finishes appear uneven.

## **Plywood panels:**

Plywood is a type of manufactured wood made from thin sheets of wood. It is then glued together for greater strength. A common reason for using plywood instead of plain wood is its resistance to cracking, shrinkage, twisting/warping, and its general high degree of strength. Also, plywood can be manufactured in sheets far wider than the trees from which it was made. It has replaced many dimensional lumbers on construction applications for these reasons.

### **Drawbacks of plywood panels:**

- Plywood is more expensive.
- Unrelated stated thickness.
- Limited selection ( oak, birch, mahogany).



## **Solid wood panels:**

Solidwood is wood from angiosperm trees (more strictly speaking non-monocot angiosperm trees). It may also be used for those trees themselves: these are usually broad-leaved; in temperate and boreal latitudes they are mostly deciduous, but in tropics and subtropics mostly evergreen. Softwoods are not necessarily harder than Plywoods. In both groups there is an enormous variation in actual wood hardness, with the range in density in hardwoods completely including that of Plywoods.

### **Drawbacks of solid wood panels:**

One of the most important disadvantages of solid wood is its significant cost. Engineered wood can be made from waste material like sawdust and chips, but solid wood requires large sections of wood that are relatively free from defects. Light weight paper honeycomb was an excellent alternative for solid materials like wood. Solid wood is more expensive than plywood, particleboards, paper honey comb panels. It is heavy and not easy to handle.

## **Solid wood panels vs. paper honey comb panels:**

One of the most frequently made hollow wood structures are hollow core doors. Hollow core doors are much lighter than solid wood doors, cheaper and are easier to install. However, sound travels more freely through them, which can be a problem if the house is noisy or the occupants desire a lot of privacy. Also, hollow core doors should not be used as doors to the outside because they can more easily be broken open by robbers. Solid wood doors are slightly more fire resistant because the fire has to burn through more material, however, using a steel door will increase fire resistance by a much larger margin.

## **Manufacturer of paper honey comb panels in Bangalore :**

- **LSquare Eco-Products Pvt Ltd**  
194, 5th Main, Peenya 2nd Stage,  
Bangalore-560058  
Ph-91-080-098867 17725
- **Vaspar Green Technologies**  
2nd Floor, Pushparang Apartments 14,  
Cornwell Cross Road, Langford Gardens,,  
Bangalore-560025  
Ph:- +(91)-(80)-22111352
- **Sobha Interiors Pvt Ltd**  
7,Bansilal Industrial Estate,  
Bannerghatta Road,  
Bangalore, 560076  
Ph-+91 80 26587025

## **Introduction to the study:**

“Honeycomb paper”, a lightweight, spongy and sturdy material made of recycled paper appears to be creating something of a revolution.”

Paper honeycombs have been traditionally used in Europe and United States for several years. There are several manufacturers who use paper honeycombs to produce hollow core flush doors. With the advent of the IT industry and the special requirement of office systems, there are many manufacturers who have now resorted to honeycomb panels for partition walls and so on. The first through feed honeycomb machine from Torwegge which was displayed in Indiawood 2006 has already come into manufacture and several more lines are in the offing. In the near future, keeping abreast of what is happening in the world, India will have its own sandwich panel materials available in reasonable quantities. Industries are now manufacturing products made out of honeycomb paper because of the versatility of this paper. It can be engineered to suit any requirement, whether to replace furniture or as packaging material

This study would help to improve the marketing strategies by understanding issues such as how:

- ✓ What proportion of the population is likely to buy the paper honey comb panels;
- ✓ What price are they willing to pay;
- ✓ The psychology of how the target audience think, feel, reason, and select between different alternatives (e.g., brands, products);
- ✓ The psychology of how the target audience is influenced by his or her environment (e.g., culture, signs, media);
- ✓ The behavior of the target audience while making other marketing decisions;
- ✓ Limitations in consumer knowledge, awareness or information processing abilities influence decisions and marketing outcome;
- ✓ How motivation and decision strategies differ between products that differ in their level of importance or interest that they entail for the consumer;

- ✓ How marketers can adapt and improve their marketing campaigns and marketing strategies to more effectively reach the target audience;
- ✓ How to compete with the existing players in the market.

## **SWOT Analysis:**

**Strength:** A complete eco friendly product.

**Weakness:** The awareness is low.

**Opportunity:** Demand may rise because it's a complete substitute for wood.

**Threats:** Wrong perception about the product.

## 1.2 Review of literature:

Roger A. More<sup>1</sup> in his article “Developer/adopter relationships in new industrial product situations “, states that Recent evidence provides numerous examples of technology-based industrial product organizations with difficulty in profitably introducing new products into potential customer organizations. Adoption of these new products has frequently been much slower than expected, has provided lower profit margins, has required much greater developer resources than expected, and in some cases has resulted in withdrawal from the market with severe financial losses. These problems have been attributed by many observers to failure to effectively manage the development process, and in some cases this attribution has support. In other cases, however, the real failure of managers in developing organizations has been in understanding and managing their strategic relationships with potential adopting organizations. In many of these situations, more effective management of these interorganizational relationships might have had a major impact on success in the situation. Several frameworks have been formulated to structure either the development process or the adoption process. Few have been formulated that explicitly conceptualize alternative interorganizational relationships.

---

1. Roger A. More, Journal of Business Research, Vol14, Issue 6, Dec 1986, Pg: 501-517

Frederick E. Webster, Jr.<sup>2</sup> in his article, “New Product Adoption in Industrial Markets: A Framework for Analysis” states that there is little doubt that consumer marketing has been aided by the body of knowledge and theory available from the behavioral science. The industrial buying decision are more complex, involve more people, take longer, require the evaluation of more factors and are less easily observable. Influence on industrial buying decisions appear to be more varied and a richer variety of information sources may be involved. For marketing managers in firms whose customers are other firms, and for researchers interested in industrial buying behavior, it would be helpful to understand the process by which firms decide to adopt new products, processes, or practices. This paper develops a framework within which characteristics of the innovating firm, the nature of the innovation, and sources of information can be analyzed as an aid to that understanding.

Judith Heerwagen<sup>3</sup> in his article “Green buildings, organizational success and occupant productivity” states that Can 'green' buildings positively contribute to business performance and organizational effectiveness? Can 'green' buildings affect high-level organizational outcomes, such as profitability, customer satisfaction and innovation? How do the physical attributes of green buildings affect the physiological, psychological, cognitive and social functioning of building occupants at the individual level? This paper explores the wider context of sustainable design, integrating work form organizational effectiveness and human factors to suggest that 'green' buildings provide economic and organizational benefits.

---

2. Frederick E. Webster, Jr., *The Journal of Marketing*, Vol. 33, Jul 1969, Pg:. 35-39

3. Judith Heerwagen , *Building Research & Information*, Vol 28, Issue 5 & 6 Sept 2000 , pages 353 -367

Lilien, G.L. Eunsang Yoon<sup>4</sup> in their article , “Determinants of new industrial product performance: a strategic re-examination of the empirical literature” Research on the determinants of industrial innovation performance using a three-dimensional framework is examined. Those dimensions are: generality over innovations, decision focus, and managerial controllability. The major determinants identified are: strategic and organizational factors, including general management's support, business-project fit, and R&D-marketing interaction; R&D and production factors, including product superiority, experience and synergy effect, user benefit of the product, and patent protection; and market and environmental factors, including degree of competition and market growth. An empirical study of 112 industrial products confirms that dynamic interaction exists between these determinants and the launch time of the product

Valerie L. Vaccaro<sup>5</sup> in his article “B2B green marketing and innovation theory for competitive advantage”, states that this conceptual paper provides a literature review of green marketing strategies and competitive advantage, and relates it to diffusion of innovation theory in a new way. First, a brief overview is described of corporate social responsibility (CSR) theories related to green marketing, with this paper providing value by adding innovation theory to address the gap in the literature. Next, a discussion is provided on reactive and proactive B2B green marketing strategies, degrees of innovation, and diffusion theory research, and propositions are developed. Then, a new model is presented on B2B green marketing innovation strategies and competitive advantage. Next, a conceptual analysis is presented using a diffusion of innovation characteristics framework to show relationships of the innovation characteristics with proactive B2B green marketing strategies and competitive advantage.

---

4.Lilien,G.L.Eunsang,Yoon *Engineering Management*,Feb1989,Vol:36,Issue:1,Pg:3 – 10

5.Valerie.L.Vaccaro,*Journal of Systems and Information Technology*,Yr: 2009,vol:11,Issue:4,Pg:315 – 330

Loannis Barboutis and Vassilios Vassiliou<sup>6</sup> in their article “strength properties of lightweight paper honeycomb panels for the furniture” states that Lightweight honeycomb sandwich panels constitute a new raw material for the furniture and joinery industry that is produced economically by automated in-line processes due to the recent development of the machinery technology comparing to the traditional batch like production processes. At the same time, new furniture connectors of these panels have been developed. The honeycomb panels offer high strength-to-weight ratio and are produced in thicker panels than the conventional wood-based panels (particleboards, medium density fiberboards, plywoods, etc.) more than 50mm. In this paper the strength properties (bending strength, impact bending strength) of the paper honeycomb panels 51.7mm thick constructed with a core of recycled paper honeycomb (cell size 30 x 30mm, weight 210 g/mm<sup>2</sup>) and surface layers of thin particleboard 7.8mm in thickness were studied. The samples were prepared according to EN 310 for the bending strength and according to DIN 52189:1992 for the impact bending strength, and the tests were carried out with a SHIMADZU machine for the modulus of rupture (MOR) and modulus of elasticity (MOE), and with an AMSLER machine for the impact bending strength. The impact bending strength and the impact bending strength to the density ratio of the honeycomb panel tested was found to be much higher comparing to the particleboard of 7.8mm and 16.1mm thicknesses.

---

6.Loannis Barboutis and Vassilios Vassiliou, *Journal of Business Research*, Volume 15, Issue 5, October 1987, Pages 377-395.

Dongmei Wang<sup>7</sup> in his article “Impact behavior and energy absorption of paper honeycomb sandwich panels” states that Dynamic cushioning tests were conducted by free drop and shock absorption principle. The effect of paper honeycomb structure factors on the impact behavior was analyzed. Results of many experiments show that the dynamic impact curve of paper honeycomb sandwich panel is concave and upward; the thickness and length of honeycomb cell-wall have a great effect on its cushioning properties; increasing the relative density of paper honeycomb can improve the energy absorption ability of the sandwich panels; the thickness of paper honeycomb core has an up and down fluctuant effect on the cushioning properties; with the increase of the thickness of paper honeycomb core, the effect dies down; flexible corrugated paperboard as liners can improve the compression resistance and cushioning properties of paper honeycombs. The research results can be used to optimize the structure design of paper honeycomb sandwich panel and material selection for packaging design.

C Cuttle<sup>8</sup> in his article “lightness, lightness, and providing ‘a preconceived appearance to the interior’” states that Waldram’s concept of designing a distribution of lighting to provide ‘a preconceived appearance to the interior’ is examined, with particular regard to application of the ‘apparent brightness’ concept. Some recent research into luminance/brightness relationships is reviewed, and it is concluded that brightness, as it is generally understood, does not provide a valid basis for designing interior lighting. The role of ‘visual constancy’ is discussed, and also the ‘modes of appearance’ concept. The latter is proposed as a useful descriptive framework for ordering readily-observed visual phenomena that influence the appearance elements in an illuminated interior. This approach leads to an understanding that brightness and lightness relate to distinctly different aspects of appearance, and this leads to the reappraisal of the role of brightness in influencing the appearance of an illuminated space. These concepts are set into the context of the holistic approach to lighting design that Waldram proposed in his classic 1954 paper.

Gary S. Lynn, Steven P. Schnaars and Richard B. Skov<sup>9</sup> in their article “A Survey of New Product Forecasting Practices in Industrial High Technology and Low Technology Businesses” states that Market forecasting is invaluable to marketing

professionals especially when trying to commercialize a new product or service. Accurate foreseeing helps managers develop strategies, identify priorities and allocate resources. But what forecasting techniques are associated with successful innovation? Do market forecasting techniques differ for high-tech vs. low-tech products? This research investigates these questions by studying 76 industrial new product projects: 38 successes and 38 failures from 38 high-technology companies and 38 low-technology companies. What we found was that some marketing techniques are better suited to high-tech products than low-tech and vice versa. In particular, successful high-tech industrial projects tended to rely more on internal qualitative forecasting techniques whereas low-tech industrial projects tended to rely more on conventional quantitative market-based techniques.

Holger Ernst<sup>10</sup> in his article “Success Factors of New Product Development: A Review of the Empirical Literature” states that The continuous development and market introduction of new products can be an important determinant of sustained company performance. For approximately 30 years, conceptual and empirical research has been undertaken to identify the critical success factors of new products. This paper reviews the findings of empirical work into the success factors of new product development (NPD). It is the prime objective of this work to summarize the most important findings in a compact and structured way. In addition, shortcomings of previous empirical work on NPD success factors will be discussed and suggestions for improvement in future empirical NPD studies will be made.

---

7. Dongmei Wang,,International Journal of Impact Engineering,Vol 36, Issue 1,Jan 2009, Pages 110-114

8. C Cuttle, Journal of Business Research, Volume 52, Issue 2, May 2001, Pages 149-160

9.Gary S. Lynn, Steven P. Schnaars and Richard B. Skov, strial Marketing Management Volume 28, Issue 6, November 1999, Pages 565-571

10.Holger Ernst, International Journal of Management Reviews, Vol. 4, pp. 1-40, 2002

---

Robert B. Handfield, Steve V. Walton, Lisa K. Seegers and Steven A. Melnyk<sup>11</sup> in their article ,“Green’ value chain practices in the furniture industry” states that This paper draws on the results of interviews with five environmental managers in the furniture industry to develop a taxonomy of environmentally-friendly (‘green’) best practices within the operations management value chain. This taxonomy is then extended to develop a group of propositions concerning the role of management in promoting environmentally-friendly practices. The results suggest that in order to be successful, environmental management strategies must be integrated into all stages of the value chain, which includes all of the processes spanning product design, procurement, manufacturing and assembly, packaging, logistics, and distribution. The propositions and results emerging from the analysis also suggests that reacting to regulations is no longer sufficient. World-class EFP must anticipate and pre-empt changing environmental regulations and customer expectations, and proactively prepare products, processes and infrastructure for these changes without sacrificing competitive advantage.

Luhao Leng<sup>12</sup> in his article “panel with paper honeycomb cores using as a table top”, states that present invention relates to a panel with paper honeycomb cores, which is usable as a table top. The panel comprises a top panel, a bottom panel, paper honeycomb cores and an internal fixed part, in which the paper honeycomb cores are filled in the closed space which is enclosed by the top panel and the bottom panel, and are fixed with the top panel and the bottom panel. The edge of the bottom panel and the lower edge of the top panel, which is formed by ending the top panel downwards are cohered together, and the flections of the top panel forms the side edge of the panel. The top panel and the bottom panel may be formed by suction moulding process or contour machining process directly. The panel having the structure described above can connect with other parts of the table.

---

11. Robert B. Handfield, Steve V. Walton, Lisa K. Seegers and Steven A. Melnyk, *Journal of Operations Management*, Volume 15, Issue 4, November 1997, Pages 293-315

12. Luhao Leng , *European Journal of Marketing*, vol 27, page 21-38

Dong-Mei Wang , Zhi-Wei Wang , Qiang-Hua Liao<sup>13</sup> in their article, “Energy absorption diagrams of paper honeycomb sandwich structures” said It is very important to evaluate the cushioning properties of paper honeycomb sandwich structures for optimizing pack design.. By considering the factors associated with the structure of paper honeycombs, the energy absorption model is obtained and characterized by the thickness-to-length ratio of the honeycomb cell wall. Both theory and experiment show that the compression energy absorption capability increases with the increasing thickness-to-length ratio of the honeycomb cell wall, and a good agreement is achieved between the theoretical and experimental energy absorption curves. The proposed method to develop an energy absorption diagram for paper honeycomb sandwich structures can be used to characterize the cushioning properties and optimize the structures of paper honeycomb sandwiches. Copyright © 2008 John Wiley & Sons, Ltd.

Oskar Jonsson, Siv Lindberg, Anders Roos, Mårten Hugosson, Mikael Lindström<sup>14</sup> in their article “Consumer Perceptions and Preferences on Solid Wood, Wood-Based Panels, and Composites: A Repertory Grid Study “ states that Knowledge about consumer perception and preferences on solid wood, wood-based panels, and wood-based composites is important for product development and marketing. The aim of this study was to identify attributes and associations that people use to describe different types of wood materials and to explore how they relate to preferences. The study involved nine samples that were evaluated with the Kelly's repertory grid technique and content analysis. Based on respondents' answers, 19 core categories reflecting sample attributes were extracted. General preferences for each sample were also recorded. Principal component analysis generated two factors describing 1) naturalness, wood-likeness, softness, unprocessed origin, living, pleasant, and high value; and 2) solid and homogeneous impression. A third, preliminary factor included categories describing irregular pattern, sleekness, and smoothness.

---

13.Dong-Mei Wang, Zhi-Wei Wang, Qiang-Hua Liao Journal of Operations Management, Vol15, Issue 4, Nov 1997, Pg 293-315

14. Oskar Jonsson, Siv Lindberg, Anders Roos, Mårten Hugosson, Mikael Lindström,

### **1.3 Statement of the problem:**

**V3 ENGINEERS PVT LTD** are planning to launch pre- fabricated walls made up of paper honey comb in combination with gypsum boards with a brand name as “e panel”.The issue raised here is that the paper honey comb is a new material used for manufacturing of doors, windows and panels in India. Though honey comb doors has been a concept widely used in the whole of Europe for more than three decades. Thus the awareness about this concept in India is comparatively less. Moreover people have a perception that the products made out of paper honey comb are fragile and they feel insecure.

### **1.4 Objectives:**

#### **Primary objective:**

- ❖ To study the market feasibility of paper Honey comb panels in the Bangalore market with reference to V3 Engineers Pvt Ltd, Bangalore

#### **Secondary objective:**

- ❖ To identify the target audience for paper honey comb panels.
- ❖ To study the comparison of paper honey comb panels with its substitutes.
- ❖ To identify the real usage of paper honey comb panels.

### **1.5 Scope of the study:**

This research gives a broad frame work about the market feasibility of the paper honey comb panels in Bangalore market and an analysis about the perception about the product by the end users as well as by interior architect. This research would also help to identify the current views and the market where it can be invested profitably. This study has been conducted in Bangalore city with sample size of 25.

## **1.6 Research methodology:**

### **a) Type of study:**

The research design adopted for this study is descriptive research. The research instrument for the study was the structured the standardized questionnaire.

### **b) Sample design:**

The total population of target audience is 166. The size of the sample is 25. The sampling method used in this study is random sampling.

### **c) Data collection method:**

The data collected can be categorized into two types:

1. Primary data
2. Secondary data

#### **Primary data:**

The primary data is collected through specially designed questionnaire which is used to collect data from the retailers. Personal interview method is also adopted to know the respondent's opinion and manager's viewpoint.

#### **Secondary data:**

The secondary data relating to retention strategy and history of the company is collected from the records of the company. Further data related to the company and the retailers are collected from the internet.

### **d) Tools for data analysis:**

- ✚ Percentage analysis
- ✚ Chi-square
- ✚ Weighted average
- ✚ One way anova

## **Percentage analysis:**

Percentage analysis is used to represent raw streams of data as a percentage (a part in 100 - percent) for better understanding of collected data.

## **Chi-Square analysis:**

Chi-Square test is one of the simplest and most widely used non parametric tests. Chi square test is applied in statistics to test the goodness of fit to verify distribution of observed data with assumed theoretical distribution.

## **One way anova:**

The results of the analysis are presented in an ANOVA table. In one-way ANOVA, the total variation is partitioned into two components. Between Groups represents variation of the group means around the overall mean. Within Groups represents variation of the individual scores around their respective group means

## **1.7 Limitations of the study:**

This study is limited to the area of Bangalore alone. The validity and reliability of the data obtained depends on the responses from the target audience that is architects, builders, interior designers, even management consultancy. There were many personal bias of the respondent, which affects the result of the study. The responds from each one of them varied from one another. The study was limited to a specific number of respondents, which did not cover the whole population.

## *CHAPTER 2*

## CHAPTER 2

### 1.1 History of the company:

**V3 ENGINEERS PVT.LTD** is one of the leading manufacturing firm in India focusing modular office partitioning systems, modular kitchen appliances and interior designing. Started in the year 1990 by 3 first generation engineers, **V3** has grown to a 1,20,000 sqft set up on a 20 acre plot. A state of art manufacturing facility with latest machineries from across the world. All products are conceptualized, designed, developed and manufactured in-house with sophisticated infrastructure. There are around 101-500 people employed in **V3 ENGINEERS PVT LTD**. The total annual sales volume is between US\$5 Million - US\$10 Million. The main market for the company is south east Asia.

**V3** is at the forefront of the metamorphosis that is taking the furniture and interior décor space by storm. With the nerve centre at Bangalore, **V3** is a force to reckon with – providing solutions that amalgamate style with substance and form with function. Through the **OfficeZone, HomeZone and Interiorz divisions**, with products and services that span the office, home and commercial spaces. Double-walled Construction, Central Gravity Ventilation, Elevated Walkways, Centralized Dust Collectors and Natural Landscaping are just a few features that increase production efficiency, reduce energy consumption and enhance the work floor ambience. Beyond cutting edge technology, or transcending the imperative of creating an ambience – the abiding focus is on establishing a work environment that accords great importance to ensuring that every individual enjoys comfort, the utmost in safety and an atmosphere that brings out the best in each one of our team members. After all, this is where the company craft products that become ‘Better solutions at work’

Continued focus on Design & Development will find expression through the state-of-the-art **V3 Campus** – offering comprehensive solutions ranging from Design to

Prototyping and from Manufacturing to Display Studio. As always, every design, product and service initiative will have one focus – customer delight. The manufacturing facilities at V3 are particularly instrumental in aiding economic and social development – through the imparting of skills and the creation of Employment avenues.

As an organization that accords the highest priority to ensuring excellence in everything that we do, V3 thrives on quality. All aspects of our business are oriented to ensure the best in quality – right from people to processes and products. This includes a failure-proof Quality Assurance Plan and time tested practices like 5S. Adherence to best practices and compliance with International quality standards are enforced and ensured meticulously.

V3 is an Institutional Member of the Quality Circle Forum of India (QCFI) and our Quality Management System (QMS) is certified under the International Quality Standard, ISO 9001:2010 by Det Norske Veritas (DNV) - testimony to our abiding commitment to quality.

## **2.2 Management:**

Foresight, visionary thinking and future focus have been the guiding principles at V3 – ideals that first kindled the entrepreneurial spirit in the 3 men who set out to make a difference.

- ❖ S Sampath Raghavan, Director - Sales & Marketing
- ❖ R Guru Prasad, Director - Finance & Admin
- ❖ N Vasu, Director – Operations

## **Vision:**

To be a global organization delivering the best for direct and indirect stake holders adopting robust, ethical and exemplary management policies.

## **Values:**

At V3, there is more to business than mere top lines and bottom lines. Ethical business conduct, transparency, financial discipline, high levels of professionalism, and the spirit of teamwork constitute the core values for the organization.

## **2.3 Future plans:**

While OfficeZone and Interiorz will offer products and services through various branches and established business associates, HomeZone offerings will be through branded franchisee outlets – with 30 outlets scheduled to open across South India by 2011.

## **Innovation:**

Innovation is not about being distinct to be different. The accent is on seamlessly fusing form with function, while ensuring that each product offers value for money. The design idiom at V3 is guided by the philosophy of ‘Better solutions at work’. Thus, every creative spark that flies within the minds and walls at their Design Studio is oriented to ensure a creative realization of this core design tenet.

From solutions that form part of our OfficeZone portfolio to products that constitute HomeZone range, to projects executed by Interiorz division – the emphasis is on redefining living spaces through a dexterous balance of ergonomics and aesthetics, effective usage of material and method and the latest in technology – to ensure great user experiences.

## **Development:**

Exquisite products and efficient services are the outcome of effective processes. A robust combination of Quality Systems and Development Standards ensures reliable processes to guarantee excellence in every component of the V3 portfolio. Each product that rolls out of the shop floor is the culmination of a process that involves innovative concepts, deft design and high production values to offer customers a fine blend of form, function and value for money.

While a battery of qualified and experienced technical professionals ensure the best in production, exemplary management by their seasoned project teams ensure timely and successful execution of projects.

## **Corporate Office:**

V3 ENGINEERS PVT. LTD

#6/1, 6/2, 6/5, 7/1,

Deganahalli, near budhihal village,

Nelamangala Taluk,

Bangalore 562 123

## **Branch offices:**

- ✓ Chennai
- ✓ Hyderabad
- ✓ Kochi
- ✓ Mumbai
- ✓ New Delhi
- ✓ Bahrain
- ✓ Sydney

## **2.9 Products:**

### **V3 Office zone:**

- Work station
- Storage system
- Cabin furniture
- Accessories
- Table legs
- Reception tables

### **V3 Home zone:**

- Modular kitchen
- Modular bedrooms
- Doors
- Panels

## **Services:**

### **V3 Interiorz:**

- ❖ Ceilings gypsum and drop tile systems
- ❖ Painting
- ❖ Gypsum walls
- ❖ Carpentry works
- ❖ Timber floors
- ❖ Aluminium works
- ❖ Glass works

- ❖ Electrical and networking
- ❖ Window furnishing
- ❖ HVAC
- ❖ Sprinkler systems
- ❖ Doors
- ❖ Furniture
- ❖ Full turnkey projects

## **2.10 Competitors:**

- Feather lite
- Blowplast Ergo space
- Godrej
- Feugo furniture pvt ltd

## **2.11 Awards and recognitions:**

- The Quality Management System (QMS) at V3 is certified under the International Quality Standard, ISO 9001:2000 by Det Norske Veritas (DNV).
- V3 is an Institutional Member of the Quality Circle Forum of India (QCFI), having participated in the Bangalore Chapter Convention & the National Convention on Quality Circles, 2006.
- The 3 Quality Circles at V3 - Prakruti, Evershine & Kaveri have been awarded the Par Excellence, Excellent & Distinguished Awards in the QC Conventions held at Bangalore & at IIT, Kanpur.
- V3 bagged the award in the category of Deemed Exports of Modular Office Furniture (Plywood & Allied Products) for the year 2005-2006, by the CAPEXIL Network, sponsored by Ministry of Commerce, Government of India.

