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Study Of Material Management Systems And Their Assesment For Residential Building

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Abstract
The investigation of the elements influencing the management of materials in building construction projects is the basis for this research project. A building project must be successfully completed by keeping the correct supplies in the right location at the right time. This activity is done to fill the gaps left by the inadequate material. planning is necessary on building sites. A building project must be successfully completed by keeping the correct supplies in the right location at the right time. This activity is done to fill the gaps left by the inadequate material. planning is necessary on building sites.The work gathered data Factors were known affecting material Management. To investigate factors by using SPSS (Satical Package for social science). A construction project's ability to succeed may depend on the management of its building materials. The objective of this work is to do comparatively study between Manual Material Management and Mechanical Material Management system on Construction industry

Keywords*— Management; Mechanical; Material Requirement planning; Building; Manual; Equipment; Construction*

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I. INTRODUCTION

According to the eleventh five year plan, construction is India's second-largest economic activity after agriculture. Materials management and material management are crucial parts of project management, and an efficient construction materials management process is essential to the success of a construction project. The execution of a project might be substantially hampered by incorrect material management on construction sites. Improper material management on the job site will have an impact on the final project cost, timeline, and quality. Understanding the history of materials management practises is crucial. Materials management is the science and art of moving, packaging, and storing materials in any form. It also includes preparing, positioning, and putting the materials to make them easier to transfer or store. The movement of physical items, such as raw materials, component parts, sub-assemblies, assemblies, and final goods along within the manufacturing environment from receipt through shipping is referred to as material management and transfer. The substance should be moved and transferred in order to raise its worth. Depending on the kind of building, the cost of material management may be 30–70% of the overall cost.

II.OBJECTIVES

1. To collect data on the human and automated materials management processes used in the construction of residential structures.
2. To investigate various material management techniques (From collected data).
3. To determine the elements that influence the handling of materials for small, medium, and big building-related companies..
4. To do Comparative Study between Manual and Mechanical Material Management System.

III.FUNCTIONS OF MATERIAL MANAGEMENT ON CONSTRUCTION SITE

1. Speedup of material movement and reduction in wastage of time.
2. Safety and safe working conditions on site.
3. Avoid damage to material in transportation of material.
4. Enhances productivity and avoids high cost.
5. Utilize gravity for assisting material.
6. Avoid disruption in production schedule.

7. To minimize the movement involved in a production operation.

IV.MATERIAL MANAGEMENT TYPES

Operators and business owners should be familiar with the following two primary forms of material management. They are listed below:

