

A STUDY ON MATERIAL HANDLING AND ITS MAINTENANCE WITH RESPECT TO GUNTUPALLI MARBLE AND GRANITES

Submitted in partial of the requirements for the award of Degree in

MASTER OF BUSINESS ADMINISTRATION

by

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**DEPARTMENT OF BUSINESS ADMINISTRATION
SCHOOL OF MANAGEMENT STUDIES**

SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

**Accredited with Grade "A" by NAAC | 12B Status by UGC | Approved by AICTE
JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600 119**

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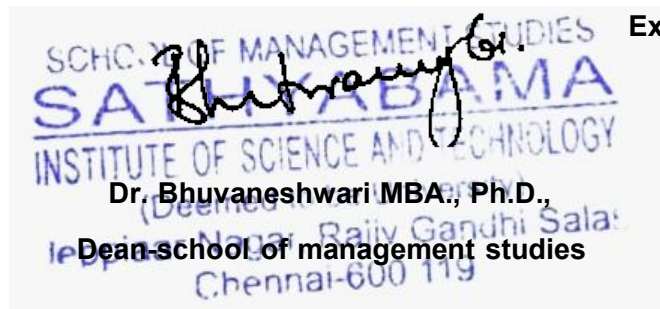
This is to certify that this project report is the Bonafede work of **Mageshwaran. s 41410186** who carried out the project entitled "**A STUDY ON MATERIAL HANDLING AND ITS MAINTAINENCE WITH RESPECT TO GUNTUPALLI MARBLE AND GRANITE**" under my supervision from January 2023 to April 2023.

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DATE: 05.05.2023

PLACE: Chennai



MAGESHWARAN S

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ABSTRACT

Material handling and its Maintenance is the combination of all technical and associated administrative actions intended to retain an item in, or restore it to, a state in which it can perform its required function. Many companies are seeking to gain competitive advantage with respect to cost, quality, service and on-time deliveries. The effect of maintenance on these variables has prompted increased attention to the maintenance area as an integral part of productivity improvement. Maintenance is rapidly evolving into a major contributor to the performance and profitability of manufacturing systems. In fact, some see maintenance as the "last frontier" for manufacturing.

The suggestions were drawn based upon the findings from the analysis; the company needs to concentrate on spares availability and need skilled labors. And the company monitors the maintenance activities. And proper schedule following on the preventive maintenance.

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CHAPTER- 1

INTRODUCTION

1.1 Introduction

The marble and granite industry involves the extraction, processing, and sale of natural stone materials used in construction and design. Marble and granite are both types of natural stone that are highly sought after for their beauty, durability, and versatility.

Marble is a metamorphic rock that is formed from limestone that has been subjected to intense heat and pressure over time. It is known for its distinctive veining and range of colours, which can include white, black, grey, pink, green, and more. Marble is commonly used in flooring, countertops, sculptures, and decorative elements. Granite, on the other hand, is an igneous rock that is formed from molten magma deep within the earth's crust. It is known for its durability and resistance to scratches, heat, and stains. Granite is commonly used in kitchen countertops, flooring, and building facades.

Marble is a precious ornamental stone used by man very early in history. It could be said that marble quarrying and processing industries belong to the oldest industries of the world. Today, marble is a differentiated product that is internationally traded. The price and value of marble depends on one hand on its natural characteristics (like quality, type and colour) and on the other hand on technological processing (giving it a special shape, polish, size and thickness. Granite is one of the emerging industries of INDIA. According to estimates INDIA has over 297 billion tons of granite reserves and more than 100 types of colours and varieties of granite are available in INDIA. This study is about Operations Planning and Control in a Granite Industry

One of the biggest industries in the world is the marble and granites industry. North American, Northern European, and East Asian nations dominate it. Significant marble and granites businesses can also be found in Australasia and Latin America. Both India and China are predicted to play major roles in the industry's growth during the coming years.

1.2 INDUSTRY PROFILE

The marble and granite industry involves the extraction and distribution of natural stone products, including marble granite limestone, travertine and slate. The industry is characterized by a high degree of vertical integration, with many companies involved in both the extraction and processing of marble and granite.

The industry is typically divided into two main sectors: quarrying and processing. Quarrying involves the extraction of raw stone from the earth, often using heavy machinery and explosives. Once the stone is extracted, it is transported to a processing plant where it is cut, polished, and shaped into finished products. The industry is highly competitive and often driven by price, with low-cost producers in countries such as China and India dominating the market.

.Despite the challenges posed by low-cost competition, the marble and granite industry remain an important source of employment and economic growth in many regions. In addition, natural stone products are valued for their durability, beauty, and sustainability, making them a popular choice for construction and design projects.

MARKET SIZE:

The global market size of the marble and granite industry was valued at USD 178.4 billion in 2020 and is expected to grow at a compound annual growth rate (CAGR) of 3.5% from 2021 to 2028. The growth of the industry is driven by increasing demand for natural stone products in construction and design applications, as well as rising disposable income and urbanization in emerging markets.

The market is segmented by product type, application, and region. In terms of product type, the market is segmented into marble, granite, limestone, sandstone, and others. Marble is expected to remain the dominant segment due to its popularity in high-end construction and design projects.

In terms of application, the market is segmented into construction, decoration, and others. The construction segment is expected to be the largest segment due to the growing demand for natural stone products in residential and commercial construction projects.

Regionally, Asia Pacific is expected to be the largest market for marble and granite products due to its rapidly growing construction and design industries, as well as the availability of low-cost production facilities in countries such as China and India. Europe and North America are also significant markets, driven by demand for high-end and luxury construction projects

1.3 company profile



GUNTUPALLI MARBLE AND GRANITES

Nature of business: Manufacturer, Distributor and Exporter.

Company CEO: ANIL JONNALAGADDA

Year of Establishment: 2013

Legal Status of Firm: Limited company

Headquarters: Chennai, Tamil Nadu

Since the foundation in 2013, Guntupalli marble and granite company specialize in the fabrication and installation of natural stone products for residential and commercial applications. They offer a wide range of products such as countertops, flooring, wall cladding, and custom stonework. Typically, these companies source their stone from quarries around the world and import them to their fabrication facilities.

1.4 Types of material handling systems



CRANES

cranes are used to transport loads over variable (horizontal and vertical) paths within a restricted area and when there is insufficient (or intermittent) flow volume such that the use of a conveyor cannot be justified. Cranes provide more flexibility in movement than conveyors because the loads handled can be more varied with respect to their shape and weight. Cranes provide less flexibility in movement than industrial trucks because they only can operate within a restricted area, though some can operate on a portable base.



CUTTING MACHINE

Cutting machines: Cutting machines are used to cut the marble and granite into smaller pieces. They use diamond blades to make precise cuts. A cutting machine is a type of machine tool used to cut and shape various materials, such as metal, wood, plastic, and fabric. The specific details of a cutting machine can vary depending on its type and purpose.



POLISHING MACHINE

Marble polishing machines are used to restore the shine and smoothness of marble surfaces that have become dull or scratched over time. Here are some common details of marble polishing machines:

Types: There are several types of marble polishing machines available, including rotary machines, planetary machines, and hand-held machines. Each type has its own advantages and disadvantages.

Power: The power of a marble polishing machine can range from 1-5 horsepower, depending on the model. Machines with higher horsepower are capable of polishing larger areas at a faster speed.



CNC MACHINE CNC machines: CNC (Computer Numerical Control) machines are used to cut, shape, and polish marble and granite. They are computer-controlled and can produce intricate designs and patterns.



FORK LIFTS

Forklifts: Forklifts are used to move smaller blocks of marble and granite around the factory or warehouse. They come in various sizes and types, including electric and diesel-powered forklifts.

1.5 History and background

India is one among the leading countries in mining and export of granite and is rich in granite reserves. Geologically, the southern and eastern belts of the nation are abundant in granite deposits.

The use of marble and granite dates back to ancient times. The ancient Greeks and Romans were known for their extensive use of marble in architecture, sculpture, and decorative arts. The Parthenon in Athens, the Colosseum in Rome, and the Taj Mahal in India are just a few examples of famous buildings that feature marble as a prominent material.

Granite has also been used for centuries, particularly in construction and architecture. The Great Pyramid of Giza in Egypt, built around 2560 BC, is made largely of granite blocks. The use of granite continued throughout history, with examples including the granite columns in the Pantheon in Rome and the granite obelisks in ancient Egypt.

1.6 NEED FOR STUDY

An equipment is an important resource which is constantly used for adding value to products. so it must be kept in good operating condition otherwise interruption of production if it is used a mass production line.

This project has been undertaken to assess the material handling and its maintenance management at Guntupalli Marble and Granites in order to avoid the breakdown and improve the productivity

1.7 Scope of the Study

- Its helps to analyze the problems of materials handling in marble and granites industry.
- To identify the potential risks reliable to the quality of product and process.
- To enhance the Improves of preventive maintenance system in marble manufacturing industry

1.8 Objectives Of Study

Primary objective:

- The objective of this study to analyze the materials handling and maintenance towards the marble and granite industry.

Secondary Objectives Of The Study:

- To examine the problem facing frequently in materials handling and its maintenance with respect to marble and granites manufacturing industry.
- To identify the potential risk in preventive maintenance to reduce wastage in marble and granite manufacturing industry.
- To give suggestions to improve the maintenance in the organization.

CHAPTER-2

Review of literature

2.1 List of reviews

Esa nopenen, Taina piispa, Anita lukka (2005) Objectives of study is new operation model for maintenance material logistics. New operation models for decreasing fixed costs and transforming into variable costs in the field of marble industry. The report illustrates two cases- a new operation model for material logistics in maintenance and an examination of Forklift truck fleet outsourcing solution.

Zakaryasoufi, Pierre david, Zakaria yahouni (2021) Level of automation plays significant role in the success of a material handling system definition, which influences the manufacturing performance. the proposition of analytic hierarchy process is implemented in a demonstrator software tool and illustrated on simple example.

Mohan Jha (2003) Objectives of the study is maintenance types, procedures and evaluation of performance. the work request format gives the maintenance personnel the basic inputs required for analyzing the breakdowns and aiming at minimizing them. the work request acts as F.I.R for planning, scheduling, priority fixing, cost controlling and fixing of an objective for the department

Selen (Belgium) (2020) It developed to simultaneously plan preventive maintenance and production in a process industry environment, where maintenance planning is extremely important

S Wannawiset, (2018) FMEA is widely selected tool for the application of machinery breakdown prevention. this research adopted **FMEA technique** to reduce and prevent breakdown of the important equipment of the large commercial machine that has capacity of 2,00,000 tons per annum, located in north east of Thailand.

Olanrewaju et al.(2016) provides an overview of the different maintenance strategies used for material handling systems, including preventive, corrective, predictive, and condition based maintenance.

Davis (2007) has suggested that the experience of maintenance management implementation in the UK has shown that the key factors for successful implementations are to approach maintenance management realistically; developing a practical plan and employing program and project management principles; accept that maintenance management will take a long time to spread across the organization and change existing maintenance culture; be determined to keep going, put in place, train and develop a network of maintenance management co-coordinators that will promote and support maintenance management activities every day;

Fredendall et al. (2007) has emphasized that a maintenance management development program should typically emphasize among other things: the leadership role of top management in launching and implementing maintenance management; establishment of maintenance management policies, goals; master plan and communicating these to everyone in the organization; and building a system for training and employee involvement.

Jonsson (2002) has emphasized on improvement of the maintenance management components in the Swedish manufacturing organizations. He has described five linked components of maintenance management as: strategy, human aspects, support mechanisms, tools and techniques, and organization and advocates for formulating clear maintenance strategies that are linked to manufacturing and corporate strategies.

Hutchins (2005) has advocated for making considerable efforts for recognizing teams and enabling them to display their work for successful maintenance management implementation

Bamber et al.(2009) has conducted a study aimed at discovering the factors affecting the successful implementation of maintenance management at a UK manufacturing small to medium-size enterprise (SME). They have outlined a generic model indicating factors affecting the successful implementation of maintenance management

Davis and Willmott (2009) have recommended two significant enablers for successful implementation of maintenance management initiatives in the manufacturing organizations:

- (1) A structured approach which uses a number of tools and techniques to achieve highly effective plants and production equipment and to measure its effectiveness.
- (2) A philosophy, which is based upon the empowerment and encouragement of factory floor-based personnel from all areas.