- **V3** is an International Member of BIFMA INTERNATIONAL (The Business & Institutional Furniture Manufacturer's Association).
- The **V3** Factory Garden won the 1st & 2nd Prizes in the Category of 'Industrial Gardens' during the Republic Day Horticultural Flower Shows conducted by the Mysore Horticultural Society, Lalbagh, Bangalore - for 2 consecutive years, 2006 & 2007.
- **V3** Dorz bagged the 2nd Prize in the Category of Plywood, Bamboo Accessories & Allied Products, at the Panel Expo 2007 held at Pragati Maidan, New Delhi.

## **2.12 Corporate responsibility:**

**V3** are conscious of the fact that the business they are in, hinges on nature's bounty. This constantly motivates them to commit themselves to protect the environment and support the community in areas where they operate. All their people and processes are sensitized to this fact of their business – enabling each one of them at **V3** to go beyond business – to touch and change lives. Few of the initiatives taken by **V3** are:

- Class room furniture, bags and books to village schools
- Van Mahotsav – to involve school children in short training programs on environment conservation, besides a tree plantation drive in the factory campus.
- **V3** Varnakriti – Platform for budding artists from small towns and villages was provided to showcase and promote their talent.

# *CHAPTER 3*

## CHAPTER 3

### 3.1. Data analysis and interpretation:

This chapter deals with analysis and interpretation of data collected through questionnaire.

#### PERCENTAGE ANALYSIS:

Percentage analysis is used to represent raw streams of data as a percentage (a part in 100 - percent) for better understanding of collected data.

**TABLE 3.1.1: TYPE OF ESTABLISHMENT**

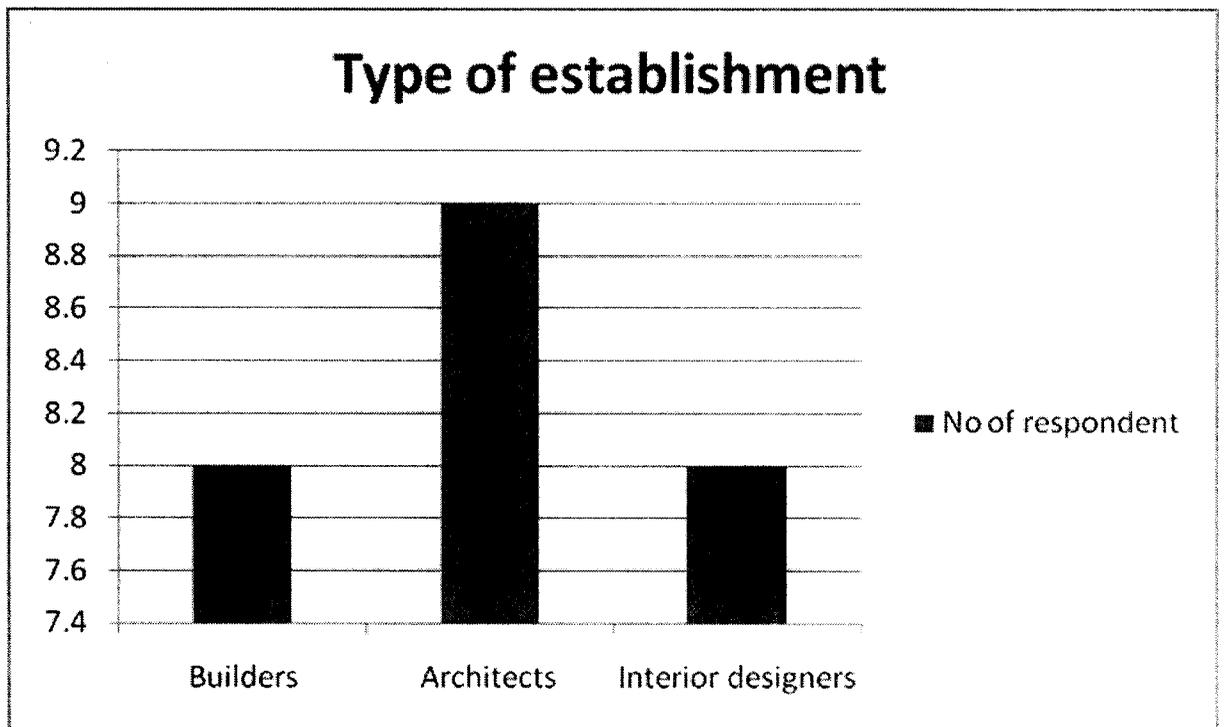
Sl no	Type of establishment	No of respondent	Percentage
1	Builders	8	32.0
2	Architects	9	36.0
3	Interior designers	8	32.0
		25	100.0

#### Inference:

It is inferred from the above table that 32% of the total respondents are builders, 36% of total respondents are architects and the rest are interior designers. The target audience for paper honey comb panels are mostly the architects whom should be given prior importance.

## CHART 1:

### 3.1.1: TYPE OF ESTABLISHMENT



**TABLE 3.1.2: PERIOD OF PRESENCE**

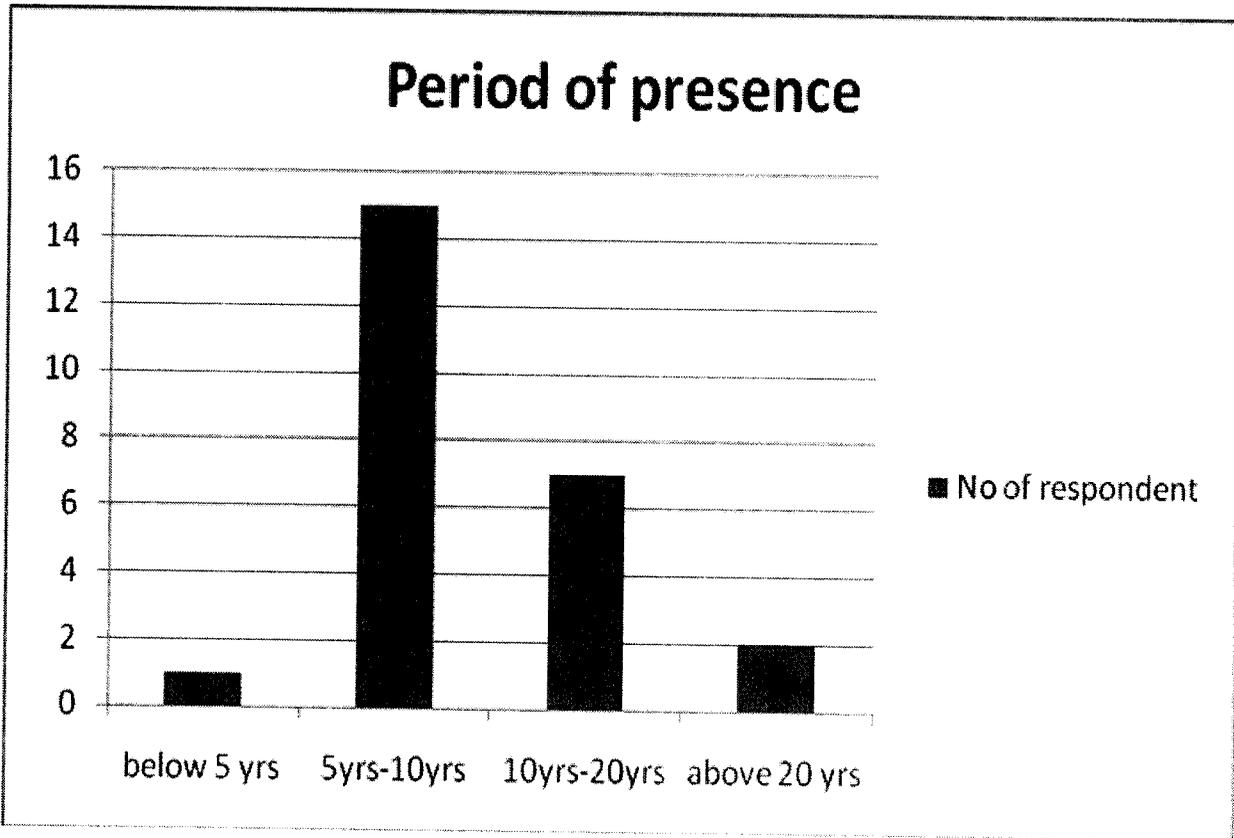
Sl no	Period of presence	No of respondent	Percentage
1	below 5 yrs	1	4.0
2	5yrs-10yrs	15	60.0
3	10yrs-20yrs	7	28.0
4	above 20 yrs	2	8.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 60% of respondents are in this field between 5 to 10 years. 28% of respondents are in this field between 10 to 28 years. 8% of respondents are being in this field for more than 20 years and 4% of respondents are in this field for less 5 years.

**CHART 2:**

**3.1.2: PERIOD OF PRESENCE**



**TABLE 3.1.3: AMOUNT OF INVESTMENT**

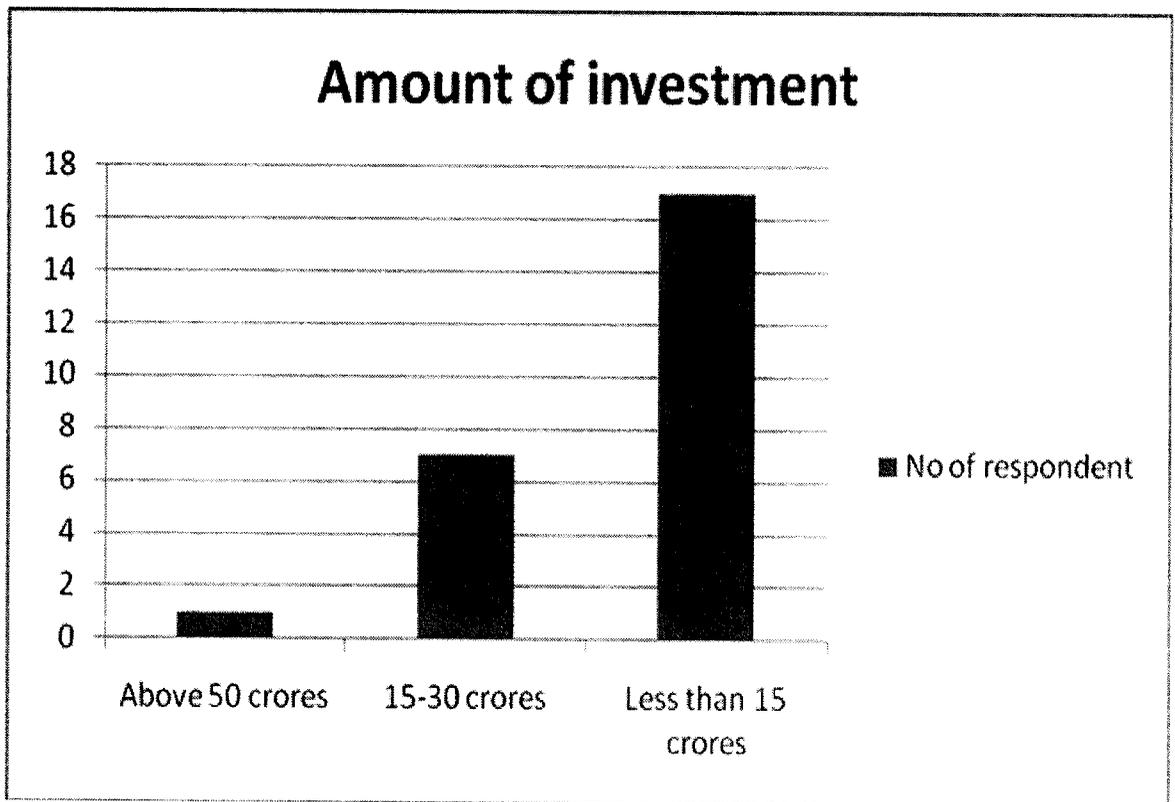
<b>Sl no</b>	<b>Amount of investment</b>	<b>No of respondent</b>	<b>Percentage</b>
1	Above 50 crores	1	4.0
2	15-30 crores	7	28.0
3	Less than 15 crores	17	68.0
<b>Total</b>		25	100.0

**Inference:**

It is inferred from the above table that 68% of respondent's level of investment in their respective field is less than 15 crores. 28% of respondent's level of investment in their respective field is between 28% and 4% of the respondent's level of investment is above 50 crores.

### CHART 3:

#### 3.1.3: AMOUNT OF INVESTMENT



**TABLE 3.1.4: NATURE OF PROJECT**

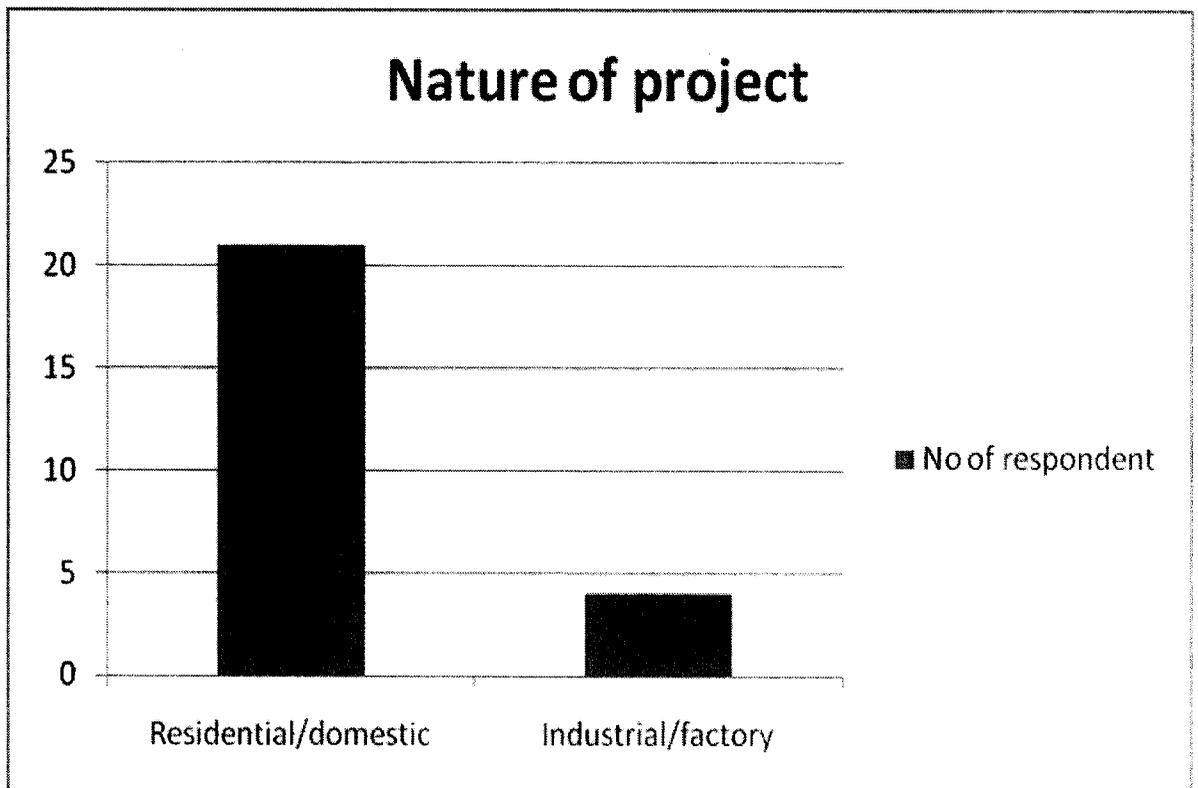
<b>Sl no</b>	<b>Nature of project</b>	<b>No of respondent</b>	<b>Percentage</b>
1	Residential/domestic	21	84.0
2	Industrial/factory	4	16.0
Total		25	100.0

**Inference:**

It is inferred from the above table that the nature of project of 84% of respondents are residential or domestic and 16% of respondent's nature of project is industrial or factory.

## CHART 4:

### 3.1.4: NATURE OF PROJECT



**TABLE 3.1.5.a: FREQUENCY OF PURCHASE: Particle board**

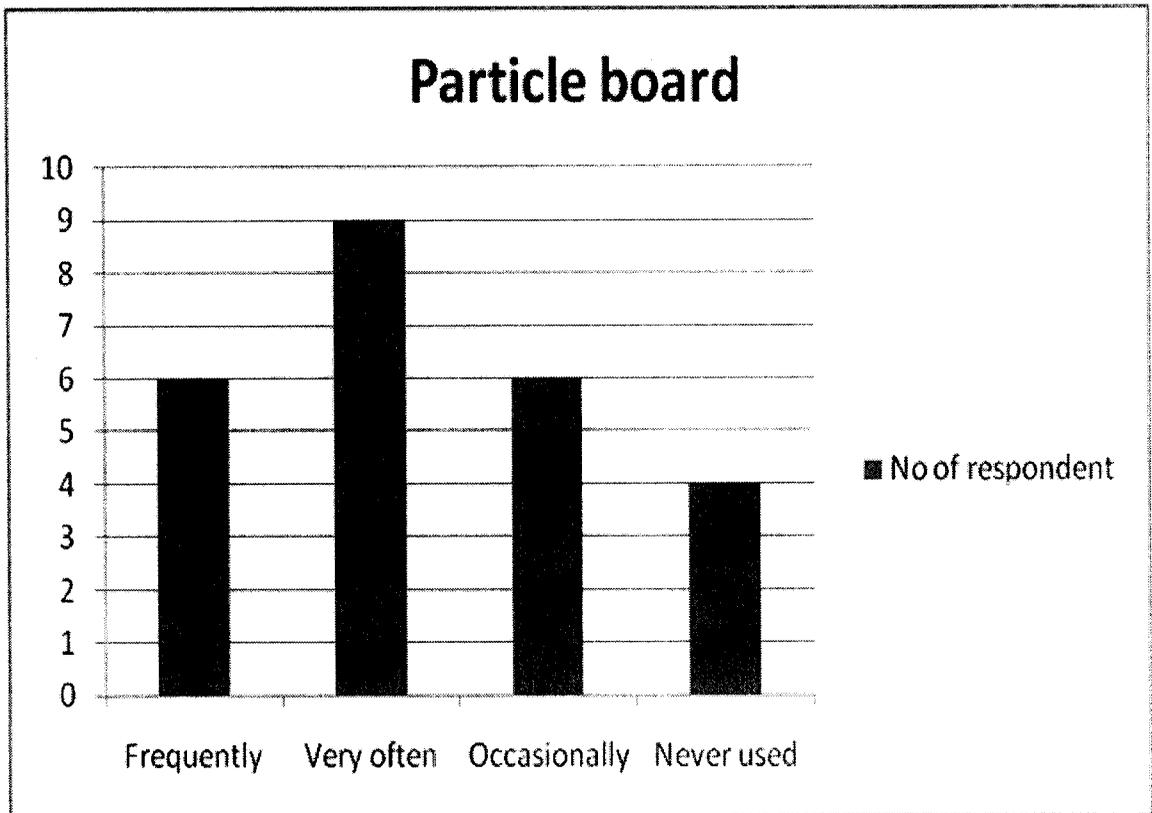
Sl no	Particle board	No of respondent	Percentage
1	Frequently	6	24.0
2	Very often	9	36.0
3	Occasionally	6	24.0
4	Never used	4	16.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 36% of the respondents use particle board very often. 24% of the respondents frequently use particle board. 24% of the respondents occasionally use particle board and 16% of the respondents never use particle board in their projects.

**CHART 5:**

**3.1.5.a: FREQUENCY OF PURCHASE: Particle board**



**TABLE 3.1.5.b: FREQUENCY OF PURCHASE: Aluminum honeycomb**

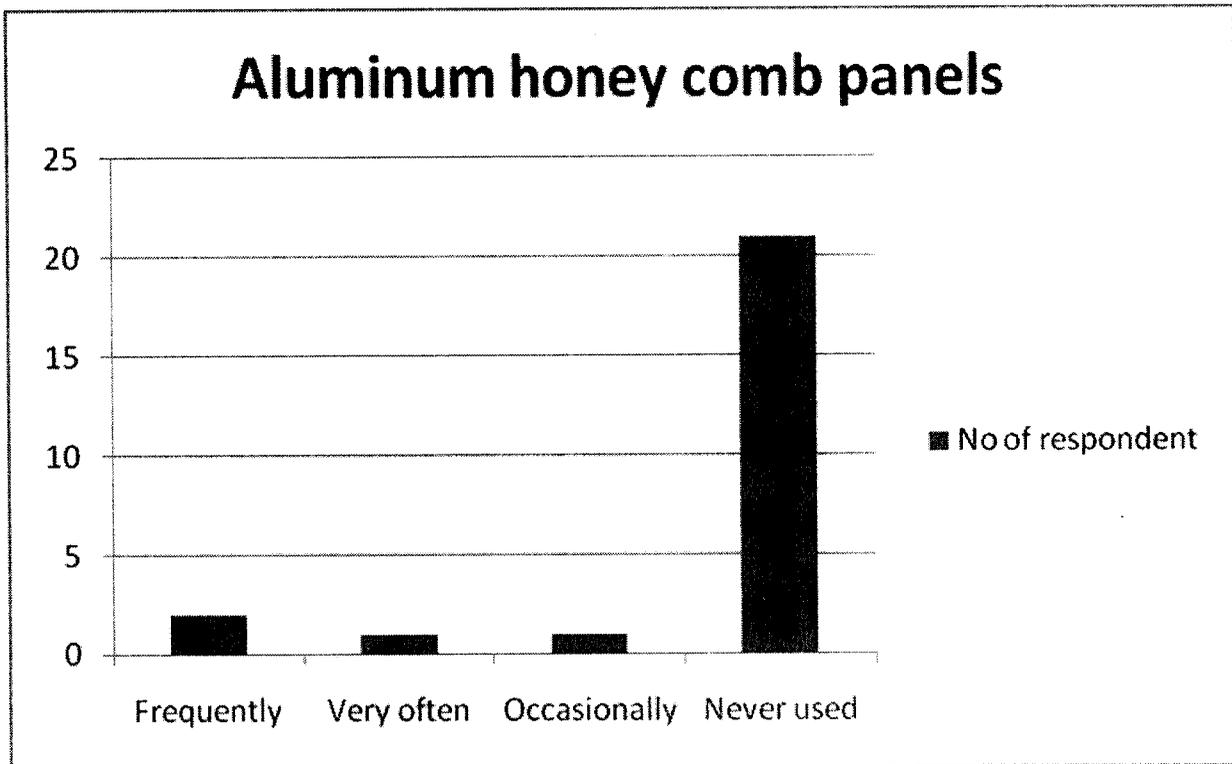
<b>Sl no</b>	<b>Aluminum honey comb</b>	<b>No of respondent</b>	<b>Percentage</b>
1	Frequently	2	8.0
2	Very often	1	4.0
3	Occasionally	1	4.0
4	Never used	21	84.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 84% of the respondents have never used aluminum honey comb in their projects. 8% of the respondents have frequently used aluminum honey comb and rest of the population have either occasionally or very often used it in their projects.

**CHART 6:**

**3.1.5.b: FREQUENCY OF PURCHASE: Aluminum honeycomb Panels**



**TABLE 3.1.5.c: FREQUENCY OF PURCHASE: Timber wood panels**

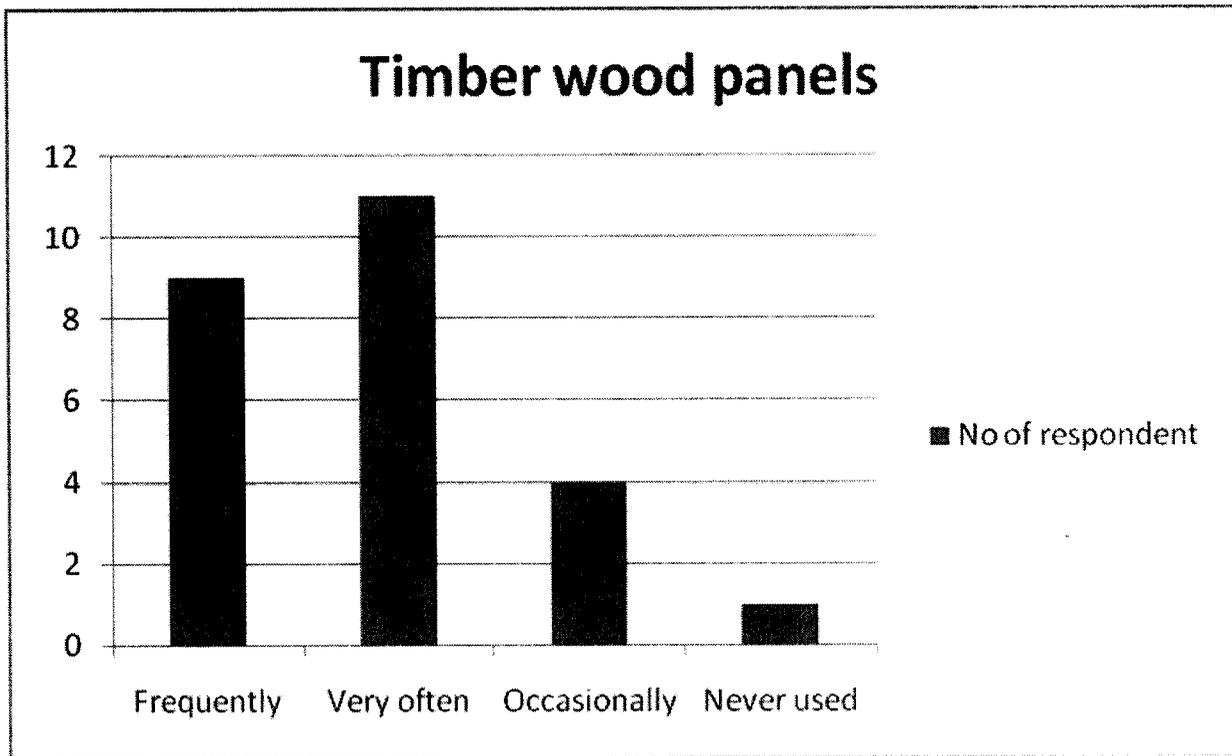
<b>Sl no</b>	<b>Timber wood panels</b>	<b>No of respondent</b>	<b>Percentage</b>
1	Frequently	9	36.0
2	Very often	11	44.0
3	Occasionally	4	16.0
4	Never used	1	4.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 44% of the respondents have very often used timber wood panels in their projects. 36% of the respondents have frequently used timber wood panels and 16% of the respondents have occasionally used it in their projects and rest of the population has never used timber wood in their projects.

