

**AN INVESTIGATION INTO THE WELFARE PROVISION FOR
CONSTRUCTION PRODUCTION WORKERS AND ITS IMPACT ON
THE TIMELY COMPLETION OF PROJECTS, A CASE STUDY OF
NAIROBI PROJECTS**

BY

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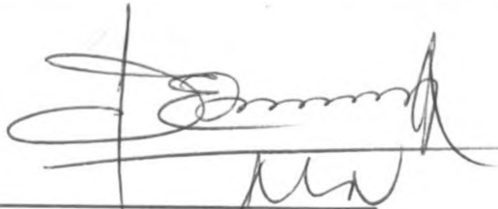


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JUNE 2004

DECLARATION

I, MOSES ARAKA NYAKIONGORA, hereby declare that this research project is my original work and has not been presented in any other University for any degree


Signed _____ 21/10/2004

With the supervision and approval of


Isabella Njeri Wachira

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DEDICATION

This work is dedicated to my late father, Naftal Mosoti Nyakiongora, who took me to school and was always keen in my academic advancement, and to my mother who tilled land for many hours, days, weeks, months and years to feed my siblings and me.

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LIST OF ABBREVIATIONS

AAK	-	Architectural Association of Kenya.
BORAQS	-	Board of Registration of Architects and Quantity Surveyors.
COTU	-	Central Organisation of Trade Unions.
CPI	-	Consumer Price Index
IEK	-	Institution of Engineers of Kenya.
ILO	-	International Labour Organisation.
IQSK	-	Institute of Quantity Surveyors of Kenya.
JBC	-	Joint Building Council.
KABCEC	-	Kenya Association of Building and Civil Engineering Contractors.
KHRC	-	Kenya Human Rights Commission
MOW	-	Ministry of Works.
OSHA	-	Occupational Safety and Health Administration.
UN	-	United Nations.
UNCHS	-	United Nations Commission for Human Settlement
USA	-	United States of America.

ABSTRACT

This study investigated the welfare of construction production workers who included masons, carpenters and handsmen among others. Labour is a major input in the cost of building construction projects and its input can have an effect on the successful completion of the project. Building construction is labour intensive and a number of specific operations require highly skilled manpower and machinery will not be a substitute. Skilled and semi-skilled workers work hand in hand and this study covered both categories.

The study investigated safety and health, and the prosperity of the workers. Labour welfare in the construction industry in the world is wanting and Kenya is not an exception. The study was therefore to find out the working conditions of site production workers and the effect this has on the successful completion of a project. A project is said to be successful if it has been completed on time, within the budget and to the desired quality.

In this study, the research concentrated on the provision of welfare of the workers and the effect it has on the success of a project in terms of timely completion. The study identified existing problems on the provision of welfare for site construction workers.

Data was collected from sites in Nairobi by way of filling questionnaires, oral interviews and by observation of the activities and welfare provision at various sites. It was generally found that the site conditions and general provisions of welfare conditions were wanting and the projects had delayed in implementation contrary to their work programmes. The question is whether there is a correlation between the two.

The following findings were prevalent in most of the sites.

- Low wages and benefits.
- Lack of job security.
- Unsafe working environment
- Poor working conditions

In conclusion, this research recommends measures, which if implemented, could go a long way in improving the welfare of the site production workers, which will in effect, also improve project implementation.

CHAPTER ONE

STUDY INTO WELFARE OF CONSTRUCTION PRODUCTION WORKERS

1.00 Introduction

1.01 Labour in the early times

There have been over the years studies of various management systems to find out what managers were doing and what they ought to be have been doing in managing workers. The industrial system in the end of the nineteenth century was well established in Europe. People migrated to the towns to work in factories and mills. They worked long hours and for low pay. They worked hard or lost their jobs. The managers were extremely powerful and their jobs were easier, Richard L. Daft (1990)

Some of the managers wanted to learn more about their work. They tried to analyse their jobs and the events happening around them. Managers everywhere seemed to be doing similar things – drawing up programmes, marshalling resources, allocating tasks and controlling costs. They came to believe that it was possible to devise an ideal organisation using a set of design rules that would apply anywhere. Richard L. Daft (1990)

Conditions have changed over the years. Projects are technically and contractually more complicated; legislation affecting business is more extensive and demanding, competition is high, and people's attitude of the managers and their roles in management of construction work have changed from that of tough task-master of the early 20th Century.

Most managers today recognize the importance of people in organisations, but the early management thinkers concentrated mainly on tasks of the business. They thought that the main problem in the factories mills and construction sites was to design efficient work places and control resources tightly. Most of them treated labour as a resource, to be worked as hard as possible.

From the outset of the Industrial Revolution, a few managers showed concern for the well-being of employees, but experience of large scale industry was limited. No one fully understood the effect of the new workplaces would have on people, but some managers quickly sensed that they could not treat people like machines.

During the early decades of the 20th century, social scientists began to study people in industrial settings. At first, their interest centred mainly on how work practices and working conditions affect people. Later, some of their attention switched to how workers affect organisations. Elton Mayo, F.J. Roethlisberger, and others undertook the famous experiments at the Hawthorne Plant of the Western Electric Company between 1927 and 1932. (Heinz Wehrich and Harold Koontz, 1993).

What Mayo and his colleagues found, partly on the earlier thinking of Pareto, was to have dramatic effect on management thought. Changing illumination for the test group, modifying rest periods, shortening working days and varying incentive pay systems did not seem to explain changes in productivity. Mayo and his researchers came to the conclusion that other factors were responsible. These were that improvement in productivity was due to such social factors as morale, satisfactory relationships between members of a work group (a “sense of belonging”) and effective management – a kind of managing that would understand human behaviour, especially group behaviour and serve it through interpersonal skills such as motivating, counselling, leading, and communicating. (*ibid*)

In UK, one of the most determined and practical studies of the relationship between organisational efficiency and employee well-being was initiated at the Glacier Metal Company in London. It involved many years of close collaboration between managers and social scientists. The Glacier team took the view that the manager not only has a technical role, but a social one of creating an organisation with which workers can identify themselves with and in which they can participate and exercise discretion (Brown and Jacques, 1965).

In her studies, Joan Woodward (1965) found that one-off or small batch production industries generally have a shallower management structure than those industries that make greater use of technology through mass or process production.

At the project/site level, construction demonstrates the “one-off” nature which Woodward referred. Building projects generally require a high level of co-ordination, specialist input and consequently direct communication and high levels of informality between the participants and the process. This necessitates a shallow management structure with few hierarchical levels. This structure allows a relationship to develop between the site management and workers, which enables discussion not only of work-related issues, but also of social and personal matters. From these relationships the manager can gauge the general feelings of the employees and problems and grievances can be settled quickly and amicably.

1.02 The Construction Industry and the economy

The importance of the construction industry in the economy stems from three of its characteristics: first its size; secondly that it provides predominantly investment goods; and thirdly, that government is the client for a large part of its work [Patricia Hillebrandt (1991)]. Construction industry accounts for about 3 to 10 percent of the gross domestic product, less in developing countries and more in developed countries – and for 50 to 60 percent of gross fixed capital formation in majority of countries (Turin, 1973, Edmonds, 1979).

According to UNCHS (1992), in developing countries indicators show that during periods of national economic growth, construction activity grows faster than the economy as a whole. The construction industry not only contributes to the direct growth of the economy, but it also serves as a stimulus for growth activities in the various sectors to which it is linked. It has the potential to positively affect living conditions at each level.

The trends over time of the construction industry can give indications as to the level of development in a country or economy. Provision of employment as a means of providing, producing, and distributing national wealth is a primary concern of every government. In many developing countries creation of job opportunities is a problem given the high population growth rates and poverty. The construction industry provides employment to 2 – 9 percent of all wage earners, with most economies employing between 4 – 5 percent. This is usually an underestimate especially in developing countries with a significant informal sector. These figures do not also include employment in industries where the construction industry has backward linkages. Construction industry displays a number of characteristics, which include:

- It is labour intensive especially in the construction of low cost houses

- It employs labour across a wide continuum of skills from skilled to unskilled personnel
- It serves as a training ground for labour from rural to urban economies and those who have little formal education
- It is very unstable and the industry registers the highest percentage of sectoral unemployment. This is because of the uncertain environment and fluctuating workload that forces contractors to maintain only skeleton staff in their permanent employ.
- Wages are usually lower in the construction industry as compared to the other sectors. In developed countries, this disparity is minimized through compensation regimes.

1.03 Labour force in construction

The construction industry is a large user of manpower across a range of skills. The supply of skilled manpower acts as a constraint to the capacity of the construction industry. The actual number of operatives employed in the industry is not easy to determine. There are many informal sector operatives in Kenya. Labour in the construction industry is highly mobile.

Construction as an industry has a poor record in being able to attract and hold high calibre labour. Gale (1991) documented the social barriers to young people entering the industry. It is perceived to provide an unattractive and uncertain career. Working in the building industry has a negative image as contrasted with the view of its products – the buildings themselves –, which have risen in esteem so that the quality of the built environment elicits public interest. Indeed the products of the building industry are seen as critical for the socio-economic development of every country and have political, historical and cultural significance but yet the lack of self-esteem of the work force is particularly striking: (Ofori 1990).

The lack of self-esteem of the workforce noted by Ofori has an obvious bearing upon the quality of the labour force in the building industry. The UN (1985) also found that construction work was associated with long hours, poor occupational health and safety and erratic provision of welfare services.

All contractors engage in contracting as a business and they would like to make a profit. In order to make profit they have to ensure efficient application of all production factors. Productivity of machines and equipment can be pre-determined and output is well known in time. While construction managers on construction sites tend to take care of plant and equipment, they find it a great problem to manage human beings. Human beings do not behave in a regimented or mechanistic manner and therefore create a number of difficulties that are not apparent in the management of plant and machinery. The major resource input to construction is human and it is therefore important for managers to understand the peculiarities inherent in them. One could generally say that labour, being a major production factor in the construction sites, should be serviced and maintained for efficient and high production capacity.

1.04 Problem Statement

The 20th Century chambers Dictionary 1983 edition defines Welfare as 'the state of fairing or doing well: freedom from calamity, etc: enjoying of health, etc. prospering.

Construction sites are believed by many scholars to be harsh and the general well being of production workers is not adequately catered for. Production workers for this research are defined as workers on the construction site who do the actual construction and they include skilled ones such as masons, carpenters, plumbers, painters etc, and unskilled labour.

As defined, the welfare will be considered under the following sub-topics:

- i) Freedom from calamity – safety of the workers
- ii) Enjoyment of health and
- iii) Prosperity of the workers

Under safety the features expected on sites will include good site layout, protection of excavations, scaffolding, use of protective clothing and safety policy and training for the workers.

Under enjoyment of health the features expected on site will include drinking water, washing facilities, sanitary facilities, rest breaks, first aid kit, medical scheme and recreational facilities.

As for the prosperity of the workers, it will include terms of employment, emoluments, training, motivation, housing, transport and retirement benefits.

A general survey of the local construction industry indicates that there is inadequate provision of amenity for the production workers. This manifests itself on construction sites as numerous injuries, health problems and low morale, Injuries and health problems result into hospitalisation and absenteeism, and while poor amenity facilities and low salaries and wages can sometimes lead to industrial unrest. All these have a negative impact on project performance leading to delays in timely completion of the works and cost overruns.

This research investigates whether safety, health and amenity facilities provided on construction sites are adequate and also find out what effect this has on timely completion of projects. It will encourage project managers to treat labour as a resource and ensure welfare of the workers is constantly looked after and improved to help keep motivated and highly productive workers for the good of the project.

The study will further establish the relationship between welfare and timely project completion.

The research will thus answer the following questions

- 1] What welfare facilities are provided on the construction sites?
- 2] Are these facilities adequate?
- 3] If inadequate how does this impact on the production workers?
- 4] How does this impact on project performance?

1.05 Study Objectives

The objectives of the study are to: -

- (i) Establish the state of the amenity facilities, safety and health of the production workers on construction sites,
- (ii) Establish the adequacy of these facilities
- (iii) Establish the relationship between the levels of success of a project and provision of welfare to workers.

1.06 Study Hypothesis

The level of welfare provision for the construction production workers on construction sites is the cause or one of the causes delays of projects.

1.07 The Scope of the study Area

The study area is Nairobi City. Nairobi is both the capital city of Kenya with a population estimated at close to 2 million people. It is the biggest city in Kenya and has more developed infrastructure than any other city in the country.

Nairobi is at the same time a Province, being one of the eight provinces in the country. It lies just south of the equator. Nairobi province is about 840 square kms and has a variety of construction activities and considering the proximity to the base of the researcher; it was an ideal area of study and was selected because of convenience. Nairobi is also considered appropriate because it offers various construction sites, some which have limited space, some with high-rise structures, which require special hoisting equipments such as cranes and hoists. The ongoing projects in Nairobi include factories, office blocks, housing estates, schools etc.

Nairobi has also various estates ranging from high class to moderates and to slums. It also has various modes of transportation system including public vehicles, private vehicles, railway and footing. The area one lives in and the mode of transport to construction sites will signify how much the welfare of the workers is developed. It can be concluded that a case study in Nairobi is a good representative of the welfare of the construction workers in the country in general.

1.08 Significance of the Research

Labour is a major input in the cost of projects and therefore management of labour is an essential function that cannot be ignored. This research will concentrate on the welfare of production workers on the construction sites to find out the situation and propose ways of addressing the shortcomings so that construction sites are safe and meet the legislation of the Factories Act, the Public Health Act and any other requirements that will make these sites hygienic, friendly and with the staff being highly motivated.

Though there have been researches into labour welfare on construction sites, all the researchers recommend further research into this field. Again things change with time, workers get more and more informed as to their rights and the contractor's obligation. More educated workers can be found in construction sites these days as the unemployment situation has not improved for a number of years. The government also gives new wage guidelines and new legislation come into being from time to time.

Technology also changes and new working techniques come into the field from time to time. New materials are also introduced while others may be withdrawn such as asbestos based roofing sheets, which were hazardous to human beings. It is therefore necessary to carry out research and give recommendation on how best to improve the welfare of production workers and motivate them.

The research is directed to the production workers who are the lowest in rank on construction sites. The findings could be a basis for improvement of the welfare of these workers and perhaps they could also prosper if their safety, health and welfare are well catered for. If workers are safe, healthy and well remunerated, chances are that there will be an improvement in productivity from the workers, the contractors and the economy in general.

CHAPTER TWO

LITERATURE REVIEW

SAFETY AND HEALTH ON CONSTRUCTION SITES

2.01 Introduction

The Willow Island cooling tower tragedy in America on April 27, 1978 is fresh in many Americans who heard or witnessed the incident. On that fateful day, a group of construction workers was waiting on the arrival of a bucket of concrete rushing up to them from 170 feet below. The 1,500 pound bucket was about two-thirds of the way up when it broke loose and plunged to the ground. As it fell, it jerked the crane; poorly anchored on top of the partially completed tower wall on which 51 workers stood, from its structure. As the crane fell, it caused the wall, the workers' scaffolding, and safety nets to crumble. Fifty one workers fell to their deaths (Dennis Middlemist et al 1983).

"Two people were injured when a three storey building collapsed on June 15, 2003 at 6am as the workers were mixing concrete. A vehicle parked nearby was extensively damaged after being buried in the rubble. The two injured workers were rushed to different hospitals by the owner of the building who was present at the site. One person, who fractured his ribs was taken to Kenyatta National Hospital, and the other, who sustained a knee injury was taken to Metropolitan Hospital in Buru Buru". (Daily Nation June 16, 2003). The following day the Chairman of AAK was quoted as saying that half of Nairobi's residential houses are unsafe as they were constructed by unqualified individuals and were not inspected by the City Council (Daily Nation, June 17, 2003).

(Daily Nation, March 27, 2003) reported that two people were killed when a mast belonging to Communications Commission of Kenya (CCK) in Westlands fell on them. The two were among six workers hired by a contractor to dismantle the masts. The two were ascending to the top of the 40foot mast to disconnect wires when it came crashing down on them. The contractor took off when the police arrived at the scene to ferry the bodies to the mortuary.

On a MOW project in Mombasa, a site meeting held on 25th September, 2003 reported as follows: -

Client stressed the safety around the excavated soak pits and expressed fear on the collapsing walling. Required the Main Contractor to secure walls of these soak pits to avert hazards.

On a sad note, the chairman reported an occurrence of an accident on the site of the works, which led to the death of an employee of the Main Contractor. The Main Contractor was thereby instructed to be extremely careful while carrying out operations on site. He was further instructed to provide a pick-up for ferrying his employees rather than using dumpers etc.

Many organisations today are involved in activities designed to make working conditions safe and healthy for employees. The construction industry has long recognized the importance of accident prevention. Job related accidents produce both social and economic losses, impairing not only productivity for the organisation but also disrupting individual growth in society. Thus safety and health issues in organisations reflect both productivity and moral concerns.

The major reasons for preventing accidents and threats to employee health are:

1. The needless destruction of health and/or life involves moral responsibility by management.
2. Accidents and illnesses limit efficiency and productivity
3. Injuries and illnesses produce far-reaching social harm
4. Safety and health technology is capable of preventing most accidents and health hazards.

In USA, the movement toward providing safe, healthy work environments coincides with industrialization of work, which was in mid-1800. In Kenya it was about one century later as the Factories Act Cap 514 of the Laws of Kenya came into place on 1st September 1951. The evolution of large industrial organisations brought with it an increase of work – related accidents and inferior health conditions.

However, the impetus for safety and health improvement was not due entirely to the enactment of mandatory laws. While many employers were negligent in their responsibilities to provide safe, healthy working conditions, many others began to improve their environments voluntarily. Progressive managers realized that a large proportion of accidents could be prevented and that health hazards were not necessarily an unavoidable by-product of industrial progress.

2.02 The Construction Industry

The construction industry is one of the world's major industries. It is responsible for the production of the built environment. As such it designs, manufactures, maintains and demolishes all the man-made buildings, bridges, roads, tunnels, dams, etc., that we utilize every day of our lives. Without humans there could be no built environment of the kind that we see today. Despite mechanization, construction remains a major employer of labour and quite often employs between 9 and 12 percent of the country's working population and sometimes as much as 20 percent.

- The continuous growth of the industry has come with a price. Many accidents happen at construction sites and though many go undetected and unreported, in many countries known fatal accidents and those involving loss of working time frequently exceed those in any other manufacturing industry.

2.03 OCCUPATIONAL SAFETY

The International Labour Organisation (ILO) has issued a very useful Manual on safety, health and welfare of workplace for employers, supervisors and workers.

At every stage of the building process there is need for planning, organizing, control and co-ordination. These functions were the ones laid down and propounded by Henri Fayol and whatever changes that have taken place since Fayol's time, it is still true that these activities are required for successful management. The important thing to remember is that this is not all that is required of the modern manager and to rely only on such vague terms is to invite problems at any stage of construction. It is in recognition of this point that many writers

since Fayol have considered approaches to management that consider the organisation of work as more than a straightforward mechanistic process.

The improvement of safety, health and welfare of sites depends upon people working together, whether governments, employers, or workers. Safety management involves the functions of planning, identifying problem areas, co-ordinating, controlling and directing the safety activities at the worksite all aimed at the prevention of accidents and ill health. Accident prevention is often misunderstood, for most people believe wrongly that an accident is synonymous with injury. This implies that no accident is significant or is of importance unless it results in an injury. Construction managers are in most cases more concerned with injuries to the workers but their prime concern should be with the dangerous conditions that produced the injury. A dangerous act can be performed hundreds of times before it results in an injury and it is to eliminate these potential dangers that the manager's efforts should be directed. They cannot afford to wait human or material damage before action is taken. Safety management means applying safety measures before accidents happen. Effective safety management has three main objectives:

- To make the environment safe
- To make the job safe
- To make workers safety conscious

2.03.01 Safety policies

Safe and healthy working conditions do not happen by chance. Employers need to have a written safety policy for their enterprise setting out the safety and health standards, which it is their objective to achieve.

The policy should deal with the following matters: -

- Arrangements for training at all levels. Particular attention needs to be given to key workers such as scaffolders and crane operators whose mistakes can be especially dangerous to other workers.
- Safe methods or systems of work for hazardous operations: the workers carrying out these works should be involved in their preparation.
- The duties and responsibilities of supervisors and key workers

Arrangement by which information on safety and health is to be known

Arrangement for setting up safety committees

The selection and control of sub-contractors.

