

ST. MARY'S UNIVERSITY COLLEGE
FACULTY OF BUSINESS
DEPARTMENT OF MARKETING MANAGEMENT

**AN ASSESSMENT OF MATERIAL HANDLING IN THE
CASE OF COUNTRY CLUB DEVELOPERS**

BY
RAHEL ADERA

JUNE 2013
SMUC
ADDIS ABABA

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CASE OF COUNTRY CLUB DEVELOPERS**

**A SENIOR RESEARCH SUBMITTED
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RAHEL ADERA

BUSINESS FACULTY

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APPROVED BY THE COMMITTEE OF EXAMINERS

DEPARTMENT HEAD

SIGNATURE

ADVISOR

SIGNATURE

INTERNAL EXAMINER

SIGNATURE

EXTERNAL EXAMINER

SIGNATURE

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Chapter One

Introduction

1.1 Background of the study

Materials handling in a manufacturing process become essentially a manufacturing process itself through integration into production line Malhotra (1997:1). Groover (2001:122) highlights that despite its importance, materials handling is a topic that frequently is treated superficially by the companies. However, other authors have perceived its relevance. Materials handling makes production flow possible, as it gives dynamism to static elements such as materials, products, equipments, layout and human resources (Chopra & Meindl, 2001:89). Furthermore, Asef-Vaziri & Laporte (2005:35) pointed out that an important proportion of manufacturing expenses can be attributed to material handling and the most critical material handling decisions in this area are the arrangement and design of material flow patterns. This idea is shared by Ioannou (2002:97), which argues that an important aspect of any production system is the design of a material handling system which integrates the production operations.

Country club Developers (CCD) is a Real Estate Developer established in 2005. Its head office is located in Addis Ababa with project site located at Oromia Periferal Zone, Lega Tafo Lagadadi. It is a company owned by two partners.

CCD has envisioned being a leading company in the national economy via sustained expansion and diversification of products and projects. Meanwhile, the company's very existence is to be dedicated to the highest quality but affordably priced real estate buildings that are completed and handed over in time to customers to their maximum satisfaction. Moreover, having these vision and mission, it is striving to attain its long run objective of sustainably growing through profitable production and marketing of quality and affordable residential buildings that command the highest market share and premium prices in the real estate industry via customers' preferences for purchase of the products over those products of competitors in the long term. Moreover, review will be made on the impact of the material handling and lesson to be drawn

from the material handling performance of the company. Finally, alternative solution or intervention area will be suggested to improve the existing performance and mitigate the bottleneck of the problem.

To this end, the study is intended to follow line of investigation on the impact of material handling on marketing practices of CCD.

1.2 Statement of the problem

The highly competitive environment, linked to the globalization phenomena, demands from companies more agility, better performance and the constant search for cost reduction. Materials handling is intrinsically associated with production flow which affects marketing practice. Because of this, it has direct influence on transit time, resources usage, service levels and finally marketing practice. Research studies have indicated that 50 percent of production cycle time in some industries is spent on materials handling, and the material handling cost can go up to 30 percent of the total product cost (Gopalakrishnan, 1990: 78).

Improving material handling system fuels a stunning return on investment. It makes more sense than almost anything else that can be done. Material handling systems power today's efficient distribution and manufacturing facilities. It is the secret weapon in logistics operations for improving system productivity, enhancing customer service and speeding up throughputs. By gaining control of warehouse, it is possible to gain control of profitability. Effective material handling systems create savings that helps directly to improve a business' bottom line. If one's business relies heavily on manufacturing, warehousing, storage or distribution, the potential savings are perhaps the greatest opportunity they can get. (Sople, 2007:74)

Hence, material handling affects the entire system of an organization in many aspects. Despite the fact that materials handling has greater impact on the success of a business, however, CCD especially since the last three years, has been encountering various gaps regarding this and the company is failing to meet the needs of its customers due to problems related to materials handling. Customers often complain on the quality of homes that is associated with the quality of materials. Meanwhile, the company is frequently accused of the qualities of homes and also

incurring loss due to decline in market. Hence, having identified the problems, this research is expected to answer the following basic research questions at the end.

1.3. Basic Research Questions

In order to investigate the above mentioned problems the study will try to answer the following research questions:

- How does the company undertake material handling?
- What problems do occur during the practice of materials handling in CCD?
- What measures are taken to overcome material handling problems in the company?

1.4 Objectives of the study

1.4.1 General Objectives

The general objective of the study is to assess material Handling in the case of CCD Plc and recommend possible solution for the problems in the findings.

1.4.2 Specific Objectives

The specific objectives of the study are:

- To examine the company's material handling practice;
- To investigate problems that occur during the practice of materials handling;
- To explore the performance of material handling on the marketing practice of the company;
- To identify measures taken to overcome problems that occurs due to poor material handling.

1.5. Significance of the Study

This study has the following benefits:

- By revealing the problems towards materials handling on CCD Plc, it provides information that will assist the management of the company to revitalize the path it is tracking on.
- It is a starting point to future research that could benefit from conclusions and data from this work.
- It is also serving in enhancing marketing department staff learning by adding value laden recommendations on to the implementation of the research.

1.6. Delimitation of the study

This paper is limited to assessing the practice of materials handling on the marketing practice of CCD Plc. To this end, it is limited to analysing the practice emphasizing on the impact it has on the marketing system of the company found around Lagatapho Lega Dadi area as the case for the sake of this study. Meanwhile, this paper has not intended to go beyond other activities of the company. In addition, the study is limited to data available from 2009-2012.

1.7. Limitation of the Study

The student researcher has faced different problems while conducting this research. Getting literature related to the issue under the study, shortage of resources and time constraints were the major difficulties that have been restraining the student researcher's endeavor. However, it was possible to conduct the research within the constraints.

1.8. Research Design and Methodology

1.8.1 Research Design

The study adopted descriptive research design by using both qualitative and quantitative data to obtain the desired result and to reach the objective at hand. The student researcher chooses this

design since the design best suits for this particular research. Therefore, the student researcher employed descriptive research method.

1.8.2 Population, Sample Size and Sampling Technique

The total population of the study was 1221 out of which 700 were employees and 521 customers. The employees were assigned to work in the head office found in Addis Ababa and at the project site found at Lega Tafo. Of the 700 employees, 8 were top managers leading marketing, engineering, and 15 are materials management, finance and project departments.