**CHART 7:**

**3.1.5.c: FREQUENCY OF PURCHASE: Timber wood panels**



**TABLE 3.1.5.d: FREQUENCY OF PURCHASE: Plywood panels**

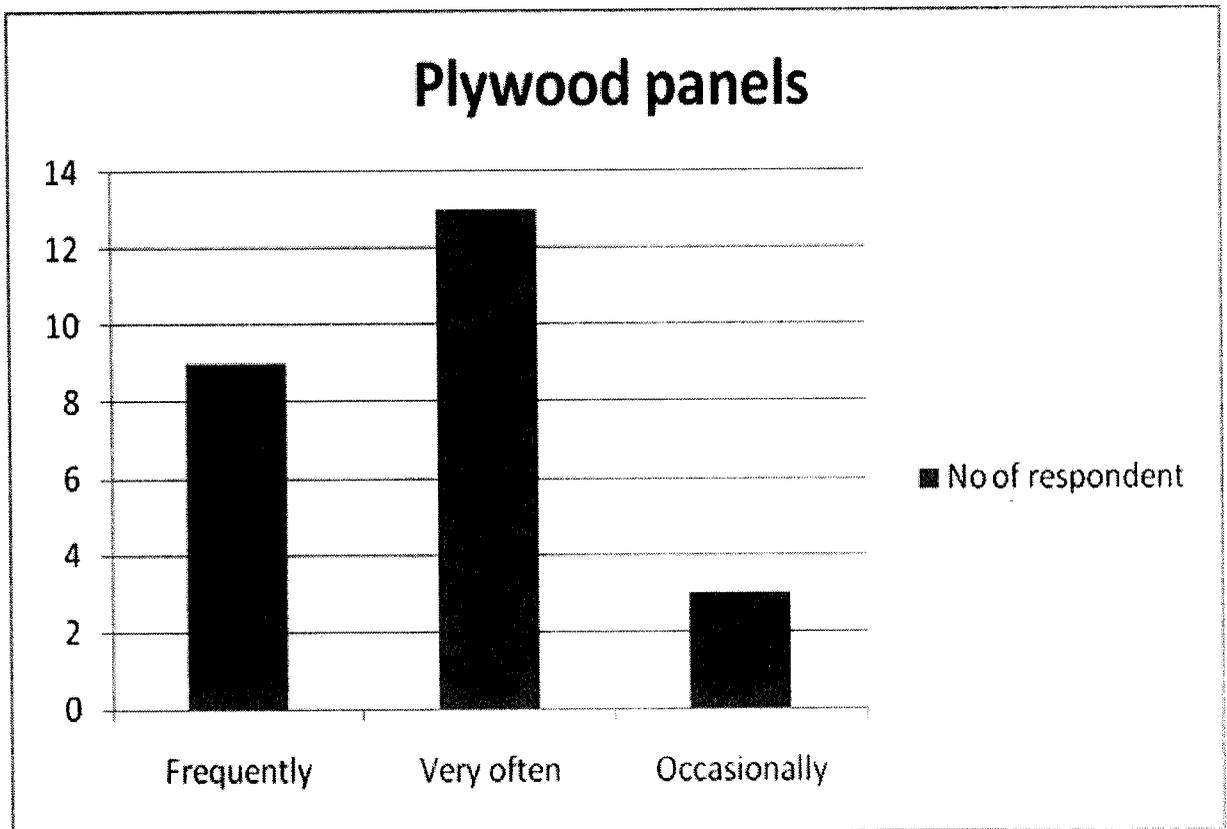
<b>Sl no</b>	<b>Plywood panels</b>	<b>No of respondent</b>	<b>Percentage</b>
1	Frequently	9	36.0
2	Very often	13	52.0
3	Occasionally	3	12.0
<b>Total</b>		25	100.0

**Inference:**

It is inferred from the above table that 52% of the respondents have very often used plywood panels in their projects. 36% of the respondents have frequently used plywood panels and 12% of the respondents have occasionally used it in their projects.

**CHART 8:**

**3.1.5.d: FREQUENCY OF PURCHASE: Plywood panels**



**TABLE 3.1.5.e: FREQUENCY OF PURCHASE: MDF panels**

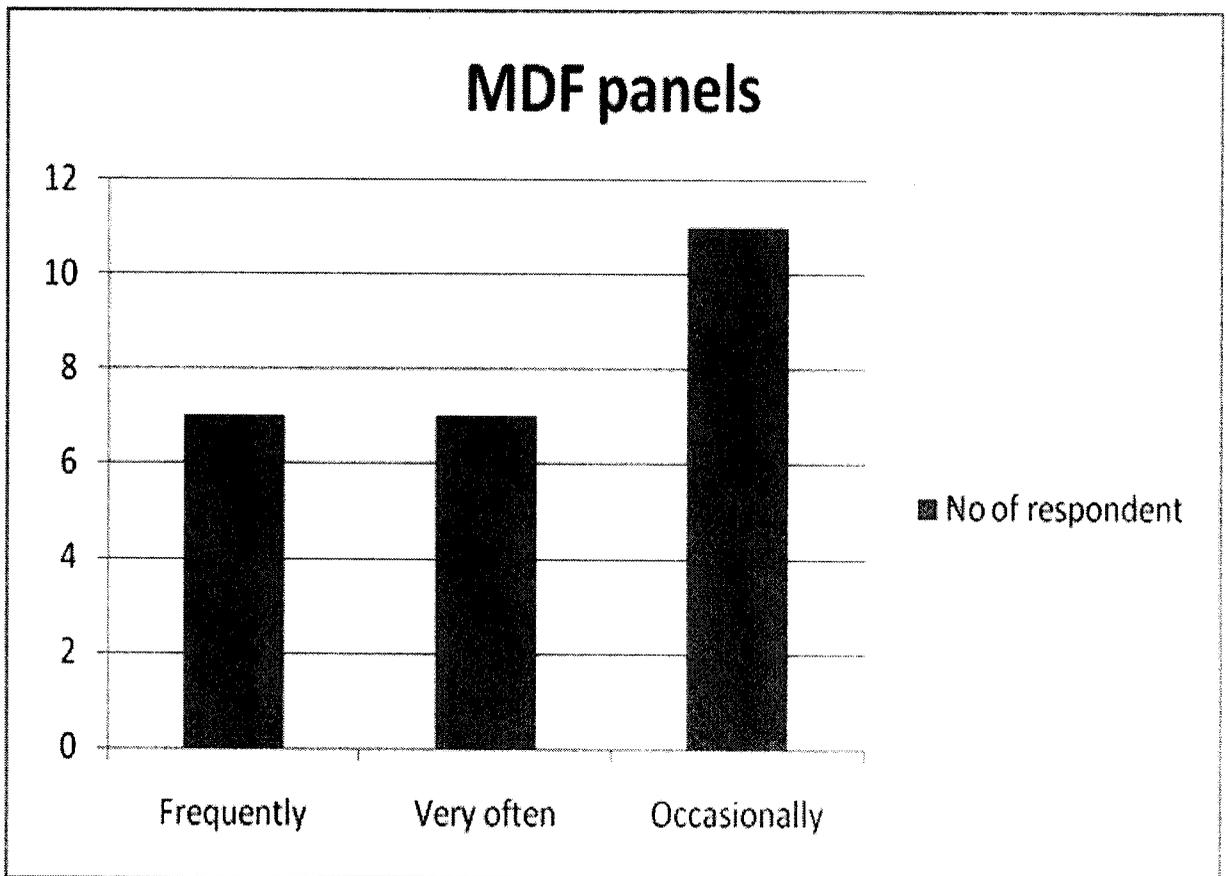
<b>Sl no</b>	<b>MDF panels</b>	<b>No of respondent</b>	<b>Percentage</b>
1	Frequently	7	28.0
2	Very often	7	28.0
3	Occasionally	11	44.0
<b>Total</b>		25	100.0

**Inference:**

It is inferred from the above table that 44% of the respondents have occasionally used MDF panels in their projects. 28% of the respondents have very often used MDF panels and 28% of the respondents have frequently used it in their projects.

**CHART 9:**

**3.1.5.e: FREQUENCY OF PURCHASE: MDF panels**



**TABLE 3.1.5.f: FREQUENCY OF PURCHASE: Solid wood panels**

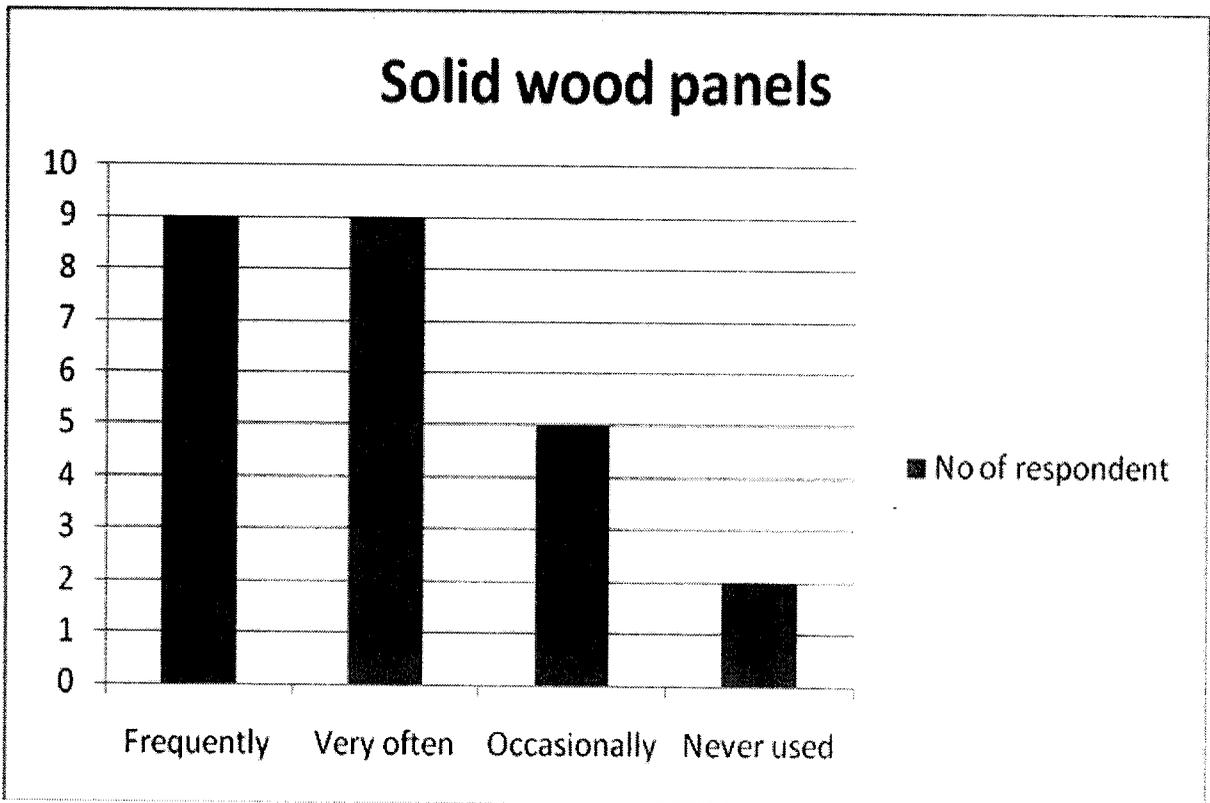
<b>Sl no</b>	<b>Solid wood panels</b>	<b>No of respondent</b>	<b>Percentage</b>
1	Frequently	9	36.0
2	Very often	9	36.0
3	Occasionally	5	20.0
4	Never used	2	8.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 36% of the respondents have very often used solid wood panels in their projects. 36% of the respondents have frequently used solid wood panels 20% of the respondents have occasionally used it and 8% of the respondents have never used it in their projects.

**CHART 10:**

**3.1.5.f: FREQUENCY OF PURCHASE: Solid wood panels**



**TABLE 3.1.6.a: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Durability**

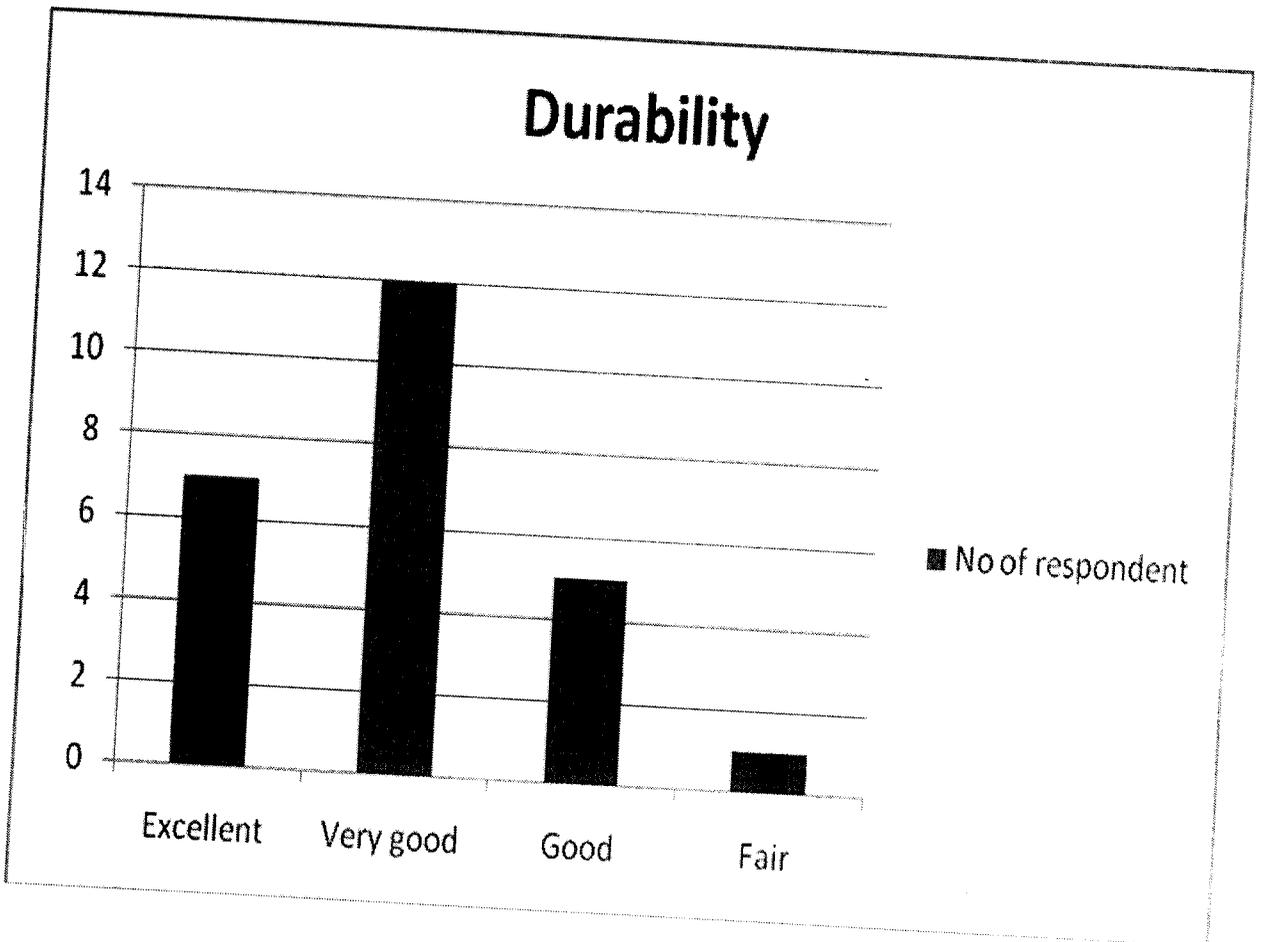
Sl no	Durability	No of respondent	Percentage
1	Excellent	7	28.0
2	Very good	12	48.0
3	Good	5	20.0
4	Fair	1	4.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 48% of the respondents have very good opinion about the durability of the panels that they currently use in their projects. 28% of the respondents feel the durability of the panels that they currently use in their projects are excellent. 20% of the respondents feel the durability of the panels that they currently use in their projects are good and rest have a fair opinion about the durability.

**CHART 11:**

**3.1.6.a: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Durability**



**TABLE3.1.6.b: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Price**

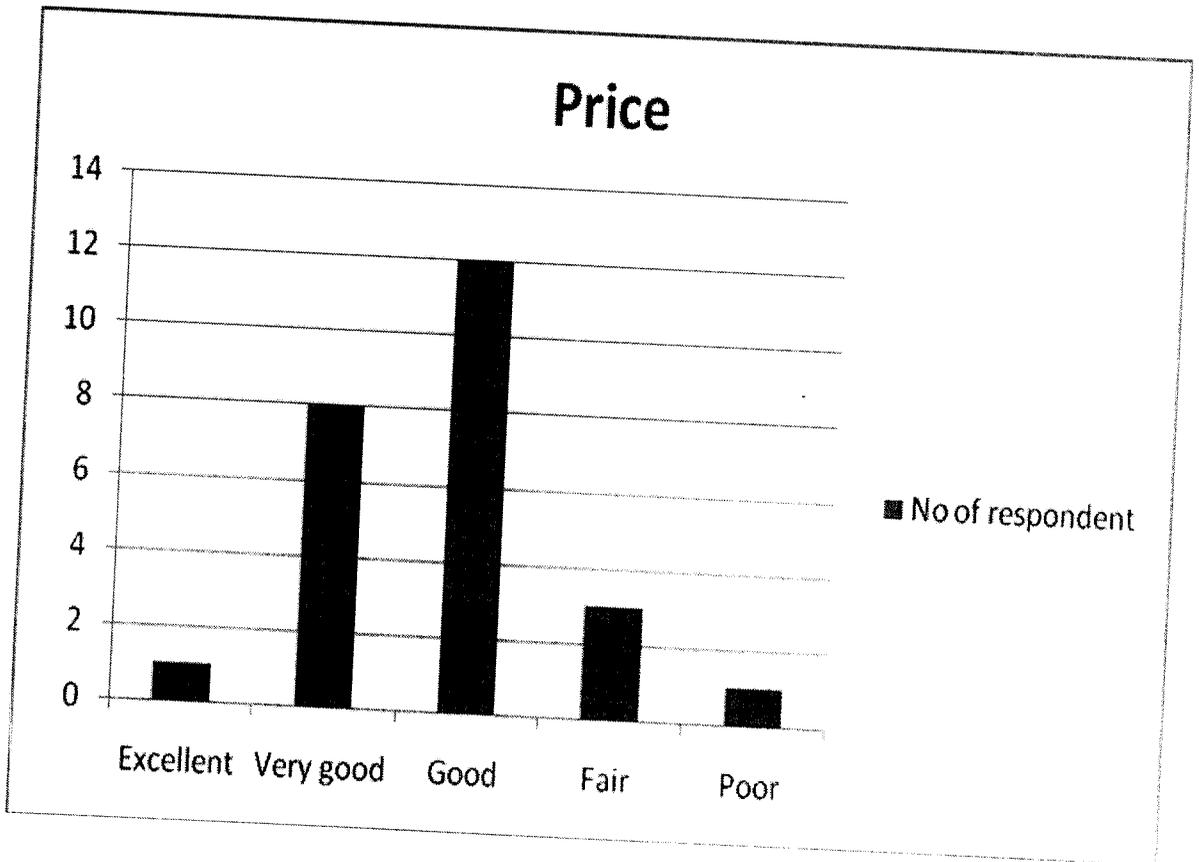
Sl no	Price	No of respondent	Percentage
1	Excellent	1	4.0
2	Very good	8	32.0
3	Good	12	48.0
4	Fair	3	12.0
5	Poor	1	4.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 48% of the respondents have good opinion about the price of the panels that they currently use in their projects. 32% of the respondents feel the price of the panels that they currently use in their projects are very good. 12% of the respondents think that the price of the panels that they currently use in their projects are fair and rest have either excellent or poor opinion about the price.

**CHART 12:**

**3.1.6.b: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Price**



**TABLE 3.1.6.c: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Quality**

Sl no	Quality	No of respondent	Percentage
1	Excellent	4	16.0
2	Very good	12	48.0
3	Good	9	36.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 48% of the respondents have very good opinion about the quality of the panels that they currently use in their projects. 36% of the respondents feel the quality of the panels that they currently use in their projects are good. 16% of the respondents feel the quality of the panels that they currently use in their projects are excellent.

**CHART 13:**

**3.1.6.c: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Quality**



**TABLE 3.1.6.d: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: High demand**

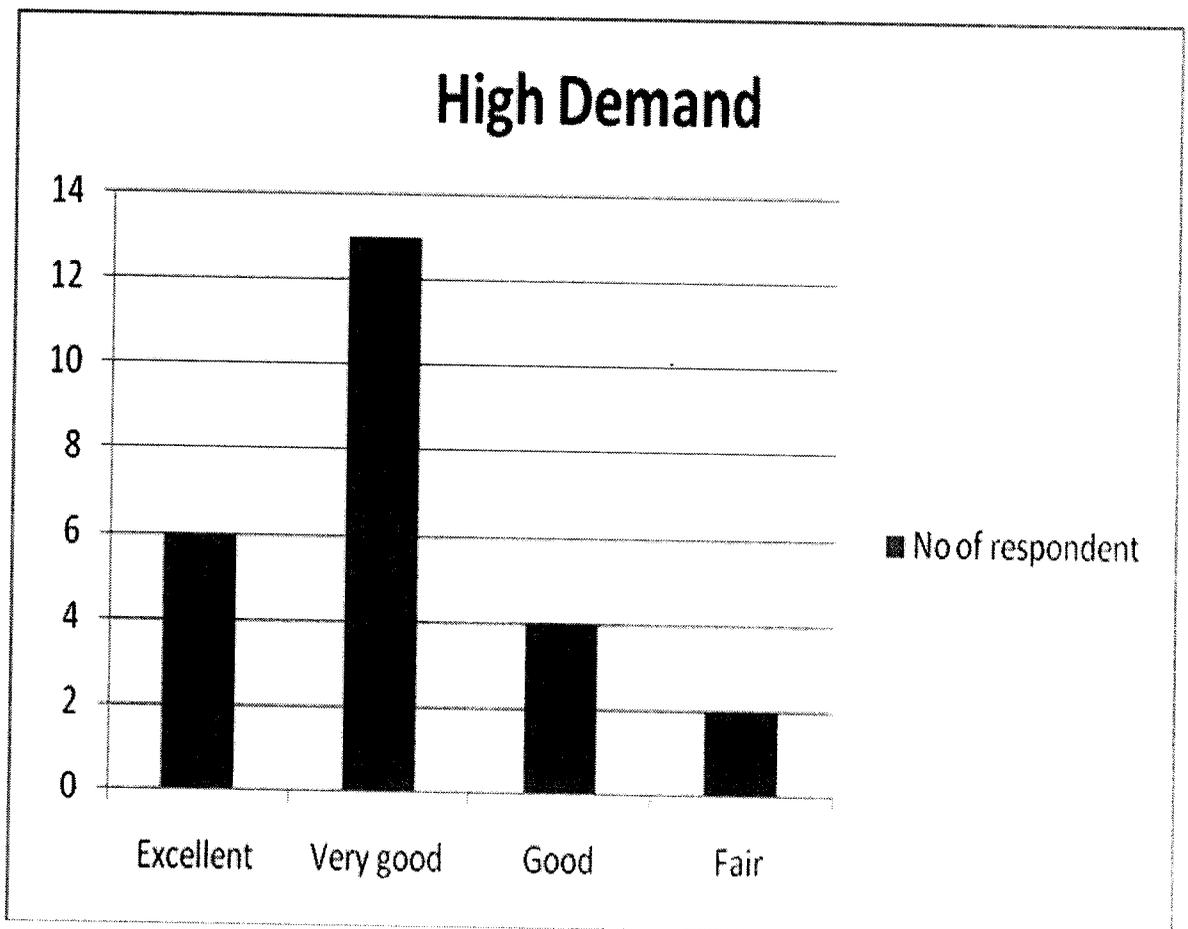
Sl no	High demand	No of respondent	Percentage
1	Excellent	6	24.0
2	Very good	13	52.0
3	Good	4	16.0
4	Fair	2	8.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 52% of the respondents feels that there is very good demand of the panels that they currently use in their projects. 24% of the respondents feel the demand of the panels that they currently use in their projects are excellent. 16% of the respondents feel the demand of the panels that they currently use in their projects are good. Rest of them has a fair opinion about the demand.