In USA, the Occupational Safety and Health Administration (OSHA) have the following primary duties and responsibilities:

1. Encourage employers and employees to reduce job hazards and implement improved safety and health practices
2. Establish "separate but dependent responsibilities and rights" for employers and employees in safety and health conditions.
3. Maintain a reporting and recording-keeping system to monitor job related accidents, injuries, and illnesses.
4. Develop mandatory job safety and health standards
5. Enforce those job safety and health standards
6. Provide for development, analysis, evaluation and approval of state occupational safety and health programs.

Although its duties are fairly broad, OSHA has tended to concentrate its efforts on the development and enforcement of safety and health standards. As a regulatory agency, it has the power to create specific standards, consistent with the act, and to assess penalties and fines on employers failing to meet these standards.

Achieving the goal of providing safe and health working conditions is a difficult task that goes well beyond the regulations and standards set out by Acts of Parliament. Companies such as Hewlett-Packard of USA view employee safety and health as an obligation to be provided willingly regardless of legal consideration. This company is famous for its excellent records of employee safety and health. Most companies in manufacturing industries in USA consider OSHA standards as a floor or referent point as they seek higher goals of employee safety and health. Regulatory standards alone have not proven sufficient to further reduce worker injury, illness, and death rates.

2.03.02 Safety and Health System Organisation

The prevention of injuries and illnesses is achieved basically through control of the working environment and control of employee behaviours. To achieve this control, it is necessary to design a systematic plan for organizing the attack against safety and health hazards. One such plan consists of management leadership and policy, assignment of responsibilities, maintenance of safe working conditions, establishment of safety and health training, an accident record system, medical and first aid systems and employee acceptance responsibilities.

2.03.03 Management Leadership

Safe and healthy working conditions do not happen by chance. To reduce injuries and illnesses, it is necessary for top management to develop both a safety and health attitude and a policy dealing with occupational hazards. In many instances, it is necessary for supervisors to foster such attitudes, by pointing to the Factories Act or by pointing to the costs associated with occupational hazards (poor morale, lost work time, hospitalisation costs, lost productivity etc). This attitude is critical, since any programme is unlikely to succeed without top management's complete endorsement.

Basic to the above are statements such as: -

The safety and health of employees and company operations are of paramount importance.

Safety and health concerns will take precedence over expediencies or shortcuts. Every attempt will be made to reduce or eliminate the possibility of safety and health hazards.

2.03.04 Assignments of Responsibility

Once safety and health policy has been established, it is necessary to delegate the responsibilities to lower-level managers who will actually implement the policy. Included in this delegation are various operating managers, personnel and training specialist, safety engineers and other specialists. In some cases, it may be advisable to create safety and health committees consisting of appropriate specialists who make these assignments. The

committees may deem it best to analyse accident and health statistics within the organisation before delegating specific responsibilities.

In construction projects where sub-contractors are used, the contract should set out responsibilities, duties and safety measures that are expected of the sub-contractor's workforce. These measures may include the provision and use of specific safety equipment, methods of carrying out specific tasks safely and the inspection and appropriate use of tools. The person in charge of the site should also ensure that materials, equipment and tools brought on to the site meet minimum safety standards.

2.03.05 Maintaining Safe Working Conditions

It is widely acknowledged and recognized that occupational safety and health depend first on the safety and health factors present in the job environment. That is no matter how much we train employees, unless the job is largely free of hazards; accident, injuries, and/or illnesses will occur. The responsibility for designing safe, healthy working conditions is usually assigned to safety engineers, job design specialists, and the operating managers.

2.03.06 Safety and Health Training

The rate of injuries and illnesses can be reduced considerably by better design of working conditions, but further reduction or elimination of injuries and illnesses then depends on employees. A safety and health training programme must consider the types of hazards present in the work environment and the types of hazards presented by people. The training must be relevant and must consider the most likely risks and hazards present in the workplace.

In terms of occupational safety and health training, the job must be evaluated, residual hazards and potential hazards identified, and procedures established to avoid such hazards in employee operations. The trainer must then consider human motives and behaviours that are likely to expose employees to greater risks. Tired and complacent workers are more exposed to risk than energized and alert ones.

Safety and health training then is designed to

1. Create an employee attitude that safety and health protection is important.
2. Focus employee attention to potential hazards and how to deal with them
3. Help employees recognize potential hazards and of which managers and safety experts may be unaware
4. Alter unsafe, employee behaviours in job operations

2.03.07 Accident Record System

Perhaps one of the most often neglected elements of a safety programme is the accident record system. This is because in the local scene accidents are normally put under carpet and the management would like to forget it quickly. However, many safety professionals, such as Peter Perkins of Hewlett-Packard, recognize that good safety and health record systems are a close ally in the fight against injuries and illnesses. A good record system can help the safety and health programme by

1. Providing for the objective evaluation of the programmer's effectiveness
2. Identifying jobs, departments, machines, employees, or supervisors with high rates of injuries or illnesses so that efforts may be concentrated in areas where they do the most good.
3. Providing data that may point to specific circumstances associated with accidents and illnesses, such as a time of day when employees are accident prone

Case No _____

Date _____

First Aid Report

Name _____ Department _____

Male Female Occupation _____ Foreman _____

Date of Occurrence _____ Time _____ a.m. p.m. Date of First Treatment _____ Time _____ a.m. p.m.

Nature of Occurrence _____

Sent: Back to Work Doctor Home Hospital

Estimated Disability _____ Days

Employees Description of Occurrence _____

Signed _____

First Aid

Issued by National Safety Council < Inc.

Form IS-6

Printed in Kenya

Stock No. 129.26

Figure .01 ACCIDENT RECORD FORMS

A simple first-aid report, in figure 01, provides information about a type of employee behaviour that led to an injury. This knowledge will help the safety trainer and will give the supervisor information about unsafe behaviour that he or she should look for in their employees.

Summary sheet used to tabulate safety and health activities in a department. It serves as both a reminder to the supervisor to conduct certain inspection activities and an analytical device for identifying high hazard conditions.

2.03.08 Medical and First Aid System

Although not all companies can afford a medical and first aid system, it is important to make provisions for employee medical and first-aid treatment. If the company is small, it is still necessary to identify the closest source of emergency treatment. Larger companies may institute first-aid training for selected employees as a means of providing immediate attention in accident cases.

Cuts or abrasions should be covered with waterproof dressings. In the case of injury thoroughly irrigate the wound and wash it with water and soap before dressing it. Always wash hands after treating a wound. In more serious situations involving open-wound injury, prompt attention is important and sensible first-aid procedures should be applied before sending the person for more expert attention.

2.03.09 Acceptance of Personal Responsibility by Employees

Employees must recognize that even the best designed safety and health programme depends largely on the personal acceptance of responsibilities. In part this is achieved through supervisory monitoring and control. Employees are required by law to comply with standards governing protective clothing and safe operations of safety devices (such as saw blade guards). While safety and health provisions can often be overridden by operators looking for shortcuts, it is their responsibility to keep a job safe.

2.03.10 Reducing Occupational Hazards

The primary means for reducing occupational hazards are:

1. Eliminating the hazard from
 - (a) The job operations (machines and processes)

- (b) Material (product)
 - (c) The physical setting (site layout)
2. Controlling the hazard by enclosing or guarding it.
 3. Training employees to be aware of and use proper procedures to avoid hazards
 4. Designing protective equipment for employees to shield them against hazards e.g. ear plugs for those working on noisy equipment such as compressors

The reduction of occupational injuries and illnesses depends first on the ability to engineer them out of the operation in which employees are exposed. The ultimate goal is to design equipment, work processes, and work settings to eliminate employee exposure to hazards. When a high level of safety is designed into the job, employee carelessness or errors are likely to result in injuries. Furthermore, protective equipment may fail, so a job that is designed to be safe eliminates this possibility.

2.03.11 Job Analysis for Safety

The basic project manager's activity for eliminating job hazards is job analysis and design. The best point at which to recognize and eliminate safety and health hazards is when a job to be carried out on site is being designed. However, the job designer must take such an analysis beyond the normal procedures for simply making an efficiently operated job. That is, the analysis must look not only for methods by which jobs can be performed faster or more accurately, but also for methods by which operations will be safer.

The following are steps in analysing safety of jobs

1. Selecting the job to be analysed
2. Breaking the job into successive steps
3. Identifying potential hazards and accidents in the steps (including the operations, the machines, the materials and the work surroundings).
4. Developing ways in which to eliminate or reduce the potential hazards. (Find a new way to do the job, change the physical conditions of that that created the hazard, change the job procedure, and reduce the necessity or frequency of doing the job.

Effective safety analysis of jobs often requires skills beyond those of the typical project manager. It is recommended that a certified safety professional be appointed to assist in the process. When professional assistance is unavailable, step 3 may be the critical step. To work through this step, the job analyst may ask questions such as: -

Is there danger of being struck by one or another type of object (moving equipment)? Can the worker be caught on or between objects (moving equipment etc)? Do some factors increase the chances of slipping or falling (slick floors, loose scaffolding, unprotected excavations, etc)? Must the worker overstrain by (lifting, or pushing and pulling materials and equipments etc)? Are environmental hazards present (toxic gases, acids, radiation etc)?

2.03.12 Employee Training

In most occupational accidents, the precipitating cause is both unsafe condition and an unsafe employee action. D.L. Lunda (1981) says that evaluation of over 80,000 work injuries showed an unsafe condition was present in 98.4 percent of the cases. If an unsafe condition exists but an accident has not occurred, this does not mean that it will never occur. At one time or another one is likely to be careless and an incident might happen because of complacency.

Even when equipment is designed to be safe, and when the job is felt to be free of recognizable hazards, operators can behave in ways to jeopardize their own safety or health. To reduce the employee's likelihood of self-inflicted accidental injury, most organisations provide safety training. Safety training is similar to other training in terms of training approaches, but objective and content are different.

In safety training, both the supervisor and the employee are instructed in the job safety operations. The supervisor has several responsibilities that contribute to the safe or hazardous operation of a job. These include establishing work methods, assigning people to jobs, supervising and monitoring employees, and maintaining equipment and the workplace environment. The training for the supervisor includes content that places emphasis on recognizing hazards and hazardous behaviours.

Employee safety training includes both attitudinal and behavioural instruction. The attitudinal instruction often includes the beliefs that:

Management is sincerely interested in employee health and safety. It is possible to prevent accidents. Employee alertness to potential and actual hazards to his/her supervisor. Behavioural training of employees consists primarily of employee being instructed in operations and known hazards are identified. By learning correct operating procedures, it is intended that employees will not be exposed so readily to injuries.

2.04.00 Construction Site Planning and Layout

2.04.01 Site Layout

A construction site should be looked at as a factory on plan. It should be viewed as a factory floor and maximize output while minimizing effort. This will result in saving of time and cost and thus increasing profit. The site layout must be commensurate with the works required to be done and the technology to be used. Poor site layout can interfere with smooth flow of work leading to confusion and is prone to higher risk of injury. Good site layout increases productivity, reduces costs and reduces the risk of injury and therefore makes the site very efficient.

The following need to be considered before work even begins.

- (a) The sequence or order in which work will be done and to any especially hazardous operations or processes.
- (b) Access for workers on and around the site. Routes should be free from obstruction and from exposure to hazards such as falling materials, materials – handling equipment and movement of vehicles. Suitable warning notices should be posted. Routes to and from welfare facilities must be considered. Edge protection will be required at the edge of floor openings and stairs, and wherever there is a drop of 2m or more.
- (c) Routes for vehicles should be “one way” in as far as practicable. Traffic congestion prejudices the safety of workers more so when impatient and careless drivers unload goods hurriedly.

- (d) Storage of materials and equipment should be well thought out. Materials need to be stored as close as possible to the appropriate workplace e.g. sand, cement and ballast should be stored close to the batching plant and steel close to the bending and cutting machine. If this is not possible then it is important to schedule the arrival of materials.
- (e) Location of Construction machinery – As far as possible machinery such as cranes which have constraints of radius of operation and pick up and dropping points, should be operated in such a way as to avoid the need to slew the load over workers.
- (f) Workshops – should be located in positions where they are usually not moved until their need has been achieved.
- (g) Location of Medical and Welfare facilities – on large sites sanitary facilities for both sexes should be provided at several locations.
- (h) Lighting – artificial lighting should be provided where workers continue to pass after dark
- (i) Site security – The site should be fenced in order to keep away unauthorized persons and to protect the public from the site hazards. The site should normally be hoarded with 2m high material without space or gaps. Overhead protection will be necessary if tower crane loads pass over public utilities.
- (j) Site tidiness – there should be arrangement to keep the site tidy and clean by removal of rubbish and waste materials and equipment which have been left lying around and stepping on nails which have been left projecting from timber. The following is recommended steps for workers to keep the site tidy:
 - (i) Clean up as they go – should not leave rubbish or scrap for the next person to clear up.
 - (ii) Keep gangways, working platforms and stairways clear of equipment and materials not in immediate use.
 - (iii) Clean up any spilled oil and grease immediately
 - (iv) Deposit waste materials at recognized disposal point
 - (v) Remove or hammer down any nails you see projecting from timber.

2.05.00

MAJOR SOURCES OF ACCIDENTS ON CONSTRUCTION SITES AND SAFETY PRECAUTIONS RECOMMENDED

2.05.01

EXCAVATIONS

Most construction works involve excavation of one form or another. The excavations can range from trench to basement excavations and can be carried out using manual or mechanical means. Excavation is done for foundations, sewers or other underground services. Excavation or trenching work can be very dangerous and even most experienced workers can be trapped by sudden collapse of unsupported sides of trenches. Buried under a cubic metre of soil one will be unable to breath and will quickly suffocate to death.

Safety precautions in excavations.

Planking and strutting recommended to support the excavated trenches. The other alternative is to excavate the trench to slope or be battered back to a safe angle of usually 45 degrees. All water should be pumped out to leave the excavations free from all water.

Workers often fall into excavations. Suitable barriers about 1m high should be erected to prevent falls. Trench supports projecting above the ground level can be useful for this purpose.

Adjoining buildings

Excavations near existing structure could cause instability of the structure and therefore care must be taken to safeguard the existing buildings by proper shoring to prevent collapse or fall.

Edges

Materials and equipment should not be moved near the edge of the excavation. There is danger of either the materials falling on those working below, or by increased loading on the surrounding ground so as to cause the support to the sides of the excavation to collapse. Excavated material should be kept away from the edges of the excavations.

Vehicles

Tipping vehicles especially on reverse are a risk on excavation sites and care must be taken to ensure that stop blocks are provided to protect the edges of the excavations.

Access

There should be provision for ladders to enter and exit the trenches or basements. The ladders should be firmly fixed to avoid sliding. The ladder can be used for quick exit especially in emergency such as flooding or trenches threatening to collapse.

Lighting

Ensure that there is enough lighting around the area of excavation and in particular around the access points and openings in barriers.

Buried or underground services

One has to be cautious before doing any excavation whether by mechanical means or manually. In built up areas, always assume that electrical cables, water services and sewers are present. Striking electric cables can cause death or severe burns. Broken gas pipes will leak and may cause explosion and fire. Water and sewer pipes if broken may create sudden risks by flooding an excavation or by causing the sides to collapse.

2.05.02 SCAFFOLDING

What goes up often comes down

At least five construction workers die each day in America from falls from elevated surfaces, Levy (2000). Locally statistics are not available. Falls of persons from a height, and similarly of materials and objects represent the most serious safety risk in the construction industry. Many of the falls are from unsafe working places or from unsafe means of access to working places.

There are many different materials used to construct scaffolding, such as steel, aluminium, wood and bamboo. Whatever the material, the principles of safe scaffolding remain the same: that it should be of adequate strength to support the weight and stress which the processes and workers will place upon it, that it is securely anchored and stable, and that it is designed to prevent the fall of workers and materials.

Tower scaffolds

A tower scaffold consists of a platform resting on horizontal ledgers connected to four uprights, supported on base plates if static or on castor wheels if mobile. It is devised for painters and others who do lightweight work of limited duration mainly in one place.

2.05.03 Causes of accidents

Accidents can happen when a tower topples over. This is likely to happen in any of the following cases:

- The ratio of the height of the tower to the width of the base is excessive,
- The top working platform is overloaded causing the tower to become unstable,
- A ladder is placed on the top platform to extend the height of the tower
- Work involving percussion tools produces an outward horizontal or lateral force at the top of the tower,
- A mobile tower is moved with persons or materials carried on the top platform
- The tower is used on sloping or uneven ground;
- The tower is not tied to the building or structure where this is necessary
- Access to the platform is via the outside of the tower

2.05.04 Trestle scaffolds

Trestle scaffolds are simply working platforms supported on “A” frames or a similar folding support.

Inspect the trestles before use and reject them if they have defective components such as loose or damaged cross bearers, broken or damaged hinges including missing screws or bolts, or damaged split stiles.

2.05.05 Suspended scaffolds

They are mostly used for work on tall buildings or structures above busy buildings streets, or in other situations where it is not feasible or economical to build a scaffold from the ground. Suspended scaffolds are of two main types:

- Suspended platforms, hinged or independent;
- Cradles

All suspended from the building or structure by means such as outriggers, tracks and parapet hooks.

2.06.00 LADDERS

Every year many workers are killed or severely injured while using ladders of all types. Because a ladder is so readily available and inexpensive, its limitations are easily overlooked.

Limitations

- Enables only one person to climb or descend at a time
- Enables only one person to work from it at any one time,
- If not lashed at the top requires two workers for use – one on the ladder and the other at the bottom,

- Leaves only one hand free, carrying tools or loads up a ladder is difficult and dangerous and the weight, which can be carried, is severely limited. There is also the risk of dropping items on passers-by;
- Has to be safely situated and secured;
- Has a limitation on heights at which it can be used.

2.06.01 **Safe use of ladders**

The following are recommended precautions for safe use of ladders:

- Make sure there are no overhead power lines with which the ladder might make contact;
- Wooden ladders with wire-reinforced stiles should be used with the wired side facing away from the user. Wire tie rods should be beneath and not above the rungs;
- The ladder should extend at least 1m above landing place, or above the highest rung on which one has to stand unless there is a suitable handhold to provide equivalent support. This is to avoid the risk of over-balancing when one steps off and on at the top;
- The worker should be able to step off the ladder at the working place without being required to climb over or under guardrails or over the boards. However, the gaps in guard-rails and toe boards should be kept as small as possible.

2.07.00 **HAZARDOUS PROCESSES**

2.07.01 **Roof Work**

Without proper precautions, roof work is among the most hazardous of construction operations. The most common accidents to workers are due to:

- Falls from edge of roofs
- Falls through openings in roofs

- Falls through fragile roof materials

2.07.02 Flat roofs

All edges and openings on a roof from or through which there is a possible fall of more than 2m should be protected with suitable guard-rails and toe boards erected to the same as described in scaffolding.

2.07.3 Sloping roofs

Edge protection is necessary for all sloping roofs of more than 10 degree pitch, or which have a slippery surface and where there is a possibility of a fall of more than 2m from the edge of the roof. It should take the form of barriers or guard-rails high enough and strong enough to stop a worker who is rolling or sliding down the roof slope.

2.07.04 fragile roofs

Before one uses any roof as a means of access or a place of work, it should be ensured that no part is covered with fragile material. Some roof coverings give a false sense of security and the impression of a surface which is solid enough to bear your weight, but they will not carry a concentrated load such as that applied by the heel of a worker's foot, or if he stumbles and falls.

2.07.05 Steel erection

The erection of steel structures and building frames involves work at heights and in exposed positions. The incidence rates for injury and death of steel erection workers are much greater than those of workers in the construction industry as a whole.

2.08.00 Demolition

The principal causes of accidents during demolition are:

- The choice of an incorrect method of demolition

- Falls through fragile roof materials

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2.08.00 Demolition

The principal causes of accidents during demolition are:

- The choice of an incorrect method of demolition

- An unsafe place of work
- The unintentional collapse of the building being demolished, or of an adjoining structure because of lack of temporary support.

2.08.01 Planning and training

Demolition must be supervised by persons with thorough knowledge not only of demolition processes but of the principles of building construction. First, a survey of the physical characteristics and design of the building to be demolished must be carried out in order to choose a safe method of work.

Demolition is an inherently dangerous process and everyone on site must wear personal protective equipment including helmet, gloves and safety footwear. The presence of debris and dust, and such jobs as cutting of bolts or rivets, call for the provision of eye protection such as goggles or visors.

Before demolition begins, all services to the building or structure must be disconnected. Failure to do this adequately can result in an electric shock, gassing, fire, explosions or flooding. Arrangements should be made to keep the public away and if possible fence off the site.