Lawrence (2009) has suggested the use of mathematical modelling to bring about the cultural change necessary to make maintenance management work and suggest the use of linear programming, integer programming, other related OR techniques and measurement of MTTS-MTTR to optimize the maintenance management process and describes how such models might be used to promote the cultural change by making the potential benefits of maintenance management more tangible and objective to employees.

McKone et al. (2015) have considered short-term measures for facilitating maintenance management activities that are typically implemented in a plant. They have suggested autonomous maintenance related activities such as the use of teams, housekeeping, cross training, and operator involvement; and planned maintenance related activities such as disciplined planning of maintenance tasks, information tracking, and schedule compliance for successful implementation of maintenance management programs.

Prickett (2019) has described the role of designating and using OEE as a measure of maintenance management effectiveness towards identification of the major causes of losses in manufacturing effectiveness, and allowing the continuous monitoring of the most important factors, which influence system performance. He has emphasized upon the necessity of planned maintenance to preserve the machine conditions, while emphasizing upon the need for development of a wider maintenance management

strategy and explains the work program to increase the OEE of machine tools and flexible manufacturing systems (FMS).

Naguib (2013) has proposed a five-phase roadmap to implementation which includes: an awareness program to obtain management commitment and support; a restructuring of the manufacturing organization to integrate maintenance in production modules; planning maps to cover maintenance management activities related to equipment effectiveness, the maintenance management system, and workplace and workforce improvements; an implementation process based on the work of cross-functional, multi-skilled, self-directed teams; and an assessment process to “close loop” the implementation process and define directions for continuous improvements.

Steinbacher and Steinbacher (1993) is presented in Figure 6. maintenance management implementation process, at the highest level requires initialization, implementation, and institutionalization. In this model, “Training and Education” are an integral element of all other pillars rather than stand-alone pillar as in the Nakajima model.

Suzuki (2022) has also emphasized on the contribution of maintenance management to business excellence, and the eight fundamental maintenance management development activities that includes leadership and administration; people management and focused improvement; policy and strategy and early management, autonomous maintenance (AM); process and planned maintenance; people satisfaction and training and education; customer satisfaction and quality maintenance; and impact on society and safety and environment management.

Pirsig (2020) emphasizes upon seven unique broad elements and four main themes in any maintenance management implementation program. The key themes in the maintenance management implementation program include training, decentralization, maintenance prevention and multi-skilling, while the broad elements include asset strategy, empowerment, resource planning and scheduling, systems and procedures, measurement, continuous improvement and processes.

Carannante et al. (2016) have proposed developed the eight-step approach to the implementation of maintenance management involving system, measurement, autonomous maintenance, housekeeping, continuous improvement, culture, training, and plant design.

Bamber et al. (2019) have suggested a six-step maintenance management implementation approach to help companies that require a renewed emphasis or vitality to an already implemented but floundering maintenance management program, and emphasize upon creating a steering organization; understanding the current situation; understanding the restraining forces and the driving forces with production associates.

Leflar (2011) has presented a five-step plan to guide the maintenance management implementation and calls for holistically following five steps including restoring equipment to new condition (ensure that equipment is clean and free of humanly detectable minor defects, create cleaning and inspection standards to keep machines in this condition, and create visual controls to rapidly identify variation from this condition), identifying complete maintenance plans (create PM checklists, establish schedules for PM execution, create PM procedures, specify equipment inspection procedures).

Jahar et (2011) identify and standardize equipment replacement parts, create equipment parts logs, and implement equipment quality checks), implementing maintenance plans with precision (complete all PM's on time, complete 100 per cent of PM checklist items, execute PM checklists without variation, and continually advance the knowledge and skill of the factory personnel), preventing recurring machine failures (implement failure analysis to prevent recurring failure, establish continuous PM evaluation and improvement – make PM's easier, faster, better), and improving machine productivity (lubrication analysis, calibration and adjustment analysis, quality maintenance analysis, machine part analysis, condition-of-use and life analysis, productivity analysis, extended condition monitoring, continuous condition monitoring, and maintenance cost analysis).

Becker, (2008) lack of management consensus, underestimating the importance of knowledge, inconsistent and unclear expectations, neglecting the basics, and maintenance management implementation within an existing organization structure that does not provide the necessary support. These problems reflect the lack of a clear understanding of what are the fundamental and complementary manufacturing practices. It has been observed that companies that have experienced failure in the maintenance management implementation programs have often neglected the development of basic practices continuous improvement, total employee involvement, cross functional teams, that support the implementation of maintenance management techniques.

Crawford et al. (2018) have pointed out several problems faced by organizations towards successfully implementation lean manufacturing initiatives including maintenance management involved cultural resistance of change, lack of training and education, lack of organizational communication, use of inappropriate performance measurement, and poor quality.

Bakerjan (2022) has stated that many organizations that attempt to implement maintenance management initiatives experience difficulties and are not able to achieve the anticipated benefits. The failure of an organization to successfully implement a maintenance management program has been attributed to the various obstacles including lack of management support and understanding, lack of sufficient training, failure to allow sufficient time for the evolution.

Hayes and Pisano (2014) have believed that while programs such as TQM, JIT, and maintenance management have proliferated the manufacturing sector, management seems content with investing in these programs without a full sense of their implementation requirements and their impact on overall manufacturing performance. The crux of the problems that many companies have experienced with improvement programs is that most companies focus on the mechanics of the programs rather than on their substance, the skills and capabilities that enable an improvement program to achieve its desired results.

McAdam and Duffner (2016) have described that many issues arise when trying to implement maintenance management in a union environment. Workers fear that the only

drive is to improve production efficiency, reduce labour, and increase employee workload. Many operators do not want additional responsibility and are happy with the situation the way it is. In addition the skilled trades enjoy feeling indispensable and think that the autonomous maintenance activity threatens their job security.

Davis (2017) has outlined various reasons for maintenance management failure within UK manufacturing organizations including lack of commitment of top management, deployment of inexperienced consultants, lack of structure, failure to implement change on the shop floor, lack of education and training for employees, lack of employee involvement, and poor structure to support the maintenance management initiatives.

Fredendall et al. (2017) have suggested that potential barrier that often affect maintenance management implementation is the inability of the organizations to coordinate its human resource practices, management policies and technology. Together, these problems reflect the lack of a system that supports the implementation of world-class manufacturing programs such as TQM, JIT and maintenance management.

Lawrence (2019) has stated that many maintenance management programs fail because the organizations are unable to change their culture. Thus, a comprehensive maintenance management implementation methodology is indispensable.

Cooke (2010) has attributed the failure of maintenance management implementation program to the inability of management to holistically implement the maintenance management practices at the workplace

Mora (2012) has stated that though in recent years, many companies have attempted to implement maintenance management programs, less than 10 per cent of companies succeed in implementing maintenance management. Implementing maintenance management requires the change of the organizational culture and change of existing behaviours of all employees, operators, engineers, maintenance technicians, and

managers. The maintenance management implementing process has been fraught with roadblocks and pitfalls.

EDWARD H (2016) Success in warehousing depends on efficiency and precision. Effective warehousing continues to be crucial to the bottom line of businesses all over the world, despite the just-in-time production attitude of today and efforts to do away with warehouses and their inventory holding expenses.

Elseiver (2019) Traditionally, a sequential approach has been used to handle these interdependent subproblems. The projected material flow distances between the organised facilities can be greatly surpassed, and designing the material flow patterns inside the prepared facilities might be challenging.

Yan pengyu (2019) The issue is presented as a complex Mixed Integer Programming (MIP) model, where the processing and transportation activities for the new jobs are put into the open time slots of the original timetable.

R rajesh (2018) The task analysis method, which divides the operation into smaller, more manageable tasks, has been the foundation for most ergonomic evaluations of manual material handling (MMH). Yet, there is a lack of precision in the terminology used to define different MMH activities.

Marley (2019) Each class's appropriate examples are provided. It is addressed how to acquire biomechanical and physiological data and what kind of ergonomic study is necessary. The magnitude of the exposure and the cost of the measurement are evaluated qualitatively. Finally, important concerns and the range of potential study are addressed.

Jos Verbeek (2019) When compared to no intervention or alternative interventions, there is moderately strong evidence that MMH counselling and training, with or without assistive devices, does not prevent back pain or disability related to back pain. The usefulness of MMH guidance, training, or supportive devices for managing back pain is not supported by RCTs. The remaining ambiguity might be significantly diminished by additional high-quality studies.

Amrita dutta (2022) Even with the ongoing development of cutting-edge tools and machinery, the construction business is physically taxing and labour-intensive. Workers engage in a lot of manual labour, which puts them at risk for injury all the time. Exoskeletons have recently drawn a lot of attention because of their ability to shield employees from harm.

Shankar Chakraborty (2021) It has been determined that choosing the best material handling equipment for typical circumstances and the handling environment is a multi-criteria decision-making challenge. It is discovered that the selection process is unstructured, typified by a great deal of domain-dependent information, and necessitates the use of a multi-criteria decision-making method, such as the analytic hierarchy process (AHP)

F T S chan (2022) The choice and configuration of equipment for material movement and storage at a facility is a crucial step in the design of a material handling system. Other than checklists, there are few tools available to help engineers choose appropriate, cost-effective material handling equipment. This is a difficult and complex operation.

CHAPTER-3

Research Methodology

3.1 Research design:

Descriptive Research

Design descriptive research is a study designed to depict the participants in an accurate way. more simply put, descriptive research is all about describing people who take part in the study.

3.2 Sources Of Data:

Data collection is the term used to describe a process of preparing and collecting data.

Primary data:

The primary data are those which are collected afresh and for the first time and thus happen to be in original character. Primary data was collected with the help of questionnaire and informal interview were also conducted to get the direct responses of the employees regarding critical factors

Secondary data:

Secondary data are those data available already in the books of records. Secondary data was collected from company records, annual reports

3.3 STRUCTURE OF QUESTIONARIE:

The questionnaire was used to collect the data from the employee and informal interview were also conducted to get the direct responses of the employees regarding critical factors.

The questionnaire was designed to include all attributes related to Maintenance Management much care taken for construct the questionnaire, so that it is free from errors and it makes sure that questionnaire is in logical sequence.

The questionnaire designed consists of dichotomous questions and various rating scale.

3.4 Sampling technique:

Probability sampling method

Probability sampling is a sampling method that involves randomly selecting a sample, or a part of the population that you want to research. It is also sometimes called random sampling.

3.5 population:

The population or universe can be defined as aggregate of items possessing a common trait. In this study population is finite. Number of employees working in Guntupalli Marble and Granites is the population size.

3.6 Sample design:

Sample design is a definite plan determined before any data actually for obtaining for a sample from a given data. The sample was collected from population. In the sample size is 110. The census method is used for the study.

3.7 DESCRIPTION OF STATISTICAL TOOLS USED

To analyse and interpret collected data the following statistical tools were used.

- Percentage method
- Chi-square test

3.7.1 PERCENTAGE METHOD

In this project Percentage method test was used. The percentage is used for making comparison between two or more series of data. It is used to classify the opinion of the respondents for different factors. We can get percentages of the data given by the respondents. The following are the formula

$$\text{Percentage of Respondent} = \frac{\text{No of Respondent}}{\text{Total no. of Respondents}} \times 100$$

3.7.2 CHI-SQUARE TEST

Chi-square analysis in statistics is to test the goodness of fit to verify the distribution of observed data with assumed theoretical distribution. Therefore, it is a measure to study the divergence of actual and expected frequencies. Chi-square, symbolically written as χ^2 (Pronounce as Ki-Square), is a statistical measure used in the context of sampling analysis for comparing a variance to a theoretical variance.

Formula,

$$\chi^2 = \frac{(O-E)^2}{E}$$

E= Expected frequency

The calculated value of chi-square is compared with the table of chi-square for the given degrees of freedom at the specified level of significance. If the calculated value is greater than the tabulated value then the difference between the observed frequency and the expected frequency are significant. The degrees of freedom is (n-2) where 'n' is number of observed frequencies and in case of contingency table the degrees of freedom is (C-1) (R-1) where C is number of columns and R is number of rows.

