



**UNIVERSITY OF NAIROBI**

**AN INVESTIGATION INTO THE EXTENT TO WHICH THE CONTRACTORS  
FULFILL THE CONSTRUCTION LAWS AT THE CONSTRUCTION SITES.**

**CASE STUDY: NAIROBI**

**BY**

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**UNIVERSITY OF NAIROBI  
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**A research project submitted in part fulfillment for the award of  
B.A. (BUILDING ECONOMICS) degree in the Department of Real Estate  
and Construction Management, School of the Built Environment**

**JULY 2008.**



**DECLARATION**


I, **MURIUKI DESMOND MURITHI**, hereby declare that this project is my original work and has not been presented for a degree in any other University.

Signed:  Date: 4/7/2008

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**DECLARATION OF THE SUPERVISOR**

This research has been submitted for examination with my approval as a University Supervisor.

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## List of Abbreviations and Acronyms

<b>NEMA</b>	National Environmental Management Authority
<b>EMCA</b>	Environmental Management and Coordination Act
<b>NCC</b>	Nairobi City Council
<b>EIA</b>	Environmental Impact Assessment
<b>EA</b>	Environmental Audit
<b>RCD</b>	Residual Current Device

## **Operational Definitions of Terms**

**Accidents:** This is unexpected happening that result in injury, loss or damage to property at the construction sites. In this study an occupational accident shall be any unplanned and unintended event that disrupts the orderly progress of performing work, delay work or involve additional losses due to personal injury, equipment damage, property or material damage.

**Injury:** This shall mean physical harm or damage to a person resulting from contact between the body and an outside agent or from exposure to environmental factors. Injuries are usually the result of accidents.

**Safety:** This is freedom from damage or risk. Safety shall refer to the freedom from hazards that may produce immediate injury to the body.

**Health:** Health shall be regarded as the absence of disease in the body.

**Law:** This shall mean binding or enforceable rule: a rule of conduct or procedure recognized by a community as binding or enforceable by authority it can also be defined as a legal system: the body or system of rules recognized by a community that are enforceable by established process it is further defined as control or authority: the control or authority resulting from the observance and enforcement of a community's system of rules

## **ABSTRACT**

This study sought to evaluate the extent to which contractors fulfill construction laws at the construction sites. This included establishing whether and to what extent do the contractors abide to the rules and regulations in the construction sites. It also sought to establish the requirements and the degree of enforcement of these laws and regulations by the relevant authorities and also to recommend on the measures that would ensure the contractors fully fulfill the laws governing the construction industry which has not been done hence the many accidents, deaths, pollution and other health and safety concerns at the construction sites.

The study relied on responses from questionnaires and interviews with the city council's city planning and architecture department as well as the NEMA's compliance and enforcement department, it also relied the data from the check list filled during the field study.

The findings indicate that contractors fail to comply with the laws and regulations governing the construction industry. The workers working in the construction industry are forced to work under very unfavorable conditions which put them at grave risk of death injury or disease. Further more the findings indicate that the developers fail to register their projects with the relevant enforcing authorities like NEMA. The findings also indicate that the enforcing authorities fail to perform regular and thorough inspections at the construction sites to ensure compliance to these laws.

The study concludes that a great deal should be done to ensure that contractors fully and comply with these laws and also ensure that there is adequate enforcement from the relevant enforcing authorities to ensure that the construction sites are a safe environment to work in for the workers.

The study recommends that, for the future constructions the contractors should provide for the specific requirements as it is in law to ensure that the construction sites are a safe place for all workers to work in. the study further recommends that there should be a better framework to ensure co-ordination of the enforcing authorities.

## **1.0. Chapter one**

### **1.1. Introduction**

The construction industry remains to be one of the most dangerous industries in which to work. This is because of the many risks and hazards involved. However hazard identification is fundamental to construction safety as well as compliance to laws governing the construction sites and risk management.

The contractor who is the employer in the construction sites has an obligation to ensure that health, safety and welfare of his workers, the environment, the public and the adjoining properties is safeguarded.

Every one involved in the construction sites has a role to play to ensure health and safety. The contractor has an obligation to ensure that this is achieved through managing, organizing, monitoring, and controlling the site.

Legislation, in the attempt to safeguard the construction industry's operations which concern the workers, object systems and suitable environment for human use, address the design of the environment and the workplace, the operating rules, procedures and instructions, the design of equipment and selection and training of workers.