**CHART 14:**

**3.1.6.d: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: High demand**



**TABLE 3.1.6.e: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Availability**

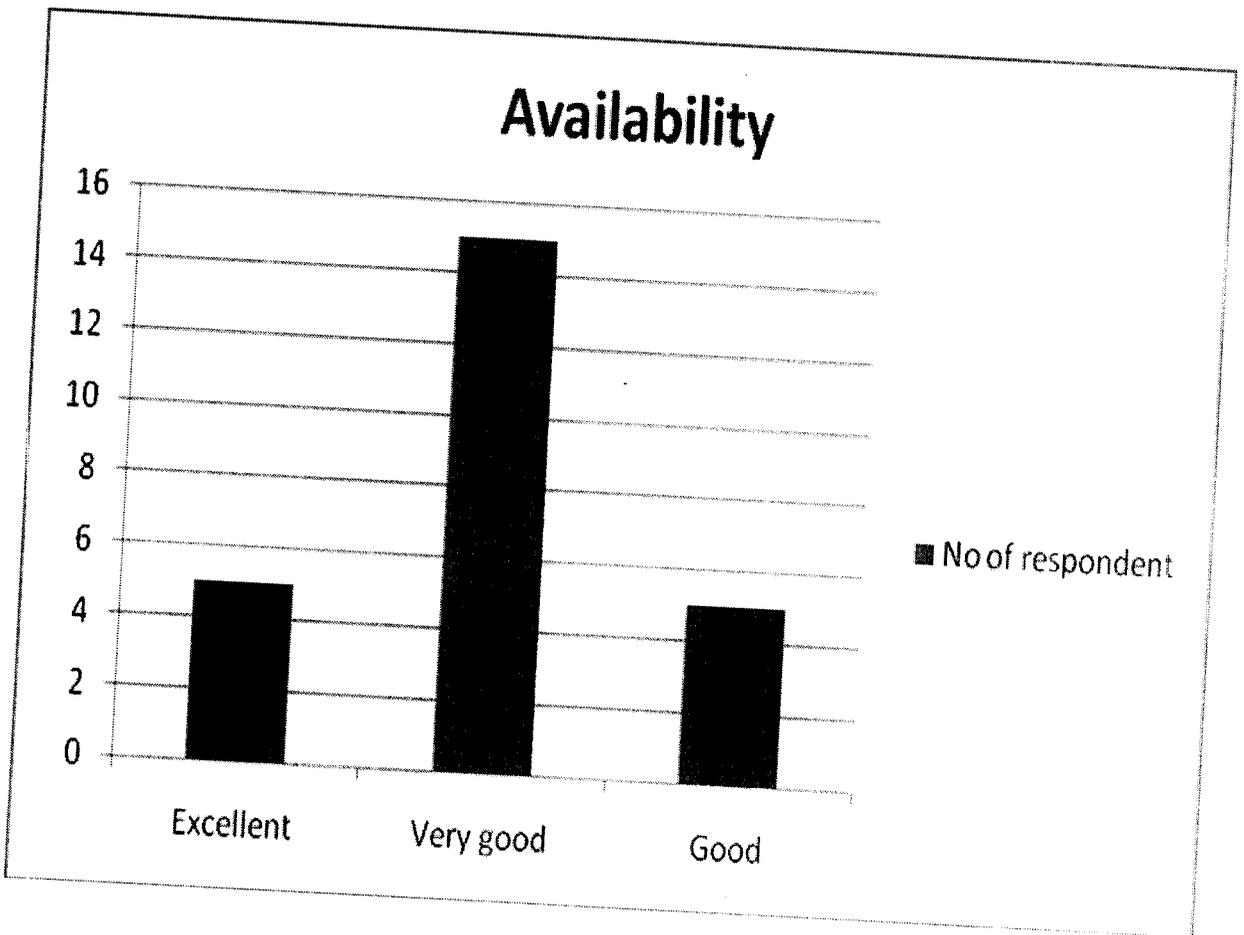
Sl no	Availability	No of respondent	Percentage
1	Excellent	5	20.0
2	Very good	15	60.0
3	Good	5	20.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 60% of the respondents feels that the availability of the panels that they currently use in their projects are very good. 20% of the respondents feels the availability of the panels that they currently use in their projects are excellent. 20% of the respondents feel the availability of the panels that they currently use in their projects are good.

**CHART 15:**

**3.1.6.e: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Availability**



**TABLE 3.1.6.f: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Strength property**

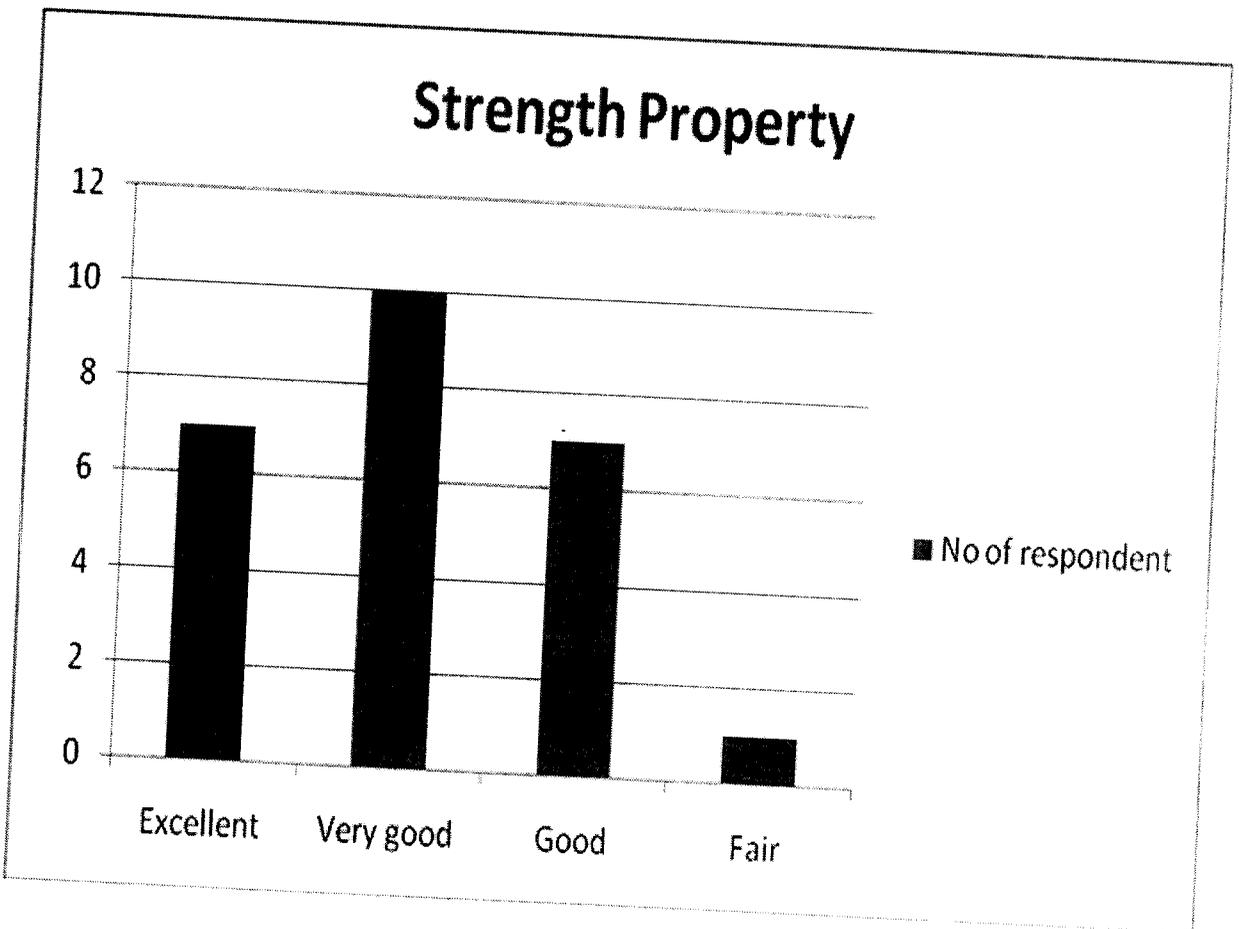
Sl no	Strength property	No of respondent	Percentage
1	Excellent	7	28.0
2	Very good	10	40.0
3	Good	7	28.0
4	Fair	1	4.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 40% of the respondents feels that the strength property of the panels that they currently use in their projects are very good. 28% of the respondents feel the strength property of the panels that they currently use in their projects are excellent. 28% of the respondents feel the strength property of the panels that they currently use in their projects are good. Rest feels its fair.

**CHART 16:**

**3.1.6.f: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Strength property**



**TABLE3.1.6.g: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Density**

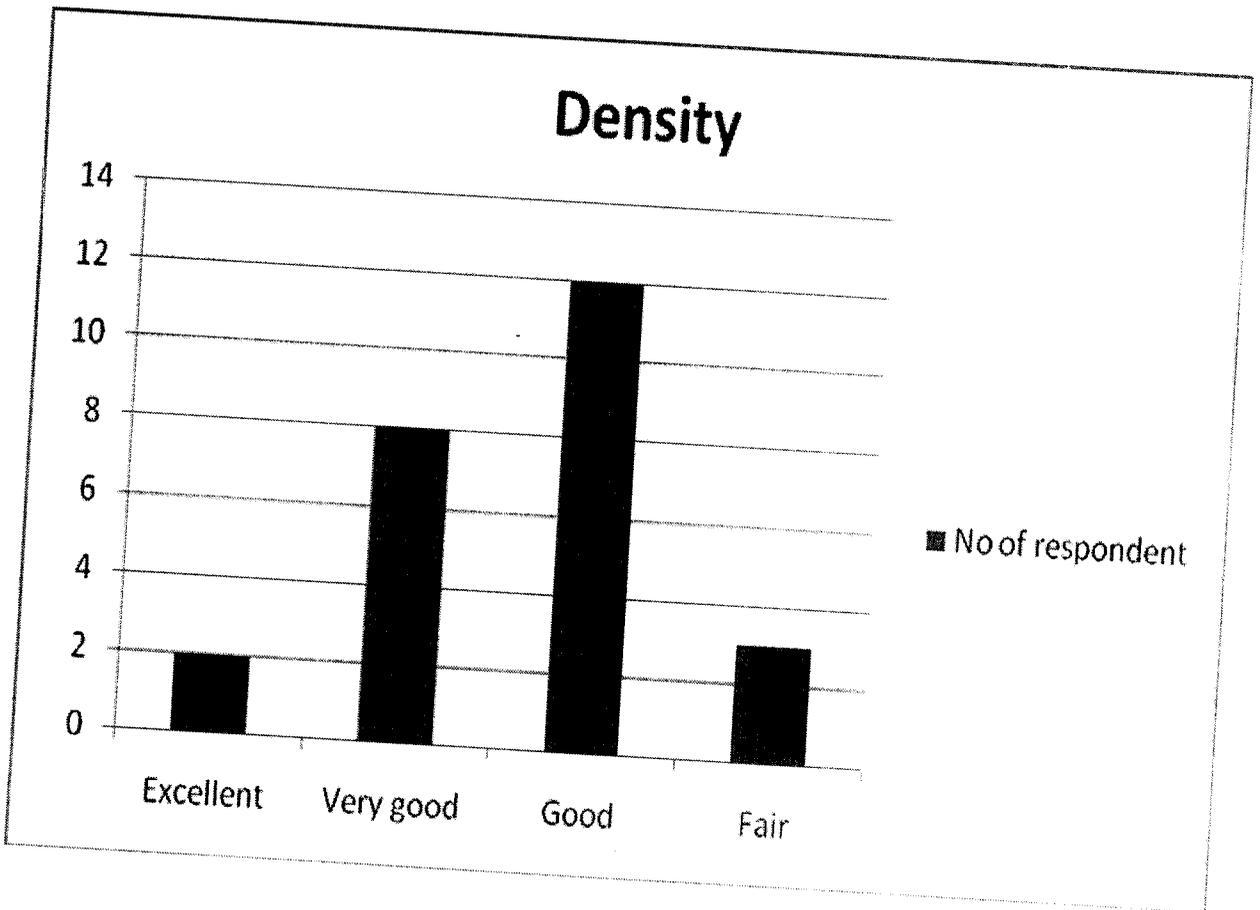
Sl no	Density	No of respondent	Percentage
1	Excellent	2	8.0
2	Very good	8	32.0
3	Good	12	48.0
4	Fair	3	12.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 48% of the respondents feels that the density of the panels that they currently use in their projects are very good. 48% of the respondents feel the strength property of the panels that they currently use in their projects are good. 12% of the respondents feel the strength property of the panels that they currently use in their projects are fair. Rest feels its excellent.

**CHART 17:**

**3.1.6.g: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Density**



**TABLE 3.1.6.h: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Pressure resistance**

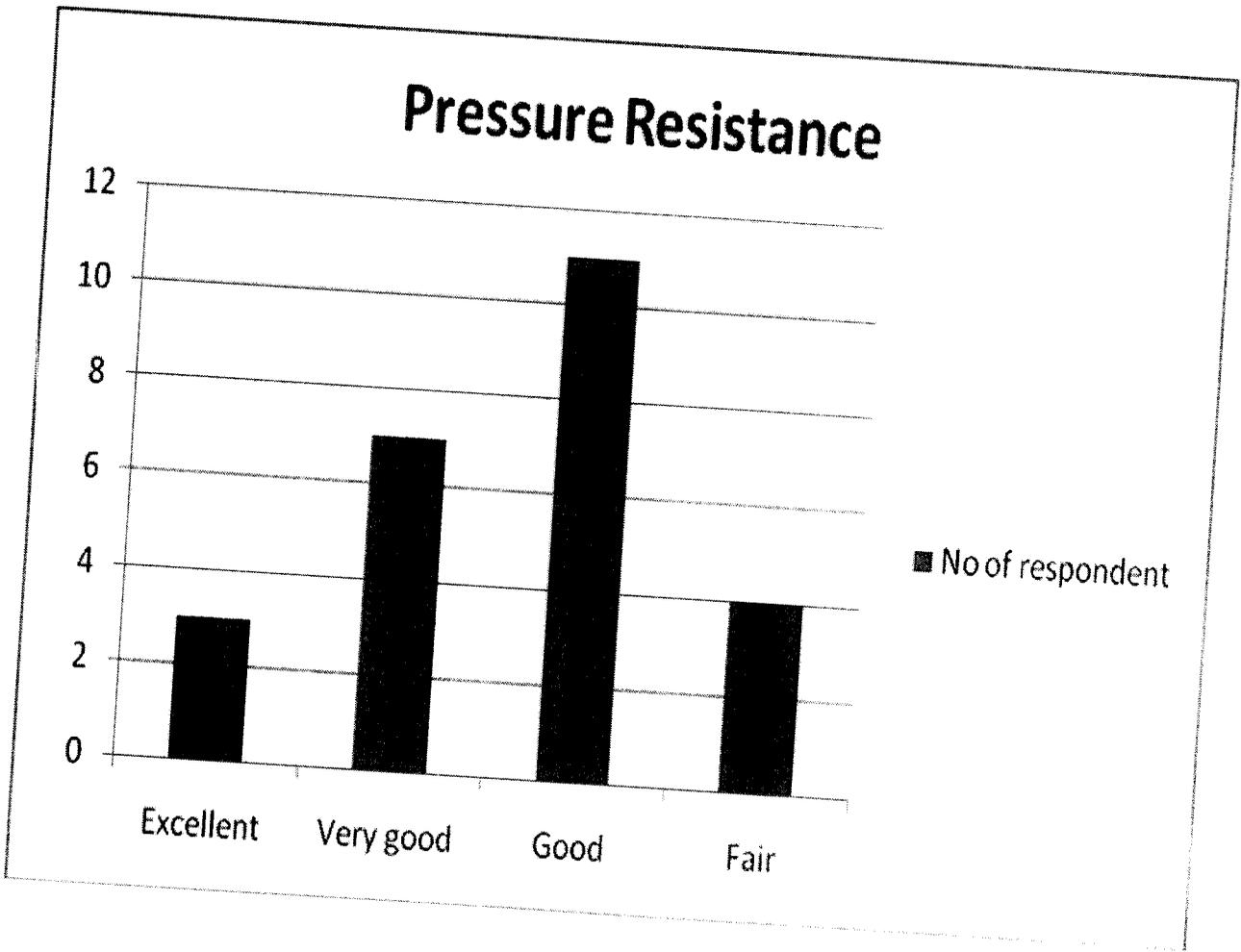
Sl no	Pressure resistance	No of respondent	Percentage
1	Excellent	3	12.0
2	Very good	7	28.0
3	Good	11	44.0
4	Fair	4	16.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 44% of the respondents feels that the pressure resistance of the panels that they currently use in their projects are good. 28% of the respondents feel the pressure resistance of the panels that they currently use in their projects is very good. 16% of the respondents feel the pressure resistance of the panels that they currently use in their projects is fair. Rest feels its excellent.

**CHART 18:**

**3.1.6.h: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Pressure resistance**



**TABLE 3.1.6.i: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Corrosion, fungi or moisture resistance**

Sl no	Corrosion, fungi or moisture resistance	No of respondent	Percentage
1	Excellent	1	4.0
2	Very good	3	12.0
3	Good	11	44.0
4	Fair	10	40.0
Total		25	100.0

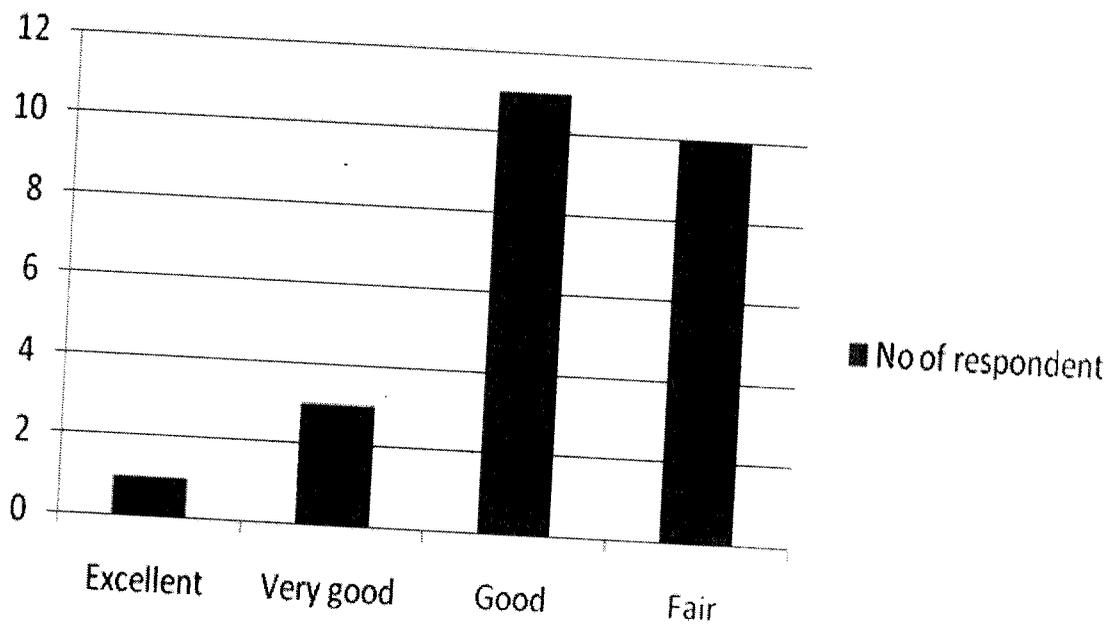
**Inference:**

It is inferred from the above table that 44% of the respondents feels that the corrosion and moisture resistance of the panels that they currently use in their projects are good. 40% of the respondents feel the corrosion and moisture resistance of the panels that they currently use in their projects are fair. 12% of the respondents feel the corrosion and moisture resistance of the panels that they currently use in their projects are very good. Rest feels its excellent.

**CHART 19:**

**3.1.6.i: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: Corrosion, fungi or moisture resistance**

**Corrosion, Fungi or Moisture Resistance**



**TABLE 3.1.6.j: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: present demand**

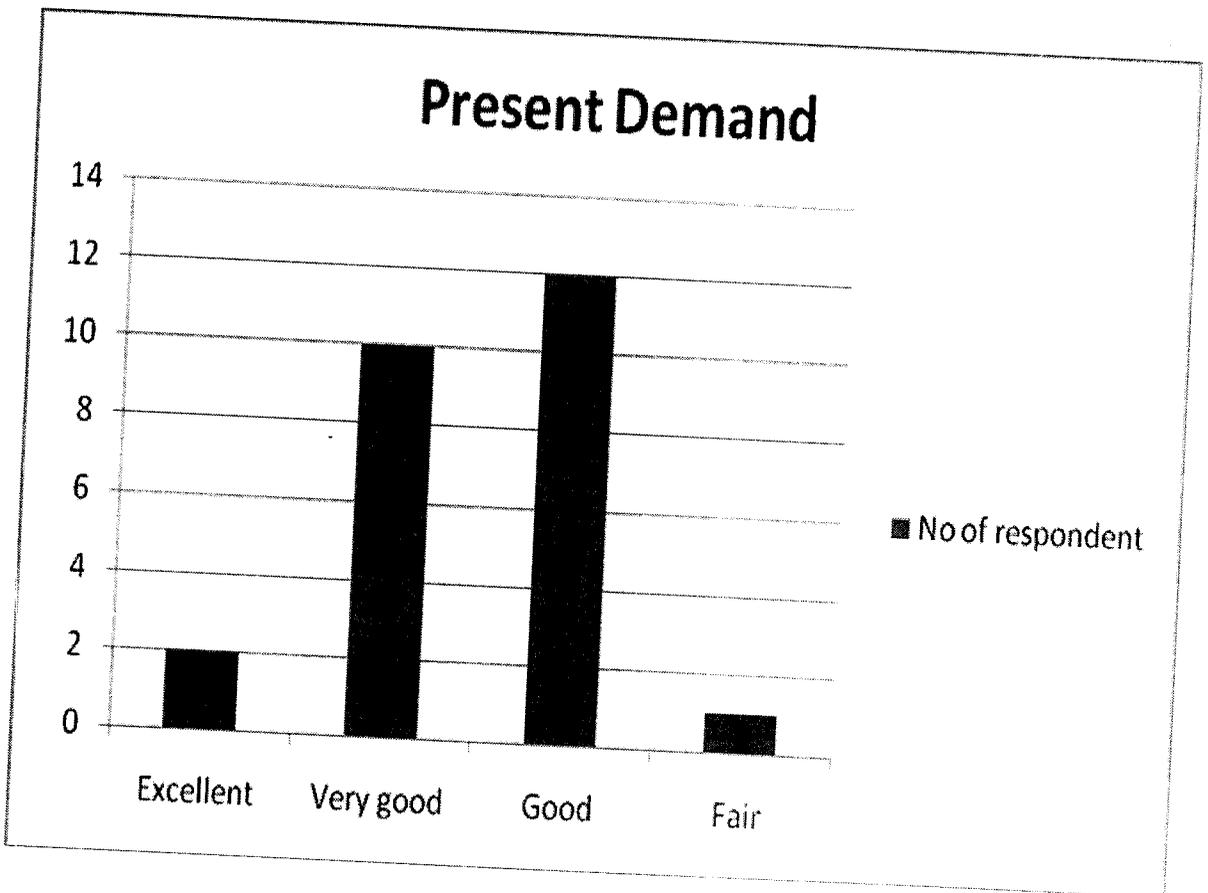
Sl no	Present demand	No of respondent	Percentage
1	Excellent	2	8.0
2	Very good	10	40.0
3	Good	12	48.0
4	Fair	1	4.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 48% of the respondents feels that the present demand of the panels that they currently use in their projects are good. 40% of the respondents feel the present demand of the panels that they currently use in their projects are very good. 8% of the respondents feel the present demand of the panels that they currently use in their projects are very good. Rest feels its fair.