3.8 Hypothesis:

HYPOTHESIS:

H0: There is significant association between the problems faced in materials handling and their quality and inspection of materials and equipment's

H1: There is no significant association between the problems faced in materials handling and their quality and inspection of materials and equipment's

CHAPTER 4

DATA ANALYSIS AND INTERPRETATION

Percentage analysis

Table 4.1.1 Age of the respondents:

S.no	Particulars	Respondents	Percentage
1	18-28	31	28.2
2	28-38	53	48.2
3	38-48	20	18.2
4	48 & above	6	5.5

Source: Primary Data

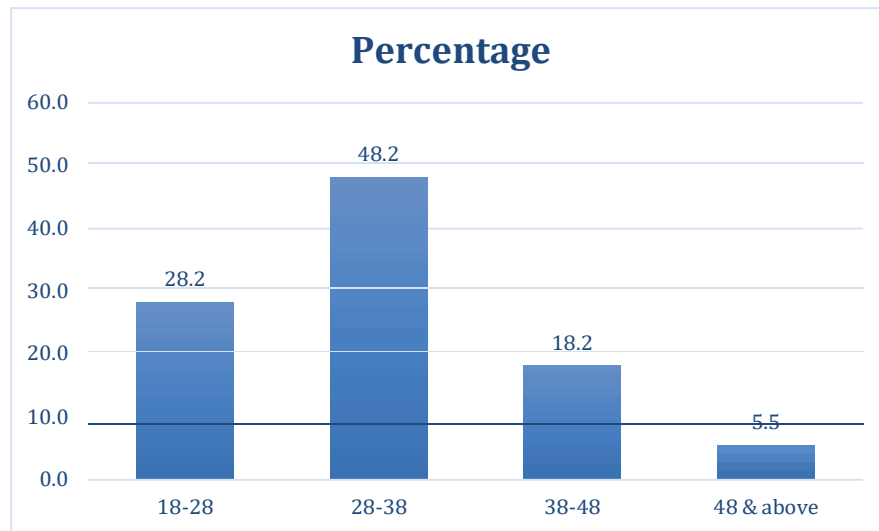


Chart4.1.1 Age of respondents

Interpretation

From the above table it is interpreted that the number of respondents between 18-28 are 28.2%, between 28-38 are 48.2%, between 38-48 are 18.2%, 48 to above are 5.5%

Inference

Majority (48,2%) of the respondents are 28-38.

Table 4.1.2 Experience of the respondents

S.No	Experience	Respondents	Percentage
1	0-1yrs	16	14.5
2	1-5yrs	53	48.2
3	5-10yrs	29	26.4
4	10yrs & above	12	10.9

Source: Primary data

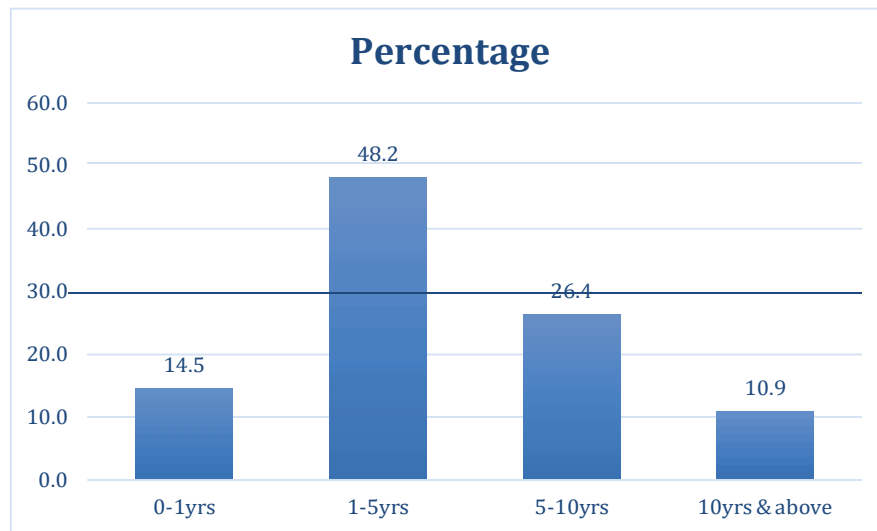


Chart 4.1.2 Experience of respondents

Interpretation

From the above table it is interpreted that the number of respondents were 14.5% are 0 – 1 years, 48.2% are 1 - 5 years, 26.4% are 5 – 10 years and 10.9 are 10 years and above.

Inference

Majority (48.2%) of the respondents are 1 -5years experience.

Table 4.1.3 Income of the respondents

S.No	Income	Respondents	Percentage
1	Less than 10000	11	10.0
2	10000-20000	29	26.4
3	20000-30000	40	36.4
4	30000 & above	30	27.3

Source: Primary data

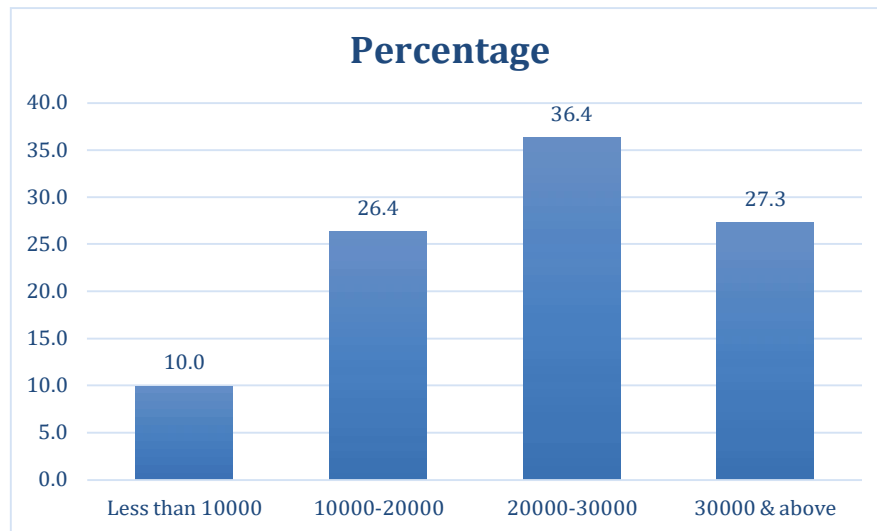


Chart 4.1.3 Income of respondents

From the above table it is interpreted that the number of respondents were 10% are less than 10000, 26.4% are 10000- 20000, 36.4% are 20000 – 30000 and 27.3% are 30000 and above.

Inference

Majority (36.4%) of the respondents are with the income level of 20000 – 30000.

Table 4.1.4 Inspection period of machines

S.No	Inspection period	Respondents	Percentage
1	Daily	11	10.0
2	Weekly	33	30.0
3	Monthly	52	47.3
4	Twice in three months	14	12.7

Source: Primary data

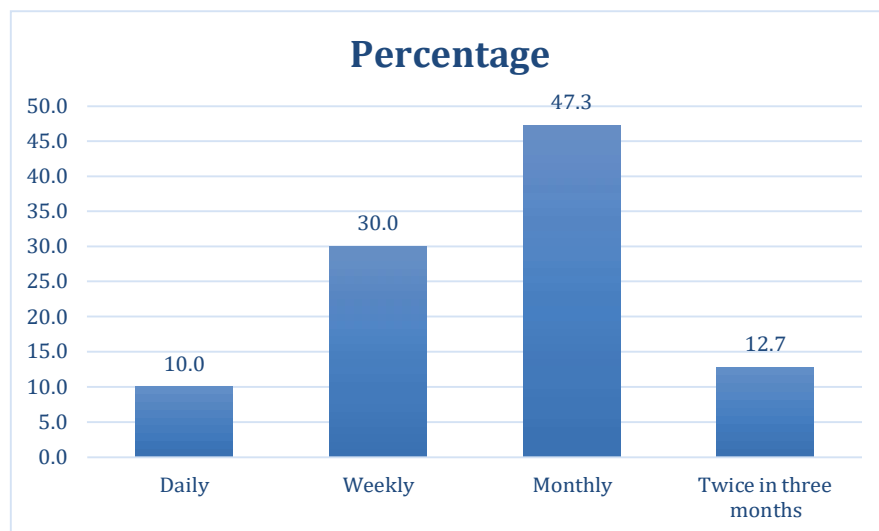


Chart 4.1.4 Inspection period of machines Interpretation

From the above table it is interpreted that the number of respondents were 10% are daily inspection, 30% are weekly, 47.3% are monthly, and 12.7% are twice in three months.

Inference

Majority (47.3%) of the respondents to monthly inspection.

Table 4.1.5 Problem facing in product ordering system

S.No	Particulars	Respondents	Percentage
1	Strongly agree	52	47.3
2	Agree	16	14.5
3	Neutral	19	17.3
4	Disagree	9	8.2
5	Strongly Disagree	14	12.7

Source : Primary Data

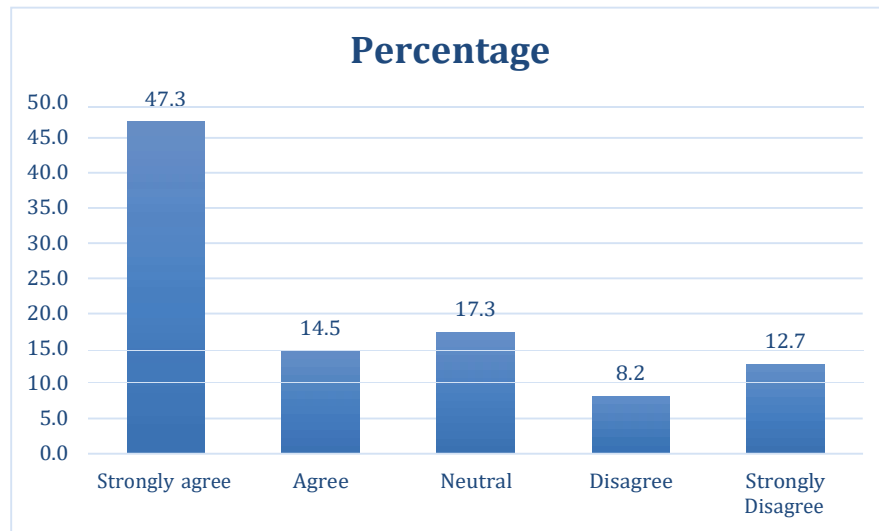


Chart 4.1.5 Problem facing in product ordering system

Interpretation

From the above table it is interpreted that the number of respondents were 47.3% says Strongly agree, 14.5% says agree, 17.8% says neutral, 8.2% says disagree, 12.7% says strongly disagree.

Inference

Majority (47.3%) of the respondents are strongly agree.

Table 4.1.6 problem facing in shortage of supply in raw materials

S.No	Particulars	Respondents	Percentage
1	Strongly agree	34	30.9
2	Agree	26	23.6
3	Neutral	27	24.5
4	Disagree	18	16.4
5	Strongly Disagree	5	4.5

Source: Primary Data

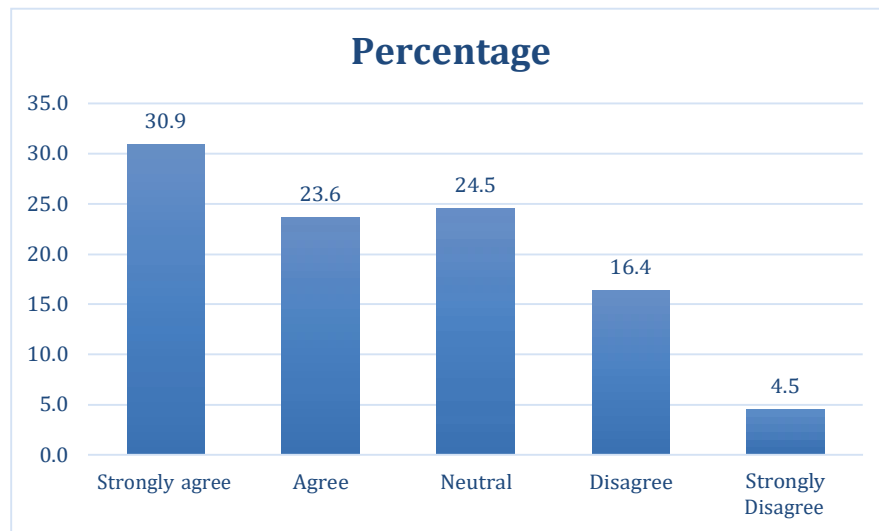


Chart 4.1.6 problem facing in shortage of supply in raw materials

Interpretation

From the above table it is interpreted that the number of respondents were 30.9% says Strongly agree, 23.6% says agree, 24.5% says neutral, 16.4% says disagree, 4.5% says strongly disagree.