The acts of parliament that mention the environment and the building development are many however some are direct than others. These statutes are about 77 in number.

The legislations governing the construction industry are:

- **The factories act chapter 514**
- **The public health act chapter 242**
- **The environmental management coordination act (act No. 8 of 1999)**
- **Agreement and conditions of contract for building works.**
- **The local government act chapter 265**

## 1.2. Background of the problem

The construction industry is economically important as it contributes 10% of the developing country's gross national product. It is also very hazardous with almost six times as many fatalities and twice as many injuries per hour worked relative to a manufacturing industry (Stanford university, 1982).

Due to better health and safety programs, improved first-aid and medical facilities in the developed countries the number of fatalities are lesser than in the developing countries.

The inspectorate department of the local authorities is vested the responsibility of inspecting and ensuring that the laws governing the construction industry to which the contractors should write to. However this department has been sighted as one of the most corrupt hence the non compliance by many contractors.

Occupational accidents are avoidable and cause a great impact on productivity and on the economy, as well as great suffering. Because they are avoidable, their occurrence is an expression of negligence and social injustice. The cost of work related accidents are rarely taken into account, even in countries that have made significance advances within the field of prevention. According to *Jacobson and Sullivan (2001)* regulatory regimes that imposes fines on firms for unsafe practices as one way of internalizing these costs creates a disincentive to firms and workers to report accidents.

Globally the construction industry has a poor safety record and is disproportionately dangerous compared to other industries. Statistics from the health and executives (HSE) shows that U.K. construction workers are more likely to be killed and two times more likely to be seriously injured compared to the average of all industries (Whitelaw 2001). United States of America's construction workers are three times more likely to be killed than all-industry average and one in every six workers can expect to be injured every year (Kartam 1997). In 1998 U.K. average annual fatal accident rate per 100,000 employees was 5.6 while the E.U. average was 13.3 (Whitelaw 2001). A potential key to improving construction safety is reducing the occurrence of hazardous events and this can be greatly achieved by complying with all the laws and regulations that govern the construction process.

In the case of: *Harris Vs Bright Asphalt contractors. 1953, 1 Q.B. 617, Slade J.* held that reasonable care involves not exposing the employee to any risk that the employer can reasonably foresee. Hence the contractor is obliged to comply with all the laws and requirements in order to ensure the employees are safe and that he wouldn't be charged of negligence.



### 1.3. Problem statement

Compliance to the laws governing the construction industry in the construction sites is key to ensure the health and safety at these sites. The contractor who is the employer should oversee the adherence to these rules.

According to, Dr. Rukwaro 2007, in his reader's manual on ergonomics for construction management, "The greatest challenge facing the construction industry in Kenya is the enforcement of the already existing rules and regulations. These requirements should be made mandatory to comply with and the enforcing agencies should be equipped and made more active in order to achieve safe working environment in the construction sites."

The laxity in enforcing these rules and regulations has led to the contractors in Kenya to evade implementing these measures. Implementing these measures has a cost implication to the contractor and hence the tendency to avoid them in the attempt to maximize their profits though in the occurrence of accidents and injuries it leads to heavy losses.

According to *Mburu Mwangi*: how firms put workers at risk, daily Nation, Monday, august 7, 2006, "whereas the factories act sets out detailed guidelines to prevent accidents in working places, it exists only on paper because the labour ministry which is meant to ensure compliance, lacks the capacity to do so." He further says that according to the director of health and safety at the ministry of labour, the department has only 52 inspectors instead of 168 to cover the whole country. The inadequacy of the enforcers of the laws gives the contractors as well as other employers a loophole to avoid putting these measures in place.

According to *Mwangi (1989)*, there are two incentives that motivate the employer to provide preventive safety measures on a site. The first one is the pressure of statutory requirements. This is provided for by the laid down legislations and other rules and regulations designed to ensure safe practice at work places. The second incentive supporting employer's consideration for work safety is economic. This is the forceful factor in motivating necessary preventive action due to the importance of controlling time and cost.

Many of the workers who work in the construction sites are desperate for jobs due to the high poverty levels in Kenya and hence their main aim is to acquire the job and they do not put their safety as apriority. They never demand for the health and safety provisions in the sites in the fear to loose their jobs.