2.08.02 Confined spaces

OSHA regulates that all employees required to enter into confined or enclosed spaces must be instructed as to the nature of the hazards involved, the necessary precautions to be taken, and the use of required protective and emergency equipment. The employer shall comply with any specific regulations that apply to work in dangerous or potentially dangerous area. Confined or enclosed areas include, process vessels, bins, boilers, ventilation, or exhaust ducts, sewers, underground utility vaults, tunnels, pipelines, and open top spaces more than 4 feet deep, such as pits, tubs, vaults, and vessels.

2.08.03 Safety precautions

The following precautions are essential before a worker enters a confined space regardless of any work that is intended to be carried out:

- Equipment for monitoring the atmosphere at frequent intervals must be provided and must be used by a competent person. No worker should enter the confined space until the competent person is satisfied that entry is safe.
- Not less than two persons should be present when working in a confined space. One should be outside the confined space to keep watch and to offer rescue action or assistance. Additional emergency and accident assistance must also be readily available.

2.09.00 VEHICLES

2.09.01 Causes of Accidents

The underlying cause of most site traffic accidents is the failure to plan a safe system of work and to train workers how to follow it. However, the common immediate causes are one or a combination of the following factors:

- ❖ Bad driving techniques which include blinding reversing;
- ❖ Carelessness or ignorance of special hazards, e.g. work near overhead power lines or excavations;
- ❖ Carrying unauthorized passengers;
- ❖ Poor maintenance of vehicles;
- ❖ Overloading or bad loading;
- ❖ Site congestion;
- ❖ Poor traffic layout;
- ❖ Lack of proper roadways combined with uneven ground and debris

2.09.02 Safety precautions

Routes should be levelled, marked and planned in such a way as to avoid potential hazards such as overhead power lines and steeply sloping ground. Where possible a one-way system should be used. Speed limits should be required and clearly displayed; they should be reduced for adverse site conditions and for areas near work in progress.

2.09.03 Loading

Loads within the capacity of the vehicle should be evenly distributed and properly secured, and should not project beyond the plan area of the vehicle. If some degree of projection is unavoidable, it should be clearly shown by the attachment of flags.

2.10.00 MOVEMENT OF MATERIALS

2.10.01 Mechanical Handling

There are several groups of material-handling equipment that differ in what the equipment does with the material it handles. Included in the category of material handling equipment are the various cranes – mobile cranes, tower cranes and so on – that lift materials vertically or pick them up and move them short distances horizontally. More specialized machines of this sort are the lumber and pipe carriers.

2.10.02 Cranes & derricks

Before a crane is used on site, the project manager should consider all factors that could affect its safe use:

- The weight, size and type of load it will have to lift,
- Restrictions on use such as overload power lines, state of the site and the type of ground.
- The need for trained operators and signallers

Rated load capacities, recommended operating speeds, and special hazard warnings or instructions shall be conspicuously posted on all equipment. Instructions or warnings shall be visible from the operator's station.

2.10.03 Signalling

There should always be a signaller, or a signalling system such as telephone, if the crane operator cannot see throughout the lift. Hand signals should be clear and distinct, and should follow a recognized code or system.

2.10.04 Overloading

All cranes should be marked with their safe working load, which must not be exceeded during the use of the crane. In the case of cranes with a derricking jib, that, with a variable operating radius, the safe working load should be shown for every radius of the jib. Winches and pulley blocks should be similarly marked.

2.10.05 Safe load indicators

All jib cranes should have an automatic safe load indicator, which alerts the operator, usually by a light, just before the safe load is reached, and warns both the operator and others nearby, usually by a bell or hooter, if the safe load is exceeded. The safe load indicator is an aid to safe crane operation but does not guarantee it.

2.10.06 Mobile cranes

A mobile crane is inherently unstable and is liable to overturn if used on uncompact ground or on a slope. The operator should understand the advantage and limitations of outrigger settings and be aware of the dangers of failing to use them. Lifting outdoors may be made more difficult or hazardous by the wind. Make sure that there is adequate clearance for the crane's jib or boom and counterweight from traffic and fixed structures such as buildings, and that no part of the crane or crane load will be closer than 4m to live overhead power lines.

2.10.07 Goods hoists

The goods, or platform, hoist used to raise materials and equipment vertically to successive levels as construction proceeds is probably the most widely used item of mechanical hoisting

equipment. It consists of a platform, which is driven either from a rope winch or by a rack and pinion with the motor and gearbox mounted on the platform. The principal dangers are of falling down the hoistway from a landing on the platform, being struck by the platform or other moving parts, and being hit by materials falling down the hoistway.

2.10.08 Safety devices

Gates should be fitted at every landing level where access to the platform is needed, and must be kept closed except when loading and unloading at that level.

To prevent the hoist operator, who should be trained and of at least age 18, from moving the platform while someone is trying to load or unload materials, the controls need to be set up so that the hoist can be operated from one position only. From this position the operator must see all landing levels clearly. If this is not possible a signalling system must be used during loading and unloading.

2.10.09 Carriage of passengers

Lifts for hoisting persons need to be especially constructed and installed for the purpose, with such features as mechanical and electrical interlocking devices on the cage and landing gates.

2.10.11 Gin or Pulley Wheels

2.10.12 Causes of accidents

The common accidents occur due to the following:

- The pole on which the wheel is mounted relies on a single support – two supports are always required;
- The hoisting rope is not fitted with a properly made safety hook – hooks made of bent reinforcement rod are dangerous;
- The hoisting rope is worn, chafed and no longer serviceable;
- The bucket or load strikes the scaffold or building, tipping out its contents;
- The load is too heavy or is not secured;

- An appliance mounted on a roof does not have a secure anchorage to prevent overturning – there should be a safety factor of at least 3.

2.10.13 Safety measures

The following are the recommended safety measures:

- If liquid is transported in a bucket, there should always be a cover;
- When hoisting a bucket, workers should always use gloves to protect their hands;
- Where the pulley is mounted near the edge of a roof or floor, guard-rails and toe boards are required;
- The lifting team must work together.

2.11.00 Manual Material handling

2.11.01 Introduction

Ergonomics

Ergonomics involves balancing the physiological, psychological and environmental factors of the work place so as to achieve the efficient production and distribution of work, while ensuring that all employees can undertake their nominated tasks in a healthy and normal manner.

It is recognized that materials, articles, or things on a site will require from time to time to be lifted, carried, or moved and they should be moved with precautions and safeguards in place so that no worker or anybody for that matter is in danger of being occasioned an injury. It should be borne in mind that materials will be transported, stored, or placed and therefore the precautions to take will include;

- 1) To ensure that the materials will not tip, collapse, or fall and
- 2) They can be removed or withdrawn without endangering the safety of any worker or anybody.

Material handling can be hazardous for several reasons and the purpose for legislation is to give guidelines on the best ways to avoid these hazards. A load could be hazardous because of;

- a) Its weight
- b) Its size
- c) Its shape
- d) Coupling
- e) Slippery or damaged surfaces
- f) Absent or inappropriate handles
- g) Imbalance

The task being done could be hazardous when it involves lifting or lowering.

- a) Repetitively
- b) Quickly
- c) For a long period of time
- d) Position of the worker while doing the task
- e) Immediately after a long flexion
- f) Shortly after a period of rest
- g) Inability to get close to the load
- h) Moving the load over a long distance
- i) Accuracy and exactness required because of fragile loads or specific unloading locations
- j) Material positioning too low or too high
- k) Kind of movement or posture
- l) Multiple handling requirements for example, lifting, carrying, and unloading

Environmental factors that can affect handling of materials include;

- 1) Temperatures
- 2) Relative humidity
- 3) Lighting
- 4) Noise

- 5) Time constraints (e.g. machine – paced work or deadline pressures and physical conditions such as obstacles, and floor surfaces being uneven, slippery or damaged).

Operators also have characteristics that affect the handling of loads and they include the following;

- 1) General health
 - 2) Physical factors such as; health, reach, flexibility, strength, weight, aerobic capacity
 - 3) Pre-existing musculoskeletal problems (handicapped)
 - 4) Psychological factors such as motivation, stress
- (i) Construction projects site operations have been known for being essentially manual based with very little of the mechanical operations lending assistance only in larger jobs. Ergonomics at the construction site will basically entail the material handling procedures, and as has been stated above, manual and machines will be used.
- (ii) Safe material handling at the site of construction forms the basis of ergonomics of construction management. It will depend on the physical size of the material, the positioning of the handles fitted for carrying it, the shape of the material, the delicacy of the material and on the posture of the handler.

2.11.02 Material handling at the construction sites and choice of tools and machines as an ergonomics of construction

Tools that are used in handling materials at the construction site form a major part of ergonomics in construction process, for a poor tool choice the efficiency and comfort will be greatly compromised.

There are some operations that will demand for a combination of manual and machine handling for their accomplishment. For example, the concrete will use the mixer, the crane to

lift it but to work it into place of forming the 'fundis' will be employed with their hand tools such as the trowels, shovels floats etc.

For safe materials handling at the construction site by use of machines, make sure that the machines are regularly serviced, for most of the destructive mishandling of machines and materials at the site by the mechanical devices comes as a result of faulty equipments. Also make sure that you use the right tool for the right job and application of proper methods of manual handling of the materials.

2.12.00 WORKING POSITIONS, TOOLS & EQUIPMENT

Over the years there has been technical development in the construction so much so that there is heavy reliance on machines and equipment for heavy works, which could not be handled manually. Although there are many tasks on construction sites, which are still handled manually, it is difficult to imagine high-rise buildings under construction without cranes, excavators, concrete mixers or pile drivers. Mechanization has eased work but has come not without problems to workplace.

Though the construction industry is technologically advanced, a lot of heavy work is still done by hand. Tools, machines and equipment are in many cases old-fashioned, poorly designed or badly maintained. Many operatives on construction sites are unskilled. Heavy loads frequently have to be carried up and down stairs, ladders, and scaffolds, and people working on construction sites often suffer from low back pain or injury to muscles and joints. This is as a result of: -

- Working positions, both standing and sitting;
- Work which is specially strenuous;
- The use of hand tools and equipment

2.12.01 Strenuous and heavy physical work

Continuous heavy manual work increases the rate of breathing and heart and one needs to be in good physical shape. There are risks involved in working at maximum physical capacity.

The use of mechanical power helps replace physical energy of a human being and increases output with less muscle power.

2.12.02 Working postures

On construction sites people work in a variety of different positions. Some workers are climbing up scaffolds, others are using hammers while on their knees, and others are working on surfaces above their heads. It is clear that in construction there are many postures to be taken and some changing regularly.

2.12.03 Sitting and Standing positions

Posture is defined by the working method applied and by the tool in use. When considering posture, you have to take into account the reach and muscular power of the worker involved. Where possible, work should be done in a sitting position. However, a standing position is often unavoidable in construction work where high muscular power, greater reach or considerable movement is involved.

A well-designed workstation provides possibilities for the worker to carry out the operation in many positions and postures, both sitting and standing. It also allows the worker to walk a little during a working day.

2.12.04 Work in cabins

Machines with cabins for the operator are frequently used on construction sites. Examples include excavators, tower cranes bulldozers, graders, and trucks. The key points to check in a cabin are:

- Is there easy access to the cabin?
- Are controls in good working order and within easy reach?
- Is the construction of the cabin solid, are windows and insulation in place, and are lights working?
- Is the operator's seat in good condition? adjustable and securely anchored?
- Is the instrumentation functioning

- Is the engine exhaust pipe placed away from the cabin and in good condition?
- Are the engine covers and enclosures in place?

2.12.05 Hand tools

There are many different types of hand tool for different kinds of work, such as shovels, trowels, axes, saws, hammers and many others.

A good quality hand tool should be designed to fit the hand and the task. With proper design of hand tools, work posture can be improved and stress can be reduced, resulting in an improved quality of work.

Accidents with hand tools nearly always arise from some human failing – carelessness.

2.12.06 Power – actuated tools

Power actuated tools are commonly used on construction sites. The common hazards are in – running nip points where one part rotates against or close to another. All nip points should be assumed to be dangerous and should be guarded to prevent approach unless they are enclosed within the machine. Equally dangerous are rotating shafts of whatever diameter and of whatever speed.

2.12.07 Safety precautions

When using power-actuated construction tools and machinery, check whether:

- All protective devices and safety measures supplied with the machine are in position, adjusted and working;
- The machine appears to be safe to use even for an inattentive worker;
- Safety devices are strong enough to withstand wear from ordinary use; and
- Safety devices do not prevent efficient use of the machine.

2.12.08 **Circular saws**

They are among the most dangerous power-actuated machines found on a construction site. The main causes of accidents are:

- Hands coming into contact with the saw blade either above or below the bench;
- Timber being thrown back by the revolving blade;
- The blade fracturing or disintegrating

2.12.09 **Precautions:**

- The top of the blade should be covered by a form of wood, which is designed to prevent hands touching the part of the blade above the wood being cut. It should be adjusted at the front or leading edge of the saw so that it almost touches the surface of the material being cut, leaving no space for a hand to pass through.
- Parallel to the blade is the fence, which acts as a support, and guide for the wood being sawn and allows a true cut to be made. It should be locked securely in position before the cut is made.
- When hand-feeding material to the saw blade, use a push-stick to keep your hands away from the blade.

2.12.10 **Electrical Equipment**

Electrical hazards are different from other types of hazard found in construction work because the human senses provide no advance warning, unless other hazard which can be heard or be seen or be smelt like gas leakage.

The main causes of electric shock are:

- The earth or ground wire becomes disconnected from its plug terminal and touches a live terminal so that the metal case becomes live;
- Wrong connectors are made to terminals on the plug or the equipment

- Damaged or missing covers on fuse and terminal boxes, or on socket outlets, expose base live conductors;
- Flexible cables are damaged when they are dragged over sharp surfaces or run over;
- Makeshift repairs are made to flexible cables with insulating tape alone.

2.12.11 Electrical Installations

This must be done and serviced by competent electricians. All forms of electrically operated equipment should be regularly checked and maintained in accordance with the manufacturer's instructions. Before using electrical equipment,

- Inspect it for any defects
- Check that the correct plug and fuse have been fitted – never use makeshift connections to equipment, or to plugs by sticking bare wires into sockets or contacts;
- Check that the insulation covering wires and cables is not worn or broken;
- Check that there is a good electrical connection at each joint of the earthing system.

2.12.12 Welding & cutting

Welding and cutting on construction sites is very common. It can be done by electric arc or oxyacetylene method.

2.12.13 Electric arc welding

The risks in electric arc welding include inhalation of toxic gases. The necessary precautions are:

- The welder and his assistant should wear suitable protective goggles or use a face-mask or shield to protect the eyes and face from invisible ultraviolet and infrared rays given off by the welding arc.

- Goggles must also be worn when carrying out weld chipping to protect the eyes from flying pieces of slag
- The welder should wear protective gloves long enough to protect wrists and forearms against heat, sparks, molten metal and radiation. Leather is a good insulator.
- The welder should wear high-top boots to prevent sparks from entering footwear.
- The work area should be screened off with sturdy opaque or translucent materials so that other workers cannot see the arc.
- The work piece should be well earthed, and all equipment should be earthed and insulated.
- Precautions should be taken against starting fires from sparks from the work area: burning particles are capable of starting a fire 20m away.

2.12.14 Gas welding

Acetylene and oxygen are normally used in gas welding. The cylinders should be stored separately since any mixture from gas leakages could be highly explosive. They should be kept away from any source of heat and shielded from direct sunlight. If stored outside, the store must be well ventilated. The cylinders in use should be kept upright in a trolley or rack.

2.12.15 Fumes

Welding in a confined space, the use of some types of welding rod, or welding on certain painted metals may cause an accumulation of toxic gases and fumes. If ventilation cannot be provided, the welder should be provided respiratory protection and supply of fresh air.

2.12.16 The carrot-and-stick approach to safety

The disciplinary portion of the safety programme qualifies for the “stick” approach. Some companies supplement their enforcement programme by offering incentives to maintain safe working conditions. These incentives can be based upon achieving either short-term or long-term goals or a combination of both.

Conclusion. “A solid safety programme, administered vigorously, reduces corporate overhead, increases employee morale, creates positive public relations, and just makes good business sense” – Sidney M. Levy (2000).

2.13.00 HEALTH ON WORK SITES

2.13.01 The Working Environment

2.13.02 Chemical substances

There are many chemicals used in the construction industry, which include insecticides, adhesives, cleaning agents wood preservatives, fungicides, sealants, paints among many. Of particular importance are solvents, which are liquids commonly used in paint, strippers, lacquers, varnishes, surface coatings, thinners and others.

2.13.03 Chemicals and their risks

Many chemicals are hazardous, with a potential for fire and explosion, or toxic with an inherent potential to cause poisoning. Toxic substances cause both acute effects, such as dizziness, vomiting and headaches, produced in a short time by exposure to solvents, and chronic effects resulting from exposure a long period as in lung diseases such as asbestosis and silicosis.

2.13.04 Preventive measures

Generally there is an order of priority in the measures for dealing with hazardous chemical substances.

- Substitute the chemical with a harmless or less hazardous one
- Enclose the process using the chemical with a harmless or less hazardous one.
- Enclose the process using the chemical or provide other engineering controls such as exhaust ventilation
- Use personal protective equipment.

2.13.05 Hazardous substances

Cement, asbestos and lead are the most common hazardous substances found on construction sites. Cement mixes are a well-known cause of skin disease. Prolonged exposure to wet cement may cause cement burns or ulceration of the skin. The recommended precautions are:

- Protect the skin from contact by wearing long-sleeved clothing and full length trousers with rubber boots and gloves when required
- Protect the eyes
- Immediately wash off any dust or freshly mixed cement that gets on to the skin
- Clean off your clothing and boots after work.

Breathing in asbestos can kill by causing irreversible lung damage and cancer.

Lead is found in electricity cables, pipes gutters and lead sheet roofs. Organic lead is added to motor fuels, and storage tanks will be highly contaminated. Lead can be inhaled or ingested when in contaminated food.

Excessive lead absorption causes constipation, abdominal pain, anaemia, weak muscles and kidney damage. It can also affect the brain causing impaired intellect, fits and coma.

2.13.06 Noise and vibration

Construction sites are noisy places. Excessive exposure to loud noise can cause permanent damage to the eardrums leading to deafness. Noise can also cause stress making it difficult to sleep at night.

The noisiest operations on a construction site include blasting, piling, clearing operations and drilling using compressors.

2.13.07 Noise control

The following are the recommended steps to reduce noise:

- Check that exhaust outlets are fitted silencers and mufflers and switch off the machines when not in use.
- Keep compressor motor covers closed when they are running
- Machinery panels should be secured to avoid their rattling
- Ensure that sound – insulating screens are provided to reduce noise from stationery plant and that where practicable noisy machinery is sited behind earth mounds or brick stacks to isolate or screen it as far as possible.

2.13.08 Hearing protection

- Wear appropriate ear muffs
- Keep ear muffs clean and don't use damaged ones.

2.13.09 Vibration

Many noisy machines transmit a lot of vibrations to the body. The common examples are pneumatic rock drills or concrete rock breakers. When using these equipment ensure that you use gloves, which help to cushion the vibrations.

2.13.10 Exposure to heat and cold

2.13.11 Hot weather

In the tropics temperatures are sometimes very high and considering that most construction work is heavy and manual and mostly done in the open, it becomes quite exhausting for the workers when working in direct sun.

Good welfare facilities are essential to health in hot climates and suitable working time arrangement is important. The following is recommended to alleviate this problem.

- Sufficient work breaks is essential;
- Rest areas away from workstations to cool off should be provided

- Adequate provision of cool, clean drinking water should be provided which workers should regularly drink and small quantities.
- Washing facilities should be provided to keep work clothes clean.

2.13.12 **How to keep the body cool**

- Keep away from direct sunlight as much as possible
- Avoid unnecessary quick movements
- Ensure that there is air circulation in operator's cabins
- Avoid wearing tight clothes or those, which prevent evaporation of perspiration such as some plastic materials.
- Wear head protection
- Take cool drinks regularly to replace moisture lost through perspiration
- Take shelter for rest poses.

2.13.13 **Cold Weather**

Cold weather while not being comfortable, it may affect health and judgment.

Some of the hazards of cold weather are as follows: -

- There are more likely to be accidents if the temperature of the hands falls below 15 degrees centigrade: there is loss of concentration and coordination
- Workers repeatedly using vibratory tools such as rock drills may suffer "white finger" syndrome involving sensory loss because of cold
- Even where the temperature is above freezing point, a condition called "immersion foot" can occur in wet conditions if the feet are not kept dry.

2.14.0 **AMENITY FACILITIES**

2.14.01 **Introduction**

Work in the construction industry is tough and involves manual activities.