Inference

Majority (30.9%) of the respondents are says strongly agree

Table 4.1.7 Problem facing in rejection of products

S.No	Particulars	Respondents	Percentage
1	Strongly agree	14	12.7
2	Agree	27	24.5
3	Neutral	47	42.7
4	Disagree	14	12.7
5	Strongly Disagree	8	7.3

Source :Primary Data

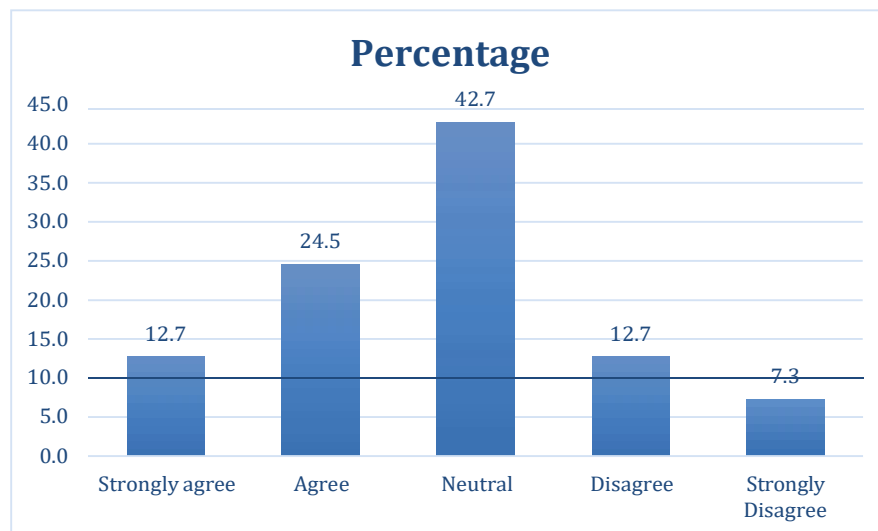


Chart 4.1.7 problem facing in rejection of products

Interpretation

From the above table it is interpreted that the number of respondents were 12.7% says Strongly agree, 24.5% says agree, 42.7% says neutral, 12.7% says disagree, 7.3% says strongly disagree

Inference

Majority (42.7%) of the respondents are says neutral.

Table 4.1.8 problem facing in delay in order receiving

S.No	Particulars	Respondents	Percentage
1	Strongly agree	15	13.6
2	Agree	33	30.0
3	Neutral	40	36.4
4	Disagree	15	13.6
5	Strongly Disagree	7	6.4

Source : Primary Data

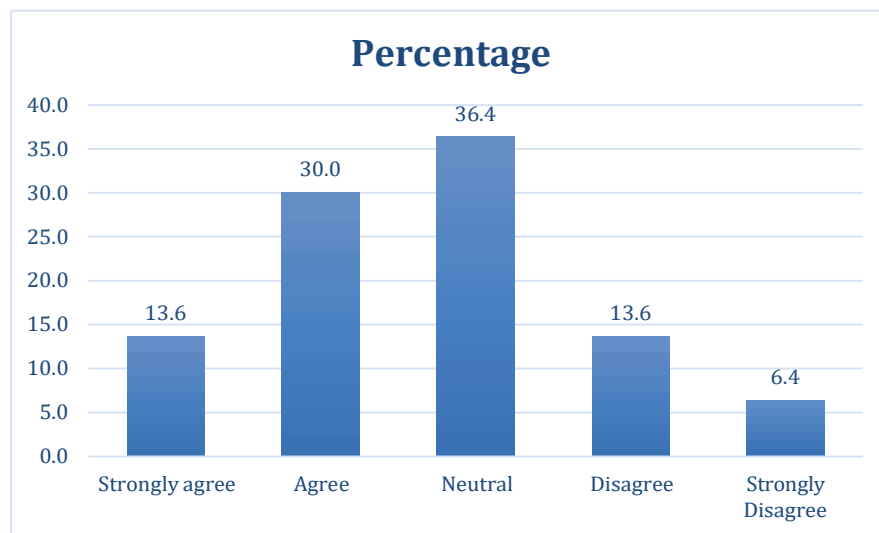


Chart 4.1.8 problem facing in delay in order receiving

Interpretation

From the above table it is interpreted that the number of respondents were 13.6% says Strongly agree, 30.0% says agree, 36.4% says neutral, 13.6% says disagree, 6.4% says strongly disagree

Inference

Majority (36.4%) of respondents are neutral.

Table 4.1.9problem facing in wants to transportation

S.No	Particulars	Respondents	Percentage
1	Strongly agree	21	19.1
2	Agree	20	18.2
3	Neutral	43	39.1
4	Disagree	10	9.1
5	Strongly Disagree	16	14.5

Source : Primary Data

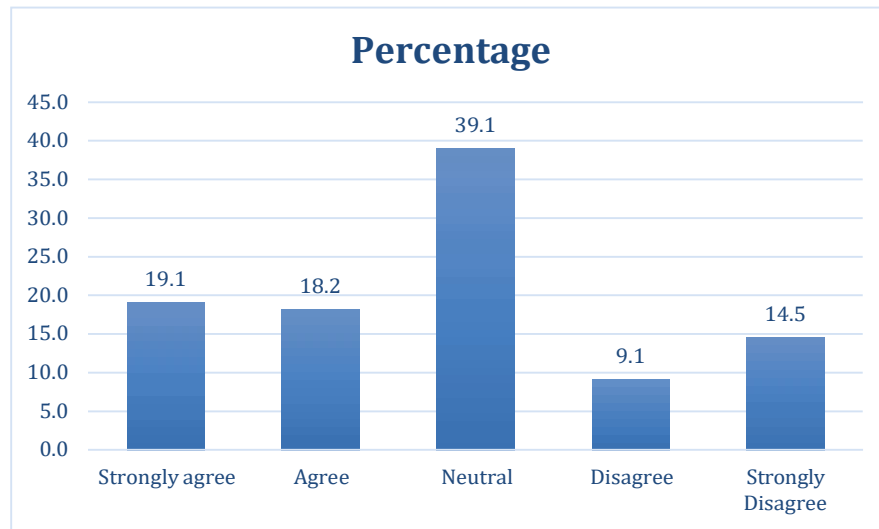


Chart 4.1.9problem facing in wants to transportation

Interpretation

From the above table it is interpreted that the number of respondents were 19.1% says Strongly agree, 18.2% says agree, 39.1% says neutral, 9.1% says disagree, 14.5% says strongly disagree

Inference

Majority (39.1%) of the respondents are says neutral.

Table 4.1.10 Factors affecting materials handling (shortage capacity)

S.No	Particulars	Respondents	Percentage
1	Strongly agree	40	36.4
2	Agree	22	20.0
3	Neutral	31	28.2
4	Disagree	9	8.2
5	Strongly Disagree	8	7.3

Source : Primary Data

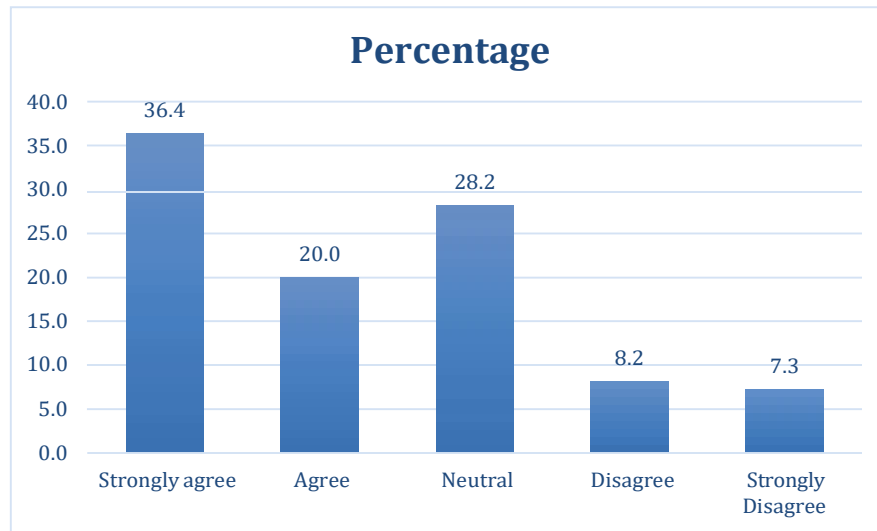


Chart 4.1.10 Factors affecting materials handling (shortage capacity)

Interpretation

From the above table it is interpreted that the number of respondents were 36.4% says Strongly agree, 20% says agree, 28.2% says neutral, 8.2% says disagree, 7.3% says strongly disagree

Inference

Majority (36.4%) of the respondents are in Strongly agree.

Table 4.1.11 Factors affecting materials handling (lack of equipment's)

S.No	Particulars	Respondents	Percentage
1	Strongly agree	15	13.6
2	Agree	47	42.7
3	Neutral	33	30.0
4	Disagree	8	7.3
5	Strongly Disagree	7	6.4

Source: Primary Data

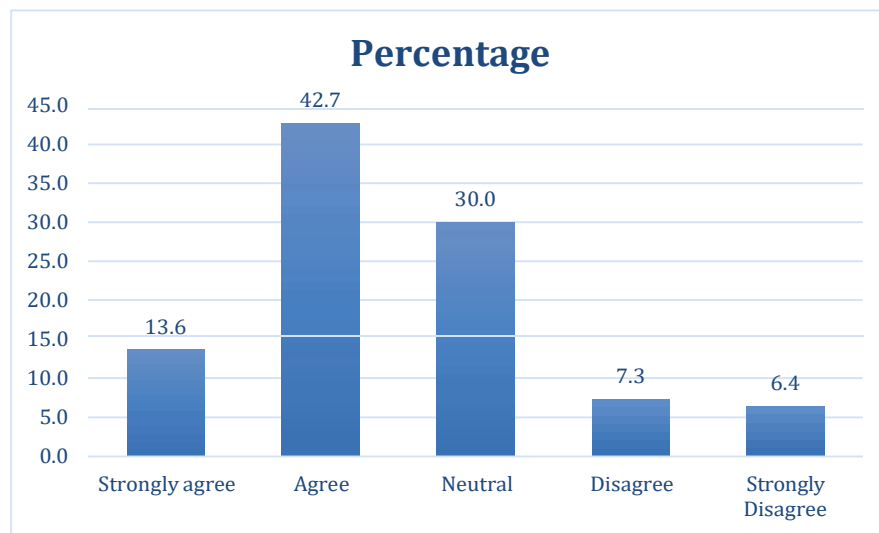


Chart 4.1.11 Factors affecting materials handling (lack of equipment's)

Interpretation

From the above table it is interpreted that the number of respondents were 13.6% says Strongly agree, 42.7% says agree, 30% says neutral, 7.3% says disagree, 6.4% says strongly disagree.

Inference

Majority (42.7%) of the respondents are in Agree.