Luck to comply with the set rules and regulations could be injurious to:

- To the workers
- The environment
- The public and adjoining property

Failure to comply with the laid down laws and regulations that govern the construction industry has a direct financial implication to the employer, the client and the worker. This is due to many injuries and accidents which accrue there to as well as the indirect costs which could come up due to the payments of fines to the relevant authorities for non compliance to these laws and regulations.

Enforcement of the laws and regulations also lead to the non-compliance by the contractors. In the examination report on the *systems, policies, procedures and practices of the city council of Nairobi prepared by Kenya anti-corruption commission directorate of preventive services march 2007* the Penalties imposed by the existing By- Laws are too lenient to deter criminal activities. Some penalties range from fines of Kshs.500 to Kshs.1, 000. In some instances t he Council invokes the Environmental Management and Co-ordination Act (EMCA), No. 8 of 1999 that provides for stiffer penalties ranging from Kshs.200,000.00 to Kshs.2,000,000.00. The prosecutors use their discretion to determine which law to apply. This creates an avenue for extortion and other corrupt practices.

This report also shows that there is only one prosecutor to handle the myriad public health claims cases brought to the Council. This has created a situation whereby when the prosecutor is indisposed, all cases have to be deferred or adjourned. Further, there is no supervision of the said prosecutor.

According to this report (page 56); Negligence by the city council officials who are supposed to inspect and prosecute these cases of malpractices and failure to comply with the available laws and regulations which further leads to dismissal of such cases on such grounds such as failure to include simple crucial information in the charge sheet such as the physical location of the facility, postal address, Land Reference Numbers and names of the offenders. For instance a public health officer issued three defective notices which the prosecutor was unable to act on.

In the examination report on the *systems, policies, procedures and practices of the city council of Nairobi prepared by Kenya anti-corruption commission directorate of preventive services march 2007*(page 43) it notes that the Council does not carry out stage by stage inspect ions of

buildings under construction. In many instances inspection is only done for the purpose of issuing occupation certificates after completion of construction. As a result, many contractors do not adhere to the building codes and regulations and end up being subject to extortion by Council officers in order to cover up and fraudulently issue them with occupation certificates. A large proportion of the developments in the city are condemnable structures as they do not meet standards

#### **1.4. Objectives of the Study**

- To establish to what extent do the contractors abide to the rules and regulations in the construction sites.
- To establish the degree of enforcement of these laws and regulations by the relevant authorities.

#### **1.5. Scope of the Study**

The scope of the study was limited to the projects where a formal construction site is established and proper documentation can be found.

Due to both financial and time limitation at the disposal of the researcher, the research was limited Nairobi area. This research will be limited to a manageable scope. For the purposes of the study, research will be limited to the extent of compliance of the contractor to the legislations that govern the construction industry.

The study covered the period between months of February and June 2008 for the purpose of achieving the research objectives

#### **1.6. Hypothesis of the study**

Effective application of the laws and regulations governing the construction industry is necessary for better working in construction sites by workers.

## **1.7. Limitations Of The Study**

The study will be limited to the time available to collect all the relevant data, the available finances to conduct the research and the willingness of the contractors to give the data and allow for the collection of the data.

## **1.8. Significance Of The Study**

Having laws and regulations governing the construction industry in Kenya is an attempt to ensure that the construction sites are conducive to work in with adequate health and safety measures to the operatives , the public, the environment and the adjoining property.

However the compliance with these rules is key to achieving the goals and objectives of these laws and regulations.

The aim of the research is to evaluate the level of compliance to these laws and regulations in ensuring that the construction sites are safe and hence recommend on what need to be done to achieve maximum compliance to these rules and regulations which are fundamental in ensuring that there are minimal if no accidents in the construction sites.

## **1.9. Research methodology**

The methodology adopted by the researcher was greatly influenced by the objectives of the study.

### **1.9.1. Data collection**

The research adopted both primary and secondary methods of data collection. Questionnaires were administered to the NCC- city planning and architecture department and the NEMA-compliance and enforcement department. Filling in a checklist with all the legislative requirements for establishing to what extent the contractors provide for the particular requirements at the construction sites. Interviews were also conducted to the site managers, the contractors or any representative on the site to establish facts that could not be established by mere visual judgment.