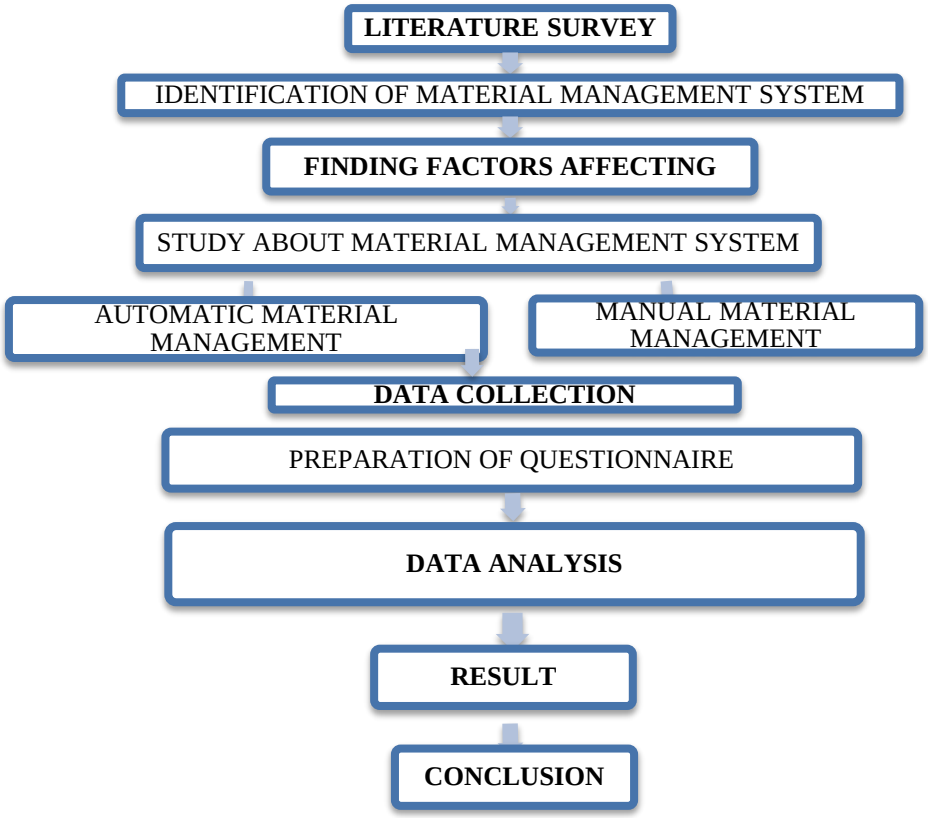
- **Mechanical (Automatic) Management**: - Automated system is a combination of both software and hardware without the need of any human. There is a movement to fully automate the management of materials as a result of the ongoing advancements in machine programming, sensing, and robotics.
- **Manual Management**: - A manual system is comparable to a bookkeeping system where records upkeep is carried out manually without the use of an automated system. Workers, however, may be at risk since this exposes them to potentially dangerous physical tasks. Thankfully, improvements in ergonomics have been achieved to lessen the dangers associated with manual container management.

V. FACTORS AFFECTING ON MATERIAL MANAGEMENT

Following are factor are selected which are affecting on material Management those are selected on the basis of literature review, personal interviews.

FACTORS AFFECTING ON MANUAL MATERIAL MANAGEMENT	**FACTORS AFFECTING ON MECHANICAL MATERIAL MANAGEMENT**
1.The conditions of existing building : If a material management system is to be developed for an existing structure and facility plan, it is necessary to research a number of building characteristics, such as the placement and size of doors, the height of the ceilings, the strength of the roof and floor, the stairs, the columns, the width of the aisles, etc.	**1.Regulations**: The legal requirements for the material Management equipment should be complied regulations.
2. Production processes: It covers things like the kind of production tools used, the procedures used, the production process, the amount of materials used in management, the order of activities, etc.	**2 Inspection and standardization**: Construction machineries must be inspected regularly and the operating conditions should abide with all the applicable national and international standards.
3. Nature of materials: The kind of raw materials, the types of materials being processed, the volumes being handled, and the distances being traversed by them are all important factors.	**3 Mechanical safety**: Proper machine guarding, wheel guards, testing of lifting machines and lifting tackles, safe lifting and rigging procedures should be maintained.
4. Products to be handled: The circumstances, fragility, and bulk of the supplies are taken into account as an adaptable, safe, and cost-effective material management structure is built.	**4 Personal Protective Equipment (PPE)**: Approved PPE's such as shoes, hard hats, gloves have to be used and replaced from time to time as they may worn out while working with the construction machineries.
5. Materials management equipment: The efficiency and utility of current material management equipment are assessed based on how well it manages various items.	**5 Education and training**: Teaching and instructing the construction workers on safety with material Management equipment will enhance safety management in the sites. Training is a continuous effort aimed at preventing accidents and also improving safety awareness