To this end, by applying the formula used by Krejcie and Morgan (1970), 30% of the customers were selected as sample to represent the population. Simple random sampling has been used to select respondents because the population size of the area is known. To this end, the student researcher chose the respondents using this technique considering giving equal chance to every population under this study and no any kind of sampling bias has been made.

1.8.3. Types of Data collected

The types of data collected for this study were primary and secondary data. Primary data were collected from the first hand informative— top managers, employees of the company and customers and secondary data from written materials.

1.8.4. Method of Data Collection

In the collection of data for this study, there were instruments that helped the student researcher to get worthwhile information and data for the objective to be reached. To this effect, interviews were made with top managers and both open and close ended questionnaires were distributed to employees and customers. Secondary data were collected from published and unpublished journals, books, e-books, company profile and websites.

1.8.5. Method of Data Analysis

After collection of raw data, data edition, coding, classification and tabulation were made using different statistical tools. The statistical tools applied to this study are: percentages and tables. Microsoft excel was used to analyse the quantitative data and qualitative data were analysed by using case analysis.

1.8. Organization of the Study

The paper consists of four chapters. These chapters are: chapter one, which includes background of the study, statement of the problem, delimitation, objectives and significance of the study and research methodology. The next is chapter two that comprises the literature review section. The third chapter consists of data analysis, major findings and interpretation of results. The final one is the fourth chapter which includes summary of findings, conclusion and recommendation.

Chapter Two

Review of Related Literature

This section is devoted to scholarly views materials handling with regard to marketing. Therefore, the concern of this section will be on cross validating the ideals in the data analysis to follow in reference to the works of acknowledged researchers and authors.

2.1. Overview of Materials Handling

To manufacture any product, it is necessary either that materials move from one step of the manufacturing process to another or that operators move to the materials. The most common practice, of course, is to move the materials. This movement of materials from one processing area to another and from department to department necessitates the use of many personnel and equipment and the handling of treatment tonnages of materials. Consideration for the handling of work-in-processes materials, as well as raw material and finished goods, has always been a part of the production systems design process. The material handling is important activity in the logistics system. The speed of the material flow across the supply chain depends on the type of the material handling equipment and the sophistication in the system. In the logistics operation the material handling system is designed in and around the warehouse (Sople 2007).

There is a strong concern to adjust the supply system in a company to achieve a higher service level internally and to the outside customers. This brings to a higher operational level and even a possible differential when compared with the other competitors (Milan, & Pretto, 2006).

According to (Slope 2007), the investment in the material handling system will be sheer waste if it is not compatible to the warehouse layout plan. The layout will create the obstacles for the free movement of equipment and the goods. The mechanized equipment requires the space for the free movement across the warehouse. They should have the accessibility to storage area for material loading and unloading during storage and retrieval. In the mechanized version the variety of equipment are used for the specific application. The range covers common types are wheeled trolleys, forklift trucks, conveyors, cranes, towlines and carousal etc. The more

sophisticated systems such as robotics, automatic storage & retrieval and automatic guided vehicles systems are used in semi or fully automatic warehouses for speedy material movement.

2.2. Definition of Materials Handling

In a broad sense, materials handling includes all movement of materials, in a manufacturing situation. It has been defined by the Materials Handling Division. Malhotra, et al. (1997:1).

According to the American Society of Mechanical Engineers, materials handling is the art and science involving the moving, packing, and storing of substances in any form. Materials handling management is among many factors that contribute to improve a company's performance. The Materials Handling Industry of America [MHIA] defines materials handling management as, "Material Handling is the movement, storage, control and protection of material, goods, and products throughout the process of manufacturing, distribution, consumption and disposal. Then it is observed that handling is broader than simple materials movement, although both terms are sometimes used as synonyms.

2.3. Role of Material Handling in Supply Chain

In the last several years material handling has become a new, complex, and rapidly evolving science. For moving material in and out of warehouse many types of equipment and system are in use, depending on the type of products and volume to be handled. The equipment is used, in loading and unloading operations, for movement of goods over short distances. The handling of material in warehouse is restricted to unitized forms, which require smaller size equipment. However, for bulk handling of material at logistics nodes such as shipyards, ports and airports different type of equipment is used (Milan, & Pretto, 2006). According to them, in warehouses, material handling operation is performed at the following stages:

- Unloading the incoming material from transport vehicle.
- Moving the unloaded material to assigned storage place in warehouses.
- Lifting the material from its storage place during order picking.
- Moving the material for inspection and packing.
- Loading packages/boxes/cartons on to transport vehicles.

The efficiency of material handling equipments adds to the performance level of the warehouse. The internal movement of goods has a direct bearing on the order picking and fulfillment cycle. The warehouse, wherein the material handling equipments is in use, is more sensitive to labor productivity than the manufacturing center as material handling is more labor intensive. There is a scope for reducing labor and enhancing productivity by emerging technology in material handling. A good material handling system will enhance the speed and throughput of material movement through the supply chain (Singh 2008).

2.4. Material Handling Guidelines

According to (Sople 2007), the material handling function reflects on the efficiency and speed of warehouse operation, which ultimately result in elongated or compressed order completion cycles. Hence the investment in material handling system is strategic in nature and is always based on long term requirements, considering product volumes and varieties. For designing an effective and efficient material system, the guidelines normally followed are:

- Designing the system for continues flow of material, i.e. idle time should be zero.
- Going in for standard equipment, which ensures low investment and flexibility in case of changes in material handling requirements in the future.
- Incorporating gravity flow in material flow system
- Ensuring that the ratio of the dead weight to the payload of material handling equipment is minimum.

According to (Singh 2008), various material handling systems are in use, right from those that are fully manual to the ones that are fully automatic. However, the selection of a particular system depends in factors such as:

- Volumes to be handled
- Speed in handling
- Productivity
- Product characteristics (weight, size, shape)
- Nature of the product (hazardous, perishable, crushable)

Recent trends indicate preferences for system with higher logistical productivity. However, investment cost goes up in more productive material handling system using sophisticated equipment. Hence, in a majority of case a combination of both manual and mechanized systems is quite common (Singh 2008).

2.5. Objectives of Materials Handling

Singh (2008), states the objectives of materials handling by presenting a logical inquiry. He says that the simplest solution to the materials handling problem- “No movement, no cost” is hardly practicable for a complete manufacturing process. It is basically sound approach when one is attempting to improve a complete production cycle and when the number of handling can be reduced. It is also a good solution in the making of heavy industrial equipment.