**CHART 20:**

**3.1.6.j: SATISFACTORY LEVEL OF PANELS CURRENTLY BEING USED: present demand**



**TABLE 3.1.7.a: OPINION OF CURRENTLY USED PANELS:  
Expensive**

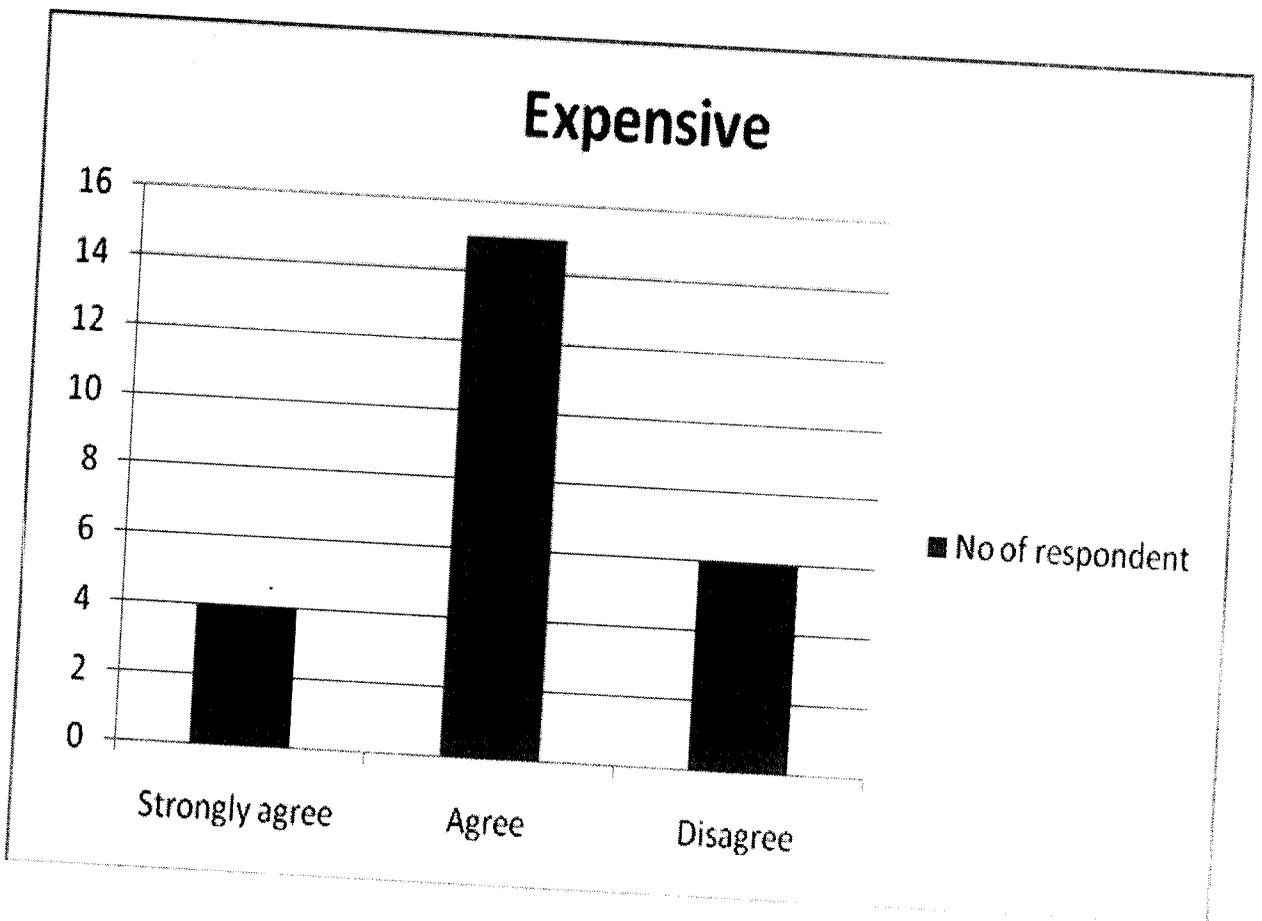
Sl no	Expensive	No of respondent	Percentage
1	Strongly agree	4	16.0
2	Agree	15	60.0
3	Disagree	6	24.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 60% of the respondents agree that the panels which they currently use in their projects are expensive. 24% of the respondents disagree that the panels which they currently use in their projects are expensive. 16% of the respondents strongly agree that the panels which they currently use in their projects are expensive.

**CHART 21:**

**3.1.7.a: OPINION OF CURRENTLY USED PANELS: Expensive**



**TABLE 3.1.7.b: OPINION OF CURRENTLY USED PANELS: Swells, breaks/splits:**

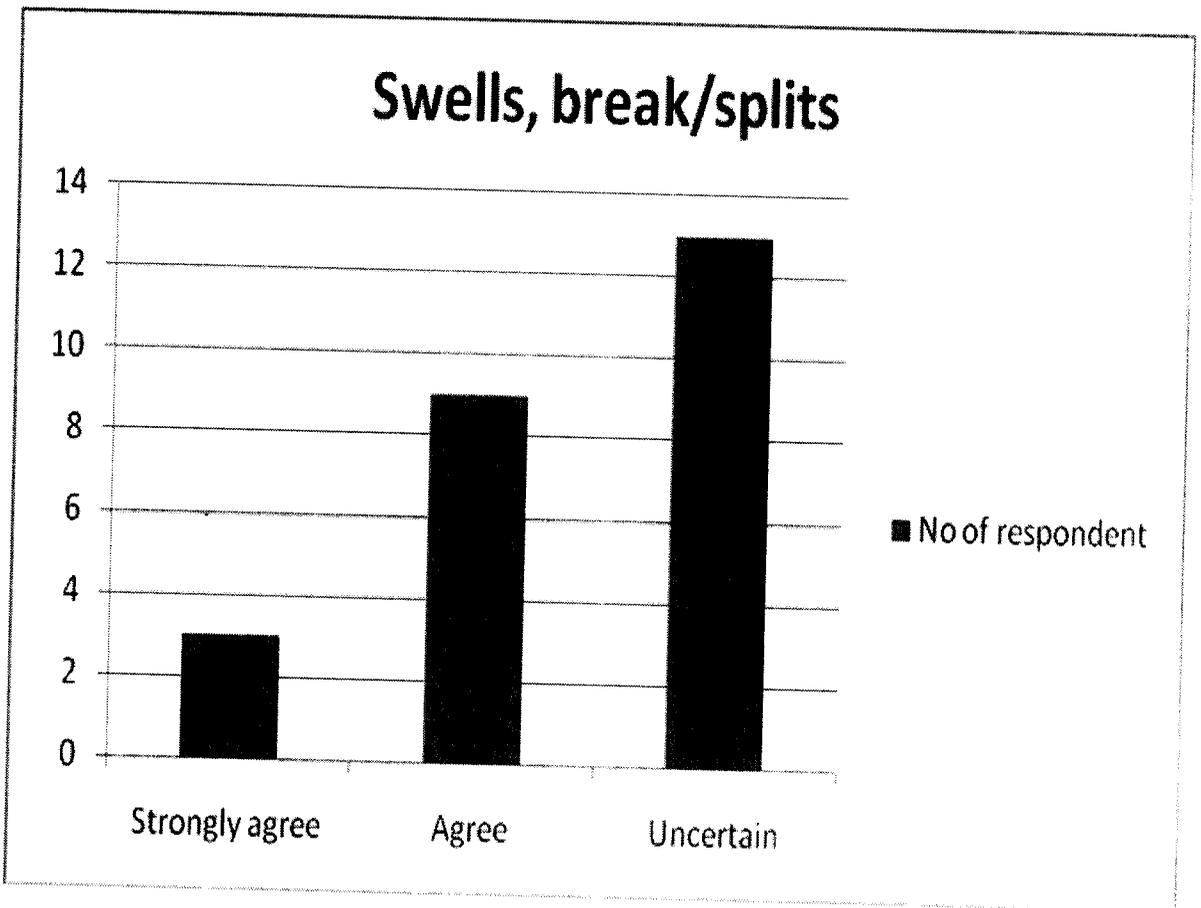
<b>Sl no</b>	<b>Swells, breaks/splits</b>	<b>No of respondent</b>	<b>Percentage</b>
1	Strongly agree	3	12.0
2	Agree	9	36.0
3	Uncertain	13	52.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 16% of the respondents agree that the panels which they currently use in their projects are expensive. 24% of the respondents disagree that the panels which they currently use in their projects are expensive. 16% of the respondents strongly agree that the panels which they currently use in their projects are expensive.

**CHART 22:**

**3.1.7.b: OPINION OF CURRENTLY USED PANELS: Swells, breaks/splits:**



**TABLE 3.1.7.c: OPINION OF CURRENTLY USED PANELS: Low moisture and heat resistance.**

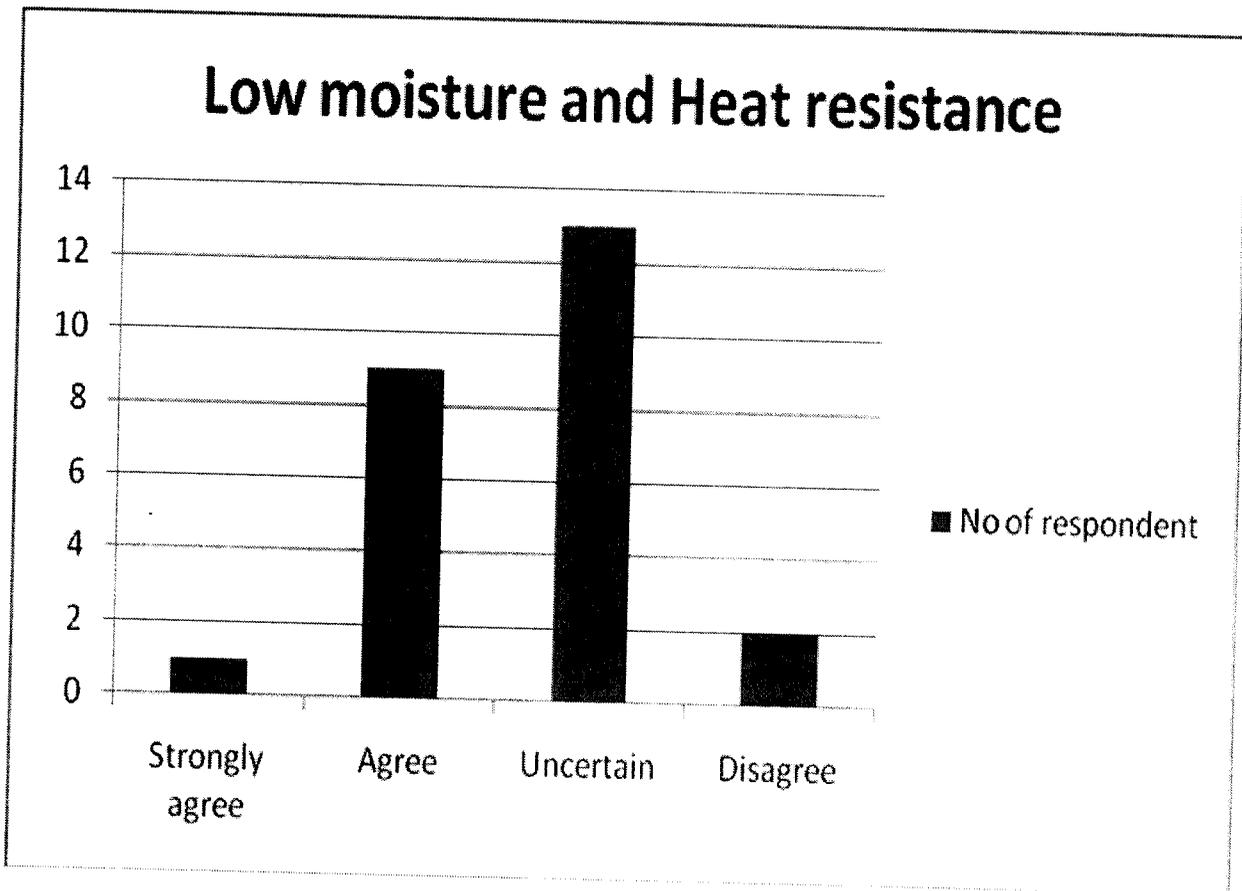
Sl no	Low moisture and heat resistance	No of respondent	Percentage
1	Strongly agree	1	4.0
2	Agree	9	36.0
3	Uncertain	13	52.0
4	Disagree	2	8.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 52% of the respondents are uncertain about the low moisture and heat resistance of the panels which they currently use in their projects. 36% of the respondents agree that the panels which they currently use in their projects have low moisture content and low heat resistance. 8% of the respondents disagree that the panels which they currently use in their projects have low moisture content and low heat resistance and rest of them strongly agree to the point.

**CHART 23:**

**3.1.7.c: OPINION OF CURRENTLY USED PANELS: Low moisture and heat resistance.**



**TABLE 3.1.7.d: OPINION OF CURRENTLY USED PANELS: Limited selection**

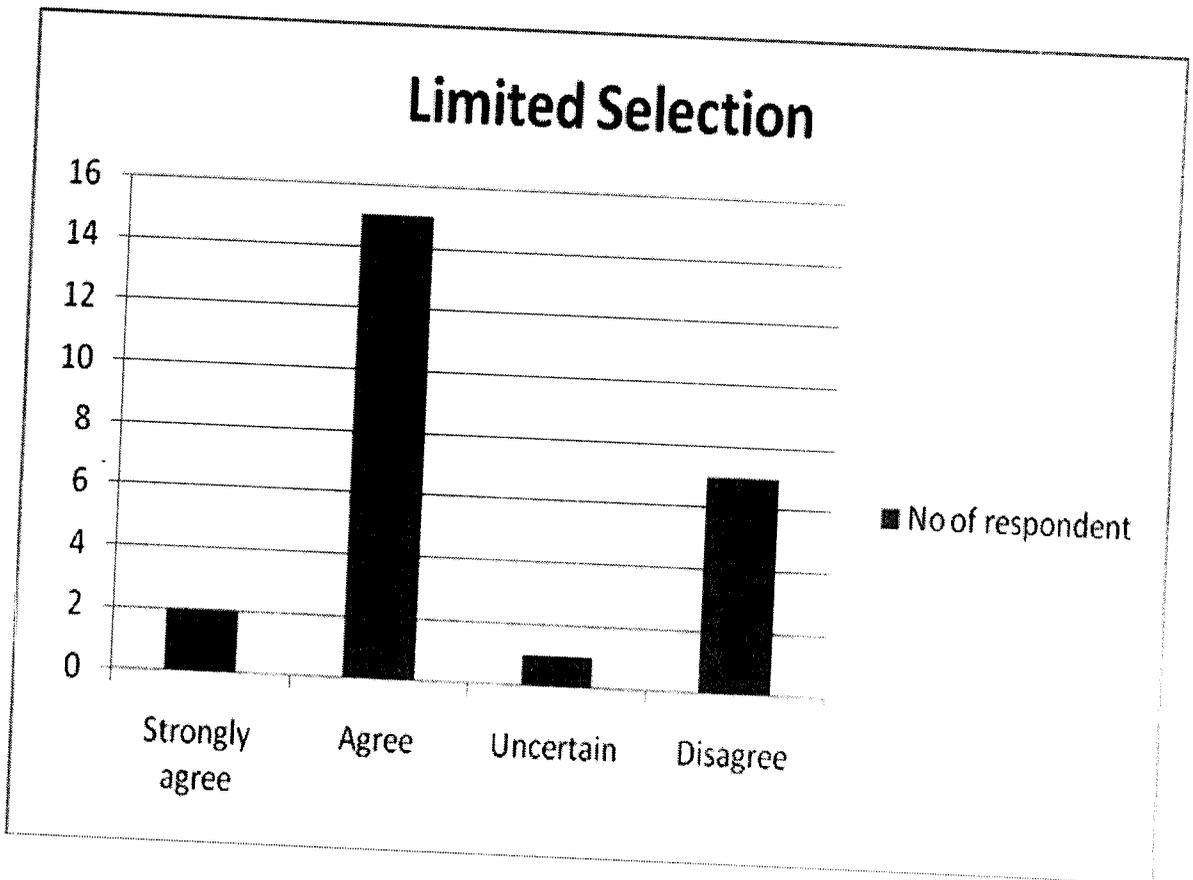
Sl no	Limited selection	No of respondent	Percentage
1	Strongly agree	2	8.0
2	Agree	15	60.0
3	Uncertain	1	4.0
4	Disagree	7	28.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 60% of the respondents agree that there is limited selection of the panels which they currently use in their projects. 28% of the respondents disagree that the panels which they currently use in their projects have limited selection. 8% of the respondents strongly agree that the panels which they currently use in their projects have limited selection and rest of them disagree to the point.

**CHART 24:**

**3.1.7.d: OPINION OF CURRENTLY USED PANELS: Limited selection**



**TABLE 3.1.7.e: OPINION OF CURRENTLY USED PANELS:  
Unrelated stated thickness.**

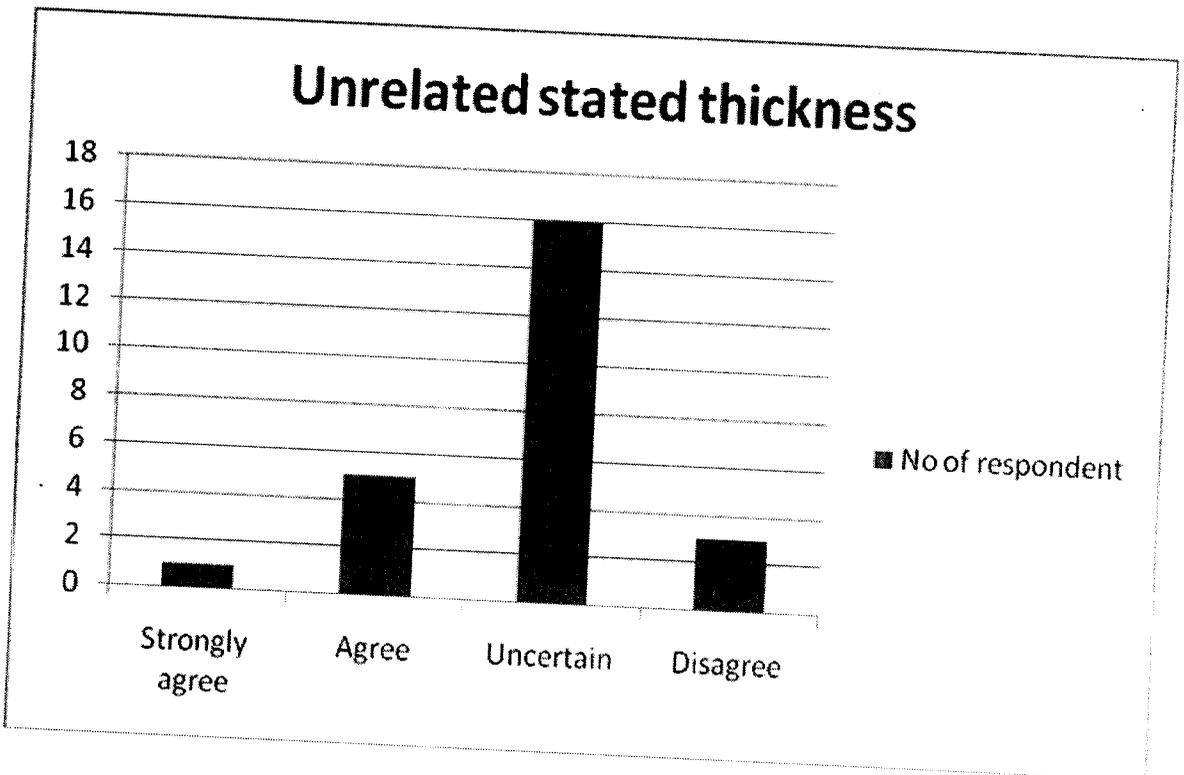
Sl no	Unrelated stated thickness	No of respondent	Percentage
1	Strongly agree	1	4.0
2	Agree	5	20.0
3	Uncertain	16	64.0
4	Disagree	3	12.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 64% of the respondents are uncertain about the unrelated stated thickness of the panels which they currently use in their projects. 20% of the respondents agree that they ace the issue of unrelated stated thickness of the panels which they currently use in their projects. 12% of the respondents disagree that the panels which they currently use in their projects have unrelated stated thickness and rest of them strongly agree to the point.

**CHART 25:**

**3.1.7.e: OPINION OF CURRENTLY USED PANELS: Unrelated stated thickness.**



**TABLE3.1.7.f: OPINION OF CURRENTLY USED PANELS: Not easy to handle.**

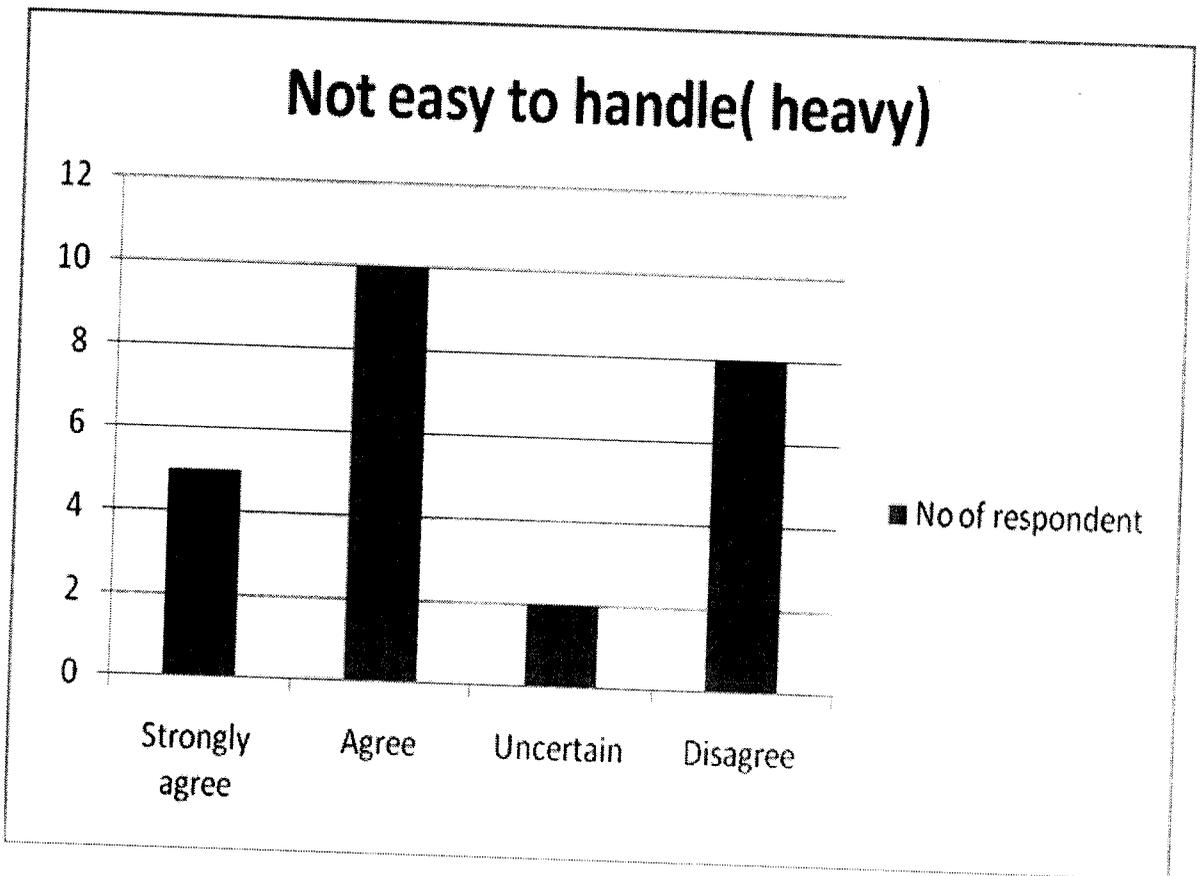
Sl no	Not easy to handle (heavy)	No of respondent	Percentage
1	Strongly agree	5	20.0
2	Agree	10	40.0
3	Uncertain	2	8.0
4	Disagree	8	32.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 40% of the respondents agree that the panels which they currently use in their projects are not easy to handle. 32% of the respondents disagree that the panels which they currently use in their projects are not easy to handle. 20% of the respondents strongly agree that the panels which they currently use in their projects are not easy to handle. Rest of the population is uncertain about this.

**CHART 26:**

**3.1.7.f: OPINION OF CURRENTLY USED PANELS: Not easy to handle.**



**TABLE3.1.7.g: OPINION OF CURRENTLY USED PANELS: Non biodegradable.**

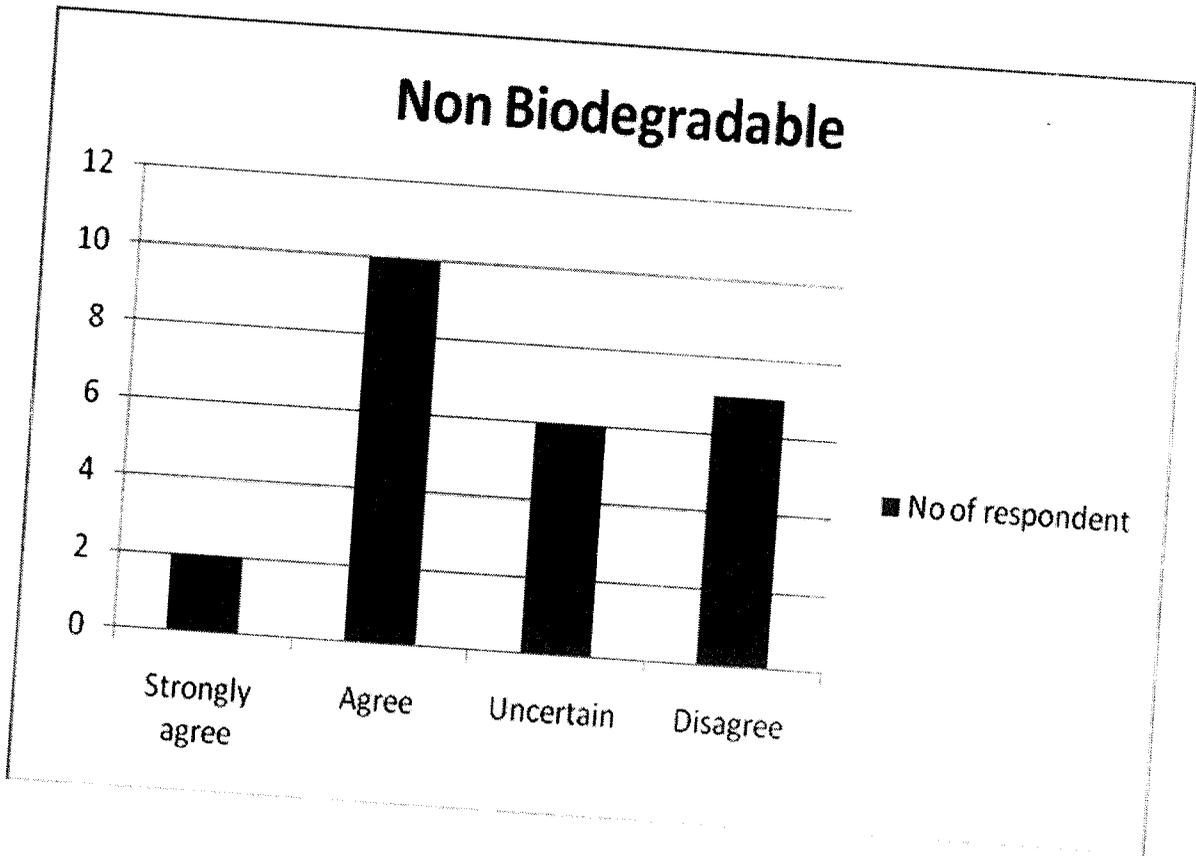
Sl no	Non bio degradable	No of respondent	Percentage
1	Strongly agree	2	8.0
2	Agree	10	40.0
3	Uncertain	6	24.0
4	Disagree	7	28.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 40% of the respondents agree that the panels which they currently use in their projects are non biodegradable. 24% of the respondents are uncertain that the panels which they currently use in their projects are non biodegradable. 28% of the respondents disagree that the panels which they currently use in their projects are non biodegradable. 8% of the respondents strongly agree that the panels which they currently use in their projects are biodegradable.