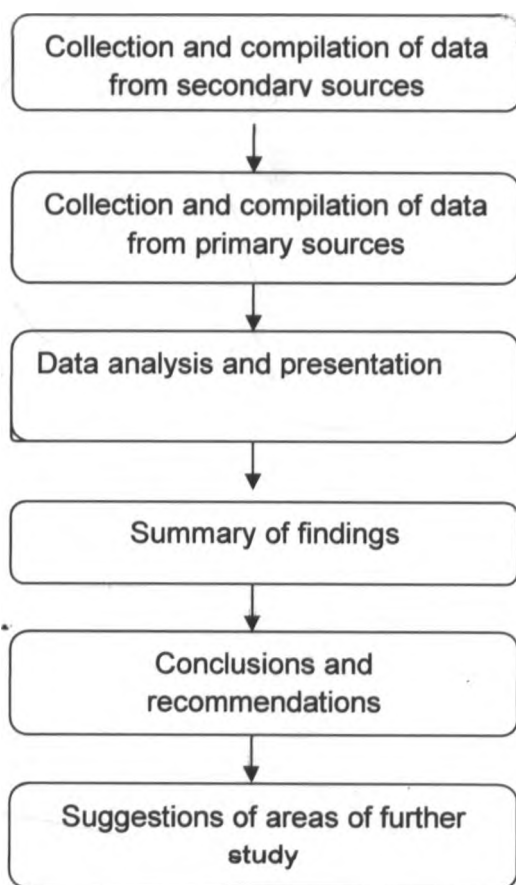
Secondary data was sourced from the various acts of parliament which govern the construction industry, journals on related issues, textbooks, workshops, reports and other relevant sources. The Internet was also a major source of current secondary data.

### 1.9.2. Data analysis

This was done through statistical approaches such as tables, charts and graphs. Plates were also used. The analysis of the data was mainly descriptive; however, percentages were used to compare the data.

### 1.9.3. Methodology flowchart

Figure 1. 1 Research Methodology Flowchart



Source: Cooper, D.R, Schindler, P.S (2003) Business Research Methods, 8<sup>th</sup> ed., Irwin, McGraw-hill

## 1.10. Organization of the Study

The research comprises of five sections as follows:

Chapter one is introductory. It contains the problem statement, objectives, hypotheses, research methodology, scope and the importance of the study.

Chapter Two discusses the literature reviewed and the theoretical framework, which acts as a basis for the research. It includes the various acts of parliament which govern the construction industry thus giving the minimum requirements that should be met by the contractors on site. It also discusses the various risks which ~~are~~ arise due to non compliance with the laws and regulations

Chapter Three is the research methodology section. It gives a background of the area as well as the population being studied. It shows how the sample sizes are obtained and the sampling techniques that are used. The data collection instruments and procedures are also discussed.

Chapter Four is the data presentation and analysis section. In this section, the information that is collected from the field is analyzed and presented in the form of tables, pie charts and plates among other methods. The responses of various groups of people to whom questionnaires were administered as well as oral interviews conducted are presented and analyzed. A summary of the findings is given and the problems encountered in the field are also mentioned.

Chapter Five gives the conclusions and recommendations made based on the results of the findings. Suggested areas of further research are also mentioned.

## **CHAPTER TWO**

### **2.0. Literature review**

#### **2.1. Introduction**

This chapter reviews the legislations that govern the construction industry in Kenya. It reviews the relevant clauses that relate either directly or indirectly to the construction process from the inception stage up to practical completion of the building. These laws act directly to the contractors on site and this chapter evaluates the laws that these contractors should comply to, to ensure health and safety of workers on site is attained alongside the public, adjoining properties and the environment.

This chapter also looks into key hazards and risks and analyses their causes in reference with the laws and regulations governing the construction industry in Kenya.

#### **2.3. Laws governing the construction industry**

##### **2.3.1. Environmental Management and Coordination Act (1999)**

The environmental management and coordination act No. 8 of 1999 is an act of parliament whose enactment was a combination of local and international activism success. This act provides for the establishment of an appropriate legal and institutional framework for the management of the environment. Prior to its enactment in 1999, there was no frame work for environmental legislation. Kenya's approach and administration to environmental issues was highly sectoral and legislation with environmental management components had been formulated largely in line with natural resource sectors.