In the latter situation it is often more feasible to bring the tools and workers to the product than to transport the product to the machine or work area. In addition to the objective of reducing the overall costs of materials handling by reducing the number of handling involved, the following may be considered as objectives of the engineer in his or her approach to this problem.

Lower the unit materials handling costs: It is obvious that if the overall materials handling costs are reduced the unit costs will be reduced. This approach requires the costs of handling be allocated to or identified with the units of product, or its component parts that moved.

Reduce the manufacturing cycle time: The total time required to make a product from the receipt of raw materials to the finished goods can be reduced through effective materials handling.

Contribute toward a better control of the flow of goods: A principle way in which good materials handling practice can affect savings is by making the control of goods easier particularly in continuous manufacturing, where all operations are “tied together” by the materials handling plan.

Provide for improved working conditions and greater safety in the movement of materials: many of the provisions of the occupational Safety and Health Act require adherence to safe

handling practices. These must be followed. In addition, it is evident that the safe handling of materials will be reflected in a better industrial accident record.

Provide for fewer rejects: Care in the handling of the product will contribute to a better quality level of the goods produced. Products damaged by inefficient handling are all too often a major cost to manufacturer.

Achieve decreased storage requirement: Better movement and storage of materials should increase the utilization of storage space.

Gain Higher productivity at lower manufacturing cost: Any materials handling system, if it is worth its investments, is design to improve productivity. This improvement should be achieved by moving materials in the fastest, most efficient and economical way possible.

2.6. Importance of Materials Handling

According to (Slope 2007) the foremost importance of materials handling is that it helps productivity and thereby increases profitability of an industry. Many enterprises go out of business because of inefficient materials handling practices. In many instances it is seen that competing industries are using same or similar production equipment, and one who uses improved materials handling system stays ahead of their competitors. A well designed materials handling system attempts to achieve the following:

- (i) Improve efficiency of a production system by ensuring the right quantity of materials delivered at the right place at the right time most economically.
- (ii) Cut down indirect labor cost.
- (iii) Reduce damage of materials during storage and movement.
- (iv) Maximize space utilization by proper storage of materials and thereby reduce storage and handling cost.
- (v) Minimize accident during materials handling.
- (vi) Reduce overall cost by improving materials handling.
- (vii) Improve customer services by supplying materials in a manner convenient for handlings.
- (viii) Increase efficiency and salability of plant and equipment with integral materials handling features.

Apart from these, for certain industries, like process industries, heavy manufacturing industries, construction industries, mining industries, and shipbuilding or aircraft industries etc., the materials are so large and heavy that these industries just cannot run without appropriate materials handling system.

All the above points clearly show the importance of materials handling in an industry or a material transportation system. However, the negative aspects of materials handling should also not be overlooked. These are:

- (i) Additional capital cost involved in any materials handling system.
- (ii) Once a materials handling system get implemented, flexibility for further changes gets greatly reduced.
- (iii) With an integrated materials handling system installed, failure/stoppage in any portion of it leads to increased downtime of the production system.
- (iv) Materials handling system needs maintenance, hence any addition to materials handling means additional maintenance facilities and costs.

2.7. Effects of Materials Handling on Market of a Company

The relevance of materials handling stems from the intrinsic relationship that it has with production flow. When it presents an imbalance, there is formation of extra stock or rupture in supply. When the flow does not have enough velocity, transit time is long and the system is not capable of serving the customers when they need it (Stock & Lambert, 2001).

It is well understood that material handling improvement will have positive effects over production. However, it is not only production, but the way the employees see the new situation. When the perception is favorable, the benefits are possible; if not, behavioral issues can emerge. Evaluations are important when interventions into the work environment are implemented. The present work is specifically related to materials handling management. By means of effective materials handling management, the company's operational performance may improve aiming to satisfy the customers or meet their expectations in terms of their needs, desires and demands which later on affect the market (Chopra & Meindl, 2001).

2.8. Factors Affecting the selection of Materials Handling Equipment

According to (Stock & Lambert, 2001), the selection of materials handling equipment requires the attaining of proper balance between the production problem, the capabilities of the equipment available, and the human element involved. The ultimate aim is to arrive at the lowest cost per unit of material handled. Equipment factors to be taken into consideration may well include the following:

Adaptability: the load carrying and movement characteristics of the equipment should fit the materials handling problem.

Flexibility: Where possible the equipment should have flexibility to handle more than one material, referring either to class or size.

Load capacity: Equipment selected should have great enough load-carrying characteristics to do the job effectively, yet should not be too large and result in excessive operating costs.

Power: Enough power should be available to do the job.

Speed: Rapidity of movement of material, within the limits of the production process or plant safety, should be considered

Space requirements: The space required to install or operate materials handling equipment is an important factor in its selection.

Supervision required: As applied to equipment selection, this refers to the degree of automaticity designed into the equipment.

Ease of maintenance: Equipment selected should be easily maintained at reasonable cost.

Environment: Equipment selected must conform to any environment regulations.

Cost: The consideration of the cost of the equipment is an obvious factor in its selection.

2.9. Principles of Material Handling

(Stock & Lambert, 2001) indicated that a good materials handling engineer will generally have several years of experience that can be brought to bear on the solution of materials handling problems or the design of materials handling systems. For many years, discussions of principles

of materials handling have been published by many experts in the field. The following list has been adapted from two of these sources:

1. Eliminate wasteful methods by:

- a. Reducing to a minimum the number of handlings of materials.
- b. Eliminating unnecessary mixing and subsequent sorting.
- c. Using mechanical aids to eliminate the use of hand labor in movement of materials.
- d. Avoiding the unnecessary transfer of materials from floor to workplace or from container to container.
- e. Increasing the speed of handling.
- f. Utilizing containers and unit loads.
- g. Utilizing gravity as a moving force wherever practicable.
- h. Introducing automatically into the materials handling plan.

2. In laying out the plant:

- a. Plan a system for materials flow and combine handling with processing wherever possible.
- b. Provide for continuous or appropriate intermittent flow of materials.
- c. Provide for the optimal flow of materials between operations and with a minimum of retrograde movement.
- d. Plan the layout of the work-station area for a minimum of handling of the product.
- e. Maximize the quantity and size of weight handled.
- f. Coordinate the overall materials handling throughout the entire plant.
- g. Provide for safe handling and safe equipment and integrate with the management information and control system.
- h. Plan for adequate receiving, storage and shipping facilities.
- i. Make optimum use of building cubage.
- j. Design adequate aisle and access areas.