Table 4.1.12 Factors affecting materials handling (improper maintenance)

S.No	Particulars	Respondents	Percentage
1	Strongly agree	17	15.5
2	Agree	30	27.3
3	Neutral	50	45.5
4	Disagree	2	1.8
5	Strongly Disagree	11	10.0

Source :Primary Data

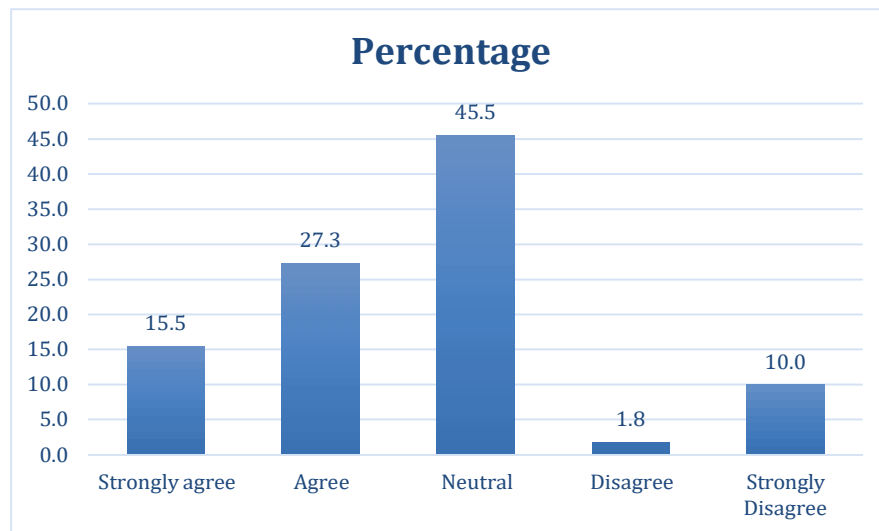


Chart 4.1.12 Factors affecting materials handling (improper maintenance)

Interpretation

From the above table it is interpreted that the number of respondents were 15.5% says Strongly agree, 27.3% says agree, 45.5% says neutral, 1.8% says disagree, 10% says strongly disagree.

Inference

Majority (45.5%) of the respondents are in neutral.

Table 4.1.13 Regular maintenance of material handling equipment is crucial for ensuring workplace safety

S.No	Particulars	Respondents	Percentage
1	Strongly agree	14	12.7
2	Agree	33	30.0
3	Neutral	36	32.7
4	Disagree	15	13.6
5	Strongly Disagree	12	10.9

Source : Primary Data

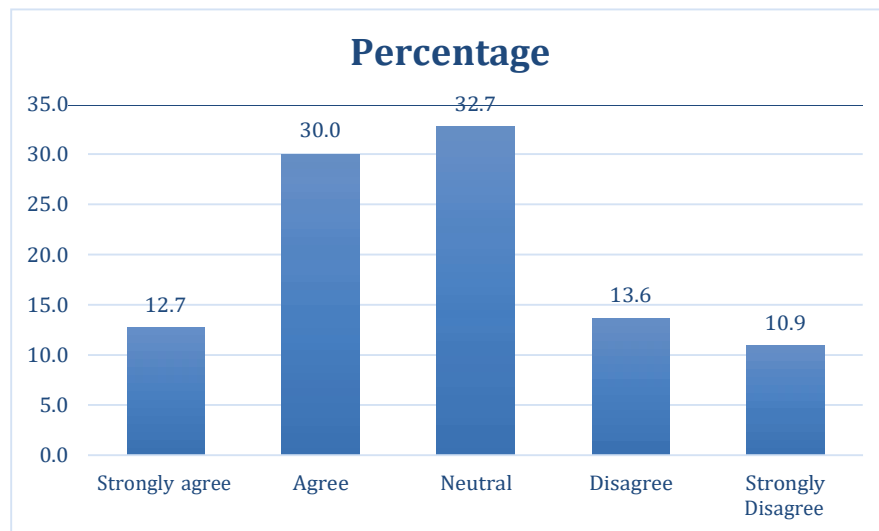


Chart 4.1.13 Regular maintenance of material handling equipment is crucial for ensuring workplace safety

Interpretation

From the above table it is interpreted that the number of respondents were 12.7% says Strongly agree, 30% says agree, 32.7% says neutral, 13.6% says disagree, 10.9% says strongly disagree.

Inference

Majority (32.7%) of the respondents are in neutral.

Table 4.1.14: complaint handling level in the company

S.No	Particulars	Respondents	Percentage
1	Never	9	8.2
2	Rarely	19	17.3
3	Sometimes	39	35.5
4	Always	23	20.9
5	Often	20	18.2

Source : Primary Data

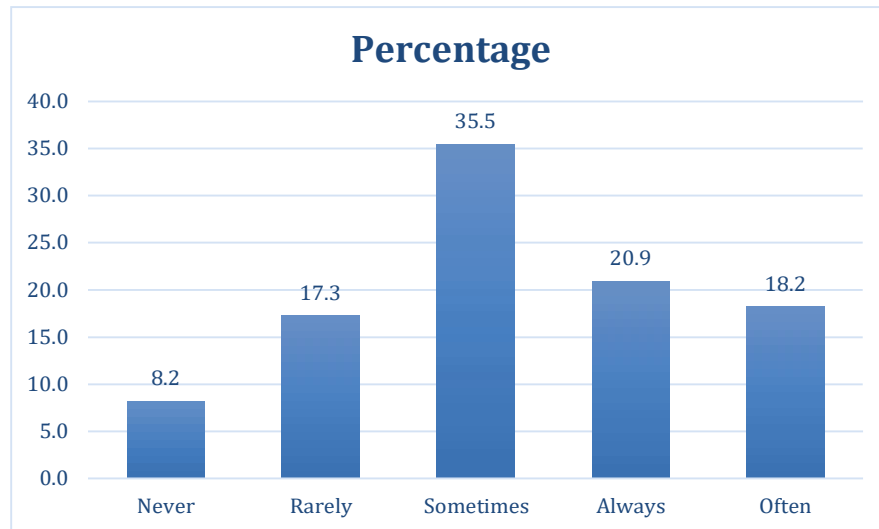


Chart 4.1.14: complaint handling level in the company

Interpretation

From the above table it is interpreted that the number of respondents were 8.2% says Never, 17.3% says Rarely, 35.5% says Sometimes, 20.9% says Always, 18.2% says Often.

Inference

Majority (35.5%) of the respondents are in Sometimes.

Table 4.1.15: Effectiveness of the maintenance team

S.No	Particulars	Respondents	Percentage
1	Never	9	8.2
2	Rarely	22	20.0
3	Sometimes	37	33.6
4	Always	23	20.9
5	Often	19	17.3

Source : Primary Data

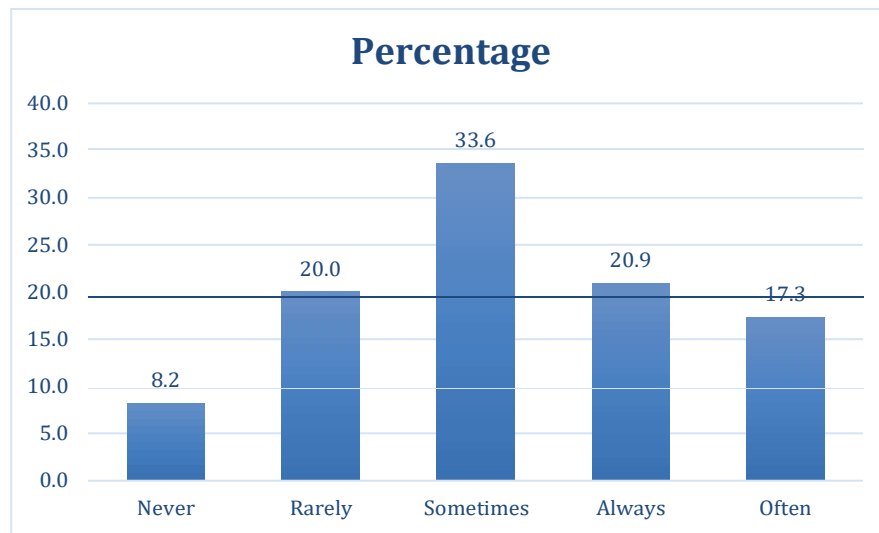


Chart 4.1.15: Effectiveness of the maintenance team

Interpretation

From the above table it is interpreted that the number of respondents were 8.2% says Never, 20% says Rarely, 33.6% says Sometimes, 20.9% says Always, 17.3% says Often.

Inference

Majority (33.6%) of the respondents are in Sometimes.

Table 4.1.16 Do you agree the maintenance24*7 is available

S.No	Particulars	Respondents	Percentage
1	Strongly agree	9	8.2
2	Agree	20	18.2
3	Neutral	46	41.8
4	Disagree	23	20.9
5	Strongly Disagree	12	10.9

Source: Primary Data

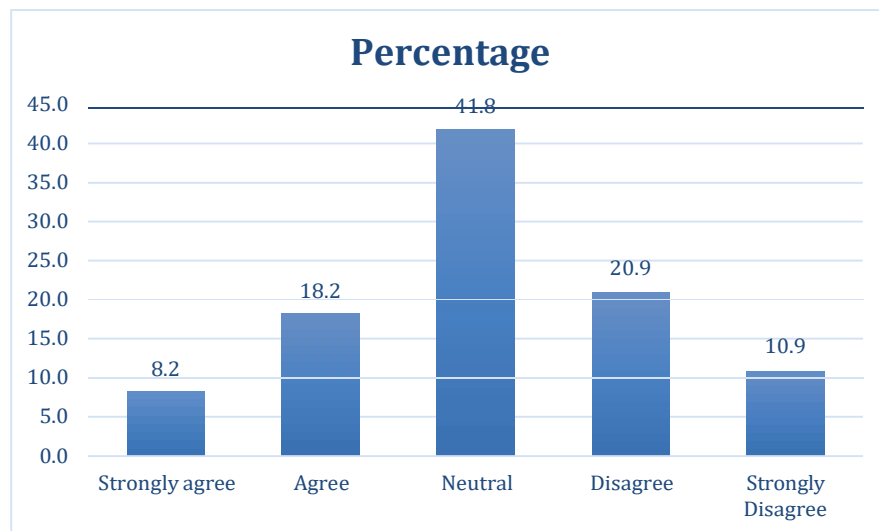


Chart 4.1.16 Do you agree the maintenance24*7 is available

Interpretation

From the above table it is interpreted that the number of respondents were 8.2% says Strongly agree, 18.2% says agree, 41.8% says neutral, 20.9% says disagree, 10.9% says strongly disagree.

Inference

Majority (41.8%) of the respondents are in neutral.

Table 4.1.17 Which maintenance is highly carried in the company

S.No	Particulars	Respondents	Percentage
1	breakdown maintenance	25	22.7
2	preventive maintenance	62	56.4
3	condition monitoring	23	20.9

Source: Primary Data

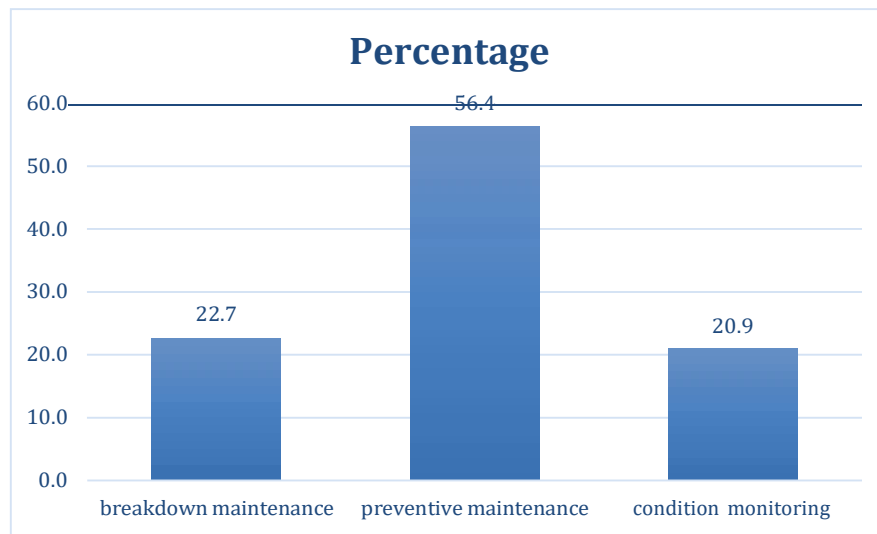


Chart 4.1.17 Which maintenance is highly carried in the company

Interpretation

From the above table it is interpreted that the number of respondents were 22.7% are breakdown maintenance, 56.4 %are Preventive Maintenance and 20.9% are Condition monitoring.