It is usually hazardous and dirty and therefore good amenity facilities may not only improve workers' amenity but also enhance efficiency.

Amenity facilities will include: drinking water, washing facilities, sanitary facilities, rest-rooms and shelter, accommodation, mess-rooms, assistance in transport from place of residence to the work site and back all help and reduce fatigue and improve workers' health.

2.14.02 Sanitary facilities

National laws usually prescribe the type, number and standard of sanitary facilities which should be provided. The Public Health Act Chapter 242 clearly stipulates the sanitary facilities expected of habitable premises. The Factories Act Chapter 514 also deals with the issue of sanitary facilities to be provided in factories and related areas. However, as a general rule, the following is recommended as a practical minimum:

- A sufficient number of water flush-type lavatories for men when this is practicable, including sufficient urinal accommodation; chemical lavatories may be used otherwise;
- The accommodation should be separate from any mess room or rest-room;
- A smooth and impermeable floor;
- Effective natural and/or artificial lighting and ventilation
- Constructed for easy maintenance and cleaned out at least daily and disinfected regularly

Amenity facilities will be determined by the size of the labour force. They range from 1WC and 1 urinal to over 4WCs and 4 urinals

2.14.03 Washing facilities

Construction work is dusty and dirty and often involves handling chemicals and other dangerous substances and therefore workers need to have washing facilities to clean themselves regularly in order to:

- Prevent chemicals contaminating food

- To remove dirt and grime, which can be ingested and cause sickness and disease
- As a basic hygiene measure

When work involves maintenance or alterations, the existing facilities may be used but otherwise the following are the recommended standard facilities:

- 1 wash-hand basin for every 15 workers with sufficient supply of water and adequate drainage;
- Soap and disinfectants as appropriate
- Suitable drying facilities such as paper towels, roller towels (or individual towels for each worker) or electric hand-dryers;
- Mirrors and shelves at each washing point which will help to keep the place tidy and clean;
- Where workers are exposed to skin contamination by chemical substances or by oil or grease, a sufficient number of showers which should be disinfected daily;
- Facilities should be covered to provide weather protection and effectively ventilated and lit.

2.14.04 Facilities for supplying food and drink and eating meals

Facilities for supplying food at construction work sites can be particularly important when sites are located in remote areas. Remoteness, together with inadequate temporary housing, which lacks in cooking facilities, may give rise to considerable problems for workers in the availability and regularity of hygienically prepared and nutritious meals.

To meet the need for proper meals, a choice of facilities should be made available:

- Facilities to boil water and heat food;
- Facilities (including provision of space, shelter, water, heating and rubbish bins) for vendors to sell hot and cold food and drink;
- A canteen supplying cooked meals or serving packed meals, snacks and beverages;
- Arrangements with a restaurant or canteen near the work site to supply packaged meals;

There should be provision for space for meals with tables and seats provided and should be protected from weather and must be hygienically acceptable.

2.14.05 Drinking water

Perhaps this is the most important commodity for a construction because as mentioned earlier, construction work is arduous and workers lose a lot of water through sweat. Losing water without replacing it can lead to gradual dehydration; and this loss is greater in hot conditions.

Arrangements for the supply of safe drinking-water may be done as follows:

- Individual closed water bottles or containers when no other facilities are available, hung close to workplace in a shaded place, free from dust and with plenty of air in circulation to keep it cool,
- Drinking-water containers made of impermeable materials with suitable covers, kept in a cool protected place
- Drinking – water fountains from a public supply with the water outlet shielded in a manner that prevents the lips of a drinker being placed against it. Drinking - water fountains are more hygienic than taps and drinking vessels;
- Water taps from a public supply clearly labelled to distinguish between drinkable and non-drinkable water. It is preferable to use disposable cups or to provide a separate cup for each worker.

Drinking –water should not be placed in sanitary facilities, or in places where it can be contaminated by dust, chemicals or other substances.

2.14.06 Facilities for changing and drying clothes

There should be provision for secure place for changing clothes from street clothes to protective clothes. This will relieve the workers from anxiety for security of their belongings. The facilities should include provision for drying wet clothes, whether it is street or working clothing. Changing facilities for men and women should be provided, at least by adequate screening.

2.14.07 Rest breaks

Most construction works start early and workers are productive but their activity level decreases as the day passes. Fatigue sets in and will have a remarkable effect on the workers' productivity unless short breaks are allowed for re-energizing. If you rest before you show signs of being really tired, recovery is much faster. Short breaks taken frequently are much better than infrequent long breaks. Productivity improves with frequent rest breaks.

2.14.08 First Aid

Construction sites are dangerous places, and first-aid and rescue equipment should always be available. What is needed will depend on the size of the site and the numbers employed, but there should be at least a stretcher and a blanket – the stretcher should be of a type, which can be raised and lowered to and from upper floors. On large sites, and always where more than 200 people are employed, there should be a properly equipped first-aid room.

On any construction site of whatever size, at least one person on every shift should have been trained in the first aid.

2.14.09 When an accident occurs

When an accident occurs on site and someone is injured, you should get help by:

- Calling for help from someone on site trained in first aid, or in cases of severe injury by calling an ambulance;
- Preventing others (including yourself) from being injured from the same cause;
- Providing life-saving first aid, even if you are not a trained first-aider
- Reporting the accident at once.

2.14.10 Fire Precautions

Fire is said to be a good servant by a very bad master. Fires on construction sites arise from the misuse of compressed gases and highly flammable liquids. Every individual on site

should be aware of the fire risk, and should know the precautions to prevent a fire and the action to be taken if fire does break out.

2.15.00 PROSPERITY OF THE WORKERS

2.15.01 Introduction

Having looked at the safety and health of construction sites, the welfare of the workers will not be complete without looking at these workers' employment in which they are expected to prosper. To prosper is defined as to thrive to get on, to experience favourable circumstances, to flourish to turn out well.

In order for the employees to prosper they need conducive working environment, fair wages. Employees need both financial and non-financial incentives in their work place.

Financial incentives are in monetary terms and may be in one or more of the following forms:

- Bonus
- Profit sharing
- Payment of various allowances

Non-financial incentives are influenced by the psychological factors. Here no cash is involved rather they are given in the form of amenities and facilities. These factors provide lucrative conditions and terms of employment.

Fourteen factors are considered most important by employees: -

- Good working conditions
- Medical and health facilities
- Educational facilities
- Safety and security
- Steady employment
- Chances of promotions
- Participation in organisation activity
- Fair adjustment for grievances
- Pension and other benefit schemes

- Protection facilities
- Transport and housing facilities
- Opportunities for self actualisation and initiatives

Under prosperity we shall therefore discuss salaries and wages, job security and motivation.

Employee motivation in the construction industry

The construction industry offers jobs and careers that are challenging and interesting. However, these attributes result from factors, which to many workers are unacceptable, e.g. outdoor work, high labour mobility and job insecurity, and constant changes in technology and methods. Construction industry is generally considered a less desirable industry to work in compared to say, manufacturing. Consequently the industry experiences difficulties in recruiting and retaining employees with high mobility and potential.

Employees are being required more and more to adapt and learn new skills. Rationalisation of component design and manufacture as well as mechanization and rationalization of construction processes have contributed to changes in the skills demanded by jobs and probably this has the greatest impact on the jobs of skilled craftsmen. Traditional skills are now being replaced by work, which may be classified as semi-skilled. Further changes both technical and human will be necessary in order to achieve higher levels of productivity. These changes have an impact upon the motivation of those currently employed as well as potential recruits.

Construction is normally affected by the state of the economy and during “boom” time there is an acute shortage of necessary skills to meet the building demand, competition for labour leads to high wage costs and quality of work produced often suffers as a consequence. Economic measures implemented by Governments in response to balance of payments difficulties and high inflation tend to have a major impact on the level of construction activity. Such cut-backs create high levels of unemployment amongst construction workers, although shortages still remain for certain skilled workers. These fluctuations in activity increase insecurity for employees; workers leave the industry not to return and companies for long periods reduce recruitment and training.

Most of the research on motivation of workers has been generally in the manufacturing and construction industry has generally been ignored. This has been because of temporary nature of the construction projects. Different writers have suggested the omission of motivation of workers in the construction some reason have been fronted. Both Schrader (1972) and Laufer and Jenkins (1982) believe that a lack of documented information is responsible. According to Maloney and McFillen (1983) there are three reasons why social scientists have avoided the subject in construction context.

- They have little or no knowledge of construction
- There is inadequate research funding from the construction industry
- Few construction researchers have a good understanding of the psychology and physiology necessary for such studies Newscombe et al (1990) noted that many of the motivational 'tools' used by construction managers still arise directly from Taylor's principles of scientific management. This approach remains despite the numerous disadvantages of the classical school of thought and the fact that these have been identified and abandoned by the majority of other industries for some considerable time. The philosophy underpinning the Taylorist approach is a straight forward trade of rewards (or incentives) for performance. This may have been justified at the turn of the twentieth century, but there is doubt as to its current validity. As a study by Mackenzie and Harris (1984) shows that construction operatives are more likely to be motivated in a manner more in line with contemporary theories whilst the desire to merely increase wages is frequently replaced with higher-order needs such as job security, belonging and welfare.

Whatever the reasons for the lack of study and outmoded approach taken in practice, it is clear that more research needs to be undertaken if we are to improve our aspect understanding of this aspect of human performance in construction. This idea has been on and was propagated by Trench (1978) who suggested that construction management could improve the industry's effectiveness by giving consideration to the motivational potential of some of the ingredients in the work environment such as money, job satisfaction, a sense of belonging and a future.

2.16.00 WAGE AND SALARY ADMINISTRATION

2.16.01 Labour wages and other benefits

“Wages of Shame” screams the headline of the Standard Newspaper pull out of May 26, 2003, The Big Issue.

In the paper’s survey, it notes that although on paper Kenya’s wage fixing is in line with the wage fixing mechanism as stipulated in the Employment Act and is in conformity with the International Labour Organisation (ILO) provisions, in reality regulations are grossly flouted.

On Tuesday, February 18, 2003, the Nation Newspaper carried a photograph of construction workers from R.K. Sanghani firm in Nairobi’s South ‘B’ who were demonstrating in the city. They claimed that they had been sacked by their employer without notice for asking to be allowed to join the Kenya Building Construction, Timber, Furniture and Allied Industries Employees Union. Some of the placards they carried read: “R.K. SANGHANI ENOUGH IS ENOUGH WE ARE FED UP WITH TORTURE” “NO MORE SLAVERY! LET DEMOCRACY DEVELOP” “ONE HUNDRED SHILLINGS, 100/= FOR A MAN WITH A FAMILY!” “HATUNA IMANI NA LABOUR OFFICERS WA SOUTH ‘B’

According to the Universal Declaration of Human Rights, “everyone who works has the right to just and favourable remuneration ensuring for himself and his family an existence worth of human dignity, and supplemented if necessary, by other means of social protection.”

From the human rights perspective, the minimum wage should enable the worker to attain a living standard that is commensurate with the national variables. The Kenya Human Rights Commission (KHRC) argues that poor wages across all sectors have contributed to what it terms the poor phenomenon in the country. In its recent survey, the commission reveals shocking wage disparities and flawed labour legislations, which it says is tantamount to slavery and a prerequisite for human rights abuse.

According to (KHRC), the minimum wage rose from shs. 1,416 in 1993 to shs. 3,518 in 2002, which the commission says, is nothing when looked at against the steadily rising consumer price index (CPI).

During the 1992/93 period, for example the CPI rose by 44.13 per cent, followed by another 40.99 per cent in 1993/94. In this situation, the report says, the workers should have been given 100 per cent increment for CPI compensation. Yet they were only compensated by 20.056 per cent. In 1994/95 the compensation was 12 per cent while CPI fell by 192 per cent. The meagre income earned by workers, notes the report, can barely enable them to survive. The workers are often forced to live under squalid conditions in the slums.

The factors that cause people to seek employment in certain kinds of work and with certain organisations are varied. Each individual has certain skills and potentialities that he seeks to “sell” and certain Acts of personal values and goals that he seeks to fulfil in his work.

Financial incentives that are associated with the job is one of the primary ingredient in the process of give-and-take, and compromise between the employers and employees. Such incentives cover primarily wages and salaries; there are also various fringe benefits that enter the picture, such as overtime pay, bonuses, insurance plans stock-ownership plans and pension plans.

2.16.02 Paying Competitive Wages and Benefits

J.M. Nyagah (1989: - every single labourer interviewed was of the opinion that the wages paid to them were not sufficient and that for management to improve production needed to review their wage levels. The labourers at that time were paid between shs. 25/= to shs. 39/= per day. At shs. 25/- per day it worked out to be shs. 660/- per month, which was very low indeed. She concluded that with this kind of wage there was no way these workers could afford a decent meal, shelter and clothing without supplementing their income. The lowest paid workers were being paid below the minimum gazetted wage guideline by the government. The unscrupulous contractors and other employees seem to have decided to cash in on the problem of unemployment by exploiting their casual workers to maximize profits and evade the requirements of the Industrial Act.

In a study on the construction of labourforce in South Africa in the Western Cape by Jane English (2002), a large number of workers expressed dissatisfaction with their wages, with 83% describing the wage as insufficient to live on. Most workers (95%) were paid on the basis of time served, with per hour per day being most common and only (5%) said they were paid according to output, by piece or by task. Most workers were paid on a weekly basis,

fortnightly or monthly basis. The average working day is 8.3 hours but 66 respondents said they worked for longer, up to 10 hours per day. Most work for 5 days per week. Some on very low wages however were uncomplaining and appeared to have resigned into receiving those low wages. One supervisor interviewed complained that the construction industry is very unfair to its employees especially casual workers, because they have to work even during harsh weather conditions. This is because when they don't turn up they simply don't make money.

2.16.03 Training

- **Need for training**
- **Employees preparing for promotion.** To be successful every organisation needs to exploit its resources. The most valuable of these is the human resource. Time and money must be invested in training and developing employees to meet future as well as present operational needs.
- **Employees needing retraining:** an important factor in achieving success whether as an individual or an organisation is the ability to recognize and respond to change. Changes in products, technology, markets, legislation and so on, can affect the way jobs are done and may mean that some, if not all employees must require new knowledge and skills.
- **Employees nearing retirement:** in the interests of both the organisation and the employees it is necessary to decide how to maintain their performance at an adequate standard, how best to utilize the knowledge and experience they have while at the same time enabling them to “run down” in preparation for retirement. Some may learn new skills, e.g. as job instructors, or apply their experience to special projects, which are necessary but difficult to fit into the normal routine; some may have to be trained to accept lower jobs for a period prior to retirement.

2.16.04 Training principles

There are certain basic principles of industrial training built upon the principles of learning.

- One must be ready to learn and the readiness to learn is greatly dependent upon the individual emptying of all his half-knowledge prejudices, bias, likes, dislikes about the subject he is going to learn
- The trainee must have an open mind – he must be receptive to new ideas, suggestions, views, i.e. new learning (any person, who believes that he knows everything worth knowing and what he does not know is not worth knowing is a man of extremely limited vision and horizon and is a poor pupil or trainee!).

2.16.05 Providing Job Security

Job security relates to the desirability of maintaining continuous employment, which is a common expectation among most workers to meet economic related needs. The following are recommendations for providing job security for skilled workers.

- Developing and implementing annual staff plans
- Providing cross or multi-skill training
- Sharing workers
- Working with owners in scheduling major project start-ups

Multi-skilling's benefits to the industry has the following:

- More effective utilization of the workforce
- Improved employment opportunities
- Labour cost saving

Project benefits of multi-skilling include:

- Fewer workers needed
- Flexibility of work assignments
- Increased acceptance from workers
- Increased worker motivation
- Improved project safety importance

Worker benefits of multi-skilling are:

- Longer, more stable employment
- More marketable workers
- Increased earning potential
- Greater variety of work
- Few relocations.
- Provide a safe and Healthy Work Environment.

2.17.00 RESEARCH MODEL FRAMEWORK OF WELFARE OF CONSTRUCTION WORKERS

It is considered that adequate provision of a safe working environment, i.e. safety, health and prosperity will lead to a satisfied and highly motivated workforce which will result into a successful project in terms of quality, time and cost.

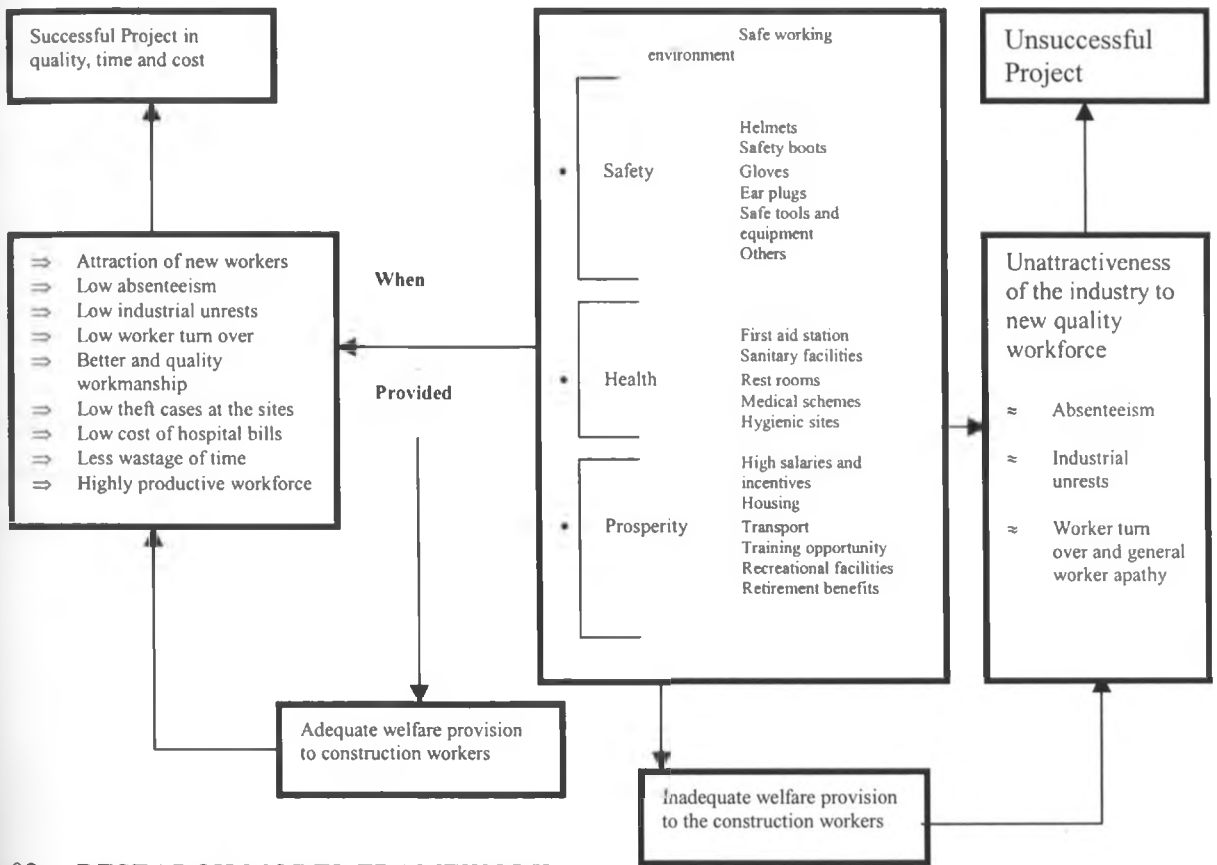


Fig. 02 RESEARCH MODEL FRAMEWORK.

2.17.01 Defining Project Success

Previously project success was defined as the completion of an activity within the constraints of time, cost and performance. These days the definition of project success has been modified to include completion:

- Within the allocated time period
- Within the budgeted cost
- At the proper performance or specification level
- With acceptance by customer/user
- With minimum or mutually agreed upon scope changes.
- Without disturbing the main workflow of the organisation
- Without changing the corporate culture

Today most of the reasons why projects are not completed on time and within cost are behavioural rather than quantitative considerations. They include:

- Poor morale
- Poor human relations
- Poor labour productivity
- No commitment by those involved in the project

For the purpose of this research we shall try to establish the relationship between time performance of a project and thus success with the provision of welfare for the construction production workers as envisaged by the above Research Model Framework

CHAPTER THREE

METHODOLOGY

3.1 POPULATION

All the contractors in Nairobi city who have active site of operation where workers could be administered to questionnaires and where the level or nature of safety, health and welfare provisions could be observed were included in the study. As concerns the workers, the target was to interview at least a trade man and a general labourer from each site.