3. In the selection and application of materials handling equipment:

- a. Plan activities and analyze equipment needs before considering the purchase of new equipment.
- b. Ensure that the existing equipment is being used effectively.
- c. Use the simplest equipment that is adaptable to the problem: avoid the use of complicated mechanisms and controls.

- d. Adopt standard equipment if possible; ensure that the purchase of special equipment is economically justified.
- e. Select equipment that is flexible in its application.
- f. Select equipment that will minimize the ratio of mobile equipment deadweights to payload.
- g. Determine comparative costs of equipment before purchasing.
- h. Recognize the need for different equipment for different jobs.
- i. Recognize the need to provide suitable building conditions for the equipment.
- j. Provide for alternative methods for use in emergencies.
- k. Give consideration to the maintenance of the equipment.
- l. Replace obsolete methods and equipment with more efficient ones.

2.10. Elements and Characteristics of a Material Handling System

Materials handling study requires that several elements are considered. The first is a handling system project, which covers activities of sequencing, velocity, layout and routing (Groover, 2001). In order to complete the analysis, Groover recommends analyzing the material itself (or object) to be transported. Therefore, he suggests the classification of Muther and Hagan which considers: (i) physical state (solid, liquid, gas); (ii) size (volume, length, width, height); (iii) weight; (iv) condition (hot, cold, dry, dirty, sticky, adhesive); (v) risk of damage (weak or strong); and (vi) safety hazards (explosive, flammable, toxic, corrosive, etc.).

Additionally, the issue of equipment and devices must be examined. Dias (1993) adopts the term “moving” to describe what, in this article, is called management (handling) to adopt the terminology of Groover. When dealing with equipment, Dias (1993) presents a broad classification that covers five categories: (i) transporters (belts, chains, rollers, etc.); (ii) cranes, hoists and lifts; (iii) industrial vehicles (carts, tractors, pallet transporters, forklifts); (iv) positioning equipment, weighing and control (ramps, transfer equipment); and (v) stents and support structures (pallets, holders, reels).

According to Chan, Ip & Lau (1999), a key factor in material handling system design process is the selection and configuration of equipment for material transportation. This is directly related to this study.

According to Gurgel (1996), the equipment should be selected based on some preliminary considerations: take into account the utilization of the factory floor and its load capacity; examine the dimensions of doors and corridors; pay close attention to ceiling height, identify the environmental conditions and their nature, avoid the use of combustion engines traction equipments in storage of food products, meet all safety standards to protect humans and to eliminate the possibility of incurring criminal and civil liabilities arising from accidents, and examine all kinds of available energy options and their capacity to supply required movements.

2.11. Materials Layout

The right choice of equipment and location of work-in-process is fundamental for the optimization of a company's manufacturing capacity. Bowersox and Closs (1996) state that a critical factor in positioning stocks in process is a balance between convenience and consolidation to create efficiencies when the stock flows along the value chain.

The importance of layout, which defines the placement of equipment and, consequently, restricts possible routes and sequencing, can be perceived by the prominence that the subject is treated in production management literature. The analysis of the relationship between layout studies and material handling, however, does not receive much attention in the same literature. This lack of attention can be seen in works like (Gaither and Frazier 2002). The patterns of flow of materials in a plant definitely affect the materials handling costs.

The production process should be so planned and the machines and benches so arranged that the handlings of materials are reduced to a minimum with as little backtracking of goods as possible. The type of manufacturing is a major factor in this respect.

In the layout of a plant for continuous manufacture the pattern of flow is planned will in advance; because of balanced machine and assembly lines, it lends itself to a well planned flow of component parts, subassemblies, and assemblies. This makes it possible to plant the handling of materials in advance, procure and install the best equipment for the job, and design for a minimum materials handling cost. However, one installed, the plan lacks flexibility- usually it cannot be changed without major expense.

2.12. Material Handling Systems - Types

Materials handling systems provide transportation and storage of materials, components and assemblies. Material handling activities start with unloading of goods from delivery transportation, the goods then pass into storage, onto machining, assembly, testing, storage, packaging, storage, and finally loading onto transport. Each of these stages of the production process requires a slightly different design of handling equipment, and some processes require integration of multiple items of handling equipment. Sople (2007) He further added that design or selection of the right material handling system is one of the most important decisions that a manager can make, because of the effects on the rest of the manufacturing plant. It affects the material flow and the factory layout. Apart from the initial capital cost for a new system, the consequences of any mis judgment in material handling will have considerable and long-term effects on operations. In recent years computer based simulation tools have been developed to simulate material handling systems and their effect on the manufacturing process.

Loading equipment is aimed at providing the capability to load and unload vehicles; it is also referred to as loading bay equipment. The category can be divided into products that provide access from the loading bay to the vehicle and equipment that moves the product from the loading bay to the vehicle and vice versa. Equipment that falls into the access category are scissor lifts, goods lifts, dock levelers, loading ramps, doors, dock seals and vehicle restraints, and equipment that falls into the movement category are pallet trucks, conveyors and fork lift trucks. Sople classifies this as follows:

Lifting and Transport Equipment

Lifting and transport equipment is used to move product around the production facility, from loading bay to storage, from storage to production, around production, from production to storage, and from storage to loading bay. Equipment that falls into this category are fork lift trucks, order picking trucks, overhead cranes, tower cranes and belt, chain and overhead conveyors.

Storage Equipment

Storage equipment, as the name suggests is used to store materials, components and assemblies. The level of complexity of this type of equipment is wide ranging, from a welded cantilever steel rack to hold lengths of stock materials to a powered vertical carousel system. Also within this category are pallet racks, mobile shelf units, and plastic, wood and steel containers.

Automated Handling Equipment

Manufacturers of automated handling equipment produce automated guide vehicles, storage and retrieval equipment, conveying systems and product sortation equipment. The level of automation varies depending on the handling requirements. Fully automated handling systems ensure that the materials/components/assemblies are delivered to the production line when required without significant manual intervention. Semi-automatic handling systems provide less advanced solutions that deliver materials/components/assemblies to the production line with some manual intervention.