VI. METHODOLOGY



VII. DATA COLLECTION & ANALYSIS

CASE STUDY

A) SAI LEELA APPTS NEAR GURUGOBIND SINGH COLLAGE INDIRA NAGAR NASHIK

Present Material Management System at Sai Leela Apt Nashik. Inspectors discovered that uncontrolled hazards relating regarding the delivery, storage, or administration of building supplies still existed on almost 10% of worksites where construction workers had documented procedures for consulting with suppliers The site verifications revealed that only 65% of builders who claimed to have an established system for consulting with subcontractors and ensuring the secure delivery, storage, and handling of construction materials was actually implemented the procedure. Inspectors discovered that unsafe conditions relating to the secure delivery, storage, or handling of construction supplies still remained on almost 10% of worksites in which builders had a recorded process for consultation about risk

They Will Conducted manually material Management System on Site As per Observation they face following problem

Lifting and Carrying on site

Problem:

Lifting and carrying risks might be present for workers who replace doors, windows, attic access, and related hardware.

Risk Description :

Lifting heavy objects when installing doors, windows, attic access, and related hardware might harm the low back's ligaments, muscles, and nerves. It might be challenging to pinpoint a single incident that caused non-specific low back pain because it is not brought on by a fall or another acute traumatic injury. Repetitive lifting can cause a bulging or damaged disc, a strained ligament, a low back strain, and other back issues.

Rising and lowering material

The risk of back, shoulder, and neck soft tissue injuries rises while lifting and lowering large objects. When big goods are moved between floors, the risk of being struck by objects and falling might rise. Avoid injuries by using lighter weights for a shorter period of time. To reduce needless manual material management, use automated lifting equipment.

Raise roof trusses

Trusses under 20 feet long can be lifted manually. Use enough workers so no one is required to lift more than 50 pounds. When it is feasible, raise trusses using cranes or other machinery. Trusses are balanced across the ropes to stop roll. Use a crane or other tools to raise the roof truss more than 20 feet. Follow the guidelines provided by the truss manufacturer at all times, as well as OSHA requirements on fall prevention and crane safety.

Position & hold materials

The danger of cramps and sprains, falls, fractured bones, and crushed fingertips rises when large steel I-beams, wood, or laminated beams are manually held and positioned. The neck, back, shoulder, and arm muscles might get strained while manually holding and putting sheet materials overhead, such as plasterboard. T-braces and motorised lifts are useful equipment for holding sheets towards the ceiling.

Repetitive management

Repeatedly Your body is put under additional strain when you manage hefty bricks and other objects. Your risk of suffering a muscle or joint injury is increased by the weight of the components and uncomfortable body postures, such as repeated bending, reaching, and twisting.

To lower the chance of damage, alter the method you perform the task. Materials should be placed near to wherever they are needed. Work should be organised to minimise bending and twist. Maintain items near to your body. To provide muscles and joints the necessary rest, take brief rests.

VERMA DEVELOPERS, IGATPURI, NASHIK

Verma Developers are develop various projects near Nashik city. Presently they develop a dharmashala project At Shaptashruni Ghad, Nanduri, Nashik They Use mechanically material Management system for their project. And their project estimated cost is about 1.5 Cr. They use mechanically material Management System For their construction Site. And by using mechanical material Management they avoid their physically problem and save time go project. As per observation it will find that the developers save their wastage of material, and save the cost of project. They Use three main types of devices used for mechanical Management of materials. The types are:

Transportation Equipments :-

These tools are solely effective for moving items horizontally. Trucks and other such vehicles are among these gadgets. As a result, these vehicles only occasionally occupy the area, which is then made available for other uses as soon as the job is over. Wheel dumps and hand trucks are the most basic of them, but they need a lot of labour for a modest load. These include simple portability, increased flexibility, and affordability. when a brief transition between workstations is necessary. The other widely used forms of horizontal transportation are tractors and trailers.

Following Equipment are Use for Transportation

1. heavy duty both side turn table platform trailer
2. Elevating truck
3. Portable hydraulic stacker
4. Wheel hydraulic trailer
5. wheel heavy duty cargo trailer
6. Box trolley for carring finished products

This techniques are offered by the equipment, which offers significant versatility. Trailers can be loaded and then afterwards picked up by several other tractors. One of the most practical and significant methods of material management within the plant is thought to be this one. You may utilise a skilled with a lift truck. These are the enhancements over trucks and wheel barrowers. Show the many transportation devices used in this category for the horizontal delivery of commodities including natural gas, oil, and water.