Kenyan Acts of Parliament which mention the environment and/or natural resources are numerous. But some are more direct than others, and thus indicate certain critical areas of legal intervention in the management of natural resources and the environment. A prominent feature of Kenya's environmental legislation is its diffuse nature with provisions being contained in about 77 statues. Most of the statutes are sectoral either by the natural resources such as fisheries, water, forestry and wildlife, or by the functional sectors such as public health, agriculture, factories, mining, shipping or chiefs' authority

Its preamble is: "an act of Parliament to provide for the establishment of an appropriate legal and institutional framework for the management of the environment and for matters connected therewith and incidental thereto whereas it is desirable that a framework environmental legislation be promulgated so as to establish an appropriate legal and institutional framework for the management of the environment; and whereas it is recognized that improved legal and administrative co-ordination of the diverse sectoral initiatives is necessary in order to improve the national capacity for the management of the environment; and whereas the environment constitutes the foundation of national economic, social, cultural and spiritual advancement; now therefore be it enacted by the Parliament of Kenya."

The act is based on the recognition that improved legal and administrative coordination of diverse sectoral initiatives and it is necessary to improve national capacity for the management of the environment and it accepts the fundamental principle that environment constitutes the foundation of our national, economic, social, cultural and spiritual advancements.

Buildings form part of the environment and the construction industry in general is under direct authority of environmental management and coordination act. EMCA is mandated to supervise and ensure that holistic environment is achieved and maintained through out the construction period.

In the section (2) of this act, interpretation, defines

**Developer** means a person who is developing a project which is subject to an environmental impact assessment process under this Act;

**environment** includes the physical factors of the surroundings of human beings including land, water, atmosphere, climate, sound, odour, taste, the biological factors of animals and plants and the social factor of aesthetics and includes both the natural and the built environment;

**Pollutant** includes any substance whether liquid, solid or gaseous which —

- a) May directly or indirectly alter the quality of any element of the receiving environment;
- b) is hazardous or potentially hazardous to human health or the environment; and includes objectionable odours, radio-activity, noise, temperature change or physical, chemical or biological change to any segment or element of the environment;



**pollution** means any direct or indirect alteration of the physical, thermal, chemical, biological, or radio-active properties of any part of the environment by discharging, emitting, or depositing wastes so as to effect any beneficial use adversely, to cause a condition which is hazardous or potentially hazardous to public health, safety or welfare, or to animals, birds, wildlife, fish or aquatic life, or to plants or to cause contravention of any condition, limitation, or restriction which is subject to a license under this Act;

**effluent** means gaseous waste, water or liquid or other fluid of domestic, agricultural, trade or industrial origin treated or untreated and discharged directly or indirectly into the aquatic environment;

Section 117(1) establishes the office of the inspectorate section

117(2) gives the duties of the inspector bestowed to him by this act

117(2) (b) gives the inspect the powers to monitor the activities of other sector-specific environmental inspectorates;

Section 148 states that, "Any written law, in force immediately before the coming into force of this Act, relating to the management of the environment shall have effect subject to modifications as may be necessary to give effect to this Act, and where the provisions of any such law conflict with any provisions of this Act, the provisions of this Act shall prevail."

This act also controls the amount of noise produced from the construction site and mandates the contractor to maintain acceptable noise standards at all times. This act defines Noise as "any undesirable sound that is intrinsically objectionable or that may cause adverse effects on human health or the environment." Under clause 101 (standards of noise)

Under this act noise from the construction sites should be kept at the reasonable levels. This could be achieved through: Breakers and other plant or machinery should be fitted with silencers. Barriers should be erected to reduce the spread of noise. Work should be sequenced to minimize the number of people exposed to noise. Other people not involved in the work should be kept away. Suitable hearing protection should be provided and worn in noisy areas

Under the clause 101 named **Standards for noise** the act gives mandate for a formation of The Standards and Enforcement Review Committee which shall, in consultation with the relevant lead agencies—

- a) recommend to the Authority minimum standards for emissions of noise and vibration pollution into the environment as are necessary to preserve and maintain public health and the environment;
- b) establish and submit to the Authority criteria and procedures for the measurement of noise and vibration pollution into the environment;
- c) establish and submit to the Authority criteria and procedures for the measurement of subsonic vibrations;
- d) establish and submit to the Authority standards for the emission of sub-sonic vibrations which are likely to have a significant impact on the environment;
- e) recommend to the Authority guidelines for the minimization of sub-sonic vibrations, referred to in paragraph (d) from existing and future sources;
- f) establish and submit to the Authority noise level and noise emission standards applicable to construction sites, plants, machinery, motor vehicles, aircraft including sonic boom, industrial and commercial activities;
- g) recommend to the Authority measures necessary to ensure the abatement and control of noise from sources referred to in paragraph (f);
- h) measure the levels of noise emanating from the sources referred to in paragraph (f) details of which measurements shall be given to the owner or occupier of the premises from which the measurement was taken; and
- (i) Recommend to the Authority guidelines for the abatement of unreasonable noise and vibration pollution emitted into the environment from any source.