Automated Guided Vehicles (AGVs)

An AGV is a material handling device that is used to move parts between machines or work centres. They are small, independently powered vehicles that are usually guided by cables that are buried in the floor or they use an optical guidance system. They are controlled by receiving instructions either from a central computer or from their own on-board computer. In some applications they can be used as mobile workstations to replace the more traditional conveyor system.

Robotics

Robotics was first introduced 30 years ago. Since then their applications and versatility have increased dramatically. The basic robotics technology is similar to CNC technology but most robots have more degrees of freedom. In manufacturing applications, robots can be used for assembly work, process such as painting, welding, etc. and for material handling. More recently robots are equipped with sensory feedback through vision and tactile sense. The main advantage

of robots is that they can be used for repetitive, monotonous, mundane tasks that need precision. They can also be used in hazardous environments that are not suitable for human operators.

2.13. Organization for Effective Materials Handling

Good materials handling practice is the responsibility of all members of the manufacturing team, from the top management down to the trucker working in the aisle of the plant. Very few other elements of manufacturing activity must be so carefully considered by each function in the manufacturing organization. (Groover 2001). (Bowersox and Closs 1996) pointed out that optimum effectiveness of materials handling procedures can only be attained if each individual recognizes and plays his part. Education and training in materials handling are prerequisite to minimum materials handling costs. According to (Bowersox and Closs 1996), responsibilities assigned such a staff group may well include:

1. Determining all new methods for the handling of new materials or products and selecting the equipment to be utilized.
2. Conducting research in materials handling methods and equipment.
3. Conducting education and training for all manufacturing personnel in good material handling practices.
4. Establishing controls of current materials handling costs by analysis of costs and comparison to budgets of either unit or total materials handling costs.
5. Initiating and conducting a continuing materials handling cost-reduction or cost improvement program.
6. Determining measurements for effectiveness of materials handling that can become the yard – sticks for progress in this activity.
7. Developing and conducting a preventive maintenance program for all materials handling equipment.

2.14. Training and Education

(Bowersox and Closs 1996), recommend that employers have to establish a formal training program to teach workers how to recognize and avoid materials handling hazards. Instructors should be well versed in safety engineering and materials handling and storing. The training should reduce workplace hazards by emphasizing the following factors:

- Dangers of lifting without proper training;
- Avoidance of unnecessary physical stress and strain;
- Awareness of what a worker can comfortably handle without undue strain;
- Use of equipment properly;
 - Recognition of potential hazards and how to prevent or correct them.

Chapter Three

Data Presentation, Analysis and Interpretation

This chapter deals with the presentation, analysis and interpretation of the data gathered from CCD plc top management and supervisors as well as customers in Addis Ababa, having been limited to Laga Tapho area. The population consisted of: 8 top managers and 156 customers to make a total of 164. In the chapter, quantitative data are presented in tables and graphs whereas qualitative data are presented in writing.

Respondents were categorized into two groups. The first group is the top managers' comprising the heads of the six managerial departments; the general and vice managers, materials manager, finance head, project manager and marketing manager, engineering department and managing director. Respondents vary with regard to sex, age and other status. Consequently, a questionnaire was distributed to 164 people.

Laga Tapho area which is found to the north of Addis Ababa was taken as study area on the basis of convenience sampling. Customers of CCD were identified and 156 sample respondents were given to fill out the questionnaires, out of which 122 or 78.2% returned. Meanwhile, all of the 8 top managers were contacted for the interview and questionnaires distributed to them were all filled out and returned. Hence the student researcher believes that these collected questionnaires are sufficient for analysis and provide a ground for possible conclusion and recommendation.

The student researcher has tried to consider gender of the respondents as much as possible. Even though the customers were not easily available as they were operating in their own businesses, the student researcher made the maximum endeavour to contact them. As a result, it was able to contact them and administer the questionnaire paying the entire price that would enable the effectiveness of the study true.

3.1. General Characteristics of Respondents

Table1: General Characteristics of the Respondents

S. No	Item		Frequency	Percentage (%)
I	Sex of the respondents	Male	84	65.6
		Female	44	34.4
	Total		128	100
II	Age of the respondents	18-30	18	14
		31-40	48	37.5
		41-50	38	29.7
		51-60	12	9.4
		Above 60	12	9.4
	Total		128	100
III	Educational Qualification	MA/MSC degree and above	22	17.2
		First Degree	68	53.1
		Diploma	24	18.8
		Certificate	12	9.4
		Below certificate	2	1.5
Total		128	100	

Source: Questionnaire

From item I of Table 1, it is noted that the number of male category is 65.6% whereas the percentage of female is 34.4. From this we can understand that male respondents dominate in filling out the questionnaire.

According to item II of Table 1, which describes age distribution of respondents, 14% of the respondents fall in the age of 18-30 and 37.5% of the respondents are between the ages of 31-40. Other 29.7% of the respondents fall in the age of 41-50, those between 51 and 60 years old and above 60 years old are 9.4% each. From this the student researcher can infer that most of the respondents are matured.

From the findings in item III of Table1, the respondents whose qualifications are below certificate are 1.5%. The study also revealed that respondents had also acquired academic qualifications stipulated in the questionnaire; certificate 9.4 %, diploma 18.8 %, and first degree 53.1% while those with MA/MSC degree and above category had the least 17.2%. This implies that all of the respondents who filled out this questionnaire are literate and most of them are

highly educated.

Table 2: Customer-ship tenure with the company

S. No	Item		Number of respondents	Percentage (%)
I	Engagement tenure as customer	Less than 1 year	13	10.6
		1-2 years	19	15.5
		3-4 years	62	51
		Above 5 years	34	27.9
Total			122	100%

Source: Questionnaire

According to item I of Table 2, those who stayed as customers of CCD plc for more than 5 years are 27.9% followed by those which have been in the business from 3-4 years are 51%. On the other hand, those who have been customers from 1-2 years constitute 15.5%. The study reveals those who have been in the business for less than a year have the least percentage, 10.6%. From this one can understand that the company was able to sell many houses in its first couple of years while the demand of its products by customers has been declining onwards.