Picking Up And Dropping Up Equipment Or Devices:-

These have been created to convey goods vertically.One of the earliest and most basic devices for raising objects via vertical distance is the block and tackle setup.By moving people while raising machines into position, it is still utilised today. It is an additional device that lifts loads vertically by wrapping wire or rope around a drum. The two types of cranes, pillar and overhead cranes, are often utilised in various workshops and for light-duty tasks. Elevators that are powered by electricity or hydraulics also belong under this class of storage and transportation systems. Following Equipments Use for Lifting Equipment

Chain Hoist, Electrical hoist ,Air Hoist, Power Hoist, Pillar Crane

Combination of lifting, lowering, and transporting devices:

Conveyors are the most basic of these systems, moving people or objects vertically or horizontally between items being conveyed by a belt. Chute and other kinds of conveyors are additional devices that fall under the category of combination devices.Following Equipment are Use for Transportation and lifting

1. Spiral chute
2. Belt Conveyor
3. Slat Conveyor
4. Roller Conveyor
5. Pivoted bucket Conveyor

VIII. DATA ANALYSIS

Scree Plot

The Eigen values are graphed against each of the components in the Scree plot. The graph may be used to decide how many components to keep. Where the curve begins to flatten is where the action is. Figure 3 illustrates how curves start to flatten between components 4 and 5.

Recommended Content Study of collected data using the T-test

The information that was provided in answer to the questionnaire was collated, and a T-test approach was used to determine the coefficient of correlation and significance levels. There were two possible responses to each question: "yes" or "no." The amount of questions with a "yes" response was counted, and this number was taken into consideration for the T-test investigation. For clarification, a sample of data from 10 firms out of the whole collection is displayed in a table. Similar to this, the information was gathered and categorised for roughly forty organisations in small- and medium-sized construction sites, and its relevance in worksite safety measures was evaluated. Then, using the sorted data, the standard deviation, variation, correlation coefficient, and significance values are computed.

Test of paired samples						
	Paired Difference			t	df	Sig.
	Mean	Std. Deviation	Std. Error Mean			
Small scale industry & large scale industry	-3.94737	4.87025	1.11731	-3.533	18	.002

The standard of paired T test the value of significant it should not more than 0.05 And in result the value of Significant is Come under 0.05 that is 0.002 so the factored considered for mechanical Management system is more significant.

IX.CONCLUSSION

On the basis of information to be gather regarding to manual and mechanical material Management process it can be conclued that the there are 60 to70% injuries and accidents are created on the construction site due to use of manual material Management this injuries are occurred due to various operation carried out. Such as lifting,transporting, and positioning material. due to this project time and project Schedule may be delay. And

also add the unconsiderable accidental cost in project cost. Data was collected from Building construction site on the basis of face to face Questionnaire survey then analyzed in a proper systematic manner in SPSS. For purpose of this study we also took into consideration the standard governing authority, that is the Workman's Compensation Act,1923 (WCA-1923) which has been provided by the Government of India for the safety and proper treatment to the work force in case of an occurrence of incidents. On the basis of this study the conclusion was In other hand by using mechanical material Management system the various construction operations carried out easily. Such as Lifling can be done by Mobail Crane,And tranport material by using elavating truck and Hydraulic stacher safely. This system can Avoid injuries related to back pain of labour while lifting heavy load. Due to this contractor can save their injuries cost and avoid accident on site and Save time and complet their project before completion period.The standard of paired T test the value of significant it should not more than 0.05 And in result the value of Significant is Come under 0.05 that is 0.002 so the factored considered for mechanical Management system is more significant.

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