This act requires the owner of the premises or the operator of a project for which an environmental impact assessment study report has been made to keep accurate records and make annual reports to the Authority describing how far the project conforms in operation with the statements made in the environmental impact assessment study report submitted under section 58(2).

It also requires the owner of premises or the operator of a project to take all reasonable measures to mitigate any undesirable effects not contemplated in the environmental impact assessment study report submitted under section 58(2) and to prepare and submit an

environmental audit report on those measures to the Authority annually or as the Authority may, in writing, require.

### **2.3.1.1. Environmental Health**

The health of the environment is a broad issue that should apply to any activity occasioning environmental degradation. However, what we have in Kenya is construed rather narrowly to apply only to environmental problems which affect the human body, but not including diseases. For brief analytical purposes, it is handled in four subsections, namely:

- (a) Public Health
- (b) The Working Environmental
- (c) Radiation Control
- (d) The Management of Hazardous Wastes

#### **(a) Public Health**

Under this section the review is confined to the provision of the Public Health Act (Cap 242), the Traffic Act (Cap 403), the Local Government Act (Cap 265), the Penal Code (Cap 63) and the Factories Act (Cap. 514). Within the Public Health Act, the sections on housing and prevention of mosquitoes are directly pertinent.

On sanitation the Act borrows from the common law doctrine of nuisance which makes it an offence for any landowner or occupier to allow nuisance or any other condition liable to be injurious or dangerous to health to prevail on his land. A medical health officer, once satisfied of the danger, may issue an order requiring the owner or occupier of the land to remove the nuisance.

In addition, the Minister on the advice of the Central Board of Health may make rules and confer powers and impose duties for the carrying out of environmental health matters. Such matters may include inspection of building for their sanitary condition, construction standards and ventilation for buildings, drainage of land, keeping of animals etc.

Fighting malaria is also a critical environmental task dealt under the Act. Part XII makes it an offence to leave on one's land or premises, any collection of water, sewage, rubbish, well, pool, gutter, channel cesspit, latrine, urinal or dung pit where mosquitoes may breed. Such a situation constitutes a nuisance. Any person who fails to clear such a nuisance is guilty of an offence under the Act.

Environmental health requirements are also provided for under the general powers and duties of the local authorities in the *Local Government Act (Cap 265)*. Municipal Councils are required to provide and maintain sanitary services, sewage and drainage facilities, take measures for the control, destruction of rats, vermin, insects and pests, control or prohibit industries, factories and businesses which emit smoke, fumes, chemicals, gases, dust, smell, noise vibrations, discomfort or annoyance to the neighborhood, and to prohibit or control work or trade of disinfection or fumigation by cyanide or other means.

The *Penal Code (Cap 65)* carries the offence of common nuisance identical to that in the Public Health Act. The offence under the Penal Code is a misdemeanor punishable by imprisonment for one year. This however is distinct from that in the Public Health Act which may require the offender to abate the offence.

Air pollution is dealt with by the Traffic Act (Cap 403) and the Factories (Amendment) Act of 1990. The Factories Act specifically prohibits factories from emitting any dust, fumes or impurities into the atmosphere without undergoing appropriate treatment to prevent air pollution or other ill effects to life and property. The amendment further prohibits the use of any stationary internal combustion engine, discharging exhaust gas into the atmosphere without treatment.

The Traffic Act prohibits air pollution through Section 51 which requires that motor vehicle use proper fuels. The Rules promulgated under the Act provide that every vehicle be so constructed, painted and used as not to emit any smoke, or visible vapor.

Air pollution as a manifestation of nuisance is also prohibited under the Mining Act (Cap 306). Section 26 requires that a holder of prospecting or mining license who causes a nuisance or damage to a landowner or lawful occupier to pay reasonable compensation for such nuisance or damage.