3.2. Materials Defect Viewed by Customers

Table 3: Problems of Installation with Defected Materials and Inconveniencies

S. No	Item	Responses	Frequency	Percentage (%)
I	What are the qualities of the materials installed in the homes you purchased/ are purchasing?	Very good	28	23
		Good	78	63.9
		Medium	16	13.1
		Poor	0	0
		Very poor	0	0
Total			122	100
II	Do you encounter inconveniences of installation or building with defected/damaged materials?	Yes	67	55
		No	43	35.2
		Unknown	12	9.8
		Total		
III	When has problem regarding inconveniences of installation occurred?	Before construction	15	12.3
		During construction	79	64.7
		After construction	28	23
		Total		

According to the data summarised in item I of table 3, the qualities of the materials installed in the homes purchased are good for 63.9% of the respondents while 23% said very good and they are medium for 13.1%. However, none responded poor and very poor. From this it can be depicted that the qualities of materials installed in the buildings are not fully satisfying for the customers and this in turn retracts customers not to witness any good of the company in this case.

The data presented in item II of table 3 above indicates that 55% of the respondent customers encounter inconveniences of installation or building with defected/damaged materials while 35.2% of them never encountered any problem. Others do not know whether they encounter such nuisance or not. From this it can be deduced that the company has limitation in possessing loyalty in providing quality house to large number of customers.

According to item III of table 3 in the previous page, that presents the time of occurrence of inconveniences of installation or building with defected/damaged materials, 64.7% of the respondents encounter such problem during construction. On the other hand 23% face such difficulties after construction while the rest 12.3% said before construction. This indicates that most of the problems regarding inconvenience in installation occur during construction.

3.3. Problems Encountered During Installation

Table 4: Tendency of Problem Encounter and Complaints Regarding Installation

S. No	Item	Responses	Frequency	Percentage (%)
I	How often have you encountered problems related to poor materials installation?	Usually	12	9.8
		Often	69	56.6
		Sometimes	32	26.2
		Seldom	9	7.4
		Never	0	0
Total			122	100
II	What is the level of tolerability of materials defect have you encountered?	Tolerable	30	24.6
		Medium	60	49.2
		Untolerable	32	26.2
		Total		
III	Do you inform complaints regarding installation or building with materials defect to the company?	Yes	76	62.3
		No	32	26.2
		I don't want	14	11.5
Total			122	100

Source: Questionnaire

According to the data presented in item I of table 4 found in the previous page, 56.6% of the respondents have often encountered problems related to poor materials installation while 26.2% face such difficulties sometimes and 9.8% usually. Other 7.4% seldom encountered such problems. From this it can be inferred that the company's poor materials installation is frequently affecting most of its customers and this problem would have been annoying them.

Following the response above, data gathered from respondents about the level of tolerability of materials defect encountered presented in item II of table 4 found in the previous page indicates

that the defect is medium tolerable for 49.2% of the respondents. However, 26.2% said that it is unalterable while it is tolerable for 24.6. From this it can be deduced that the quality level of defected materials is not exciting for the customers and the company is not able to at least satisfy most of its customers to the optimum level.

The result of the data presented in item III of table 4 found in the previous page reveals that 62.3% of the respondents inform complaints regarding installation or building with materials defect to the company. However, 26.2% never do while 11.5% do not want to. This shows that most of the respondents discuss with the company on the quality of materials installed in the houses they buy. On the other hand, considerable number of the respondents suffers from problems which do not arise from their own but from the company because of not informing the problems nor being careless.

3.4. Qualities of Installed Materials and Actions taken to Tackle the Problems

Table 5: Company's Action to solve Problems and Qualities of Installed Materials

S. No	Item	Responses	Frequency	Percentage (%)
I	How was the company's action taken to solve the problem(s)?	Immediate	24	19.7
		Medium	78	63.9
		slow	20	16.4
	Total		122	100
II	Is there any basis of agreement document signed between you and CCD regarding compensation of materials defect happened on the home (s) you purchased?	Yes	122	100
		No	0	0
		Unknown	0	0
	Total		122	100
III	What are the qualities of the materials installed in the homes you purchased/ are purchasing?	Very good	32	26.2
		Good	67	54.9
		Medium	23	18.9
		Poor	0	0
		Very poor	0	0
Total		122	100	

Source: Questionnaire

Respondents were asked how the company's quickness with regards to taking actions in order to solve the problem looks like. Accordingly, as result of data presented in item I of table 5 above shows 63.9% said that the company is medium in reacting to such problems and 16.4 claimed it as slow. Conversely, it was immediate for 19.7% of them. This implies that the company has not designed a scheme which would respond to customers' complaints regarding matters related to quality.

According to the data shown in item II of the table above, all the respondents admitted that there is basis of agreement document signed between customers and CCD plc, regarding compensation of materials defect happened on the home (s) purchased. This indicates that customers would get insured for the homes they purchase from the company for any problem that occurs on the houses because of quality building.

According to the data presented in item III of table 5 found in the previous page, the qualities of the materials installed in the homes purchased are good as 54.9% of the respondents said while 26.2% claimed it is very good. For 18.9% of them, the quality is medium. From this it can be surmised that the quality of materials installed in the houses are good though there is still gap.

3.5. Customers' level of Satisfaction on the Quality of Materials

Table 6: customers' Satisfaction Level and Performance of the Company's Materials Handling Practice

S. No	Item	Responses	Frequency	Percentage (%)
I	What is the level of your satisfaction by the qualities of materials installed?	Very high	12	9.8
		High	37	30.3
		Medium	70	57.4
		Low	3	2.5
		Very Low	0	0
Total			122	100
II	How do you rate performance of the company's materials handling practice?	Very high	14	11.5
		High	30	24.6
		Medium	68	55.7
		Low	10	8.2
		Very Low	0	0
Total			122	100

Source: Questionnaire

According to the data portrayed in item I of table 5 above, the level of satisfaction by the qualities of materials installed is medium for 57.4%, high for 30.3% and very high as 9.8% of them responded. However, it is low for 2.5% of the respondents. This indicates that the overall qualities of materials installed are not blameful.

Responses on the performance of the company's materials handling practice in item II of the table above shows that respondents rated medium (55.7%), high (24.6%) and very high (11.5%). Conversely, 8.2% rated as low. Hence from this it can be deduced that the company's performance of materials handling practice is not all in all effective.

3.6. Materials Handling Equipments and Existence and Tendency of Occurrence of Problems

Table 7: Types of Materials Handling Equipments and Existence of Problems and Tendency of Occurrence of Problems

S. No	Item	Responses	Frequency	Percentage (%)
I	Do you encounter materials defect while handling the materials?	Yes	8	100
		No	0	0
		Unknown	0	0
		Total	8	100
II	How often does such problem happen?	Usually	4	50
		Often	3	37.5
		Sometimes	1	12.5
		Seldom	0	0
		Never	0	0
Total			8	100

Source: Questionnaire

According to data presented in item I of table 7 above, that portray the types of materials handling equipments used by the company, all of the respondent top managers completely agree with the existence of materials defect while handling materials. This shows that the company is unable to keep materials.