Inference

Majority (56.4%) of the respondents to Preventive maintenance.

Table 4.1.18 Preventive maintenance means the schedule followed at correct time

S.No	Particulars	Respondents	Percentage
1	Strongly agree	22	20.0
2	Agree	18	16.4
3	Neutral	29	26.4
4	Disagree	28	25.5
5	Strongly Disagree	13	11.8

Source: Primary Data

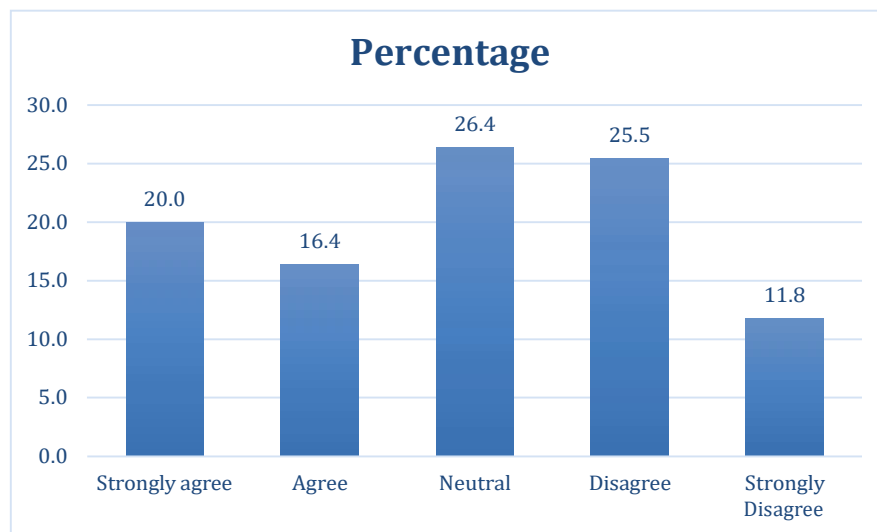


Chart 4.1.18 Preventive maintenance means the schedule followed at correct time

Interpretation

From the above table it is interpreted that the number of respondents were 20% says Strongly agree, 16.4% says agree, 26.4% says neutral, 25.5% says disagree, 11.8% says strongly disagree.

Inference

Majority (26.4%) of the respondents are in Agree.

Table 4.1.19 what you suggest to improve the maintenance in the company

S.No	Particulars	Respondents	Percentage
1	need management support	17	15.5
2	reduce the communication	38	34.5
3	spares availability	39	35.5
4	need skilled workers	13	11.8

Source: Primary Data

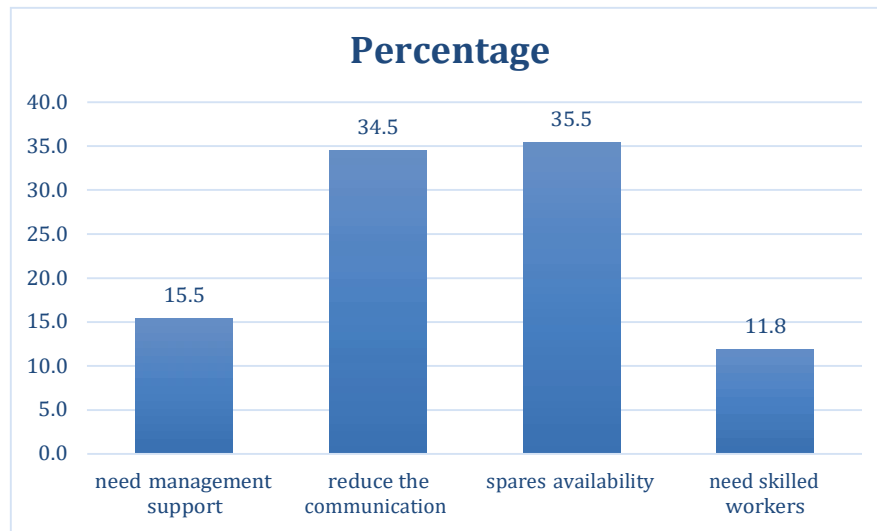


Chart 4.1.19 what you suggest to improve the maintenance in the company

Interpretation

From the above table it is interpreted that the number of respondents were 15.5% are need management support, 34.5% are reduce the communication gap, 35.5 are spares availability and 11.8 are need skilled workers.

Inference

Majority (35.5%) of the respondents to Spares availability.

Table 4.1.20 Delay of maintenance is cause to the low productivity

S.No	Particulars	Respondents	Percentage
1	Strongly agree	13	11.8
2	Agree	21	19.1
3	Neutral	32	29.1
4	Disagree	34	30.9
5	Strongly Disagree	10	9.1

Source: Primary Data

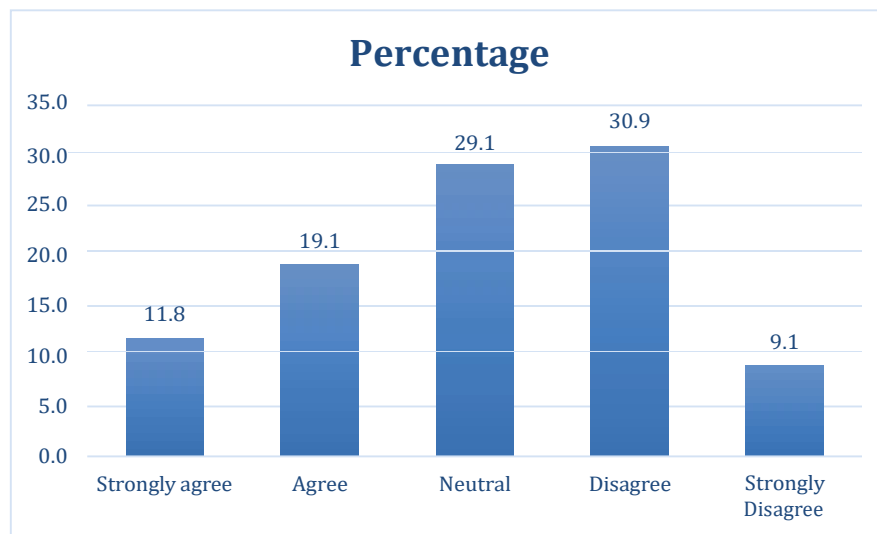


Chart 4.1.20 Delay of maintenance is cause to the low productivity

Interpretation

From the above table it is interpreted that the number of respondents were 11.8% says Strongly agree, 19.1% says agree, 29.1% says neutral, 30.9% says disagree, 9.1% says strongly disagree .

Inference

Majority (30.9 %) of the respondents are in Disagree.

Table 4.1.21 Insufficient of employees in organization

S.No	Particulars	Respondents	Percentage
1	Never	8	7.3
2	Rarely	11	10.0
3	Sometimes	30	27.3
4	Always	29	26.4
5	Often	32	29.1

Source: Primary Data

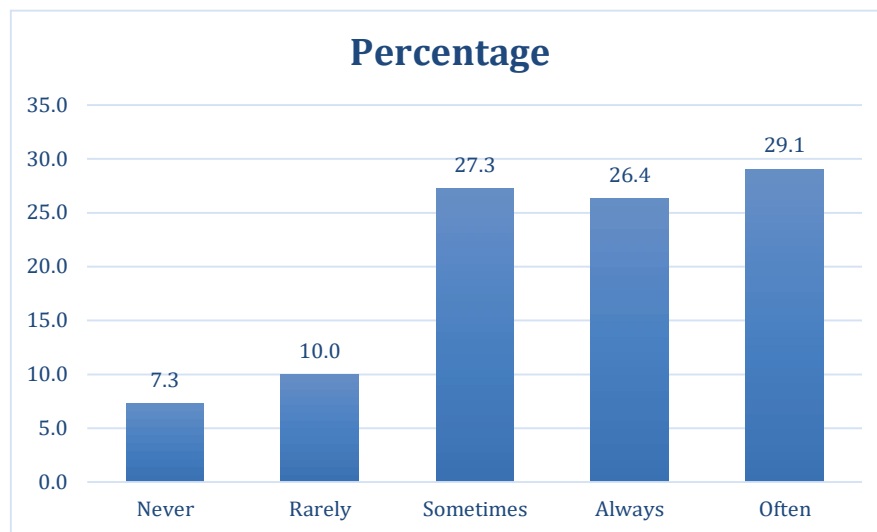


Chart 4.1.21 Insufficient of employees in organization

Interpretation

From the above table it is interpreted that the number of respondents were 7.3% says Never, 10% says Rarely, 27.3% says Sometimes, 26.4% says Always, 29.1% says Often.

Inference

Majority (29.1%) of the respondents are in Often.

4..2 STATISTICAL TOOLS AND ANALYSIS

CHI- SQUARE TEST !

Chi-square is the sum of the squared difference observed (o) and the expected (e) data (or the deviation, d), divided by the expected data in all possible categories.

Null hypothesis (Ho):

There is no relationship between the age wise classification of respondent and experience wise classification of respondent.

Alternate hypothesis (H1):

There is a relationship between the age wise classification of respondent and experience wise classification of respondent.

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
AGE WISE CLASSIFICATION OF RESPONDENT * EXPERIENCE WISE CLASSIFICATION OF RESPONDENT	110	100.0%	0	0.0%	110	100.0%

**AGE WISE CLASSIFICATION OF RESPONDENT * EXPERIENCE WISE CLASSIFICATION OF
RESPONDENT Crosstabulation**

			EXPERIENCE WISE CLASSIFICATION OF RESPONDENT			
			2	3	4	5
AGE WISE CLASSIFICA TION OF RESPONDE NT	2	Count	13	3	0	0
		% within AGE WISE CLASSIFICATION OF RESPONDENT	81.2%	18.8%	0.0%	0.0%
		% within EXPERIENCE WISE CLASSIFICATION OF RESPONDENT	100.0%	50.0%	0.0%	0.0%
	3	% of Total	11.8%	2.7%	0.0%	0.0%
		Count	0	3	22	0
		% within AGE WISE CLASSIFICATION OF RESPONDENT	0.0%	12.0%	88.0%	0.0%

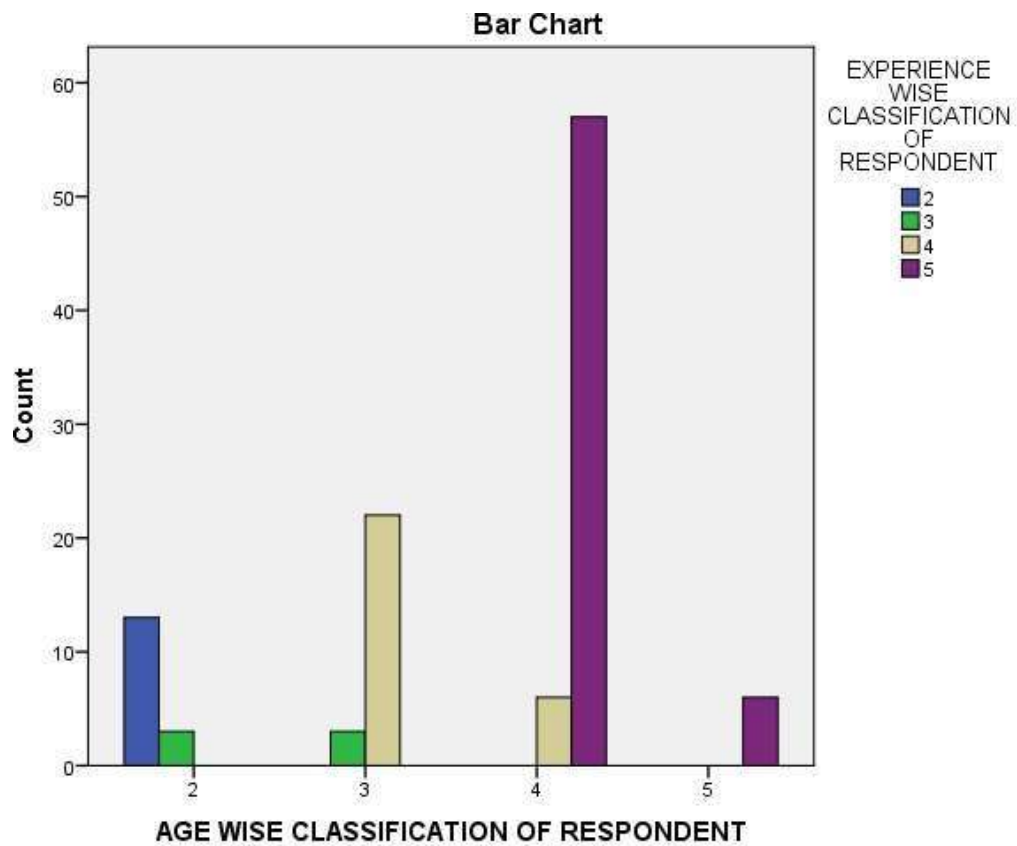
	% within EXPERIENCE WISE CLASSIFICATION OF RESPONDENT	0.0%	50.0%	78.6%	0.0%
	% of Total	0.0%	2.7%	20.0%	0.0%
	Count	0	0	6	57
	% within AGE WISE CLASSIFICATION OF RESPONDENT	0.0%	0.0%	9.5%	90.5%
	% within EXPERIENCE WISE CLASSIFICATION OF RESPONDENT	0.0%	0.0%	21.4%	90.5%
	% of Total	0.0%	0.0%	5.5%	51.8%
4	Count	0	0	0	6
	% within AGE WISE CLASSIFICATION OF RESPONDENT	0.0%	0.0%	0.0%	100.0%
	% within EXPERIENCE WISE CLASSIFICATION OF RESPONDENT	0.0%	0.0%	0.0%	9.5%
5					