**CHART 27:**

**3.1.7.g: OPINION OF CURRENTLY USED PANELS: Non biodegradable.**



**TABLE 3.1.7.h: OPINION OF CURRENTLY USED PANELS: Non recyclable**

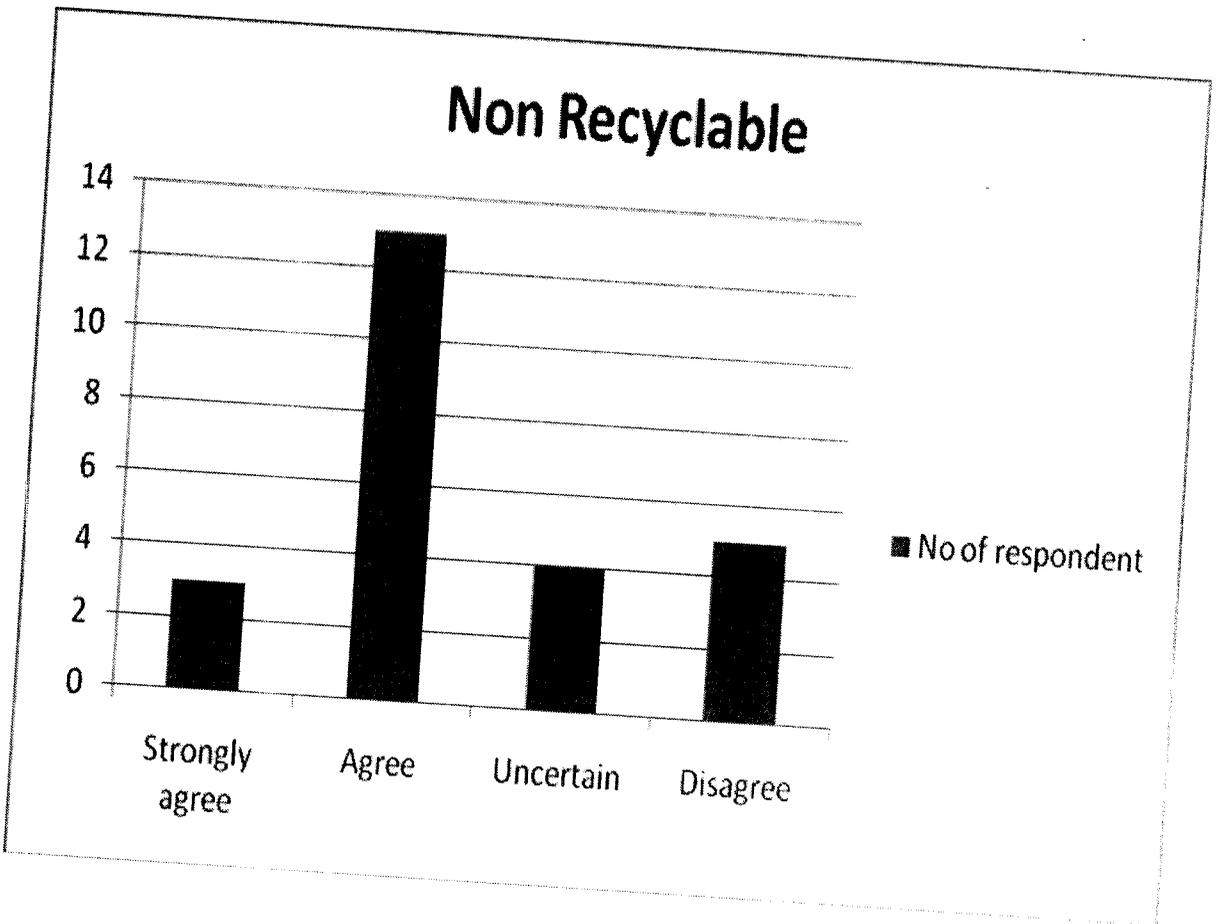
Sl no	Non recyclable	No of respondent	Percentage
1	Strongly agree	3	12.0
2	Agree	13	52.0
3	Uncertain	4	16.0
4	Disagree	5	20.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 52% of the respondents agree that the panels which they currently use in their projects are non recyclable. 20% of the respondents disagree that the panels which they currently use in their projects are non recyclable. 16% of the respondents are uncertain that the panels which they currently use in their projects are non recyclable. Rest of the population strongly agrees to the point.

**CHART 28:**

**3.1.7.h: OPINION OF CURRENTLY USED PANELS: Non recyclable**



**TABLE 3.1.7.i: OPINION OF CURRENTLY USED PANELS: Low strength.**

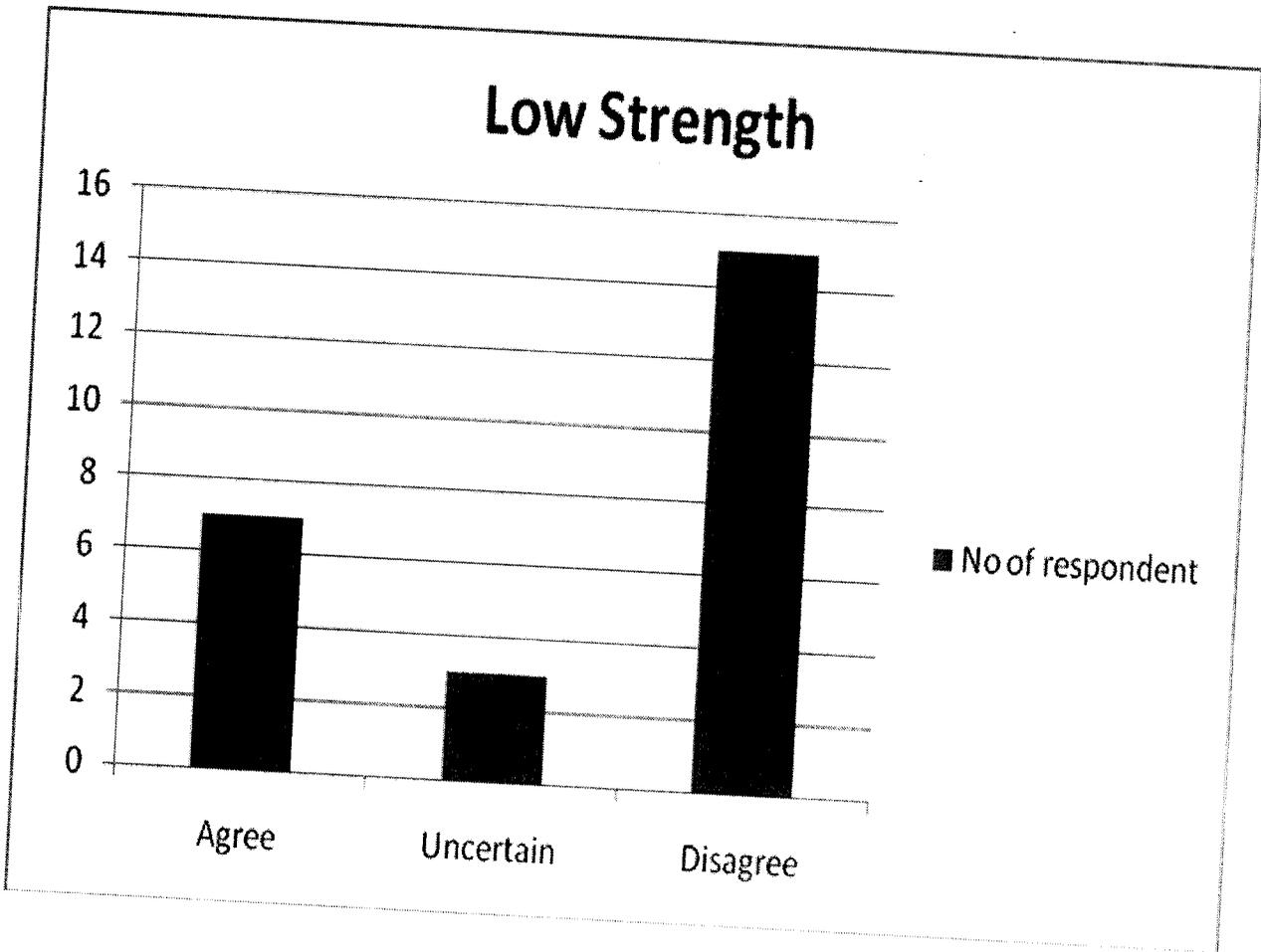
Sl no	Low strength	No of respondent	Percentage
1	Agree	7	28.0
2	Uncertain	3	12.0
3	Disagree	15	60.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 60% of the respondents disagree that the panels which they currently use in their projects have low strength. 28% of the respondents agree that the panels which they currently use in their projects have low strength. 12% of the respondents strongly are uncertain that the panels which they currently use in their projects have low strength.

**CHART 29:**

**3.1.7.i: OPINION OF CURRENTLY USED PANELS: Low strength.**



**TABLE 3.1.7.j: OPINION OF CURRENTLY USED PANELS: Less durable.**

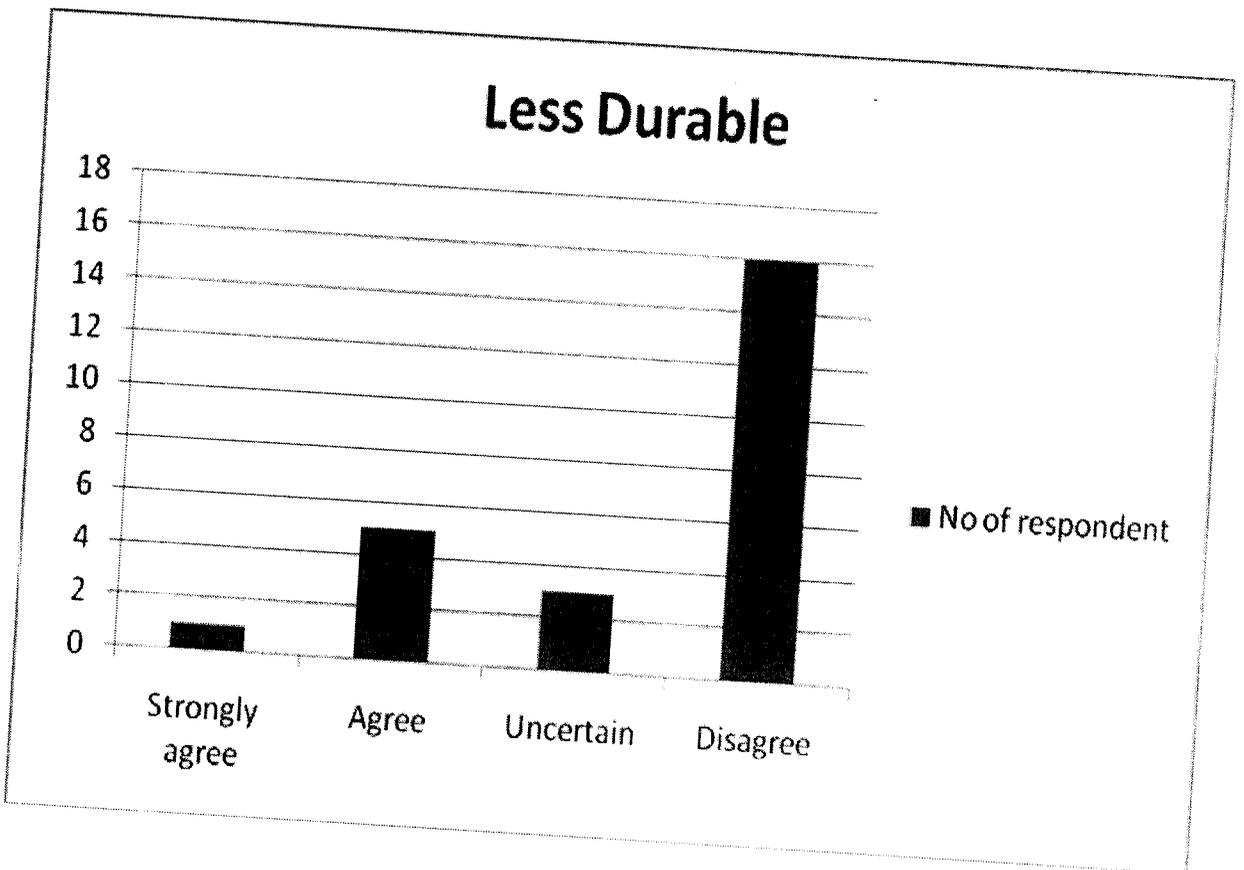
Sl no	Less durable	No of respondent	Percentage
1	Strongly agree	1	4.0
2	Agree	5	20.0
3	Uncertain	3	12.0
4	Disagree	16	64.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 64% of the respondents disagree that the panels which they currently use in their projects are less durable. 20% of the respondents agree that the panels which they currently use in their projects are less durable. 12% of the respondents strongly agree that the panels which they currently use in their projects are less durable.

**CHART 30:**

**3.1.7.j: OPINION OF CURRENTLY USED PANELS: Less durable.**



**TABLE 3.1.8: PAPER HONEY COMB SUBSTITUTES WOOD:**

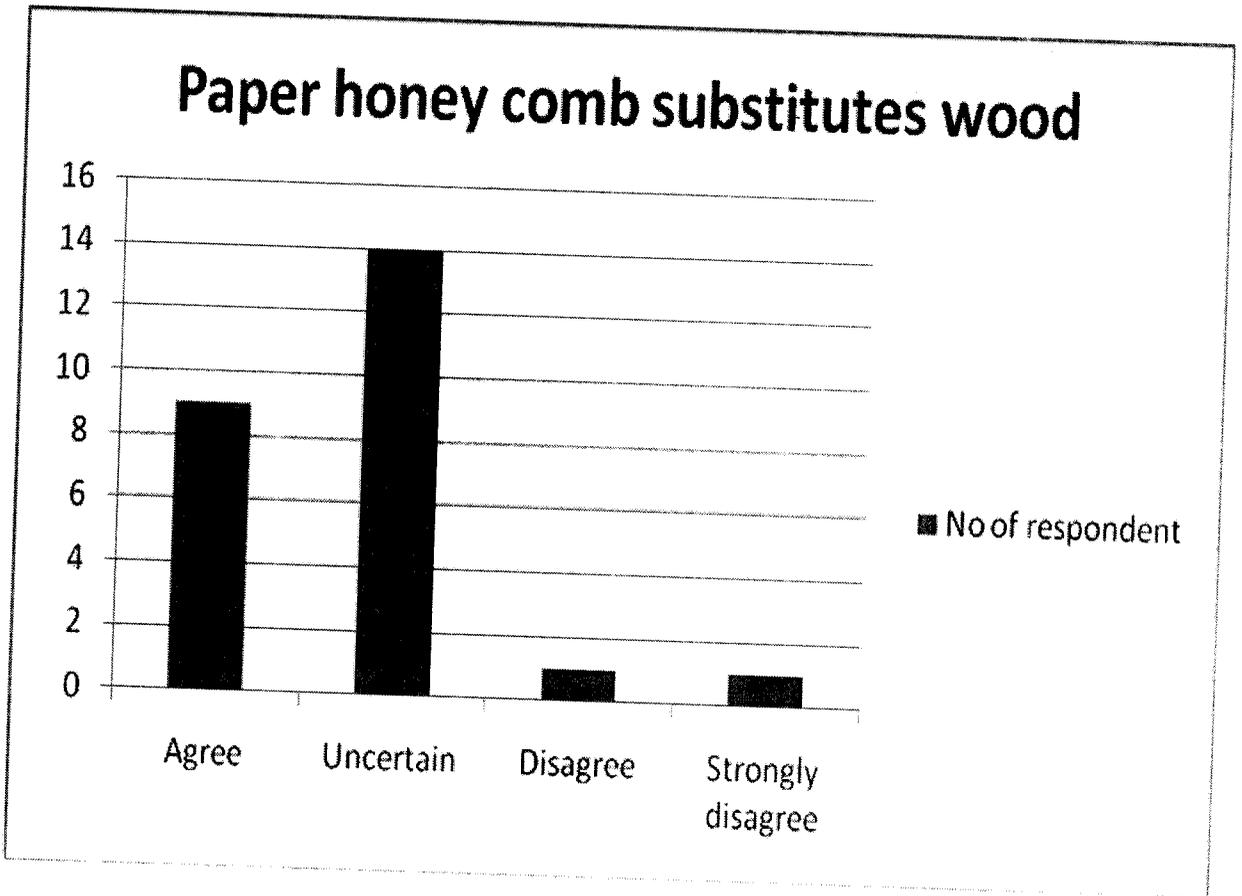
Sl no	Paper honey comb substitutes wood	No of respondent	Percentage
1	Agree	9	36.0
2	Uncertain	14	56.0
3	Disagree	1	4.0
4	Strongly disagree	1	4.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 56% of the respondents are uncertain that paper honey comb is a complete substitute for wood. 36% of the respondents agree that paper honey comb is a complete substitute for wood. Rest of the population disagree to this.

**CHART 31:**

**3.1.8: PAPER HONEY COMB SUBSTITUTES WOOD:**



**TABLE 3.1.9.a: LEVEL OF ACCEPTANCE OF PAPER HONEY  
COMB PANELS: Strength property**

Sl no	Strength property	No of respondent	Percentage
1	Very likely	2	8.0
2	Likely	14	56.0
3	Uncertain	8	32.0
4	Unlikely	1	4.0
Total		25	100.0

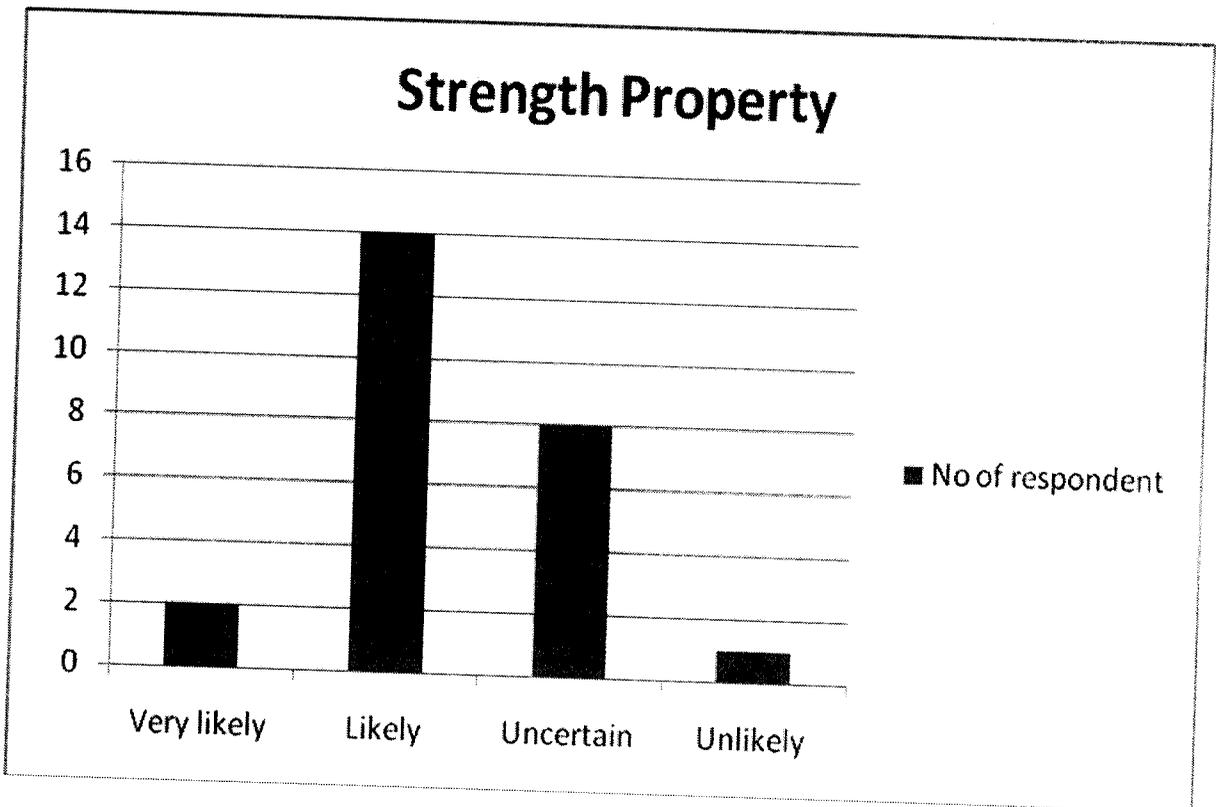
**Inference:**

It is inferred from the above table that 56% of the respondents are likely to accept paper honey comb panels because of its strength property. 32% respondents are uncertain about the strength property of paper honey comb panels. 8% of the respondents are very likely to accept paper honey comb panels because of its strength property and rest of the population is unlikely.

**CHART 32:**

**3.1.9.a: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB**

**PANELS: Strength property**



**TABLE 3.1.9.b: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Quality**

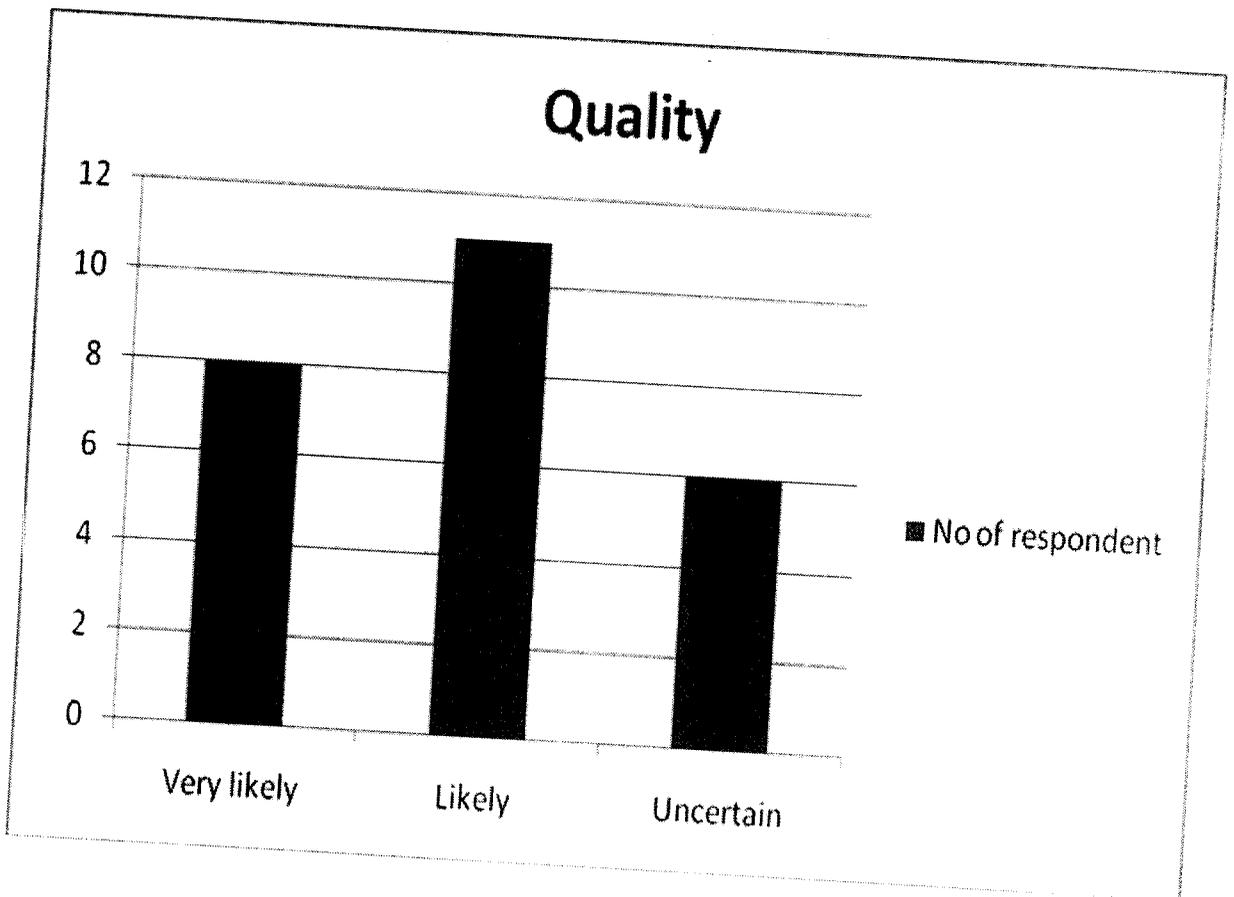
Sl no	Quality	No of respondent	Percentage
1	Very likely	8	32.0
2	Likely	11	44.0
3	Uncertain	6	24.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 44% of the respondents are likely to accept paper honey comb panels because of its quality. 32% of the respondents are very likely to accept paper honey comb panels because of its quality. 24% respondents are uncertain about the quality of paper honey comb panels.