On the other hand, the data presented in item II of the table above shows materials defect usually occur in the company as half of the respondent top managers responded. Other 37.5% said the problem often occurs while 12.5% claimed as the problem happens sometimes. From this it can be understood that loss of materials is not new phenomenon to the company and this in turn has greater impact on the market of the company as damaged materials would not be dealt to be marketed rather than letting fall.

3.7. Reaction of Managers towards Problems of Materials Handling

Table 8: Materials Handling Performance the CCD

1= Strongly Agree 2= Agree 3= Neutral 4= Disagree 5= strongly disagree

S. No	Items	Level of Agreement									
		1	%	2	%	3	%	4	%	5	%
1	The load carrying and movement characteristics of the equipment fit the materials handling problem	0	0	4	50	3	37.5	1	12.5	0	0
2	The equipments have flexibility to handle more than one material, referring either to class or size where possible.	2	25	3	37.5	2	25	1	12.5	0	0
3	The equipment selected has great enough load-carrying characteristics to do the job effectively.	3	37.5	2	25	2	25	1	12.5	0	0
4	There is enough power available to do the job.	4	50	2	25	2	25	0	0	0	0
5	There is rapidity of movement of material, within the limits of the production process or plant safety, considered.	3	37.5	4	50	0	0	1	12.5	0	0
6	Much consideration is given to the space required to install or operate materials handling equipment.	3	37.5	2	25	1	12.5	2	25	0	0
7	Supervision is often made during materials handling	0	0	2	25	3	37.5	3	37.5	0	0
8	The equipments selected are not easily maintained at reasonable cost.	4	50	3	37.5	0	0	1	12.5	0	0
9	Trainings are conducted on how to handle and care for materials.	3	37.5	3	37.5	1	12.5	1	12.5	0	0

Source: Questionnaire

According to item 1 of table 8 on the previous page, which tells about the load carrying and movement characteristics of the equipment, 50% of the respondents do not agree the capacity of the equipment to fit the materials handling problem. Other 12.5% agree with the issue while 37.5% are neutral on this matter. This shows that the load carrying equipments are doubtful in this matter.

According to item II of table 8 found in the previous page, 25% of the respondent top managers strongly disagree with flexibility of the equipments to handle more than one material, referring either to class or size where possible. Those who disagree are 37.5% while 25% are neutral.

Other 12.5% agree with the matter. This indicates that the capacity of the load carrying equipments is lower.

Data summarized in item III of table 8 found in the previous page show that 37.5% of the respondents strongly disagree and 25% disagree with the effectiveness of the equipment selected has great enough load-carrying characteristics to do the job. Other 25% are neutral while 12.5% agree with the matter. From this we can understand that the company has not yet gotten effective material carrying equipments to perform its job effectively and this impacts the company's market by delaying its activities and decreasing quality.

As result of data summarized in item IV of table 8 in the previous page shows half of the respondents strongly agree and 25% agree that there is no enough power available to do the job. The remainder are neutral. From this it can be inferred that the power to do such careful activities is very low and this implies that the company gets difficult to do any activity with the required power and this reduces its effectiveness.

According to results of the data summarized in item V of table 8, 37.5 % of the respondents strongly disagree and 50% disagree with the existence of rapidity of movement of material, within the limits of the production process or plant safety, considered. However, 12.5% agree with the case. From this it can be surmised that the building process lacks swiftness due to lack of rapidity of moving materials which affects the company's timely completion and delivery of products to its customers.

Results of the data summarized in item VI of table 8 shows that 37.5 % of the respondents strongly disagree and 25% disagree that there is much consideration given to the space required to install or operate materials handling equipment. Those who are neutral to the case are 25% while 12.5% agree. This shows that let alone materials, even the material handling equipments are not in a safer condition and it would be not easier for the company to move materials unless there are load carrying well treated equipments.

Data summarized in item VII of table 8 indicate that supervision is not often made during materials handling as 25% of the respondents disagree. However, 37.5% agree that there is

supervision while the same percentage of the respondents is neutral. This implies that the company has problem in evaluating its material handling performance.

According to item VIII of table 8, strongly agree 50% that the equipments selected are not easily maintained at reasonable cost and 37.5% agree. The remainder 12.5% agree on the matter. This shows that the company is facing difficulties in handling equipments in economical way and this implies that the company is incurring higher cost even loss.

The student researcher has found that trainings are not well conducted on how to handle and care for materials. As the data summarized in item IX of table 8, 37.5 % of the respondents strongly disagree with the issue. Also 37.5% disagree with the matter. On the other hand, 12.5% are in the same mind with the case while respondents with the same percentage are neutral. This shows that conducting training on how to handle materials is by large forgotten which implies unskilled workers or those with lower skill are made to operate machines and other equipments. This in turn would be the case for the damage of equipments and low performance.

Chapter Four

Summary, Conclusion and Recommendations

4.1. Summary of the Major Findings

This study is attempted to assess material handling in the case of Country Club Developer's plc. In this chapter, it is tried to address the basic questions raised in chapter one and the necessary information obtained from the sample respondents draw conclusions and propose recommendations based on the major findings of the research.

The major findings of the researcher are summarized as follows:

- Performance of the company's materials handling practice is only medium as 55.7% of the respondent customers claim. It is high for 24.6% and very high for 11.5% while 8.2% said low. On the side of the top managers, this has been viewed as there is no good practice.
- As the data summarized from 122 of the respondent customers, 55% of them encounter inconveniences of installation or building with defected/damaged materials. However, 35.2% of them said that they do not encounter such problem while 9.8% do not have any idea about the matter. On the other hand, the top managers admitted that the company's materials handling practices are not promising.
- The study has found that 62.3% of the respondent customers inform their complaints regarding poor qualities of materials to the company, but 26,2% do not complain about this while 11.5% do not want to complain. In this regard, the top managers' response shows that the measures taken by the company to address such problems is not attractive.

4.2. Conclusion

The company's material handling system; problems that occur during the practice of materials handling that the company encounters towards its marketing practice; and the measures taken to overcome material handling problems related to marketing practice were thoroughly analysed based on the responses gathered from respondents. As a result, the major problem areas were identified.