It should be noted that there were two sets of questionnaires, one for the contractors or any other authorized persons with data required from the contractor, and another set meant for construction production workers at the site. This was important for the research could not be complete without knowing what the workers themselves feel about their situations of work for comparison with that given by the contractors and observations made on site as far as the provision of these facilities is concerned.

As has been discussed in the literature, provision of the safety, health and amenity facilities on site of operation was to be observed and entered using a check list and in the check list presence of a feature scored 1 point while absence or inadequate provision scored 0 point.

3.2 SAMPLING

The non-probability sample method was employed as the research was only intended for on going projects only. The construction industry has been in depression for a long time with a number of projects having stalled before completion. Active sites were therefore not readily available in Nairobi. Considering the time frame for this study being short, convenient sampling was ideal.

And not all the approached contractors were willing to participate in the study. This made development of population or sample frame impractical that would have allowed the probability sampling method to be applied.

To make work of sampling of sites faster, the author first used his contact in the industry to roughly get to know which places and contractors had works going on. This he did through calling architects, quantity surveyors, engineers and other construction professionals who may have projects within the city.

These sites and contractors were therefore purposefully selected in that all available sites and contractors were approached and any that was willing to participate was studied.

Given that Nairobi is extensive and the projects are far in between and considering data had to be collected, observations made and recorded the exercise was slow and time consuming but there was no other way but to do it that way.

With three months of data collection and analysis it was calculated that it would take 2 months to complete 4 questionnaires after six working days making a total of 16 per week, and in four weeks 48 questionnaires could be collected from the contractors and 48 check lists filled. 48 questionnaires were therefore sent out for data collection from sites/contractors while 96 questionnaires were sent to the workers that is two questionnaires per site one to a skilled worker and one to a general labourer.

3.3 DATA SOURCE AND COLLECTION METHODS

The information and data is to be collected from the contractors (directors), their authorized personnel to issue the information on the firms, the workers at the sites who included the trades men and general labourers.

The other form of data is obtained through observation by the researcher and his assistants for the safety, health and welfare facilities as provided on sites being scored in the checklist for each site.

From these sources of data the researcher would be in a position to gather the necessary data to help in the analysis and form conclusion on what the objective of the study are. The questionnaires were structured such that the respondents had only to tick the answer he or she is in agreement with. The other questions were made such that a figure extracted from the records was to be inserted.

3.4 DATA PRESENTATION AND ANALYSIS

The information received from the field is to be presented in forms of tables, in order to discuss them according the way they answered the objectives of the research. The other forms of presentation are pictures taken from the field for discussion of what was observed at the sites and qualitatively describe the working conditions of the construction workers in Nairobi city.

The check list as filled had total scores for each of the three factors being studied that is safety, health, and welfare measured such that if fully and adequately provided, each would have 4 points while lack or inadequate provision would score 0 points as shown below:

Safety as a feature on site

	Provided	Not provided
a. Helmets	1 Point	0 Point
b Fast aid kit equipped	1 Point	0 Point
c. Regular Safety drills	1 Point	0 Point
d. Safety Policy existence	1 Point	0 Point

Health features on site

	Provided	Not provided
a. Clean drinking water	1 Point	0 Point
b Ear muffs for noisy machines	1 Point	0 Point
c. Dust masks	1 Point	0 Point
d. Rest times for workers	1 Point	0 Point

Welfare features on site

	Provided	Not provided
a. Sanitary facilities	1 Point	0 Point
b Washing facilities	1 Point	0 Point
c. Mess rooms	1 Point	0 Point
d. Fair wage or salary	1 Point	0Point

The questionnaire to the contractors will be scored in terms of project time percentage overruns as noted by the contractor in the process of doing the project and it is assumed that the same features should apply for all the sites.

The two sets of data are to help in showing how the level of provision of safety, health and welfare to construction production workers influence or affect the success of the projects when measured in terms of times of completion or time overruns.

In this research both the qualitative and descriptive methods of data analysis will be used for instance the means, percentages, correlation coefficient in order to test the hypothesis at 0.05% level of significance

Limitations

This research being academic was limited to the period it could take. Construction projects take long to complete and one could not follow a project from start to completion in order to establish actual time delays.

CHAPTER FOUR

PRESENTATION AND DATA ANALYSIS

4.1 PRESENTATION

Out of the 48 questionnaires sent out to contractors 39 were received back that is 81 percent response which was above average and can be considered as adequate for analysis. From the workers, the response after was 92 out of 96 questionnaires sent out, that is 96 percent. It should be noted that the response of 39 contractors who responded are the only sites analysed, any site that did not have the contractor's response were not considered in the analysis. This was necessitated by the fact that check lists were filled for all the sites but not all the contractors' questionnaires were returned, and for the analysis these two had to be there.

Out of all the responsive contractors, 53% had been in construction industry for over 15 years and therefore had a wide experience in the field of building construction. It is also important to note that all the contractors studied were those dealing in building construction project not civil and roads construction works because at the time of conducting this research there were no roads and civil construction works going in Nairobi.

79% of the contractors interviewed had less than 20 permanent employees. Only one of the forty-eight contractors interviewed had over 100 permanent employees. The majority of the contractors recruit construction workers who are brought in by their friends while 21% recruit from the workers assembling at site gate in the morning. Only 11% recruited by way of advertising.

Table 4.02 below shows how the safety, health and welfare facilities were provided for and scored in sites that were visited.

Site No.	Safety provision scores out of maximum of 4	Health provision scores out of maximum of 4	Welfare provision scores out of maximum of 4	Total score for the site/contractor of maximum of 12
1	1	0	1	2
2	0	1	2	3
3	0	1	3	4
4	1	1	2	4
5	0	1	2	3
6	0	1	1	2
7	0	2	3	5
8	1	0	1	2
9	0	1	3	4
10	0	0	2	2
11	1	0	2	3
12	0	1	3	4
13	1	0	1	2
14	0	0	3	3
15	0	1	2	3
16	1	3	1	5
17	0	2	2	4
18	0	0	3	3
19	0	1	1	2
20	0	1	2	3
21	1	1	2	4
22	1	0	1	2
23	0	0	2	2
24	0	1	3	4
25	1	2	2	5
26	2	2	2	6
27	0	1	1	2
28	0	0	2	2
29	1	1	1	3
30	0	1	3	4
31	0	1	1	2
32	1	2	3	6
33	1	1	3	5
34	0	0	3	3
35	0	2	2	4
36	0	1	3	4
37	1	1	3	5
38	0	0	2	2
39	0	1	3	4
Total for all sites	15 out of maximum of 156	35 out of maximum of 156	79 out of maximum of 156	130 out of maximum of 468

Source –Field Study 2003. SITE CHECKLIST FORM.

From the table 4.01 above, safety features tended to score lowest in the sites with the level of provision being, out of the maximum 156 adequate provision only 15 was established that is 10 percent.

Health features on site scored 35 out of 156, which is about 22 percent while the welfare provision seemed to have scored better at 79 out of 156, which is about 51 percent.

Out of the 39 sites that were responsive, only two sites managed to score an average of the required maximum scores for these features at 6-point level out of 12 points. This shows that there was very low level of safety, health and welfare provision in the construction sites in Nairobi as shown from the table above the percentage provision is:

$$130 / 468 = 28 \text{ percent.}$$

The average level of safety, health and amenity provision in the 39 sites

$$130 / 39 = 3 \text{ points}$$

These poor scores were exemplified by two sites, which were at the foundation excavation stage, however, the foundations were not planked and strutted as required and this posed a risk to the workers. On one site whose foundations had flooded by heavy rains the previous evening, barefooted workers were found scooping water using water cans. This is against the expected pumping out of the water, by water pumps or if the workers were to scoop the water, then they should have been dressed in proper waterproof gear Plate No.4.01

SAFETY ON SITES

Protection of excavations

The following issues were noted as compromising safety on sites. Two sites were at excavation for foundations but the foundations were neither planked nor strutted though some were more than 2 metres deep. When planking and strutting is not provided, excavations should be at an angle of 45 degrees, which was not the case. Suitable barriers about 1m high were not provided to prevent workers falling into the excavations.

workers wearing crash helmets though some had them but they were not wearing them at the time of visiting the sites.

Plate No. 4.01 shows a construction worker scooping water from a flooded excavation pit barefooted with no waterproof gears.



PLATE NO. 4.01 SCOOPING WATER BAREFOOTED

Source, field 2003

All sites visited had not provided washrooms and drying lines, neither did they provide changing rooms. Construction work being dirty, it means that workers go home dirty. A number of workers were seen washing themselves at the concreting point, as this was the only water point in all sites visited. It means that they don't take showers on sites but only wipe their feet and hands.

Plate No. 4.02 shows the risk that most of our construction workers are exposed to as they use power tools.

FOR USE IN THE
LIBRARY ONLY



PLATE NO. 4.02 GRINDING WITHOUT EYE PROTECTION

Source, field 2003

When the contractors were asked why they don't provide the workers with these items they said that even when they provide them the workers don't use them. However, this should not be an excuse, as they should enforce the safety rules since the sites are theirs and when an accident occurs, they are the ones held responsible. However, their contention was vindicated as some workers were found with crash helmets, which they were not wearing.

On one site the contractor said that workers even use them to scoop drinking water! The workers on their side said that the helmets are cumbersome and uncomfortable especially when it is hot. There is urgent need to sensitise the workers on their safety and proper use of safety gear.

Only twenty out of thirty nine sites had gumboots. Most workers especially those doing concrete work were using cement bags to make improvised boots to protect their feet and hands, as gloves are not readily available.

Construction sites are noisy and on one site workers were cutting granite using power actuated grinders which were noisy and also produce sparkles but the workers wore neither ear muffs nor necessary protective clothing as in plate No.4.02.

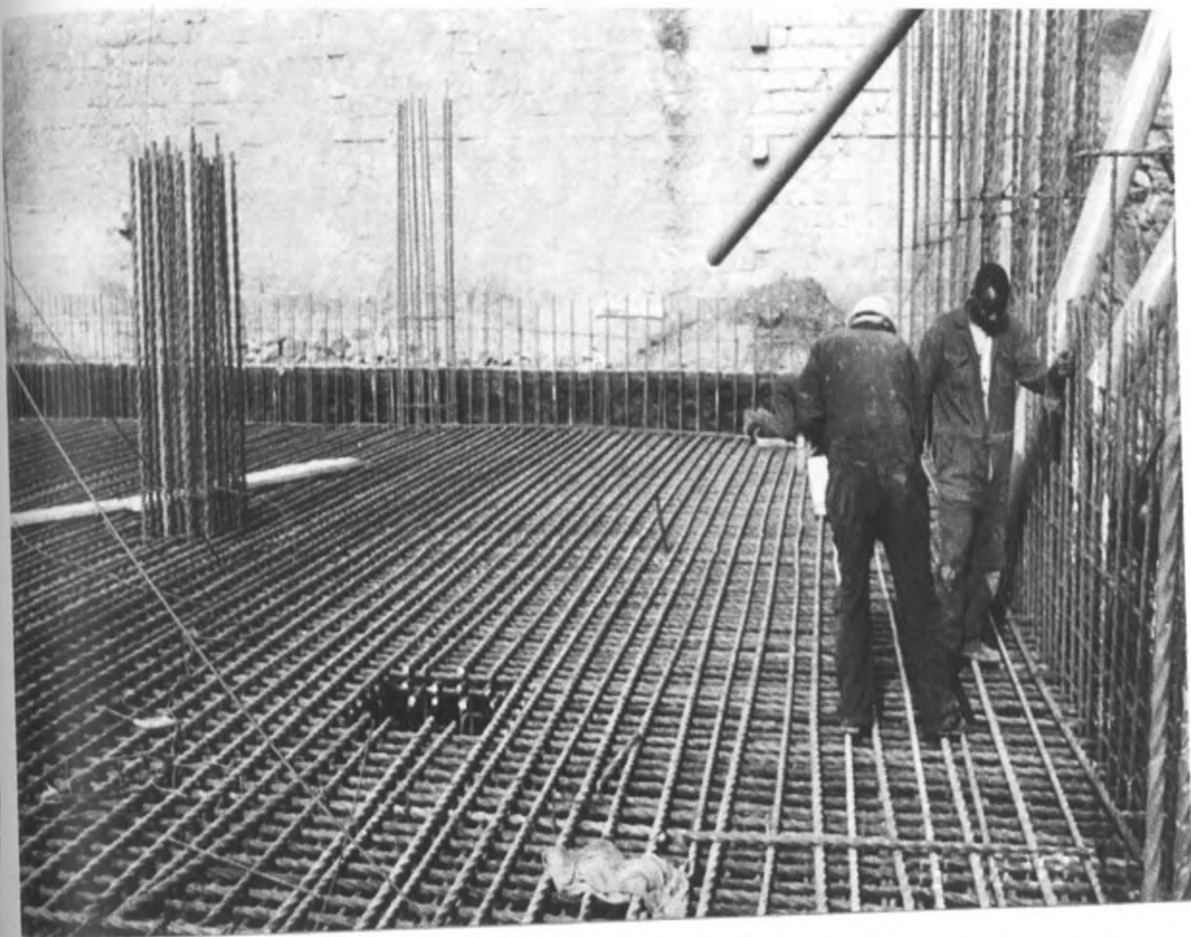


PLATE NO. 4.03 WORKING WITHOUT HEAD PROTECTION GEAR

Source, field 2003

In the plate 4.03 one worker is seen without proper head protection gear

On plate No. 4.04 a worker is tasked to carry out welding works using an electric arc to carry out welding works using an electric arc welder, and even though he had the welding glass shield he had no protective clothing from the sparks and fumes generated from the arch welder

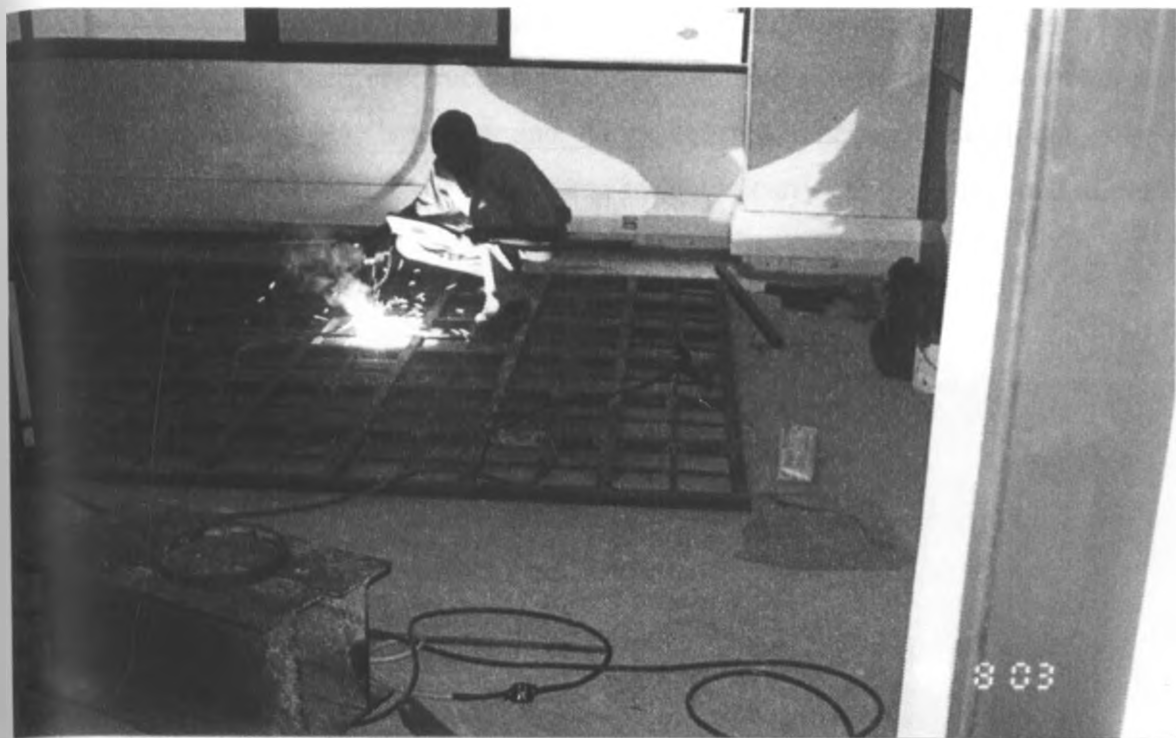


PLATE NO. 4.04 WELDING WITHOUT COMPLETE PROTECTION GEAR

Source, field 2003

4.4 Scaffolding

All the thirty nine sites except two, which were under excavation, had some scaffolding in one form or another. Scaffolding was highly compromised as what was provided was below the requirements especially as provided for by the Factories Act or OSHA of USA.

The members were poorly anchored and there was too much space between the platforms in which workers or materials could easily fall through. Indeed all the contractors interviewed said that most accidents, some fatal and others causing serious injuries are as a result of workers falling off the scaffolding. On one site the scaffolding was so poorly done such that one could wonder whether it was an acrobat's balancing ropes.

In all the sites where workers were working on heights, some at around fifty metres above the ground, none had safety belts harnessed to firm objects. There were also no safety nets to arrest falling objects from injuring persons working or passing at lower levels of the construction works.

The plate No.4.05 shows the risk that most of the construction workers are exposed to in the course of carrying out their construction tasks where the worker is forced to climb on to the same formwork to which he is to pour and vibrate concrete. The proper scaffolding had not been taken into account before the worker was tasked to carry out the works and this is not right.



PLATE NO. 4.05 IMPROPER SCAFFOLDING

Source, field 2003

4.5 First Aid

All sites did not have a fully-fledged first aid room. It is recommended that every site must have a first aid and rescue equipment including a stretcher and a blanket should be the basic facilities available. However, no site had the two facilities. All the sites had a first aid kit, which was equipped only with a spirit, bandage and cotton wool. First aid is a life saving exercise which is taken for granted on the sites visited and shows how the workers are exposed to danger and risk when injured. Twenty nine sites indicated that there had been an accident of some sort. The most frequent accidents/incidents reported included being pierced by sharp objects, being hit by falling objects and tripping and falling. The most serious accident was when a worker fell off a scaffold from 3rd floor of a 17 floor storey building and died instantly.

However, there were other accidents and though minor need not happen if safety precautions are taken. Considering that accidents/incidents are frequent at the sites, the First Aid facility is not well equipped for any eventuality.

It was also noted that on all sites there was no trained First Aider who had a certificate from, for example, St. Johns Ambulance as recommended by the Factories Act. It was found that workers are never trained on first aid and neither are they ever drilled on safety and first aid issues.

4.6 Employee Training on Safety

All the sites did not have a written safety policy. Employers are expected to have a written safety policy for their enterprise setting out the safety and health standards, which it is their objective to achieve. Apart from the contractors displaying the Factories Act in their site offices (which workers are never allowed to step in) there was no any other written policy. The Factories Act is only displayed for the factory inspectors and not for the workers! The factory inspectors are conversant with the Factories Act and it is the workers who need to know about it.

In safety training, both the supervisor and the employee are instructed in the job safety operations. The supervisor has responsibility that contributes to the safe or hazardous operation of the job. Even when an equipment is designed to be safe, and when the job is felt to be free of recognizable hazards, operators can behave in ways to jeopardize their own safety or health. To reduce the employees' likelihood of self-inflicted accidental injury, most organisations provide safety.

Training should be provided for both supervisor and the workers. The training of the supervisors includes content that places emphasis on recognizing hazards and hazardous behaviours.

Employee safety training includes both attitudinal and behavioural instruction. In all the sites visited there was no training of any sort for the workers and most workers who were asked whether they have ever been drilled for safety answered in the negative. They said that when

they are on site there is no time to waste on luxuries such as safety drills, according to their employers

4.7 Fire Fighting

Though fire outbreaks at construction sites are rare, there is always a possibility of it occurring since there are activities, which can contribute to the outbreak. This includes welding and smoking by workers. A number of sites had also inflammable materials in their stores such as diesel, paints which, could necessitate provision of fire fighting equipment. All the thirty-nine sites did not have even a single fire fighting equipment. The contractors did not have an explanation to this but some said that the risk of fire outbreak is minimal and should there be a chance of an outbreak, they can use sand, soil and water to put the fire out.