Total	% of Total	0.0%	0.0%	0.0%	5.5%
	Count	13	6	28	63
	% within AGE WISE CLASSIFICATION OF RESPONDENT	11.8%	5.5%	25.5%	57.3%
	% within EXPERIENCE WISE CLASSIFICATION OF RESPONDENT	100.0%	100.0%	100.0%	100.0%
	% of Total	11.8%	5.5%	25.5%	57.3%

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	175.111 _a	9	.000
Likelihood Ratio	163.863	9	.000
Linear-by-Linear Association	90.100	1	.000
N of Valid Cases	110		

a. 10 cells (62.5%) have expected count less than 5.
The minimum expected count is .33.



Degree of Freedom= $(r-1) * (c-1)$

$$= 3*3= 9$$

Calculated value = 175.111

Tabulated value = 16.919

$Z = Z_{cal} > Z_{tab}$

$$Z= 175.111 > 16.919$$

Hence, the Alternate hypothesis [H1] is accepted

INFERENCE:

Since the calculated value is greater than the tabulated value, we accept the alternate hypothesis and hence there is a relationship between the age wise classification of respondent and experience wise classification of respondent.

ONE-WAY ANOVA CLASSIFICATION

Null hypothesis (Ho):

There is a significance difference between the effectiveness of the maintenance team and 24*7 maintenance available.

Alternate hypothesis (H1):

There is no significance difference between the effectiveness of the maintenance team and 24*7 maintenance available.

Descriptives

EFFECTIVENESS OF THE MAINTENANCE TEAM

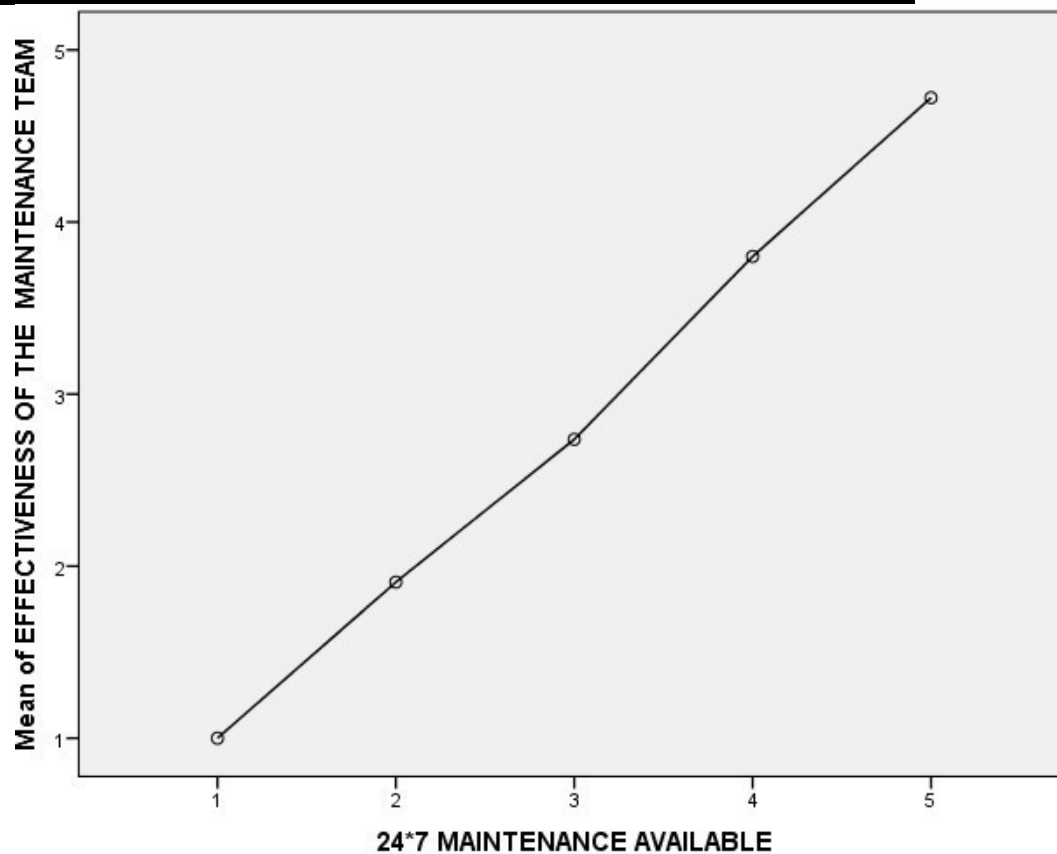
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimu m	Maximu m
					Lower Bound	Upper Bound		
1	15	1.00	.000	.000	1.00	1.00	1	1
2	43	1.91	.294	.045	1.82	2.00	1	2
3	19	2.74	.452	.104	2.52	2.95	2	3
4	15	3.80	.414	.107	3.57	4.03	3	4
5	18	4.72	.461	.109	4.49	4.95	4	5
Total	110	2.65	1.268	.121	2.41	2.89	1	5

Test of Homogeneity of Variances
EFFECTIVENESS OF THE
MAINTENANCE TEAM

Levene Statistic	df1	df2	Sig.
11.253	4	105	.000

ANOVA
EFFECTIVENESS OF THE MAINTENANCE TEAM

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	161.849	4	40.462	318.883	.000
Within Groups	13.323	105	.127		
Total	175.173	109			



Calculated value = 318.883

Tabulated value = 2.46

$F = F_{cal} > F_{tab} \quad F = 318.883 > 2.46$

Hence, the Alternate hypothesis [H1] is accepted.

INFERENCE:

The calculated value of F is greater than the tabulated value. Hence, we reject the null hypothesis and conclude that there is no significance difference between the effectiveness of the maintenance team and 24*7 maintenance available.

ANALYSIS USING KARL PEARSON'S CORRELATION

Correlation analysis is the statistical tool used to measure the degree to which two variables are linearly related to each other. Correlation measures the degree of association between two variables.

Null hypothesis (H0):

There is positive relationship between the complaint handling system with maintenance cause to low productivity.

Alternate hypothesis (H1):

There is negative relationship between the complaint handling system with maintenance cause to low productivity.

Correlations		COMPLAINT HANDLING SYSTEM	MAINTENANCE CAUSE TO LOW PRODUCTIVITY
COMPLAINT HANDLING SYSTEM	Pearson Correlation	1	.891**
	Sig. (2-tailed)		.000
	N	110	110
MAINTENANCE CAUSE TO LOW PRODUCTIVITY	Pearson Correlation	.891**	1
	Sig. (2-tailed)	.000	
	N	110	110

** . Correlation is significant at the 0.01 level (2-tailed).

$$r = \frac{N\sum XY - \sum X \sum Y}{\sqrt{N\sum X^2 - (\sum X)^2} \sqrt{N\sum Y^2 - (\sum Y)^2}}$$

r= .891

INFERENCE:

Since r is positive, there is positive relationship between the complaint handling system with maintenance cause to low productivity.

CHAPTER- 5

5.1 FINDINGS

- Majority (48,2%) of the respondents are 28-38.
- Majority (48.2%) of the respondents are 1 -5years experience.
- Majority (36.4%) of the respondents are with the income level of 20000 – 30000.
- Majority (47.3%) of the respondents to monthly inspection.
- Majority (47.3%) of the respondents are strongly agree.
- Majority (47.3%) of the respondents are strongly agree.
- Majority (42.7%) of the respondents are says neutral.
- Majority (36.4%) of respondents are neutral.
- Majority (39.1%) of the respondents are says neutral.
- Majority (36.4%) of the respondents are in Strongly agree.
- Majority (42.7%) of the respondents are in Agree.
- Majority (45.5%) of the respondents are in neutral.
- Majority (32.7%) of the respondents are in neutral.
- Majority (35.5%) of the respondents are in Sometimes.
- Majority (33.6%) of the respondents are in Sometimes.
- Majority (41.8%) of the respondents are in neutral.
- Majority (56.4%) of the respondents to Preventive maintenance.
- Majority (26.4%) of the respondents are in Agree.
- Majority (35.5%) of the respondents to Spares availability.
- Majority (30.9 %) of the respondents are in Disagree.
- Majority (29.1%) of the respondents are in Often.

5.2 CONCLUSION

The maintenance department of the company needs to follow the maintenance schedules and use the good skilled workers to do the jobs. The management should give good support to maintenance department, and the company need to monitor the maintenance activities, and if the company is reducing the spares availability that will give a good result. The company take a step to reduce the communication gap between the contract and permanent labours. It will give a good result to the maintenance activities

5.3 SUGGESTION

- The company need to understand the working Requirements and they should appoint the skilled workers.
- The management need to monitor the maintenance activities, and fulfil the spares requirements that avoids delay of production.
- The maintenance department should follow the preventive maintenance schedules that avoids the high level of breakdown maintenance.
- The company should appoint the skilled workers of each department.

References:

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APPENDIX (Questionnaire)

Personal details

Age

- a) 18-28
- b) 28-38
- c) 38-48
- d) 48 and above

Experience

- a) 0 - 1 years
- b) 1 - 5 years
- c) 5 - 10 years
- d) 10 years and above

Income

- a) Less than 10,000
- b) 10,000 - 20,000
- c) 20,000 - 30,000
- d) 30,000 and above

Inspection period of machines and materials?

- a) Daily inspection
- b) Weekly inspection
- c) Monthly inspection
- d) Twice in three months

Do you face the following problems frequently in handling the materials

Strongly agree - agree – neutral - disagree - strongly disagree

Product ordering system

Shortage of supply in raw materials

Rejection of products

Delay in order receiving

Wants to transportation

Factors affecting materials handling in marble industry

Strongly agree - agree – neutral - disagree - strongly disagree

Shortage capacity

Lack of equipment's

Improper maintenance

Regular maintenance of material handling equipment is crucial for ensuring workplace safety

- a) Strongly agree
- b) Agree
- c) Neutral
- d) Disagree
- e) Strongly disagree

Please rate the complaint handling level in the company

1 Never

2

3

4

5 Always

Please rate the effectiveness of the maintenance team

1 Never

2

3

4

5 Always

Do agree the maintenance 24*7 is available

- a) Strongly agree
- b) Agree
- c) Neutral
- d) Disagree
- e) Strongly disagree

Which maintenance is highly carried in the company

- ☐ Breakdown maintenance
- ☐ Preventive maintenance
- ☐ Condition monitoring

If it is preventive maintenance means the schedule followed at correct time

- a) Strongly agree
- b) Agree
- c) Neutral
- d) Disagree
- e) Strongly disagree

If it is yes means what you suggest

- a) Need management support
- b) Reduce the communication gap
- c) Spares availability
- d) Need skilled workers

Do you agree does the delay of maintenance is cause to the low productivity

- a) Strongly agree
- b) Agree
- c) Neutral
- d) Disagree
- e) Strongly disagree

Insufficient of employees in organization

- 1Never
- 2
- 3
- 4
- 5Always

A STUDY ON MATERIAL HANDLING AND ITS MAINTENANCE WITH RESPECT TO MARBLE AND GRANITES INDUSTRY

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ABSTRACT:

Material handling and its Maintenance is the combination of all technical and associated administrative actions intended to retain an item in, or restore it to, a state in which it can perform its required function. Many companies are seeking to gain competitive advantage with respect to cost, quality, service and on-time deliveries. The effect of maintenance on these variables has prompted increased attention to the maintenance area as an integral part of productivity improvement. Maintenance is rapidly evolving into a major contributor to the performance and profitability of manufacturing systems.