- Performance of the company's materials handling practice is mostly on average level as the customer respondents' responses show. Also the top managers admit there is problem regarding to the matter. Therefore, it can be concluded that the company is not in a good level of materials handling practice.
- In the study, it has been identified that inconveniences of installation with defected materials often occur. These inconveniences occur in the company due to improper materials management practices observed in the company and this has been identified from the inquiry made with the top managers.
- The study has found that most of the respondent customers inform their complaints regarding poor qualities of materials to the company. There are also those who do not complain nor want to. Though it is known that there is problem, no corrective measures were taken by the company to address those problems. Even the measures taken to improve the problems occur are not impressive.

4.3. Recommendations

The performance of the company regarding materials handling is not promising. This was identified from the responses of customers and top managers and their responses were analyzed in the previous section. The findings indicate that there are gaps created in the market of the company due to lower performance of material handling. This would harm the company's marketing practice if due consideration is not given. Therefore, the following points seek consideration to tackle the problems.

- The company should design sound quality control system to maintain good quality of materials installed in the houses built. In addition, the load carrying equipments should be fitting and agile to the materials moved from place to place so as to avoid material loss or damage.
- Training on how to handle materials is significant to protect the quality of works done regarding materials handling for not all workers are familiar with the equipments. Hence training and skill development programs are absolute must to the company. This would by far reduce damage of equipments and solve problem of low material handling performance. In addition, the market of the company will be in effect if this is done as the quality of the materials is uncompromising for the marketing practice.

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Appendix A

St. Mary's University College

Faculty of Business

Department of Marketing Management

The questioner is prepared by St. Mary's University College under graduate degree students for fulfilment of Bachelor Degree Program.

The purpose of the student research is to assess the materials, handling practice on marketing practices in the case of country club developers PLC. To collect data which can assist to prepare a senior essay and the outcome of these questioners meant to support a research report to be presented for University College.

The validity of your response has high contribution for success of my senior essay due to this reason I would like to ask with due respect to give me the right response.

Note:-

- You are not required to write your name
- Please make ✓ to answer the questions
- Questions related to your opinion please write is shortly and Precisely on the space provided

Part I. General characteristics of the respondents

1. Sex

A. Male B. Female

2. Age

A. 18-27 years D. 48-56 years
B. 28-37 years E. Above 57 years
C. 38-47 years

3. Educational background

A. Below 10th grade D. Diploma
B. 10th complete E. 1st degree and above
C. Certificate

4. Occupation

A. Governmental D. Merchant
B. Private E. Others (please specify) _____
C. Broker

5. For how many years have you been customer of country club developers plc ?

A. < 1year C. 6-10 years
B. 1-5 years D. above 11 years

Part II. Questions directly related to the study

1. What are the qualities of the materials installed in the homes you purchased/ are purchasing?

A. Very good B. Good C. Medium
D. Poor E. Very poor

2. Do you meet inconveniences regarding installing or building home with defected/damaged materials?

A. Yes B. No C. Unknown

2.1 If your answer for the above question is yes please explain what kind of problems _____

3. If you encounter inconveniences regarding installation with materials defect when has this problem occurred?

A. before construction B. during construction C. after construction

4. How often have you encountered problems related to poor materials handling?

A. usually B. Often C. sometimes D. seldom E. never

5. What is the level of materials defect have you encountered?

A. Untolerable B. Tolerable C. Medium

6. Do you inform if you encounter inconveniences regarding installation with materials defect to the company?

A. Yes B. No C. unknown

6.1. If your answer for question number 5 is "Yes", how was the company's action taken to solve the problem(s)?

A. Immediate B. Slow C. Very slow

7. is there any basis of agreement document signed between you and CCD regarding compensation of materials defect happened on the home (s) you purchased?

A. Yes B. No C. Unknown

8. What is the level of your satisfaction by the qualities of materials installed?

A. very high B. high C. medium D. Low E. very Low

9. How do you rate performance of the company's materials handling practice?

Very good Good Medium Poor Very poor

10. If you have additional comments please try to mention it?

Appendix B

St. Mary's University College

Faculty of Business

Department of Marketing Management

A Questionnaire to be filled by Top managers of Country club developers plc.

I. General characteristics of respondents:

1. Sex A. Male B. Female
2. Age:
A. 18-30 B. 31-40 C. 41-50 D. 50-60 E. above 60
3. Educational background
D. Below 10th grade E. Diploma
E. 10th complete F. 1st degree and above
F. Certificate
4. Which department are you in?
A. Marketing B. Engineering C. Finance
D. Materials E. Production

II. Questions directly related with the study

1. Which types of materials handling equipment does the company use?
(You can choose more than one)
A. Conveyors
B. Cranes
C. Industrial trucks
D. Containers and supports
Others specify _____
2. Do you encounter materials defect while handling the materials?
A. Yes B. No C. unknown

2.1. If your answer for the above question is “Yes”, how often does such problem happen?

A. Usually B. often sometimes seldom never

Appendix C

PLEASE COMPLETE ALL THE QUESTIONS

Please fill out the following free spaces found in front of each items by putting a tick mark under the column that shows your level of agreement.

1= Strongly Agree 2= Agree 3= Neutral 4= Disagree 5= strongly disagree

S. No	Items	Level of Agreement				
		1	2	3	4	5
1	The load carrying and movement characteristics of the equipment fit the materials handling problem					
2	The equipments have flexibility to handle more than one material, referring either to class or size where possible.					
3	The equipment selected has great enough load-carrying characteristics to do the job effectively.					
4	There is enough power available to do the job.					
5	There is rapidity of movement of material, within the limits of the production process or plant safety, considered.					
6	Much consideration is given to the space required to install or operate materials handling equipment.					
7	Supervision is often made during materials handling					
8	The equipments selected are not easily maintained at reasonable cost.					
9	Trainings are conducted on how to handle and care for materials.					

Appendix D

St. Mary's University College

Faculty of Business

Department of Marketing Management

Interview Questions

These interview questions are prepared for top managers of Country Club Developers Plc.

- What techniques are used to undertake materials handling?
- What materials handling problems does the company encounter towards its marketing practice?
- How does the company entertain customers' complaints regarding materials defect?
- How did the company's performance of materials handling effected its market advantage?
- What possible measures are taken to overcome material handling problems related to marketing practice of the company?