**CHART 33:**

**3.1.9.b: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB  
PANELS: Quality**



**TABLE 3.1.9.c: LEVEL OF ACCEPTANCE OF PAPER HONEY  
 COMB PANELS: Eco friendly / bio degradable:**

Sl no	Eco friendly/ bio degradable	No of respondent	Percentage
1	Very likely	9	36.0
2	Likely	15	60.0
3	Uncertain	1	4.0
Total		25	100.0

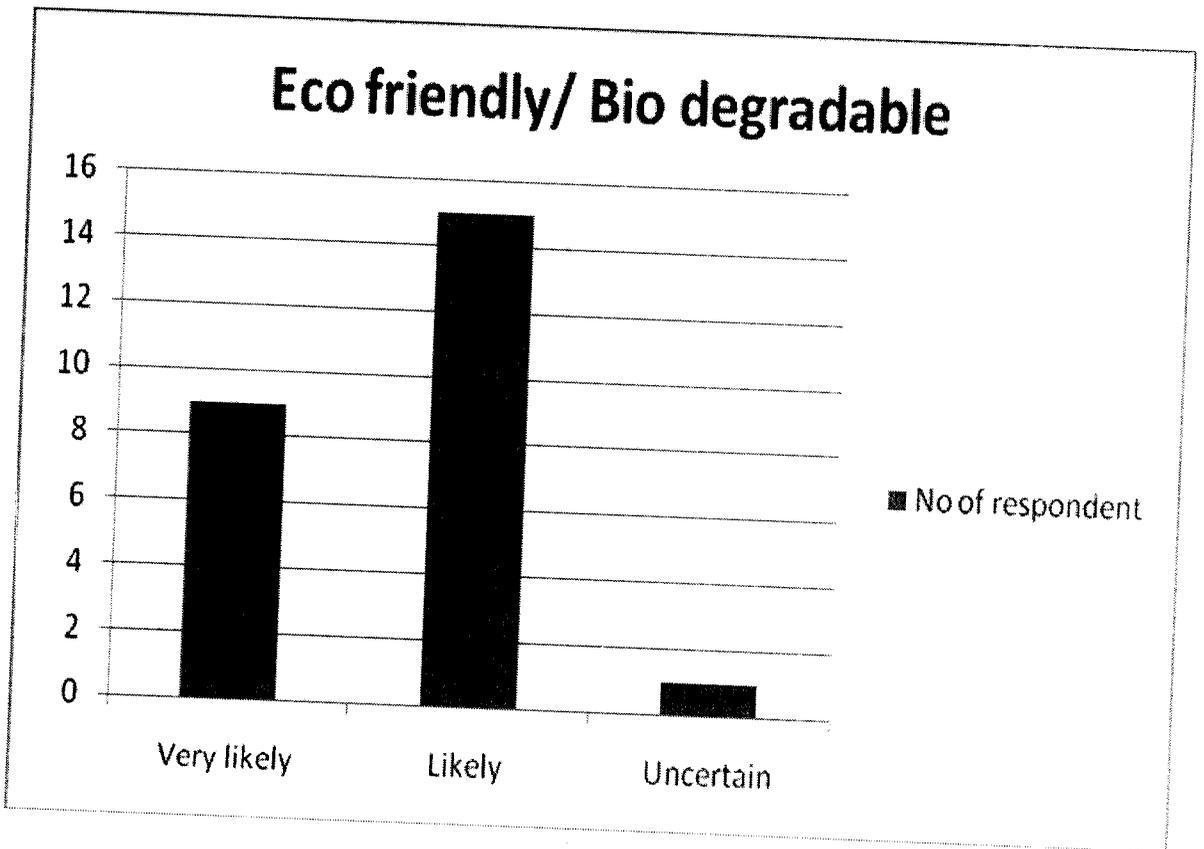
**Inference:**

It is inferred from the above table that 60% of the respondents are likely to accept paper honey comb panels because its eco friendly and bio degradable. 36% of the respondents are very likely to accept paper honey comb panels because its eco friendly and bio degradable. 4% respondents are uncertain about the eco friendly and bio degradable nature of paper honey comb panels.

**CHART 34:**

**3.1.9.c: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB**

**PANELS: Eco friendly / bio degradable:**



**TABLE 3.1.9.d: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Availability.**

Sl no	Availability	No of respondent	Percentage
1	Very likely	6	24.0
2	Likely	11	44.0
3	Uncertain	4	16.0
4	Unlikely	4	16.0
Total		25	100.0

P-3212

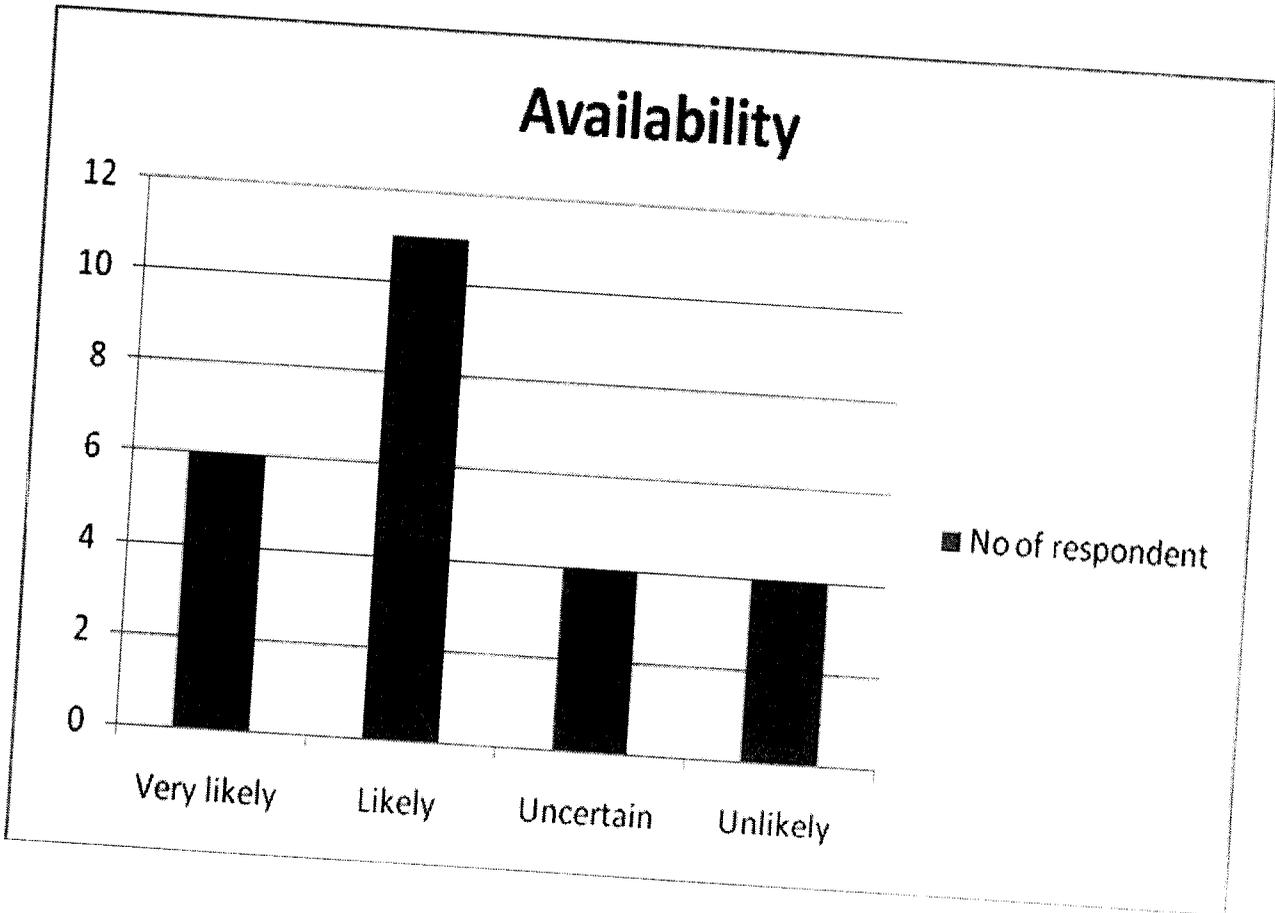


**Inference:**

It is inferred from the above table that 44% of the respondents are likely to accept paper honey comb panels because of its availability. 24% of the respondents are very likely to accept paper honey comb panels because of its availability. 16% respondents are uncertain about the availability of paper honey comb panels and rest of population is unlikely to accept paper honey comb panels because of its availability.

**CHART 35:**

**3.1.9.d: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB  
PANELS: Availability.**



**TABLE 3.1.9.e: LEVEL OF ACCEPTANCE OF PAPER HONEY  
COMB PANELS: Low price**

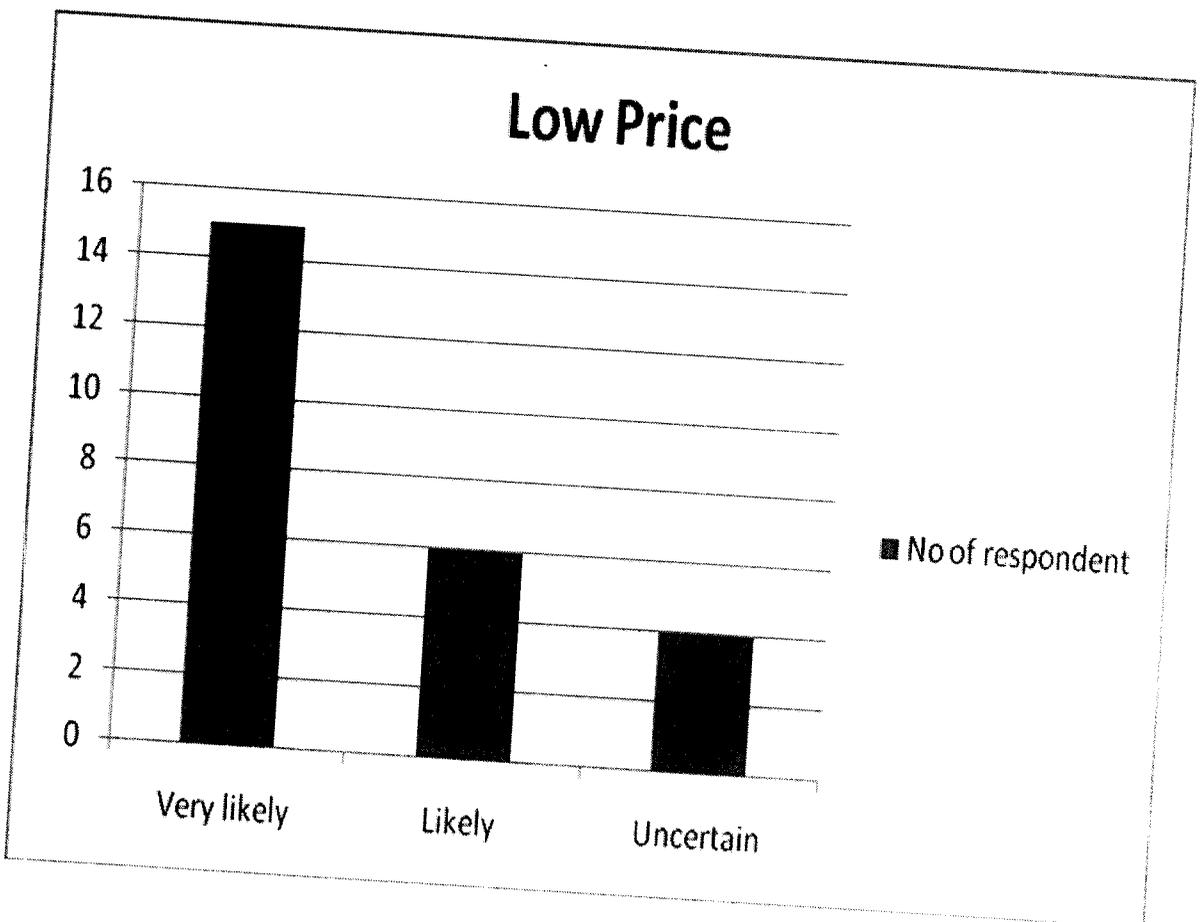
Sl no	Low price	No of respondent	Percentage
1	Very likely	15	60.0
2	Likely	6	24.0
3	Uncertain	4	16.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 60% of the respondents are very likely to accept paper honey comb panels because of its low price. 24% of the respondents are likely to accept paper honey comb panels because of its low price. 16% respondents are uncertain about the low price feature of paper honey comb panels.

**CHART 36:**

**3.1.9.e: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB  
PANELS: Low price**



**TABLE 3.1.9.f: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Light weight.**

Sl no	Light weight	No of respondent	Percentage
1	Very likely	14	56.0
2	Likely	9	36.0
3	Uncertain	2	8.0
Total		25	100.0

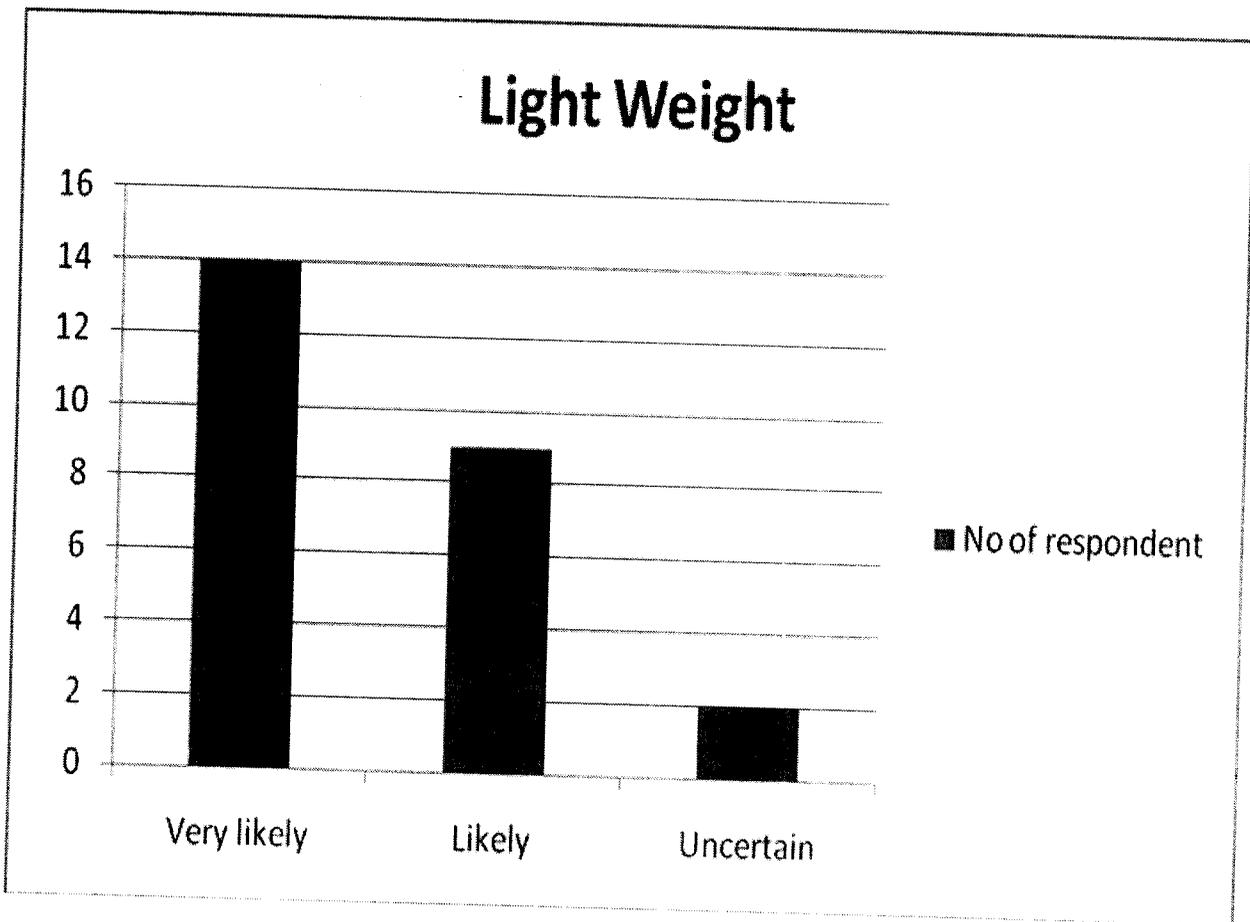
**Inference:**

It is inferred from the above table that 56% of the respondents are very likely to accept paper honey comb panels because of its light weight. 36% of the respondents are likely to accept paper honey comb panels because of its light weight. 8% respondents are uncertain about the light weight property of paper honey comb panels.

**CHART 37:**

**3.1.9.f: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB**

**PANELS: Light weight.**



**TABLE 3.1.9.g: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Moisture resistance.**

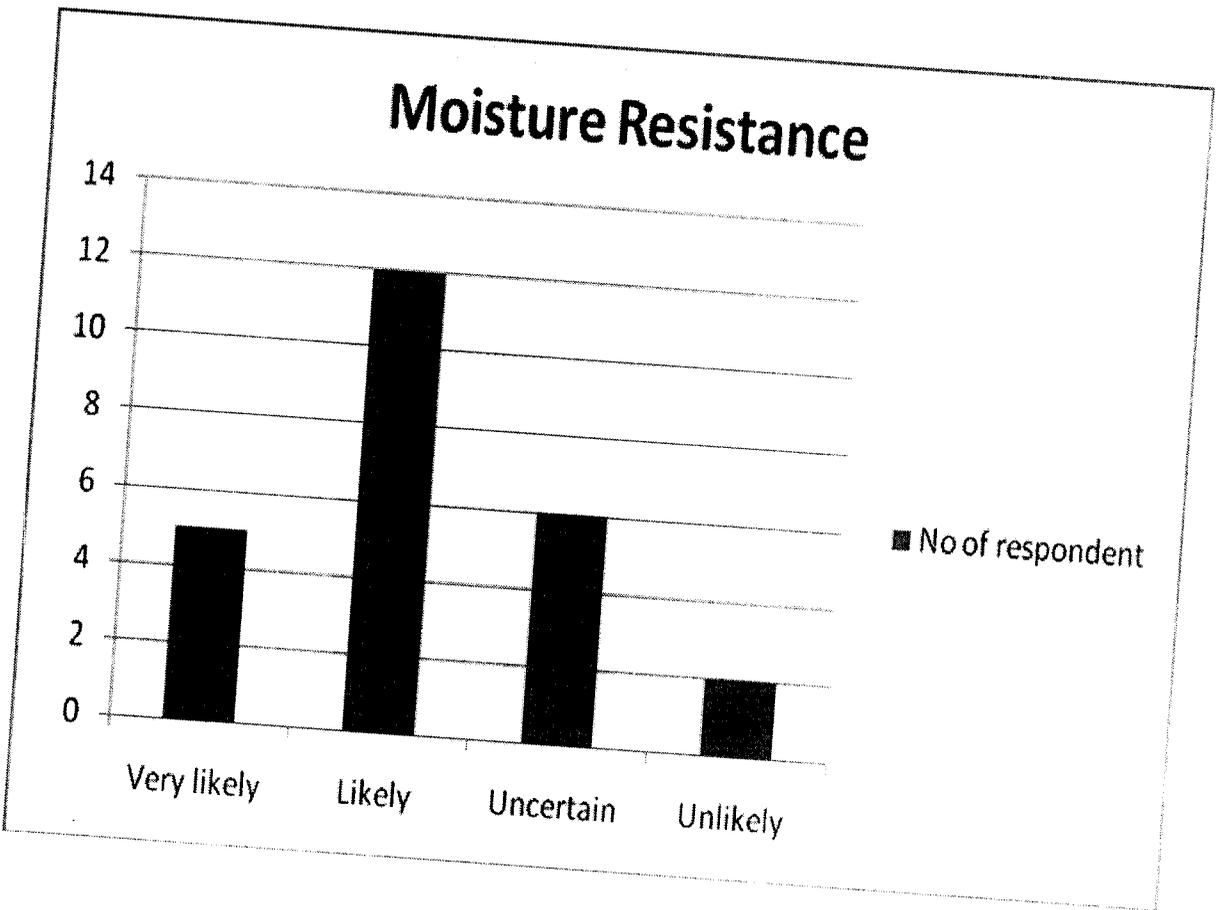
Sl no	Moisture resistance	No of respondent	Percentage
1	Very likely	5	20.0
2	Likely	12	48.0
3	Uncertain	6	24.0
4	Unlikely	2	8.0
<b>Total</b>		25	100.0

**Inference:**

It is inferred from the above table that 48% of the respondents are likely to accept paper honey comb panels because of its moisture resistance. 24% respondents are uncertain about the moisture resistance of paper honey comb panels. 20% of the respondents are very likely to accept paper honey comb panels because of its moisture resistance.

**CHART 38:**

**3.1.9.g: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB  
PANELS: Moisture resistance.**



**TABLE 3.1.9.h: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Durability.**

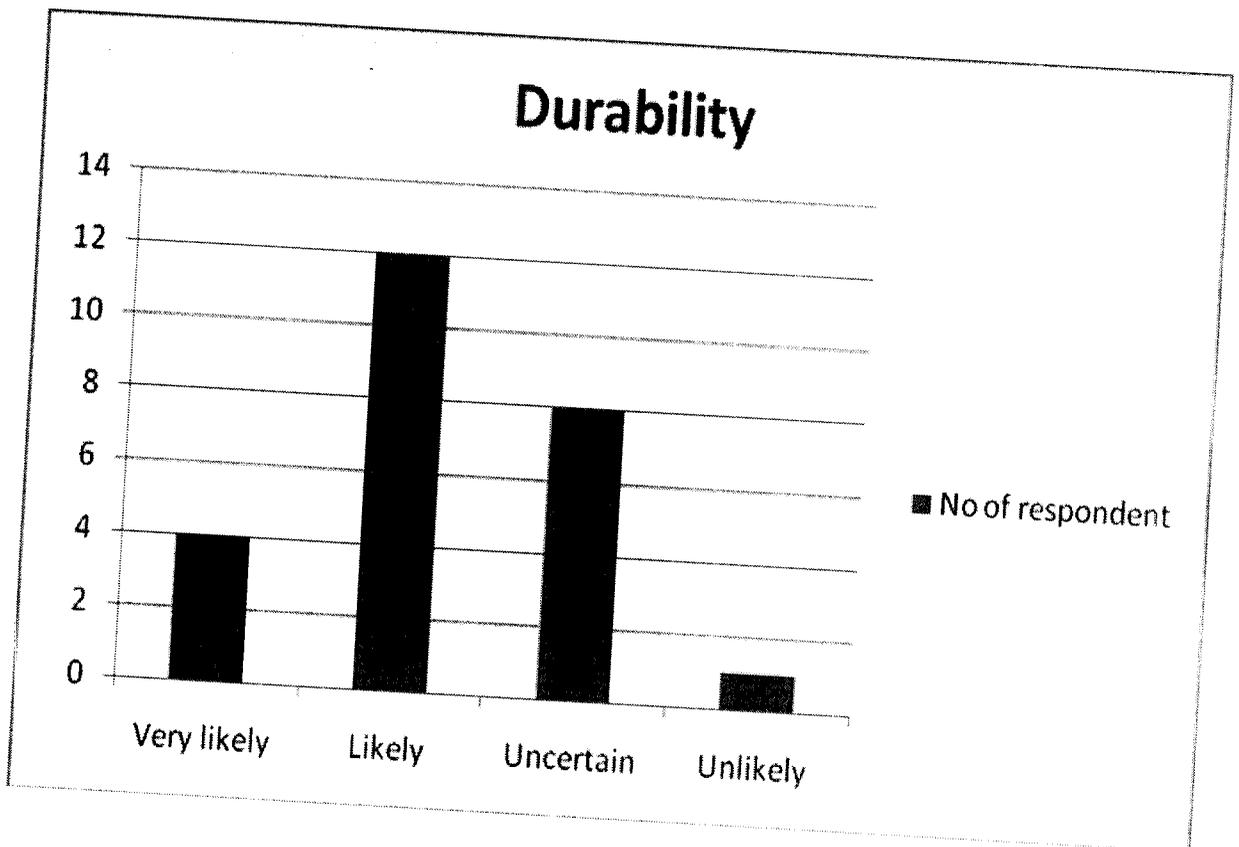
Sl no	Durability	No of respondent	Percentage
1	Very likely	4	16.0
2	Likely	12	48.0
3	Uncertain	8	32.0
4	Unlikely	1	4.0
Total		25	100.0

**Inference:**

It is inferred from the above table that 48% of the respondents are likely to accept paper honey comb panels because of its durability. 32% respondents are uncertain about the durability of paper honey comb panels. 16% of the respondents are very likely to accept paper honey comb panels because of its durability.