4.8 Health and Amenity facilities Provision

Drinking water

In all the sites visited, the following was observed and confirmed by the contractors/project managers:

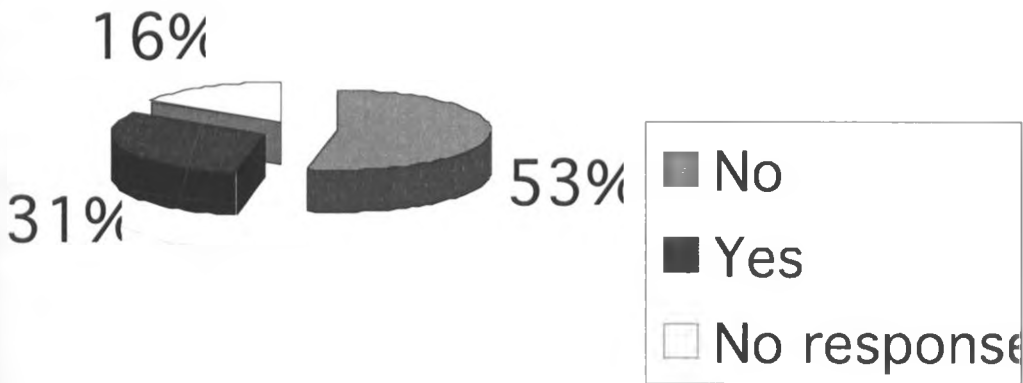
- There was no individual closed water bottles or containers available for workers
- There were no drinking water fountains with water outlets shielded in a manner that prevents lips of a drinker being placed against
- There were neither disposable cups nor separate cups for individual workers for drinking water
- Most workers drink water directly from the hose pipe and if there is no hose pipe many of them share a cup to drink water which they scoop from drums. The water may not be wholesome but because of the thirty considering the hard work they perform, they just drink.

Table 4.02 shows some of the responses concerning the welfare provision on sites as viewed by the workers themselves. 53% said the provision was inadequate while 31% it was okay and 16% did not respond.

TABLE 4.02

Response	Frequency	Percentage
No	49	53
Yes	28	31
No response	15	16
Total	92	100.00

WELFARE PROVISION



Source, field 2003 WELFARE PROVISION

53 percent indicating that they are not satisfied with the welfare facilities provided. They said that there is only one toilet on site and if they were many especially when concreting,

they share the same and it becomes dirty. There are no changing rooms on site, no mess rooms, no first aid rooms, no shades to protect them against rain and sun.

4.9 Washing Facilities

In all the sites visited, the minimum standard was not met, as they did not have the following:

- 1 wash-hand basin for every 15 workers with sufficient water supply and adequate drainage
- Soap and disinfectants
- Suitable drying facilities such as paper towels, roller towels There were no showers which are recommended where workers are exposed to skin contamination by chemical substances
- No site had hot water available for use by the workers
- There were no changing rooms in all the sites
- Construction work being dirty, it means that workers go home dirty
- Most workers were seen washing themselves at the concreting point, as this was the only water point in all sites visited. They don't take showers at the sites but only wipe their feet and hands and go home dirty.

4.10 Sanitary Facilities

While all sites had a provision of one form of a sanitary facility or another, none of them provided what can be called adequate as in all sites a water closet or a pit latrine was available regardless of the number of workers. The water closets were dirty and from enquiry they are cleaned only once a day. It was observed that the toilet facilities provided were not gender sensitive as there were no separate facilities for ladies and gentlemen. Where water closets are used they are dirty and are only cleaned once a day regardless of how dirty they become. At all the 39 sites there was no provision of toilet paper for the workers.

4.11 Meals

Table 4.03. Shows number of meals a worker takes in a day; the response was;

The majority eats two meals a day (59%) while only 34% eat three meals a day. 7% eat only one meal a day! This does not augur well for the health of the workers.

Construction work is strenuous and quite physically exhausting. This requires a well balanced diet and which should be eaten over three meals in a day.

Most workers interviewed said that they cannot afford three meals a day, leave alone balancing the diet. They normally eat outside the construction sites where meals are sold by food vendors and in most cases the lunch is beans and maize with a cup of porridge. Others take a half litre packet of milk with a piece of bread. Nobody affords a meal, which will satisfy him completely. They say that it is a meal to 'cheat' the stomach.

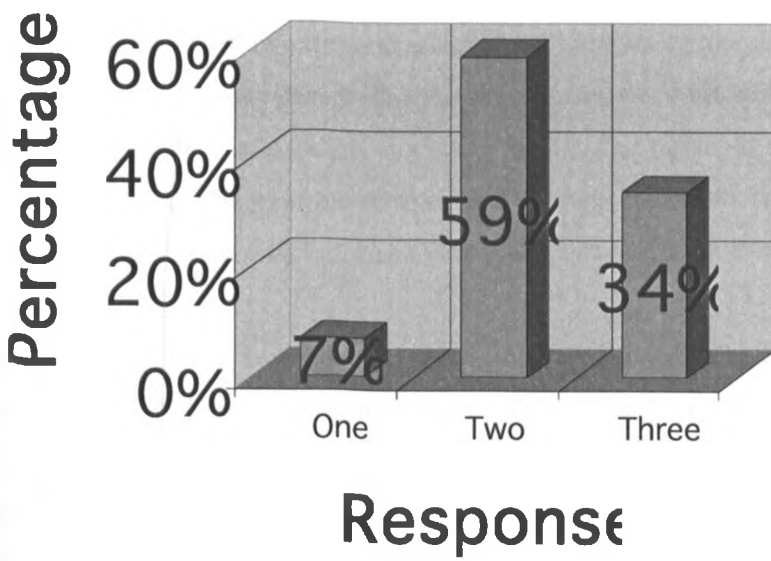
None of the workers interviewed ever takes 10.00 o'clock teas. No contractor ever provides meals for the workers except only during concreting work are they provided with a packet of half litre milk.

Mess rooms were not provided by the contractors, as required instead makeshift sheds were the normal mode of its provision by outside food vendors. In places where the mess rooms were built on site they were poorly equipped and were run by independent persons who cooked and sold food on site. The mess room were not hygienic and there were not enough seats or in some cases non at all for those who liked to take their meals there. Plate No. 4.06 shows cooking sufurias strewn all over the mess and close by steel reinforcement bars are stored nearby.

TABLE 4.03

Response	Frequency	Percentage
One	6	7
Two	54	59
Three	32	34
Total	92	100.00

NO. OF MEALS



Source, field 2003.NO.OF MEALS DAY

Plate No. 4.06, shows the most common type of mess rooms provided on construction sites in Nairobi.

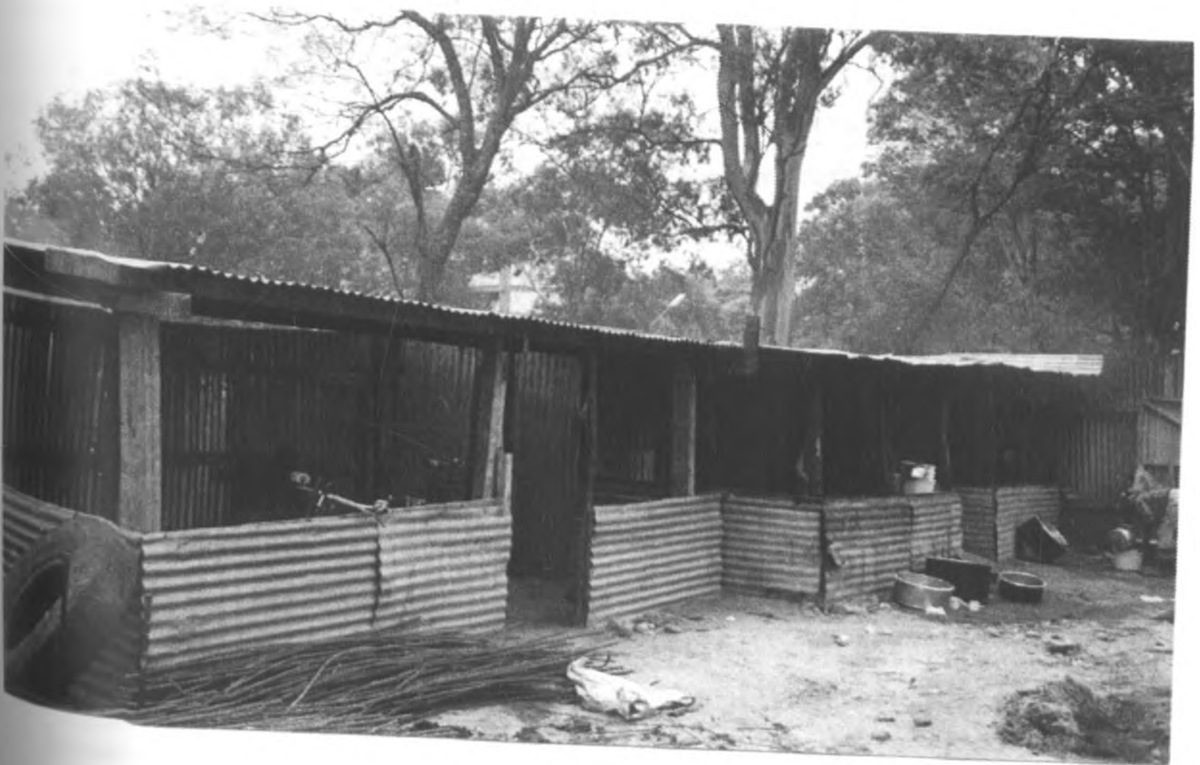


PLATE NO. 4.06 MESS ROOMS ON SITE

Source, field 2003

4.12 Rest Breaks

No contractor provides for rest breaks for the workers. It is only lunch for which most workers said is only 30 minutes and which they found to be too short. Only two sites had an hour lunch break. Considering that construction works start early when workers are most productive, their level of activity decreases as the day passes by. Fatigue sets in and will have a remarkable effect on the workers productivity unless short breaks are allowed for re-energizing. When one rests before he is completely tired, recovery is much faster.

One worker narrated how he was employed and immediately he was assigned to unload cement from a trailer carrying 800 bags. They were a number of them and they were to unload and carry to the store on their shoulders. Having not done this work before, the worker fainted at 10.00 o'clock having worked non-stop for three hours. When he came to, he went home and lost the earning for the day.

Nairobi is in the tropics and temperatures are high during day time most of the year. Considering that most construction work is manual and mostly done in the open, it becomes quite exhausting for the workers when working in direct sun. The essentials to workers' health were lacking in all the sites visited and included the following: -

- No sufficient work breaks were provided
- Rest areas away from workstations to cool off were not provided
- There were no washing facilities provided to keep work clothes clean

4.13 Material Handling

On handling of materials on site, it was observed on all sites that materials are mainly handled manually. The most commonly handled materials include cement, sand, ballast, steel reinforcement and timber, cement is packaged in 50 kg bags and a worker is expected to carry this on his shoulders sometimes from delivery trucks to stores and from stores to the concrete mixing plant. At the mixing plant dry batching is dusty. However, workers are not provided with dust coats and masks and are exposed to the danger of inhaling cement, which is a health hazard. Most workers use improvised used empty cement bags to cover themselves.

Concrete was also commonly pushed in wheelbarrows on rough surface, occasionally on makeshift timber on which they have to have a sense of balancing act. The workers were observed sweating and straining a lot. On one site a photograph was being taken of a worker pouring concrete from a skip into wheelbarrows when one of them asked him what his wife would say if she saw the photograph. He did not respond and this shows that some workers are even ashamed of telling their relatives and friends the kind of work they do on construction sites.



PLATE NO. 4.07 POURING CONCRETE INTO WHEEL BARROWS

Source, field 2003

4.14 Recreational Facilities

None of all the sites had any recreational facility of any sort. Work and all work makes Jack a dull boy is applicable in the construction industry. While other industries provide recreational facilities such as games like darts, pool table, draughts, volleyball among others, no construction site had such a facility. Neither did any contractor have such a facility even outside the site, nor sponsor any worker to join sports associations.

4.15 Workers' Response to Questionnaire

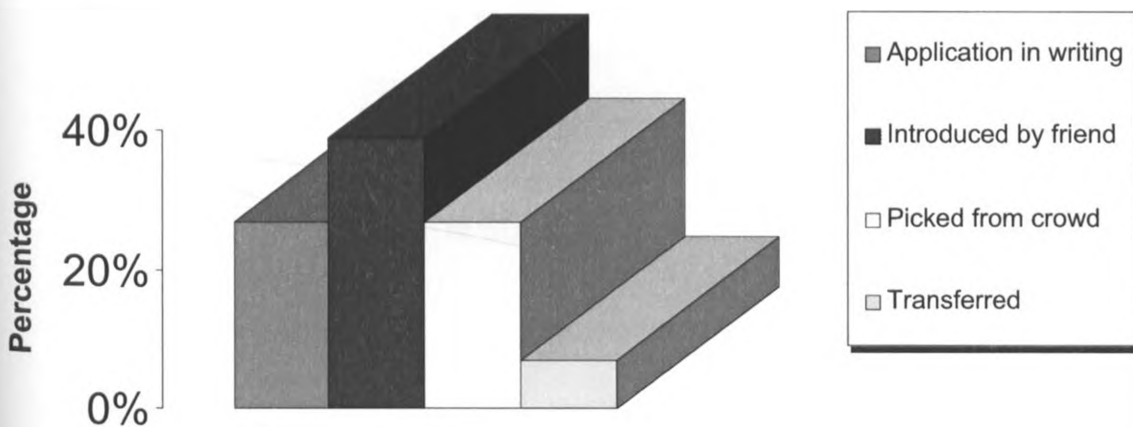
Securing Employment

Most workers secure employment by being introduced by friends i.e. 39%, application in writing and picked from the crowd represents the same figure i.e. 27% each, no response of security employment by being introduced by former schoolmate while 7% indicates workers transferred from another site but with same company.

TABLE 4.04

Response	Frequency	Percentage
Application in writing	25	27
Introduced by friend	36	39
Picked from crowd	25	27
Total	92	100.00

SECURING EMPLOYMENT



Source, field 2003. SECURING EMPLOYMENT

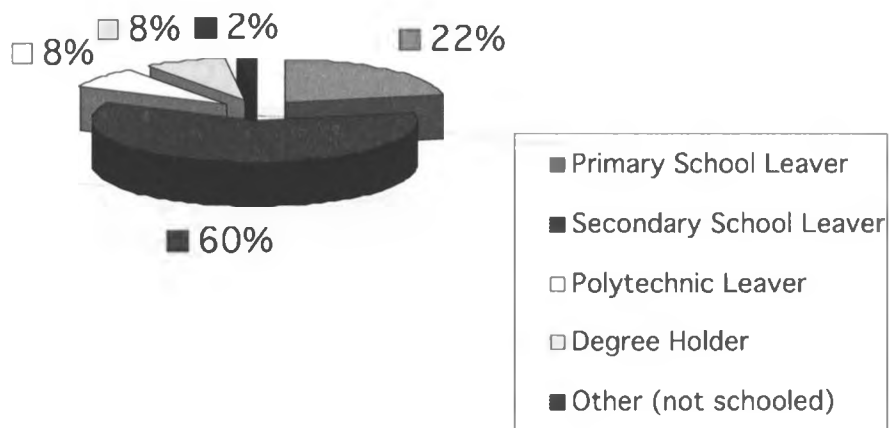
Table 4.04: Shows how the workers managed to get employed in the firms.

4.16 Educational Background

Table 4.05: To find out the level of education of workers

Response	Frequency	Percentage
Primary School Leaver	20	22
Secondary School Leaver	56	60
Polytechnic Leaver	7	8
Degree Holder	7	8
Other (not schooled)	2	2
Total	92	100.00

EDUCATIONAL QUALIFICATION



Source, field 2003. EDUCATIONAL QUALIFICATION.

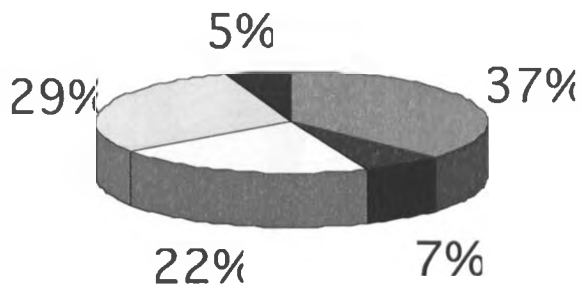
From the field data it became clear that the majority of the construction production workers are secondary school leavers (IV) who account for 60%, followed by 22% being primary school leavers and the rest as shown. This shows that construction industry has people who have spent a considerable number of years in school and are informed and educated and need to be well remunerated and have good welfare facilities. The work is physically very demanding hence the young men are majority.

4.17 Terms of Employment

Table 4.06: workers' terms of employments

Response	Frequency	Percentage
Casual	34	37
Temporary/Probationary	6	7
Permanent & Pensionable	20	22
Permanent but not pensionable	27	29
No response	5	5
Total	92	100

TERMS OF EMPLOYMENT



- Casual
- Permanent & Pensionable
- No response
- Temporary/Probationary
- Permanent but not pensionable

Source, field 2003. TERMS OF EMPLOYMENT.

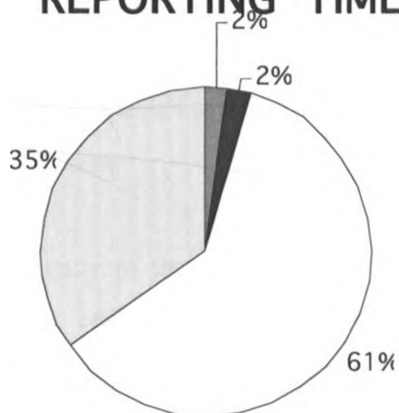
From the interviews with the workers, the majority, 37 percent were casuals, who said that their work is only on daily wages and they are paid at the end of the week. Even the 29 percent who indicated that they are permanent when interviewed further they said that they only understood that they are permanent in as far as that project is concerned. After the project they have to look around again for another project. If the contractor is lucky to be having another project, then they could be moved there. These type of workers were mainly specialized in certain trades such as granite laying, joiners and master masons among others. Unskilled workers have less chances of being moved to another site

4.18 Working Hours

Table 4.07: This shows when the workers report to work in the morning

Time Response	Frequency	Percentage
6.00 O'clock	2	2
6.30 O'clock	2	2
7.00 O'clock	56	61
8.00 O'clock	32	35
Total	92	100

REPORTING TIME



■ 6.00 O'clock ■ 6.30 O'clock □ 7.00 O'clock □ 8.00 O'clock

Reporting time is important as it indicates whether these workers rest enough in the night. It also means that they need fast transport to reach workplace in time. 61% report for work at 7.00 O'clock. Time to report for work is related to time they leave their place of stay (home) for work and also time they return back home. The average number of hours worked in a day was 8 1/2 hours.

4.19 Transport

Table 4.08 shows that the majority of the workers (61%) use public transport to come to work while 20% walk to work and only 12% are provided with company transport. Those who are provided with company transport said that they are normally picked at certain points and dropped there in the evening. Most of them are picked up in lorries, which are not meant for carrying passengers but materials. During the rainy season they are drenched in rain water without the owners caring about it.

61% come by bus being the highest response. Company transport is 12% meaning that few companies in construction give transport for its workers. 22% indicates no response to the question.

The relationship between place of living and coming to work shows a direct relationship (question 9 & 8) e.g. 59% stay in a rented house while 61% workers come to work by bus.

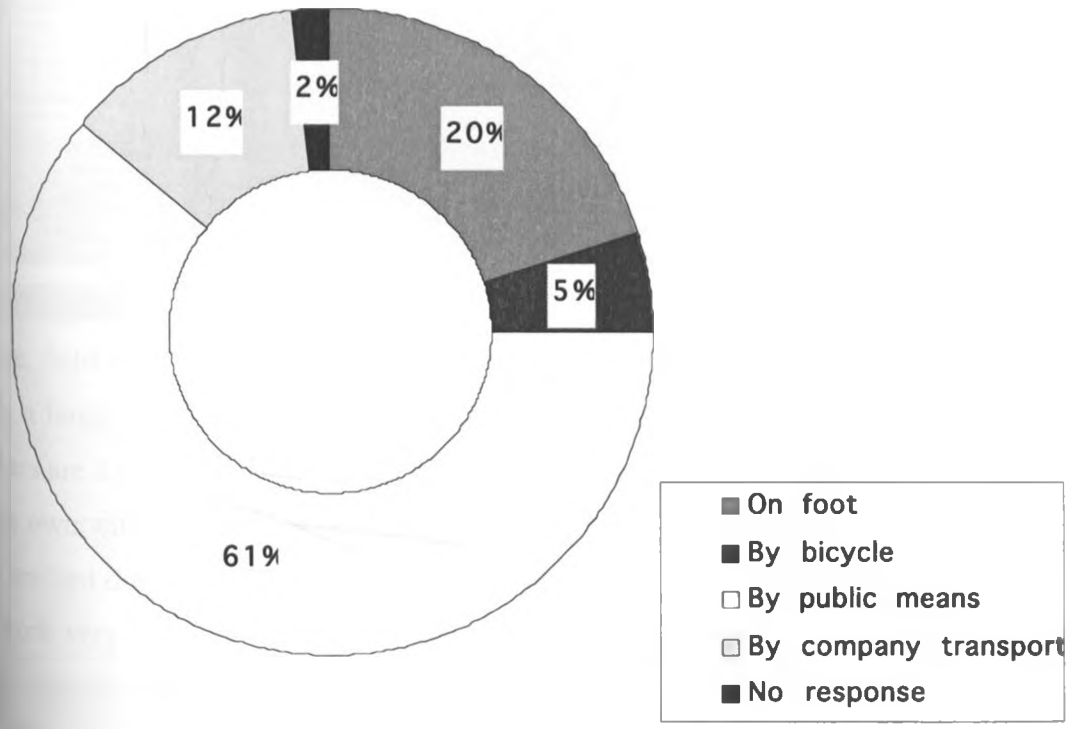
Some of the contractors made provision for transporting workers to sites. However the transport provided is by way of transporting them on open lorries and are picked from a few designated points and dropped on the same spots in the evening. The lorries are open whether it rains or shines, cold or hot, the workers are still carried in the open. When the contractors were asked why they cannot provide better transport such as a bus, they said that is unaffordable and out of question.