INTRODUCTION:

The marble and granite industry involves the extraction, processing, and sale of natural stone materials used in construction and design. Marble and granite are both types of natural stone that are highly sought after for their beauty, durability, and versatility. Marble is a metamorphic rock that is formed from limestone that has been subjected to intense heat and pressure over time. It is known for its distinctive veining and range of colours, which can include white, black, grey, pink, green, and more. Marble is commonly used in flooring, countertops, sculptures, and decorative elements. Granite, on the other hand, is an igneous rock that is formed from molten magma deep within the earth's crust. It is known for its durability and resistance to scratches, heat, and stains.

INDUSTRY PROFILE:

The marble and granite industry involves the extraction and distribution of natural stone products, including marble granite limestone, travertine and slate. The industry is characterized by a high degree of vertical integration, with many companies involved in both the extraction and processing of marble and granite. The industry is typically divided into two main sectors: quarrying and processing. Quarrying involves the extraction of raw stone from the earth, often using heavy machinery and explosives. Once the stone is extracted, it is transported to a processing plant where it is cut, polished, and shaped into finished products. The global market size of the marble and granite industry was valued at USD 178.4 billion in 2020 and is expected to grow at a compound annual growth rate (CAGR) of 3.5% from 2021 to 2028.

REVIEW OF LITERATURE:

- **Esa nopenen, Taina piispa, Anita lukka (2005)** Objectives of study is new operation model for maintenance material logistics. New operation models for decreasing fixed costs and transforming into variable costs in the field of marble industry. The report illustrates two cases- a new operation model for material logistics in maintenance and an examination of Forklift truck fleet outsourcing solution.
- **Zakaryasoufi, Pierre david, Zakaria yahouni (2021)** Level of automation plays significant role in the success of a material handling system definition, which influences the manufacturing performance. the proposition of analytic hierarchy process is implemented in a demonstrator software tool and illustrated on simple example.
- **Mohan Jha (2003)** Objectives of the study is maintenance types, procedures and evaluation of performance. the work request format gives the maintenance personnel the basic inputs required for analyzing the breakdowns and aiming at minimizing them. the work request acts as F.I.R for planning, scheduling, priority fixing, cost controlling and fixing of an objective for the department
- **Selen (Belgium) (2020)** It developed to simultaneously plan preventive maintenance and production in a process industry environment, where maintenance planning is extremely important
- **S Wannawiset, (2018)** FMEA is widely selected tool for the application of machinery breakdown prevention. this research adopted FMEA technique to reduce and prevent breakdown of the important equipment of the large commercial machine that has capacity of 2,00,000 tons per annum, located in north east of Thailand.

OBJECTIVES OF STUDY:

- The objective of this study to analyze the materials handling and maintenance towards the marble and granite industry.
- To examine the problem facing frequently in materials handling and its maintenance with respect to marble and granites manufacturing industry.
- To identify the potential risk in preventive maintenance to reduce wastage in marble and granite manufacturing industry.
- To give suggestions to improve the maintenance in the organization.

NEED FOR STUDY:

An equipment is an important resource which is constantly used for adding value to products.so it must be kept in good operating condition otherwise interruption of production if it is used a mass production line. This project has been undertaken to assess the material handling and its maintenance management at Guntupalli Marble and Granites in order to avoid the breakdown and improve the productivity

SCOPE OF THE STUDY:

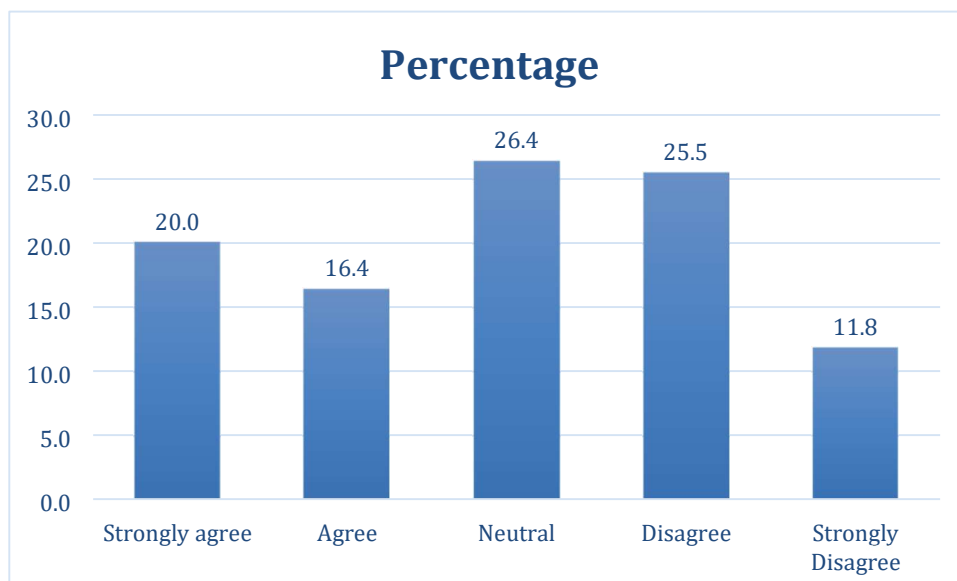
- Its helps to analyze the problems of materials handling in marble and granites industry.
- To identify the potential risks reliable to the quality of product and process.
- To enhance the Improves of preventive maintenance system in marble manufacturing industry

DATA ANALYSIS:

1.The Preventive maintenance means the schedule followed at correct time

S.No	Particulars	Respondents	Percentage
1	Strongly agree	22	20.0
2	Agree	18	16.4
3	Neutral	29	26.4
4	Disagree	28	25.5
5	Strongly Disagree	13	11.8

Source: Primary Data



INTERPRETATION:

From the above table it is interpreted that the number of respondents were 20% says Strongly agree, 16.4% says agree, 26.4% says neutral, 25.5% says disagree, 11.8% says strongly disagree.

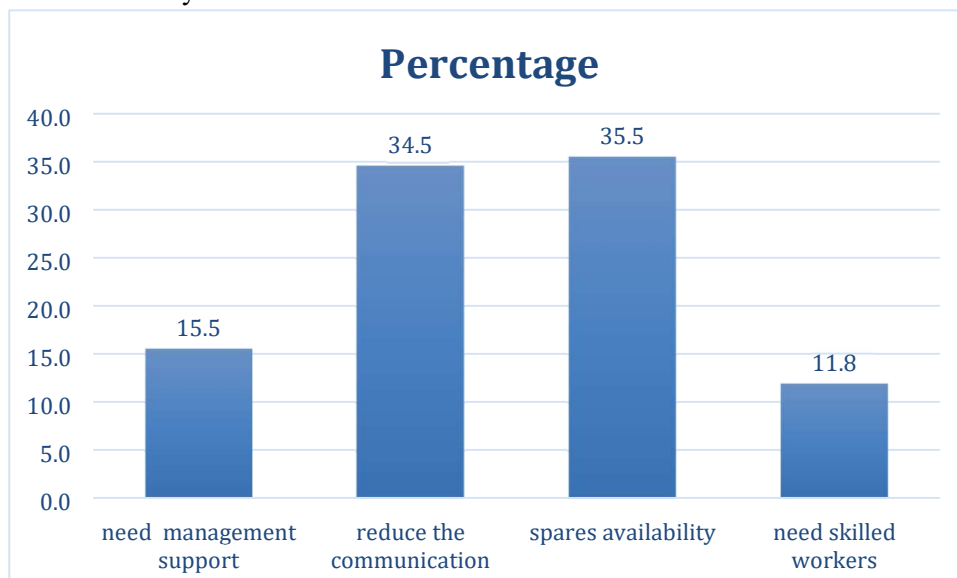
INFERENCE:

Majority (26.4%) of the respondents are in Agree

2.what you suggest to improve the maintenance in the company

S.No	Particulars	Respondents	Percentage
1	need management support	17	15.5
2	reduce the communication	38	34.5
3	spares availability	39	35.5
4	need skilled workers	13	11.8

Source: Primary Data



INTERPRETATION :

From the above table it is interpreted that the number of respondents were 15.5% are need management support, 34.5% are reduce the communication gap, 35.5 are spares availability and 11.8 are need skilled workers.

INFERENCE :

Majority (35.5%) of the respondents to Spares availability.

ONE-WAY ANOVA CLASSIFICATION

Null hypothesis (Ho):

There is a significance difference between the effectiveness of the maintenance team and 24*7 maintenance available.

Alternate hypothesis (H1):

There is no significance difference between the effectiveness of the maintenance team and 24*7 maintenance available.

Descriptives**EFFECTIVENESS OF THE MAINTENANCE TEAM**

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1	15	1.00	.000	.000	1.00	1.00	1	1
2	43	1.91	.294	.045	1.82	2.00	1	2
3	19	2.74	.452	.104	2.52	2.95	2	3
4	15	3.80	.414	.107	3.57	4.03	3	4
5	18	4.72	.461	.109	4.49	4.95	4	5
Total	110	2.65	1.268	.121	2.41	2.89	1	5

Test of Homogeneity of Variances**EFFECTIVENESS OF THE MAINTENANCE TEAM**

Levene Statistic	df1	df2	Sig.
11.253	4	105	.000

ANOVA**EFFECTIVENESS OF THE MAINTENANCE TEAM**

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	161.849	4	40.462	318.883	.000
Within Groups	13.323	105	.127		
Total	175.173	109			

INFERENCE:

The calculated value of F is greater than the tabulated value. Hence, we reject the null hypothesis and conclude that there is no significance difference between the effectiveness of the maintenance team and 24*7 maintenance available.

CORRELATION:

Correlation analysis is the statistical tool used to measure the degree to which two variables are linearly related to each other. Correlation measures the degree of association between two variables.

Null hypothesis (H0):

There is positive relationship between the complaint handling system with maintenance cause to low productivity.

Alternate hypothesis (H1):

There is negative relationship between the complaint handling system with maintenance cause to low productivity.

		Correlations	
		COMPLAINT HANDLING SYSTEM	MAINTENANCE CAUSE TO LOW PRODUCTIVITY
COMPLAINT HANDLING SYSTEM	Pearson Correlation	1	.891**
	Sig. (2-tailed)	110	.000
	N	110	110
MAINTENANCE CAUSE TO LOW PRODUCTIVITY	Pearson Correlation	.891**	1
	Sig. (2-tailed)	.000	
	N	110	110

** . Correlation is significant at the 0.01 level (2-tailed).

INFERENCE:

Since r is positive, there is positive relationship between the complaint handling system with maintenance cause to low productivity.

SUGGESTION:

- The company need to understand the working Requirements and they should appoint the skilled workers.
- The management need to monitor the maintenance activities, and fulfil the spares requirements that avoids delay of production.
- The maintenance department should follow the preventive maintenance schedules that avoids the high level of breakdown maintenance.
- The company should appoint the skilled workers of each department

CONCLUSION:

The maintenance department of the company needs to follow the maintenance schedules and use the good skilled workers to do the jobs. The management should give good support to maintenance department, and the company need to monitor the maintenance activities, and if the company is reducing the spares availability that will give a good result. The company take a step to reduce the communication gap between the contract and permanent labours. It will give a good result to the maintenance activities

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