**CHART 39:**

**3.1.9.h: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB PANELS: Durability.**



**TABLE 3.1.9.i: LEVEL OF ACCEPTANCE OF PAPER HONEY  
COMB PANELS: Pressure resistance**

Sl no	Pressure resistance	No of respondent	Percentage
1	Very likely	4	16.0
2	Likely	7	28.0
3	Uncertain	12	48.0
4	Unlikely	2	8.0
Total		25	100.0

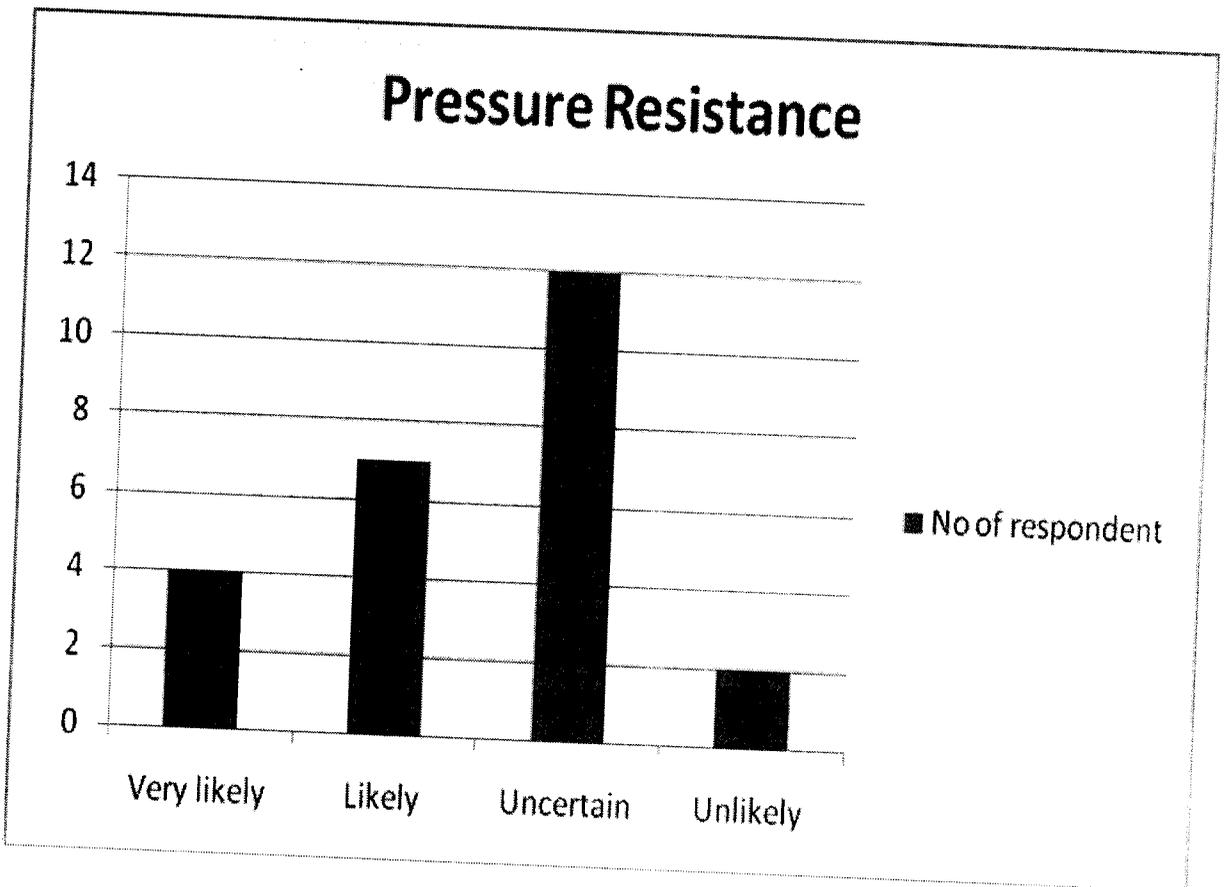
**Inference:**

It is inferred from the above table that 48% respondents are uncertain about the pressure resistance property of paper honey comb panel. 28% of the respondents are likely to accept paper honey comb panels because of its pressure resistance. 16% of the respondents are very likely to accept paper honey comb panels because of its pressure resistance.

**CHART 40:**

**3.1.9.i: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB**

**PANELS: Pressure resistance**



**TABLE 3.1.9.j: LEVEL OF ACCEPTANCE OF PAPER HONEY  
COMB PANELS: Market demand**

Sl no	Market demand	No of respondent	Percentage
1	Very likely	3	12.0
2	Likely	15	60.0
3	Uncertain	5	20.0
4	Unlikely	2	8.0
Total		25	100.0

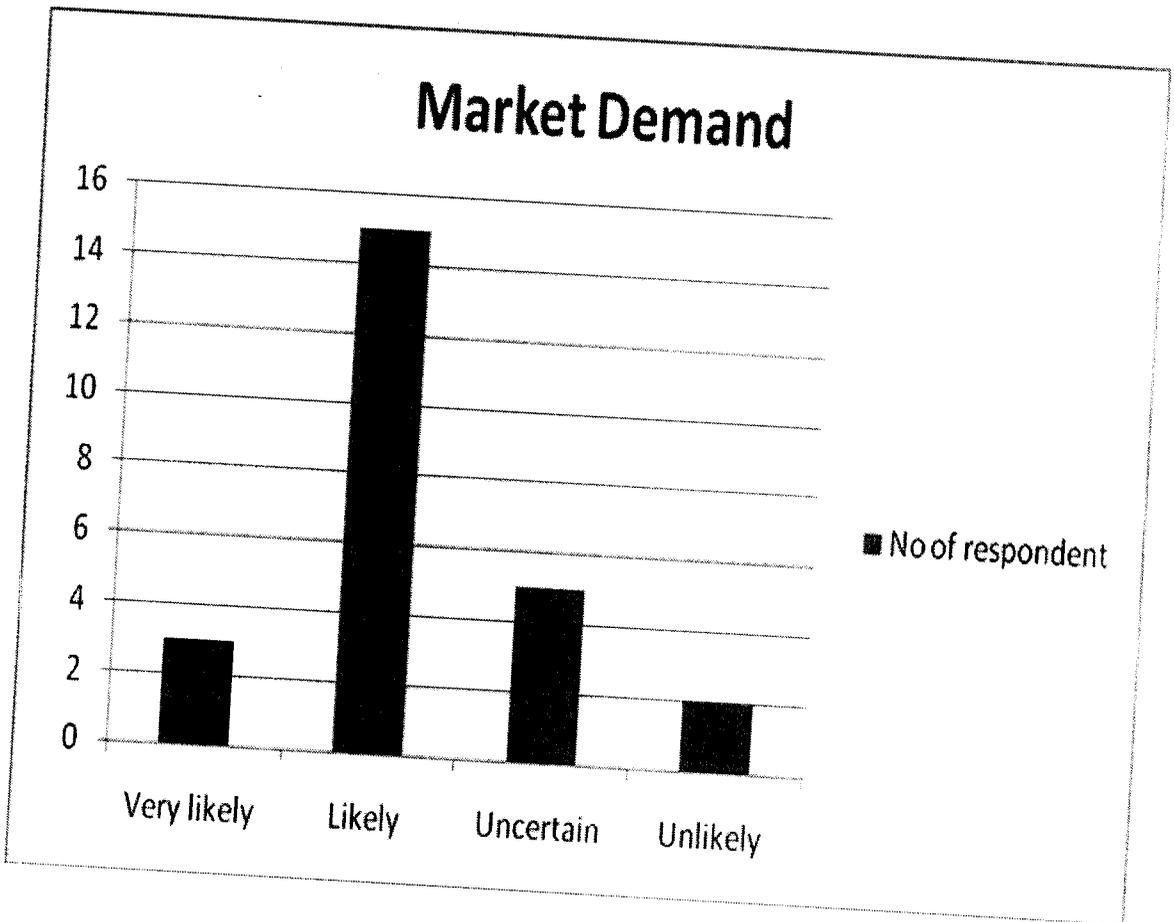
**Inference:**

It is inferred from the above table that 60% of the respondents are likely to accept paper honey comb panels if market demand is high. 20% respondents are uncertain about the market demand of paper honey comb panel. 12% of the respondents are very likely to accept paper honey comb panels if market demand is high.

**CHART 41:**

**3.1.9.j: LEVEL OF ACCEPTANCE OF PAPER HONEY COMB**

**PANELS: Market demand**



### 3.2.1: WEIGHTED AVERAGE RANKING:

**TABLE 3.2.1: FREQUENCY OF PURCHASE OF VARIOUS PANELS:**

	Frequently 4	Very often 3	Occasionally 2	Never used 1	Total	Weighted average	Rank
Particle board	6	9	6	4	67	2.68	V
Aluminum honey comb	2	1	1	21	34	1.36	VI
Timber wood	9	11	4	1	78	3.12	III
plywood	9	13	3	0	81	3.24	I
MDF panels	7	7	11	0	71	2.84	II
Solid wood panels	9	9	5	2	75	3.00	IV

#### **Inference:**

From the above table, plywood is very frequently used by all the respective target audience. MDF is very often used by them and timber wood is given the third preference.

**TABLE 3.2.2: LEVEL OF ACCEPTANCE OF PAPER HONEYCOMB:**

	Very likely	Likely	uncertain	unlikely	Very unlikely	Total	Weighted average	Rank
	5	4	3	2	1			
Strengthen property	2	14	8	1	0	92	3.69	IX
Quality	8	11	6	0	0	102	4.08	V
Eco friendly / bio degradable	9	15	1	0	0	108	4.32	III
Availability	6	11	4	4	0	94	3.76	VII
Low price	15	6	4	0	0	111	4.44	II
Light weight	14	9	2	0	0	112	4.48	I
Moisture resistance	5	12	6	2	0	95	3.8	VI
Durability	4	12	8	1	0	94	3.76	VII
Pressure resistance	4	7	12	2	0	88	3.52	X
Market demand	3	15	5	2	0	104	4.16	IV

**Inference:**

From the above table it can be interpreted that the target audience would like to give first preference to light weight and second preference to low price and third preference to eco friendliness features to accept paper honey comb panels in future.

### 3.3.1 CHI-SQUARE

The chi-square measures test the hypothesis that the row and column variables in a cross tabulation are interdependent. A low significance value typically below 0.05 indicates that there may be some relationship between two variables. While the chi-square measures may indicate that there is a relationship between two variables, they do not indicate the strength or direction of relationship.

**TABLE 3.3.1: Level of awareness of paper honeycomb and level of acceptance of paper honeycomb.**

			Crosstab				
			Level of acceptance of paper honey comb panels				Total
			very likely	likely	uncertain	unlikely	
PaperHoney Comb	agree	Count	2	6	1	0	9
		Expected Count	1.1	5.4	1.8	.7	9.0
Substitutes Wood	uncertain	Count	1	9	4	0	14
		Expected Count	1.7	8.4	2.8	1.1	14.0
	disagree	Count	0	0	0	1	1
		Expected Count	.1	.6	.2	.1	1.0
	strongly disagree	Count	0	0	0	1	1
		Expected Count	.1	.6	.2	.1	1.0
Total		Count	3	15	5	2	25
		Expected Count	3.0	15.0	5.0	2.0	25.0

#### Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	26.878 <sup>a</sup>	9	.001
Likelihood Ratio	15.714	9	.073
Linear-by-Linear Association	9.349	1	.002
N of Valid Cases	25		

**Null hypothesis:** There is no significant association between level of awareness of paper honey comb and level of acceptance of paper honey comb panels.

**Alternative hypothesis:** There is significant association between level of awareness of paper honey comb and level of acceptance of paper honey comb panels.

Degree of freedom =  $(4-1)*(4-1) = 9$

Significance level = 0.05

Calculated value = 0.02

### **Inference:**

From the above table, it is inferred that the calculated P value .002 is less than .05 (level of significance), hence null hypothesis is rejected and the alternate hypothesis is accepted. Hence there is significant association between level of awareness of paper honey comb and level of acceptance of paper honey comb panels.

**TABLE 3.3.2: Investment Vs Frequency of purchase of conventional panels.**

**Crosstab**

			Frequency of purchase of conventional panels.			Total
			frequently	very often	occasionally	
Investment	above 50 crores	Count	1	0	0	1
		Expected Count	.4	.5	.1	1.0
	15-30 crores	Count	3	4	0	7
		Expected Count	2.5	3.6	.8	7.0
	less than 15 crores	Count	5	9	3	17
		Expected Count	6.1	8.8	2.0	17.0
Total		Count	9	13	3	25
		Expected Count	9.0	13.0	3.0	25.0

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.404 <sup>a</sup>	4	.493
Likelihood Ratio	4.460	4	.347
Linear-by-Linear Association	2.455	1	.117
N of Valid Cases	25		

**Null hypothesis:** There is no significant association between investment and frequency of purchase of various panels.

**Alternative hypothesis:** There is significant association between investment and frequency of purchase of various panels.

Degree of freedom =  $(3-1)*(4-1) = 9$

Significance level = 0.05

Calculated value = 0.117

### **Inference:**

From the above table, it is inferred that the calculated P value .117 is more than .05 (level of significance), hence null hypothesis is accepted and the alternate hypothesis is rejected. Hence there is no significant association between investment and frequency of purchase of various panels.

**TABLE 3.3.2: Nature of the projects Vs frequency of purchase of various conventional panels.**

**Crosstab**

			Frequency of purchase of various conventional panels			
			frequently	very often	occasionally	never used
Nature Of Projects	residential/domestic	Count	7	11	3	0
		Expected Count	7.6	9.2	3.4	.8
	industrial/factory	Count	2	0	1	1
		Expected Count	1.4	1.8	.6	.2
Total	Count	9	11	4	1	
	Expected Count	9.0	11.0	4.0	1.0	

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.846 <sup>a</sup>	3	.049
Likelihood Ratio	7.950	3	.047
Linear-by-Linear Association	.940	1	.332
N of Valid Cases	25		

**Null hypothesis:** There is no significant association between nature of the projects and frequency of purchase of various panels.

**Alternative hypothesis:** There is significant association between nature of the projects and frequency of purchase of various panels.

Degree of freedom =  $(4-1)*(4-1) = 9$

Significance level = 0.05

Calculated value = 0.04

### **Inference:**

From the above table, it is inferred that the calculated P value .04 is more than .05 (level of significance), hence null hypothesis is rejected and the alternate hypothesis is accepted. Hence there is significant association between nature of the projects and frequency of purchase of various panels.

**TABLE 3.3.2: Period of presence Vs Paper honeycomb substitutes wood.**

**Presence \* PaperHoneyCombSubstitutesWood Crosstabulation**

			PaperHoneyCombSubstitutesWood				Total
			agree	uncertain	disagree	strongly disagree	
Presence below 5 yrs	Count	1	0	0	0	1	
	Expected Count	.4	.6	.0	.0	1.0	
5yrs-10yrs	Count	6	8	0	1	15	
	Expected Count	5.4	8.4	.6	.6	15.0	
10yrs-20yrs	Count	2	4	1	0	7	
	Expected Count	2.5	3.9	.3	.3	7.0	
above 20 yrs	Count	0	2	0	0	2	
	Expected Count	.7	1.1	.1	.1	2.0	
Total	Count	9	14	1	1	25	
	Expected Count	9.0	14.0	1.0	1.0	25.0	

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.542 <sup>a</sup>	9	.685
Likelihood Ratio	7.651	9	.570
Linear-by-Linear Association	.917	1	.338
N of Valid Cases	25		

**Null hypothesis:** There is no significant association between period of presence and level of awareness of paper honeycomb.

**Alternative hypothesis:** There is significant association between period of presence and level of awareness of paper honeycomb.

Degree of freedom =  $(4-1)*(4-1) = 9$

Significance level = 0.05

Calculated value = 0.685

**Inference:**

From the above table, it is inferred that the calculated P value .685 is more than .05 (level of significance), hence null hypothesis is accepted and the alternate hypothesis is rejected. Hence there is no significant association between period of presence and level of awareness of paper honeycomb.

## **ANOVA:**

Analysis of variance is a technique used to test equality of means, when more than two populations are considered. In z-test and t-test we considered only the equality of two population means. If there are more than two populations, for testing the equality of their means the analysis of variance method is applied. This technique is widely used in different fields for example, to study the pattern of average sales by using different sales techniques, the types of drugs manufactured by different companies to cure a particular disease.

A central point here is that although the analysis of variance is literally a technique that analysis, by doing so, it provides us with a test for the significance of the difference among means.

Here we use two- way classification of analysis of variance, which are classified according to two factors, one column wise and the other row wise.

### **Procedure for testing means:**

HO: There is no significant difference between column means as well as between row means.

H1: There is significant difference between column means or between row means.

### **Procedure:**

Step 1: find N, the total no of observations

Step 2: find T, the total of all observations.

Step 3: find  $T^2/N$ , the correction factor.

Step 4: calculate the total sum of squares

Step 5: calculate column sum of squares.

Step 6: prepare the anova table to calculate F-ratio.

**TABLE 3.4.1: Establishment Vs. Level of acceptance of paper honey comb.**

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
StrengthenProper ty	Between Groups	6.384	3	2.128	8.840	.001
	Within Groups	5.056	21	.241		
	Total	11.440	24			
HoneyCombQuali ty	Between Groups	3.903	3	1.301	2.750	.068
	Within Groups	9.937	21	.473		
	Total	13.840	24			
EcoFriendly	Between Groups	2.361	3	.787	3.253	.042
	Within Groups	5.079	21	.242		
	Total	7.440	24			
Availability	Between Groups	2.457	3	.819	.778	.519
	Within Groups	22.103	21	1.053		
	Total	24.560	24			
LowPrice	Between Groups	6.057	3	2.019	5.232	.007
	Within Groups	8.103	21	.386		
	Total	14.160	24			
LightWeight	Between Groups	2.494	3	.831	2.254	.112
	Within Groups	7.746	21	.369		
	Total	10.240	24			
HoneyCombmois utureResistance	Between Groups	4.754	3	1.585	2.512	.086
	Within Groups	13.246	21	.631		
	Total	18.000	24			
Durability	Between Groups	2.243	3	.748	1.274	.309
	Within Groups	12.317	21	.587		
	Total	14.560	24			
PressureResisten ce	Between Groups	1.256	3	.419	.518	.675
	Within Groups	16.984	21	.809		

	Total	18.240	24			
MarketDemand	Between Groups	7.314	3	2.438	7.066	.002
	Within Groups	7.246	21	.345		
	Total	14.560	24			

**Null hypothesis:** There is no significant difference between type of establishment and level of acceptance of paper honey comb.

**Alternative hypothesis:** There is significant difference between type of establishment and level of acceptance of paper honey comb.

**Interpretation:**

The calculated value of analysis of variance is less than the table value, so there is no significant difference between type of establishment and level of acceptance of paper honey comb.

**TABLE 3.4.2: Level of awareness of paper honey comb Vs. drawbacks of conventional boards.**

		ANOVA				
		Sum of Squares	df	Mean Square	F	Sig.
Expensive	Between Groups	2.003	3	.668	.598	.023
	Within Groups	23.437	21	1.116		
	Total	25.440	24			
SwellsBreaks	Between Groups	.944	3	.315	.598	.026
	Within Groups	11.056	21	.526		
	Total	12.000	24			
LowMoistureHeatResistance	Between Groups	.681	3	.227	.430	.034
	Within Groups	11.079	21	.528		
	Total	11.760	24			
LimitedSelection	Between Groups	4.994	3	1.665	1.816	.017
	Within Groups	19.246	21	.916		
	Total	24.240	24			
UnrelatedStatedThickness	Between Groups	.876	3	.292	.585	.032
	Within Groups	10.484	21	.499		
	Total	11.360	24			
Heavy	Between Groups	1.383	3	.461	.314	.015
	Within Groups	30.857	21	1.469		
	Total	32.240	24			
NonBioDegradable	Between Groups	4.556	3	1.519	1.725	.192
	Within Groups	18.484	21	.880		
	Total	23.040	24			
NonRecyclable	Between Groups	7.303	3	2.434	3.441	.035
	Within Groups	14.857	21	.707		
	Total	22.160	24			
LowStrength	Between Groups	2.011	3	.670	.808	.504
	Within Groups	17.429	21	.830		
	Total	19.440	24			

LessDurable	Between Groups	2.331	3	.777	.840	.487
	Within Groups	19.429	21	.925		
	Total	21.760	24			

**Null hypothesis:** There is no significant difference between type level of awareness of paper honey comb and drawbacks of conventional boards.

**Alternative hypothesis:** There is significant difference between type level of awareness of paper honey comb and drawbacks of conventional boards.

**Interpretation:**

The calculated value of analysis of variance is less than the table value, so there is no significant difference between type level of awareness of paper honey comb and drawbacks of conventional boards.

## **FINDINGS:**

- It is noted from the analysis that maximum number of respondents are having experience in their field between 5 to 10 years.
- It is found from the analysis that majority of the respondents have invested less than 5 crores in their business.
- It is noted from the analysis that maximum number of respondents' nature of projects they are involved in is residential/ domestic.
- It is inferred from the analysis that majority of the respondents use plywood in their projects, MDF is given the second preference and timber wood is given the third preference.
- It is obvious from the analysis that maximum number of respondents feels the durability, quality, high demand, availability, strength of the most frequently used panels in various projects are very good.
- It is identified from the analysis that maximum number of respondents feels the price, density, pressure resistance, moisture resistance and present demand of the frequently used panels in various projects are somewhat good to some extent.
- It is obvious from the analysis that maximum number of respondents agrees that the panels which they currently use in various projects are expensive, have limited selection, are heavy, are non recyclable.
- It is identified from the analysis that maximum number of respondents disagree that the panels which they currently use in various projects are non biodegradable, have low strength and less durable.
- It is inferred from the analysis that maximum number of respondents are uncertain about the low moisture/ heat resistance, swells, breaks/splits, unrelated stated thickness of the frequently used panels in various projects.
- It is noted from the analysis that majority of the respondents are uncertain that paper honey comb can actually replace wood.
- It is evident from the analysis that majority of the respondents are likely to accept paper honey comb panels because of its strength property, quality, eco friendly nature, availability, moisture resistance, durability and market demand.

- It is found from the analysis that majority of the respondents are uncertain about the pressure resistance feature of paper honey comb panels.
- It is obvious from the analysis that maximum number of respondents are very likely to accept paper honey comb panels because of its low price and light weight features.
- It is noted from the analysis that maximum number of respondents are mostly interested in the eco friendly nature, low price and light weight features of paper honey comb panels.
- There is significant association between level of awareness and level of acceptance of paper honey comb panels.
- There is significant association between nature of the project and frequency of purchase of conventional panels.
- There is no significant difference between type of establishment and level of acceptance of paper honey comb.
- There is no significant difference between type level of awareness of paper honey comb and drawbacks of conventional boards.

## **SUGGESTIONS:**

- ❖ The company may take the help of media or public relation services to create awareness about paper honey comb panels.
- ❖ At present the awareness level is very low that target audience is hesitating to accept paper honey comb panels.
- ❖ From the survey it is found that target audience is comfortable in using timber wood, plywood and MDF panels.
- ❖ The foremost important step to be taken by company is to take necessary steps to create awareness about paper honey comb. From the study its clear that level of awareness and level of acceptance of paper honey comb panel is inter dependent.
- ❖ From the survey conducted the respondents feel that the current marketing strategy adopted by V3 is lagging.
- ❖ It has been found that they are not so interested in accepting a substitute product.
- ❖ The company may give more preference to honey comb panels for residential and domestic purposes.

## **CONCLUSION:**

Paper honey comb not only reduces the cost of construction but will also ensure no depletion of world's natural wealth. Thus the industries of present age are getting more responsible. They are more environment conscious than ever before. Advanced materials with combination of properties for specific end uses became a reality.

# *CHAPTER 4*

*ANNEXURE*

## QUESTIONNAIRE

1. Type of establishment
  - a. Builders
  - b. architect
  - c. interior designer
  - d. event management
2. Period of presence
  - a. Below 5 yrs
  - b. 5 yrs – 10 yrs
  - c. 10 yrs – 20 yrs
  - d. above 20 yrs
3. Amount of investment
  - a. Above 50 crores
  - b. 30 – 50 crores
  - c. 15 – 30 crores
  - d. less than 15 crores
4. Number of projects completed / in progress:
5. Nature of the projects undertaken:
  - a. Residential/ domestic
  - b. Industrial / factory
  - c. Event management
  - d. Others
6. Tick the frequency of purchase of the following panels in your projects

	Frequently	Very often	Occasionally	Never used
Particle board				
Aluminum honey comb				
Timber wood panels				
Plywood panels				
MDF panels				
Solid wood panels				

7. Tick the satisfactory level of panels currently being used in your projects

	Excellent	Very good	Good	Fair	Poor
Durability					
Price					
Quality					
High demand					
Availability					
Strength property					
Density					
Pressure resistance					
Corrosion, fungi or moisture resistance					
Present demand					

8. Tick the opinion of currently used panels

	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
Expensive					
Swells , break/ splits					
Low moisture and heat resistance					
Limited selection					
Unrelated stated thickness					
Not easy to handle( heavy)					
Non bio degradable					
Non recyclable					
Low strength					
Less durable					

9. Paper honey comb is a complete substitute for wood.

- a. Strongly agree    b. Agree    c. No Comments    d. Disagree  
 b. Strongly disagree

10. Tick the Level of acceptance of paper honey comb panels.

	Very likely	Likely	Uncertain	Unlikely	Very unlikely
Strengthen property					
Quality					
Eco friendly / bio degradable					
Availability					
Low price					
Light weight					
Moisture resistance					
Durability					
Pressure resistance					
Market demand					

# *CHAPTER 5*

# *BIBLIOGRAPHY*

## REFERENCE:

<http://www.scribd.com/doc/15596383/Final-Project-Report-on-Paper-Industry>

<http://users.auth.gr/~jbarb/Publications/lightweight%20honeycomb%20furniture.pdf>

<http://www.superhoneycomb.com/>

<http://paper-honeycomb.com/demonstration>

<http://bangaloreofficeinteriors.com/contactform/forms/bangalore-interior-decorators-contact.html>

<http://users.auth.gr/~jbarb/Publications/lightweight%20honeycomb%20furniture.pdf>

<http://in.linkedin.com/in/abhijeetmakhijani>

[http://honecore.com/about\\_us.html](http://honecore.com/about_us.html)

<http://www.clickindia.com/detail.php?id=4144863>

<http://www.questionpro.com/akira/surveyTemplateInfo.do?surveyID=135&mode=2>

[http://www.mineful.com/online\\_surveys/questionnaire\\_sample\\_templates.html](http://www.mineful.com/online_surveys/questionnaire_sample_templates.html)

<http://www.questionpro.com/akira/editSurvey.do>

<http://www.packraftindia.com/honeycomb-products.html>

<http://www.b2bfreezone.com/product-search/honeycomb-material.htm>

<http://www.internationalbusinessstrategies.com/market-research-reports/40880606.html>

<http://www.internationalbusinessstrategies.com/market-research-reports/43620608.html>

<http://www.internationalbusinessstrategies.com/market-research-reports/43600608.html>

[http://www.conventions.net/trade\\_show\\_displays/3\\_panel\\_trade\\_show\\_exhibits-1524.asp](http://www.conventions.net/trade_show_displays/3_panel_trade_show_exhibits-1524.asp)

<http://www.vasparhoneycomb.com/clients.html>

[http://www.alibaba.com/showroom/paper\\_honeycomb.html](http://www.alibaba.com/showroom/paper_honeycomb.html)