When asked about the adequacy of the welfare facilities on site, it was listed as the most wanting on site with 24 per cent indicating that they are not satisfied with the welfare facilities. It collaborates the employer's contention that they provide just basic facilities, which was one toilet only. The surprising finding was that there was no provision for separate facilities for ladies and gentlemen. While the majority of the workers on construction sites are males, there should always be provision for ladies' facility.

Table 4.08: How the workers came to work

Response	Frequency	Percentage
On foot	18	20
By bicycle	5	5
By public means	56	61
By company transport	11	12
No response	2	2
Total	92	100

MEANS OF TRANSPORT



Source, field 2003. MEANS OF TRANSPORT.

4.20 Housing

As Table 4.09 shows majority of workers stay in rented houses. On further enquiry, most casual workers said that they combine efforts with one or two of them and stay in a single rented room being let for between Shs. 600 – Shs. 1000 a month. The house should therefore be as near as possible to the site for them to walk or take cheapest means to work. Those who responded that they stay in a company house this was where the company had a few workers housed on site to enhance security.

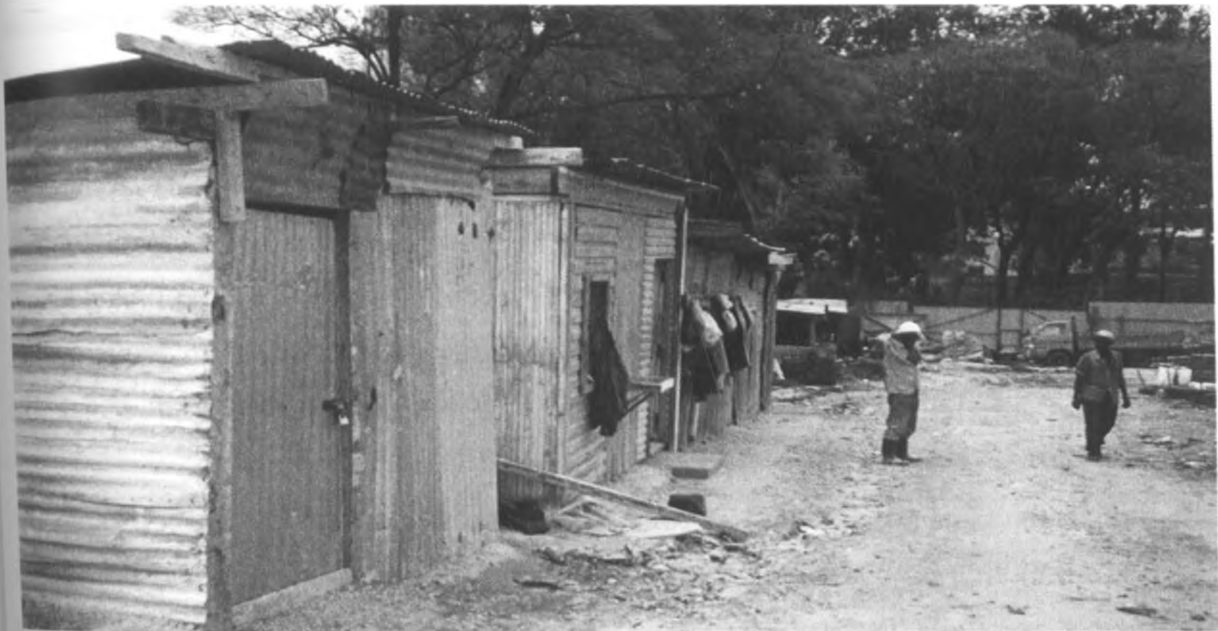


PLATE NO. 4.08 HOUSING ON SITEP

Source, field 2003

Quite a large number, 24% of the respondents stay with relatives and considering that all workers are 18 years and above, this becomes uncomfortable as a grown up would like to live on his own, either rented but preferably a personal home. Those who stay with relatives said they are tied down because of economic reasons. It also means that they cannot go and look for work very far from where they live, as they cannot ask their relatives to move to near where they have secured employment.

4.21 Training

Workers have no or little chance of improving their careers, as employers do not sponsor them for training. 90 percent have never been sponsored for any training. Without training

the prospects of workers advancing in their employment are little and therefore prosperity is also restricted.

On training of workers to further their career, 89% said they don't train and 11% said they do. Those who do not train said that it is inconveniencing as when they are in training they are not productive and that they fear that if they are well trained they may look for work elsewhere or demand better employment terms. The contractors prefer circumstances where they only hire workers when they need them and discard them when not needed. Only one contractor admitted to be taking employees for training in various trades. He said he has assisted a number of workers to develop their careers and are highly productive when they have been trained. He said that all he needed was to give a proposal to the Director of Industrial Training and if the course is approved, he gets a percentage refund of the cost of the course. The amount of refund depends on how much there is on account of building and civil engineering account which at the time of writing this paper the Director of Industrial Training confirmed was over shs. 100 million unutilised. In most cases the refund is between 75% - 100% of the total expenditure on training of workers who are normally crafts technicians and crafts apprentices.

The director also confirmed that because of the amount of money currently lying unutilised, any contractor who takes workers for training will easily be refunded 100% of the cost of training.

The director also confirmed he has embarked on seminars to sensitise the contractors on the need and benefits that could accrue from training of workers.

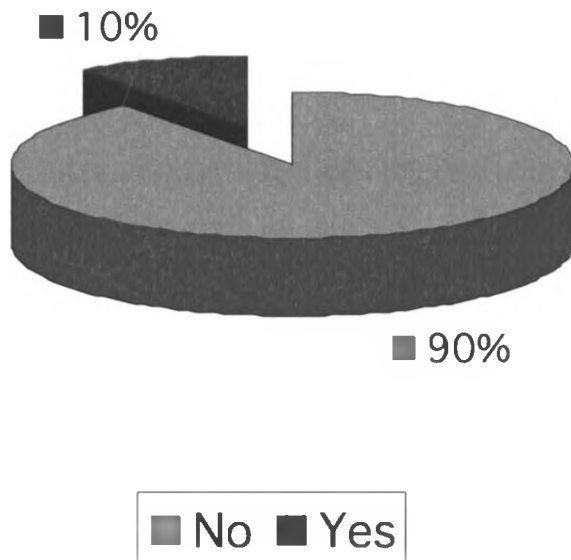
Such a seminar he organized recently in Mombasa had poor response as out of 45 contractors who had confirmed attendance only 10 eventually attended but worse still out of the 10 who attended, none was a principal partner in those firms.

A number of contractors found it cumbersome to spend their money on training employees and be refunded later. One contractor lamented that refunding is an agonizing experience as

Table 4.10: Sponsorship of workers for a training course since employment

Response	Frequency	Percentage
No	81	90
Yes	9	10
Total	92	100

TRAINING OF WORKERS



Source, Field 2003. TRAINING OF WORKERS

he found that it sometimes costs him more to chase a refund than the refund itself! He did not have complimentaries for getting any refund from a government department, whether it is Kenya Revenue Authority or Director of Industrial Training.

4.22 Salary and Wages

From table 4.11 the majority of workers earn between Kshs.200 – Kshs.250 and they constitute 29%. As described, this is far below what COTU proposes as basic salary of Kshs. 37,500.00 per month. At this rate the workers will not prosper as this works out to a wage rate of between Kshs. 5200 – Kshs. 6500 per month. While others earn as low as between Kshs. 100 – Kshs. 150 per day amounts to between Kshs. 2600 – Kshs. 3600 per month. However, majority of the contractors pay within the minimum agreed between the trade unions.

One hundred shillings per day will not suffice as the cost of living is much higher than what one hundred shillings can buy. If a worker earns shs. 100/- per day, he spends shs. 30/- for lunch, shs. 60/- for transport, then he will be left with a balance of shs. 10/- for supper, breakfast, house rent and all other basic requirements including paying fees for his children!

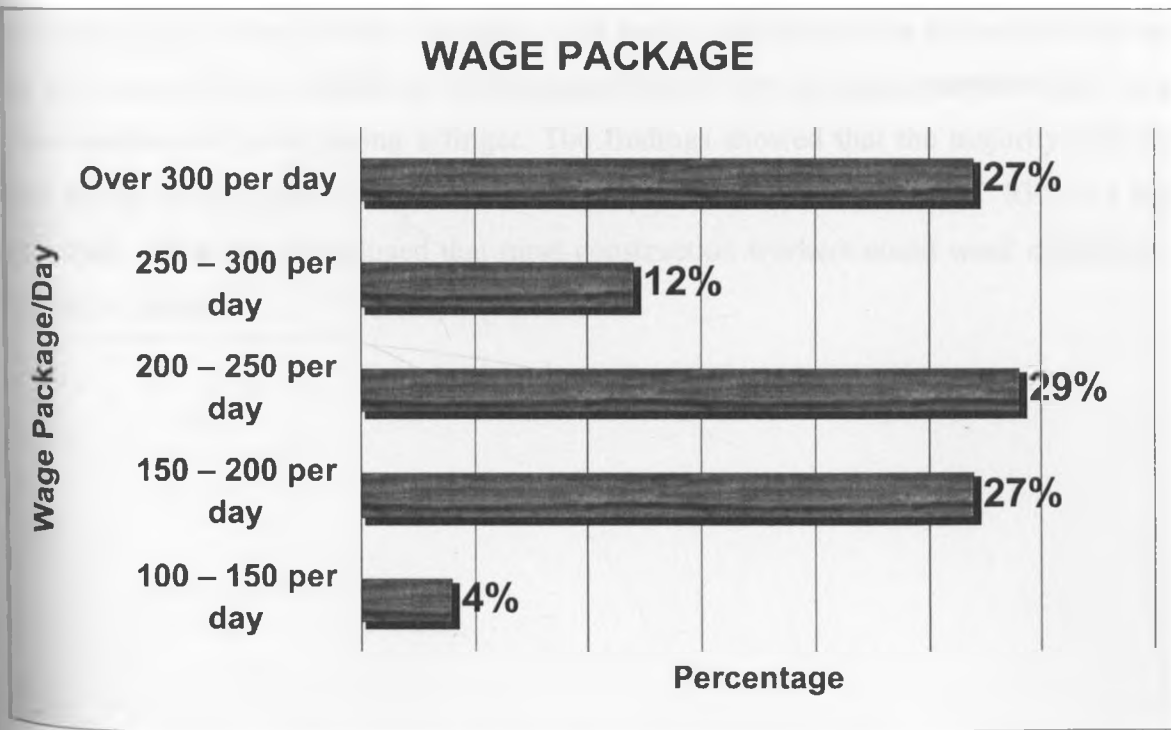
The salary or wages was the most contentious issue as all the respondents said that they are grossly underpaid. On one site, which had had a lockout, the workers had gone on demonstration citing low wages and torturous conditions bordering slavery on the construction site. They had placards saying: “ONE HUNDRED SHILLINGS, 100/- FOR A MAN WITH A FAMILY!” “HATUNA IMANI NA LABOUR OFFICERS WA SOUTH ‘B’” meaning “WE HAVE NO FAITH IN LABOUR OFFICERS OF SOUTH ‘B’”.

Table 4.11: On wage package of the workers per day.

47 percent of the contractors said they motivate workers by paying them high salary. However, as indicated by the presented data, the highest skilled worker is paid approximately shs. 8,400/- per month and lowest shs. 3,600/-.

TABLE 4.11

Wage package/day	Frequency	Percentage
100 – 150 per day	4	4
150 – 200 per day	25	27
200 – 250 per day	27	29
250 – 300 per day	11	12
Over 300 per day	25	27
Total	92	100.00



Source, field 2003. WAGE PACKAGE

This does not amount to high salary as indicated that the research by COTU recommends a minimum wage of shs. 37,500/- per month. 16% did not indicate what motivation they accord their workers. In accordance with the memorandum of Agreement between the Kenya Association of Building and Civil Engineering contractors and the Kenya Building and Allied Workers Union dated 12th May 2003 and registered by Industrial court ref. RCA128 of 2003 on 1st July 2003, the revised basic daily rates for Nairobi, Mombasa and Kisumu are Shs. 224/85 per normal working day. This works to approximately Shs. 5846.10 per month. All contractors said they have no scheme of service for the workers as they are employed per project and are only paid weekly wages and therefore have no arrangement for any other development or plan to enhance the prosperity of the workers.

4.23 Trade Unions

Most workers at 59% do not belong to trade unions because they said to join a trade union you will need to pay subscription. This money is what they are looking for. Trade Unions can also not thrive without money so the workers are at catch 22. Without strong unions, no one will fight for the prosperity and welfare of workers. With high unemployment, the contractors can hire and fire at will. Some workers interviewed also attributed non-joining of trade unions to poor administration as they said that trade union officials are compromised and do not fight for their rights. However, they had no evidence to the claims but only said that they suspected the officials in that even their friends who are union members have been sacked without officials raising a finger. The findings showed that the majority have not much liking for the construction industry they just did not have alternative. 83% is a high percentage and it can be deduced that most construction workers could work elsewhere if they had a choice.

Table 4.12: Belonging to trade union and the researcher found the following: -

Response	Frequency	Percentage
Yes	38	41
No	54	59
Total	92	100.00

TRADE UNION MEMBERSHIP



Source, Field 2003. TRADE UNIONS

4.24 Project Time Performance;

Sites/contractor	Contract Sum	Contract Period	% of works completed	Delays in works	Percentage delay
1	52,000,000	40 weeks	90	45 weeks	101
2	18,000,000	24 weeks	60	3 weeks	13
3	126,000,000	52 weeks	75	0 weeks	0
4	250,000,000	90 weeks	45	5 weeks	6
5	309,000,000	100 weeks	40	10 weeks	10
6	1,480,808,030	183 weeks	90	63 weeks	34
7	57,000,000	30 weeks	50	7 weeks	23
8	451,000,000	102 weeks	25	10 weeks	10
9	78,000,000	40 weeks	1	3 weeks	8
10	175,000,000	65 weeks	95	13 weeks	20
11	15,000,000	12 weeks	80	5 weeks	42
12	18,000,000	24 weeks	60	3 weeks	13
13	166,000,000	52 weeks	75	0 weeks	0
14	57,000,000	28 weeks	50	8 weeks	28
15	57,000,000	60 weeks	70	41 weeks	70
16	18,000,000	34 weeks	40	12 weeks	35
17	108,000,000	23 weeks	75	0 weeks	0
18	75,000,000	45 weeks	70	13 weeks	29
19	480,000,000	113 weeks	40	23 weeks	20
20	1,179,800,000	190 weeks	80	38 weeks	20
21	13,000,000	32 weeks	80	12 weeks	38
22	371,000,000	100 weeks	50	14 weeks	14
23	1,123,654,000	153 weeks	90	49 weeks	32
24	53,000,000	40 weeks	50	15 weeks	38
25	238,000,000	134 weeks	45	20 weeks	15
26	28,000,000	40 weeks	56	9 weeks	23
27	165,000,000	65 weeks	95	5 weeks	8
28	32,000,000	60 weeks	90	25 weeks	42
29	155,120,000	85 weeks	95	6 weeks	7
30	35,000,000	34 weeks	80	18 weeks	53
31	311,000,000	135 weeks	60	10 weeks	7
32	1,123,801,000	238 weeks	90	66 weeks	28
33	57,000,000	30 weeks	50	7 weeks	23
34	45,000,000	95 weeks	35	23 weeks	24
35	28,000,000	40 weeks	6	13 weeks	33
36	65,000,000	55 weeks	75	3 weeks	5
37	9,000,000	34 weeks	60	5 weeks	15
38	146,000,000	95 weeks	100	20 weeks	21
39	1,420,100,125	183 weeks	90	53 weeks	30
Total					938

Table 4.13 check list of delays per site

Source; Field 2003

As the research was intended to correlate time performance of a project and the provision of welfare of the production workers, at each site the researcher asked the contractor/project manager the completion status of the project vis-à-vis the contract period.

All projects except three were late by a number of weeks in accordance with the works programme. The contractors attributed the delays in completion to various reasons but the major reasons were low productivity of the workers. The weather phenomenon of 1998 called El-nino rains and slow mobilisation were also mentioned as some of the reasons for delays apart from labour unrests.

On average all the surveyed projects or sites indicated that there was a delay in works completion of 24 percent table 4.13.

As also indicated in the table, there was no project which was ahead of schedule and the worst in time performance was already late by 101% and only 90% of the work was already complete. At this rate it is hard to project when the works will be completed. Only three projects had 0% delays.

The projects surveyed ranged from Kshs. 9,000,000.00 to Kshs. 1,480,808,030.00 contract sum. The contract periods ranged from 34 weeks for the shortest to 238 weeks for the longest. It was noted that there was no consistency in the contract periods and the project size in terms of contract value. For example, the project with a contract period of 238 weeks was worth 1,123,801,000.00, while a bigger one worth 1,480,808,030.00 had a contract period of 183 weeks. The contractors said that in most cases, apart from government projects, which have a fixed contract, which is predetermined before the project is tendered for, most other employers and consultants prefer the contractors to compete on contract period together with the tender price.

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Table 4.14, shows the provision level of the facilities and the percentage delay in completion

Sites/ contractors	Total score providing facilities (x)	for the Percentage delay (y)	$x-x'$	$y-y'$	$(x-x')(x-x')$	$(y-y')(y-y')$	$(x-x')(y-y')$
1	2	101	-1	73	1	5329	-73
2	3	13	0	-15	0	225	0
3	4	0	1	-28	1	784	-28
4	4	6	1	-22	1	484	-22
5	3	10	0	-18	0	324	0
6	2	34	-1	6	1	36	-6
7	5	23	2	-5	4	25	-10
8	2	10	-1	-18	1	324	18
9	4	8	1	-20	1	400	-20
10	2	20	-1	-8	1	64	8
11	3	42	0	14	0	196	0
12	4	13	1	-15	1	225	-15
13	2	0	-1	-28	1	784	28
14	3	28	0	0	0	0	0
15	3	70	0	42	0	1764	0
16	5	35	2	7	4	49	14
17	4	0	1	-28	1	784	-28
18	3	29	0	1	0	1	0
19	2	20	-1	-8	1	64	8
20	3	20	0	-8	0	64	0
21	4	38	1	10	1	1	10
22	2	14	-1	-14	1	196	14
23	2	32	-1	4	1	16	-4
24	4	38	1	10	1	1	10
25	5	15	2	-13	4	169	-26
26	6	23	3	-5	9	25	-15
27	2	8	-1	-20	1	400	20
28	2	42	-1	14	1	196	-14
29	3	7	0	-21	0	441	0
30	4	53	1	25	1	625	25
31	2	7	-1	-21	1	441	21
32	6	28	3	0	9	0	0
33	5	23	2	-5	4	25	-10
34	3	24	0	-4	0	16	0
35	4	33	1	5	1	25	5
36	4	5	1	-23	1	529	-23
37	5	15	2	-13	4	169	-26
38	2	21	-1	-7	1	49	7
39	4	30	1	2	1	4	2
Total	130	938			61	502	-130

Source, field 2003

Percentage score provision of safety, health and welfare facilities at the construction sites shall be referred to as x

4.25 Correlations

SPSS Programme was used in calculating correlations.

Table No. 4.15

Descriptive statistics

	Mean	Std. Deviation	N
Total score for the facilities (X)	3.3846	1.20559	39
Percentage delay (y)	24.0513	19.76433	39

Table No. 4.16

Correlations

		Total score for providing the facilities (X)	Percentage delay (y)
Total score for providing the facilities (X)	Pearson Correlation	1	-.078
	Sig. (2-tailed)	.	.636
	N	39	39
Percentage delay (y)	Pearson Correlation	-.078	1
	Sig. (2-tailed)	.636	.
	N	39	39

Correlations

Chi-Square Test

Chi-square (χ^2) is a statistical technique, which attempts to establish relationships between two variables both of which are categorical in nature.

Research Hypothesis

The levels at which welfare facilities are provided at the construction sites, influences the level of success as measured through the delayed completion.

A. Null Hypothesis

There is no significant relationship between welfare facilities provision and success in project completion.

Table No. 4.17

B. Variables measured

- Existing welfare facilities provided
- Percentage delay

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	26.762 ^a	24	.316
Likelihood Ratio	31.220	24	.148
Linear-by-Linear Association	.007	1	.933
N of Valid Cases	39		

a. 50 cells (100.0%) have expected count less than 5. The minimum expected count is .26.

Computed Chi-square= 26.762

Degrees of Freedom= 24

Significance level= 0.05

Tabulated/Critical Chi-square= 23.68

Decision: Since the computed chi value is bigger than the tabulated chi, null hypothesis is rejected i.e. welfare facilities provision has a significant relationship with the project completion or success.

The Chi-square being a form of count occurring in two or more mutually exclusive categories, the technique compares the proportion observed in each category with what would be expected under the assumption of independence between the two variables; i.e. existing welfare provisions and percentage delays of the projects. In this analysis, the computed Chi-square is 26.762 while the tabulated /critical Chi-square is 23.68, which leads to conclude that the null-hypothesis must be rejected as it has been proven that the two variables are not independent of each other.

The research hypothesis holds and that provision of welfare on construction sites influences the level of project success as measured through delayed completion.

This research finding is important for contractors developers and consultants. It clearly shows that it will make economic sense to take welfare provision on construction sites seriously as this will reduce delays in project implementation and improve on the success of the projects. This will accrue into less cost and thus benefits to the developers and contractors.

CHAPTER FIVE

5.00 CONCLUSION AND RECOMMENDATION

5.1 CONCLUSION

From this study it can be concluded that the safety, health and prosperity of production workers is not given the attention that it deserves. Most sites are accidents prone as 74% of the contractors indicated there had been some form of injury on site. Though the contractors were blaming workers for the accidents as arising out of carelessness, it was noted through observation that sites are not tidy and accident free conditions do not prevail.

Most of the contractors do not drill workers on safety on sites and this shows that majority of the workers may not be aware of lurking danger and health hazards on construction sites. Training workers on precautions to take on sites could go a long way in reducing the propensity of the accidents happening.

Also contributing to accidents and injuries is non-provision of essential safety clothing and gadgets, which could prevent or reduce the impact of an accident. Very few had trained first aiders and properly spelled out safety policy in place as was evidenced by selective provision of helmet for instance.

Amenity facilities as an essential aspect of what should have been provided to workers, was found to be quite inadequate as most contractors, 68 percent said they provide just basic facilities which is normally one toilet, one urinal and some form of remote transportation system. All the sites visited it was found that the toilets are dirty and carelessly used by the workers. They are cleaned once a day and regardless of how dirty they become they cannot be cleaned until the following day. There was no sign of using disinfectants in the toilets. There was no provision for wash hand facility and whoever wanted to wash their hands had to go to the water points which in most cases was near the mixing of concrete station.

It is possible to conclude that the welfare of workers as defined i.e. free from calamity, enjoying good health and prosperity is lacking on construction sites. Workers are injured on sites, their health is not catered for and low salaries and wages ranging from shs. 3,600 to shs. 8,400 per month cannot enable them to prosper economically. It is apparent that contractors

who pay an equivalent of shs. 3,600 per month are just beating the government at shs. 3,518 in the year 2002.

However it was noted that lack of provision of welfare for the workers was most prevalent on sites run by small contractors. Small contractors (see question 3 for contractors) are those in categories "C" and below while those in categories A & B had much better facilities. The big contractors were fairly serious in provision of welfare facilities though they were still providing below expectations.

Trade Unions' presence on construction sites is not felt as majority of workers are not members and even the management becomes hostile to trade unionism. Workers also become reluctant to join unions because they claimed that unions demand money for registration and regular subscriptions, money which they do not have. Without paying union dues, no union representation and so the workers are caught between the rock and the hard surface.

All the projects, except three, were behind the programme by a certain period. It clearly showed that the projects were not going to be successful, as they will not be completed on time.

The level of safety, health and amenity provision on construction sites is very important in the success of construction project completion, as proved in this study the delays experienced by the contractors have been influenced more by non provision of adequate welfare provision. This is because the level of provision of the welfare facilities proved to have had a significant influence on the delays as the testing of the hypothesis has proved it to be true. This clearly vindicates the theoretical framework and is proven to be true.

The Null Hypothesis that the level of provision of welfare on construction sites is not the cause of delays in projects completion is therefore rejected.

There is therefore a correlation between the provision of welfare for the production workers and the success of a project in terms of delay. This research finding is important and should be brought to the attention of the contractors, project managers and interested parties so that a

concerted effort can be made to improve the welfare of the workers as this will have two-fold positives on site;

- (i) Reduce timely delays in project implementation.
- (ii) Improve the image of the industry and uplift the standard of living of the workers.

5.2 RECOMMENDATION

This research recommends the following: -

1. In Kenya there is no solid safety programme, which is administered vigorously. A programme like the Occupational Safety and Health Act (USA) should be introduced in Kenya and vigorously enforced. There should be regulations which are performance oriented and must be complied with by all contractors on construction sites. The government should be the one to enact the regulations and ensure that they are followed. This can be done with participation of COTU and professional bodies in the construction industry such as AAK, IEK, and IQSK among others.
2. The Factories and the Public Health Acts and other Regulations, which touch on the welfare of workers should be displayed conspicuously on all sites, so that they can easily be read by workers, unlike currently when only one page of the of the Factories Act is displayed in the Contractor's site office where workers have no access to it.
3. The government collects 1/4% from every project worth over Kshs. 1,000,000/-. However, though this money goes to the Director of Industrial Training, most of it is not used for training purposes, as contractors do not send employees for training. It must be made compulsory that for every project a contractor undertakes, he must take two workers to be trained. Training is free though the contractor makes initial payment but he is

reimbursed at the end of the course. At the time of writing this document the director of Industrial Training had KShs. 98,000,000/- unspent.

Since contractors are reluctant to voluntarily send workers for training, the Director of Industrial Training can alternatively change the policy of contractors paying for the training and are reimbursed later to paying for the course directly to the training institutions.

This will enable more workers to improve on their skills and will make their employment more secure. It will also make them more marketable and a well-trained person is always respected in society. The workers will, if the conditions of construction sites are improved, and if they are well trained, be proud to be associated with the construction sites unlike now when they don't like their close relatives to know what they do to earn a living.

4. Trade unions should be strong and agitate for the workers' welfare. First workers should be paid enough to afford to subscribe to trade unions, which in turn will fight for improvement of their working conditions and wages and other emoluments. This can be done only with government assistance since the government is the one, which has been culprit in proscribing some trade unions and also failing to register others.

Workers should also be thoroughly trained to understand their rights and obligations. The management of construction sites must train them on safety measures to be taken on sites. The management must also allow trade union officials to visit and talk to workers especially at hours, which should not interrupt the works. This could be at lunch hour or immediately after breaking in the evening.

5. Lastly, this research finding, though academic, should be made available to professional bodies and associations, which have relevance in construction industry to assist them, understand that there is a problem in the provision of welfare for construction workers. Some of the bodies I have in mind include KABCEC, JBC, AAK, IQSK, BORAQS, and IEK among others. They could

implement the recommendation given or this research could alert them to do their own research.

6. This research should produce an affordable welfare manual to be used on construction sites. The manual should be made a mandatory document on all construction sites.

Further Research

This research is in no way exhaustive and as time goes on and new materials and methods of construction come into being, and as the country develops and workers become more and more aware of their rights, there is need for continuous research on the subject of welfare of workers and how to improve their productivity without compromising their welfare. The new research findings could improve on the successful implementation of projects.

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LETTER OF REQUEST FOR INFORMATION

University of Nairobi,
Dept of Building Econ. & Mgmt.,
P.O. Box 30197,
NAIROBI.
E.mail. mharaka@uonbi.ac.ke
3rd June, 2003

Dear Sir/Madam,

I kindly wish to introduce myself as a student undertaking a Postgraduate course leading to Master of Arts in Construction Management.

It is a requirement that for one to complete this course, one must carryout a research project as a partial fulfillment of this postgraduate course. It is my proposal to research into the welfare of construction workers on building sites. This exercise will be used purely for academic purposes and any information given will be treated with confidence and will not be used elsewhere outside this research.

In this regard, I am attaching a questionnaire for your Construction Manager/Site Agent and another one for the construction workers. I promise to give you a copy of my research findings just for your information only.

Thanking you in advance for your co-operation.

Yours faithfully,

Moses Araka Nyakiongora

A1

**FOR USE IN THE
LIBRARY ONLY**

QUESTIONNAIRE TO BE FILLED BY PROJECT MANAGERS/SITE AGENTS

Kindly answer these questions for my Research Project. Your answers will be strictly for academic exercise only and will not be used for any other purpose whatsoever. Please tick one.

1. How long have you been in the construction business _____
 - (a) Less than 5 years
 - (b) 5 – 10 years
 - (c) 10 – 15 years
 - (d) Over 15 years

2. What is the legal structure of your firm?
 - (a) sole proprietorship
 - (b) partnership
 - (c) Private Limited Liability Company
 - (d) Public Limited Liability Company

Please tick one

3. Are you registered with the Ministry of Roads, Public Works & Housing?
Yes No
If yes under what category
 - (a) A
 - (b) B
 - (c) C
 - (d) D
 - (e) Other (specify)

4. What is the highest value of contract price you have handled?
 - (a) Less than Shs. 5million
 - (b) Less than Shs. 20million
 - (c) Less than Shs. 100million
 - (d) Over Shs. 100million

5. How long was the contract period? _____
- (a) Less than twelve months
- (b) Less than eighteen months
- (c) Less than twenty-four months
- (d) Less than thirty-six months
- (e) Over thirty-six months
6. How have you won most of the contracts you have done?
- (a) Negotiation
- (b) Competitive tendering
- (c) Selective tendering
- (d) Serial tendering
- (e) Other
7. Who is in charge of your site?
- (a) Construction Manager
- (b) Site Agent
- (c) Site Foreman
- (d) Other (specify)
8. How many sites do you have currently?
- (a) One
- (b) More than two but less than five
- (c) More than five sites
9. How do you recruit your employees?
- (a) Advertising and interviews
- (b) Introduced by other workers
- (c) Come with introductory letters from 'bosses'
- (d) Crowd at the site gates and foreman picks the number he wants
for the day
10. How many permanent employees do you have in your organization.
- (a) Less than 20
- (b) Over 20 but less than 50

- (c) Over 50 but less than 100
- (d) Over 100
11. What is the average number of labour force you have on this site?
- (a) Less than 10
- (b) Between 10 – 20
- (c) Between 20 – 50
- (d) Between 50 – 100
- (e) Over 100
12. What time do they report for duty? _____. What time do they break?
_____.
13. Do you allow overtime? Yes No
14. Do you allow working in shifts? Yes No
15. There is stringent requirement by the Factories Act for provision of welfare facilities for construction workers. Do you price for these requirements when tendering for projects? Yes No
16. Do you provide welfare facilities as expected?
- (a) Adequate
- (b) Just basic
- (c) More than the requirements
- (d) We don't provide generally.
17. How regularly do you pay your workers?
- (a) Daily
- (b) Weekly
- (c) Fortnightly
- (d) Monthly
- (e) Piecework
18. How much do you pay the following category of workers?
- (a) Labourers
- (i) Shs. 100 – 150 per day
- (ii) Shs. 150 – 170 per day

- (iii) Shs 170 – 200 per day
- (iv) Shs. 200 – 250 per day
- (v) Over Shs. 250 per day

(b) Semi-skilled

- (i) Shs 100 – 160 per day
- (ii) Shs 160 – 200 per day
- (iii) Shs. 200 – 250 per day
- (iv) Shs. 250 – 300 per day
- (v) Over 300 per day

(c) Skilled

- (i) Shs. 150 – 200 per day
- (ii) Shs. 200 – 250 per day
- (iii) Shs 250 – 300 per day
- (iv) Shs. 300 – 350 per day
- (v) Over Shs. 350 per day

19. Which of these benefits do you provide them with?

- (a) Transport to and from site – Yes No
- (b) Medical allowance/or cover – Yes No
- (c) Social Security Fund/Pension Scheme – Yes No
- (d) Training/Training Allowance - Yes No
- (e) Housing/Housing allowance – Yes No
- (f) Advances - Yes No

20. Does your firm send employees to the Vocational Training Centres?

- Yes No

21. Do you have in-house training for your employees? Yes No

22. What motivational incentives do you provide your labour force?

- (a) High salary and wages
- (b) Good Welfare facilities and hygienic working conditions
- (c) Job guarantee and prospects for promotion
- (d) Bonuses and prospects of buying shares in the company

23. Do you provide the workers especially the skilled with tools to use?

Yes No

(a) They come with theirs

(b) We provide workers with all tools

(c) We provide some and they come with some tools

24. Do you have a trained First Aider on site with fully equipped kit?

Yes No

Have you ever had an incident which caused injury to your workers on site?

Yes No

25. Do you provide workers with the following items for protection?

(a) Dust coats - Yes No

(b) Gloves - Yes No

(c) Crash Helmets- Yes No

(d) Raincoats - Yes No

(e) Boots - Yes No

(f) Goggles or face masks - Yes No

(g) Ear protection gear - Yes No

26. Do you ever invite someone trained on safety matters to address the workers on their own safety and that of the others on site? Yes No

27. How regular are the labour inspectors on your site?

(a) Regular (monthly)

(b) They have never come

(c) Once in a long time

28. What recommendation do factory inspectors give at site

(a) _____

(b) _____

(c) _____

29. Do your workers belong to trade unions? Yes No

30. Do trade union officials visit your site? Yes No

31. If yes what is their concern or the purpose of their visit(s)?
- (a) Check on welfare of workers
 - (b) Check on safety of workers
 - (c) Check on whether or not minimum wage guidelines are adhered to
 - (d) You don't really see why they come
32. Does your firm sponsor any recreation activities which your employees participate in? Yes No
- (a) Volleyball
 - (b) Hockey
 - (c) Football
 - (d) Wrestling
 - (e) None of these
34. How does your labour force have their meals
- (a) In canteen within the site
 - (b) In the site with meals being brought in by hawkers
 - (c) Outside the site in food kiosks
 - (d) I don't know
35. Is your project on schedule in accordance with the Works Programme?
- Yes No
36. If No, what do you attribute the delays to?
- (a) Delayed payments
 - (b) Low labour productivity
 - (c) Labour unrest
 - (d) Inclement weather conditions
 - (e) Additional works
 - (f) Other (specify)
37. What is the most challenging labour management problem you have ever faced on a construction site? _____

Thank you for your time and patience.

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QUESTIONNAIRE TO BE FILLED BY PRODUCTION WORKERS

Kindly answer these questions for my Research Project by ticking your choice. Your answers will be strictly for academic exercise only and will not be used for any other purpose whatsoever.

1. How old are you?

- (a) Below 18 years
- (b) Between 18 – 25 years
- (c) Between 25 – 30 years
- (d) Between 30 – 40 years
- (e) Over 40 years

2. What is your level of education?

- (a) Primary School leaver
- (b) Secondary School leaver (Form IV)
- (c) High School leaver (Form VI)
- (d) Polytechnic leaver (Diploma holder)
- (e) University level (Degree holder)
- (f) Other (Please specify) _____

3. What trade are you engaged in?

- (a) Mason
- (b) Carpenter
- (c) Wireman
- (d) Plant Operator
- (e) General handsman
- (f) Other (Please specify) _____

4. How did you secure employment in this firm?

- (a) Application in writing
- (b) Introduced by a friend
- (c) Walked in and was picked at the gate from a crowd

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- (d) Was introduced by my former school/college
- (e) Was working with this company on another site and was transferred here

5. Before being employed here had you worked with any other construction company? Yes No

6. How long have you worked with this company? _____

7. Which was your last place of employment before you came to this site?

- (a) Another construction co.
- (b) This is my first employment
- (c) A manufacturing industry
- (d) Other (specify) _____

8. What are your terms of employment

- (a) Casual
- (b) Temporary/Probationary
- (c) Permanent and Pensionable
- (d) Permanent but not Pensionable

9. Where do you live?

- (a) Rented house
- (b) With relatives
- (c) My own house
- (d) Company house

10. How do you come to work?

- (a) On foot
- (b) By bicycle
- (c) By bus
- (d) By company transport

11. What time do you report to work?

- (a) 8 o'clock
- (b) 7 o'clock
- (c) 6 o'clock

(d) 6.30am

12. What time do you leave where you stay in the morning for work?

(a) Before 5.00am

(b) Before 6.00am

(c) Before 7.00am

13. What time do you reach home after work?

(a) Before 5.00pm

(b) Between 5 – 6.00pm

(c) Between 6 – 7.00 pm

(d) Between 7 – 8.00pm

(e) After 8.00pm

14. How many days do you work in a week?

(a) 6 days

(b) 7 days

(c) 5 days

(d) 4 days

(e) Other (specify) _____

15. Do you work overtime?

(a) Once in awhile

(b) No

(c) Always

16. What is your wage package?

(a) Between Shs. 100 – Shs. 150 per day

(b) Between Shs. 150 – shs. 200 per day

(c) Between Shs. 200 – Shs. 250 per day

(d) Between Shs. 250 – Shs. 300 per day

(e) Over Shs. 300 per day

17. After all your expenses, do you save some money at the end of the month?

(a) Yes

(b) No

- (c) Once in a while
- (d) Always out of pocket (Minus)

18. What are your hobbies?

- (a) Playing games such as football, volleyball, tennis, rugby etc
- (b) Travelling to various places for sight seeing
- (c) Reading
- (d) Listening to music
- (e) I have no hobbies
- (f) Other (specify) _____

19. How many meals do you have in a day?

- (a) One
- (b) Two
- (c) Three
- (d) Four

20. How do you get your lunch meals during working days?

- (a) Cooked and sold to me at the site
- (b) I carry my own food from home
- (c) I eat in a kiosk outside the site
- (d) I don't eat lunches

21. Do you belong to a trade union? Yes No

22. Do your union officials visit your place of work to check on your welfare?

- Yes No

23. Are you satisfied with the welfare facilities on the construction site generally?

(Protective clothing, good tools and equipment, sanitary facilities, messrooms and general hygiene and safety of the site etc) Yes No

If No, could you suggest what needs to be improved

- (a) _____
- (b) _____
- (c) _____
- (d) _____

24. Have you ever been sponsored for a training course since you were employed?
Yes No
If yes, did it improve your performance and the perspective of your work?
Yes No
25. Will you work in another industry apart from construction?
Yes No
26. Which other industry would you prefer to work in?
(a) Manufacturing industry
(b) Hotel industry
(c) Teaching
(d) Office work
(e) Health industry (hospitals, pharmacies etc)
(f) Other (specify) _____
27. What don't you like most on this construction site?
(a) The tools and equipment
(b) The kind of work I do
(c) The welfare facilities available
(d) The kind of friends I have made here
(e) The kind of management on this site
(f) Other (specify) _____
28. How do you relate with your supervisors?
(a) Good working relationship
(b) Difficult to understand
(c) High handed
(d) Other (specify) _____
29. Have you ever had differences with your supervisor?
Yes No

If yes, how were the differences solved

- (a) Intervention by a more senior supervisor
- (b) Intervention by a trade unionist
- (c) We talked and agreed between ourselves
- (d) I quit the job
- (e) I was fired
- (f) Other (Specify) _____

29. What can you say about the portion of work you perform in a day?

- (a) Reasonable and manageable
- (b) Too heavy and punishing
- (c) Too little for my capacity
- (d) Other (Specify) _____

30. Are you satisfied with the work you are doing?

- (a) Yes
- (b) No
- (c) Kind of

31. What don't you like in the construction sites that you would like improved by the management? _____

I sincerely thank you for your time and patience

Site Checklist Form

SITE NO	General Site Layout	Safety Policy Existence	Protective Gear	Adequate Scaffolding	Equipped First Aid Kit	Clean Drinking Water	Sanitary Facilities	Washing Facilities	Mess rooms
1									
2									
3									
4									
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