## **(b) The Working Environment**

The statute relevant to this subject is the Factories Act (Cap 514). The primary environmental requirements under the Factories Act are that each factory must observe as high standards of cleanliness as are possible for the respective operations; avoid overcrowding, construct and maintain adequate ventilation, provide and maintain suitable natural or artificial lighting, as appropriate, provide drainage of floors and construct and maintain clean sanitary conveniences. The Minister for Labor may make rules specifying the requirements for these standards. All the standards prescribed and the rules promulgated by the Minister are however to be enforced by the local authority with the jurisdiction over the area in question. The Act also establishes the National Advisory Committee on Occupational Health and Safety chaired by the Chief Inspector of factories who is responsible to the Minister for Labor.

## **(c) Radiation Control**

Since 1982, Kenya decided to join in the global movement for the use of nuclear energy for peaceful purposes, a movement led by the International Atomic Energy Agency (IAEA). Most of such uses are in the fields of medicine, agriculture, energy and environmental monitoring. The dangers of injury to the public prompted the adoption of the Radiation Protection Act (Cap 243) in November 1984 to provide according to its citation, protection of the public and radiation workers from the dangers arising from the use of devices or materials capable of producing ionizing radiation and for connected purpose.

The Act prohibits the unauthorized manufacture, production, possession or use, sale, disposal, lease, loan or dealership, import, export of any irradiating device or radioactive material. All authorized buyers, sellers, users, of such device must be properly licensed. The Act is administered by the Chief Radiation Protection Officer assisted by a Radiation Protection Board,

## **(d) Management of Hazardous Waste**

The radiation protection focuses largely on protection of human beings against injury by such wastes or radiations. The Public Health Act also is concerned with the protection of human health. Section 75 of the Constitution whose purpose is protection from the deprivation of property, empowers the government to acquire property "in circumstances where it is necessary to do so because property is in a dangerous state or injurious to the health of human

beings or animals or plants." This is the closest reference to the protection of the environment. To date, Kenya does not have a statute that deals with the management of hazardous waste (including disposal) as such.

And despite the numerous international conventions and protocols that deal with hazardous waste such as the London Convention, the Basel Convention and the Bamako Convention, it still remains for Kenya to develop and adopt national legislation on the management of hazardous waste. The current Environmental Management and Co-ordination Act in Kenya, only provides for framework law for the management of hazardous wastes. Currently, the National Environment Management Authority is in the process of developing regulations that will prescribe for the management of waste. These Regulations will have to be gazetted by the Minister of Environment and Natural Resources before they can be enforced as law.

The environmental management and coordination Act established a number of institutions for the management of the environment in Kenya.

For the purposes of this study only one will be reviewed;

### **2.3.1.2. The National Environment Management Authority (N.E.M.A)**

#### **Object and Purpose of NEMA**

NEMA is the institution with the legal authority to exercise general supervision and co-ordination over all matters relating to the environment, and is the principal instrument of the Government charged with the implementation of all policies relating to the environment.

#### **Functions of NEMA**

NEMA's functions, which determine its scope of activities, are more particularly set out in Section 9 (2) of the Act. They include co-ordination the various environmental management activities being undertaken by the lead agencies and promoting the integration of environmental consideration into development policies, plans, programs and projects; undertake in co-operation with relevant lead agencies programs intended to enhance environmental education and public awareness about the need for sound environmental management, publish and disseminate manuals, codes or guidelines relating to environmental management, prepare and issue an annual report on the state of the environment in Kenya and

in this regard may direct any lead agency to prepare and submit to it a report on the state of the sector of the environment under the administration of the lead agency establishing and reviewing, in consultation with relevant lead agencies, land use guidelines; advising the Government on legislative and other measures for the management of the environment or the implementation of relevant international conventions, treaties and agreements in the field of environment; advising the Government on regional and international environmental conventions, treaties and agreements to which Kenya is a party, mobilizing and monitoring the use of financial and human resources for environmental management; and rendering advice and technical support where possible to entities engaged in national resources management and environmental protection so as to enable them to carry out their responsibilities satisfactorily.

As such it is very clear that part of NEMA's role is to ensure that the public receives adequate information on aspects of environmental management in Kenya.

The department under NEMA which is responsible with the enforcement of the environmental laws is:

### **Compliance & Enforcement Department**

The Department ensures compliance to environmental legislations and regulations among all stakeholders.

#### **The main functions of the Department include:**

- Identifying projects and programmes, plans and policies for which environmental audit or environmental monitoring must be conducted under the Act;
- Ensuring EIAs and EAs are conducted to guide development activities through licensing and provide improvement guidelines for existing projects;
- Providing technical input to development of environmental regulations and standards; conducting regular inspections of facilities and premises to enforce compliance with legislations;

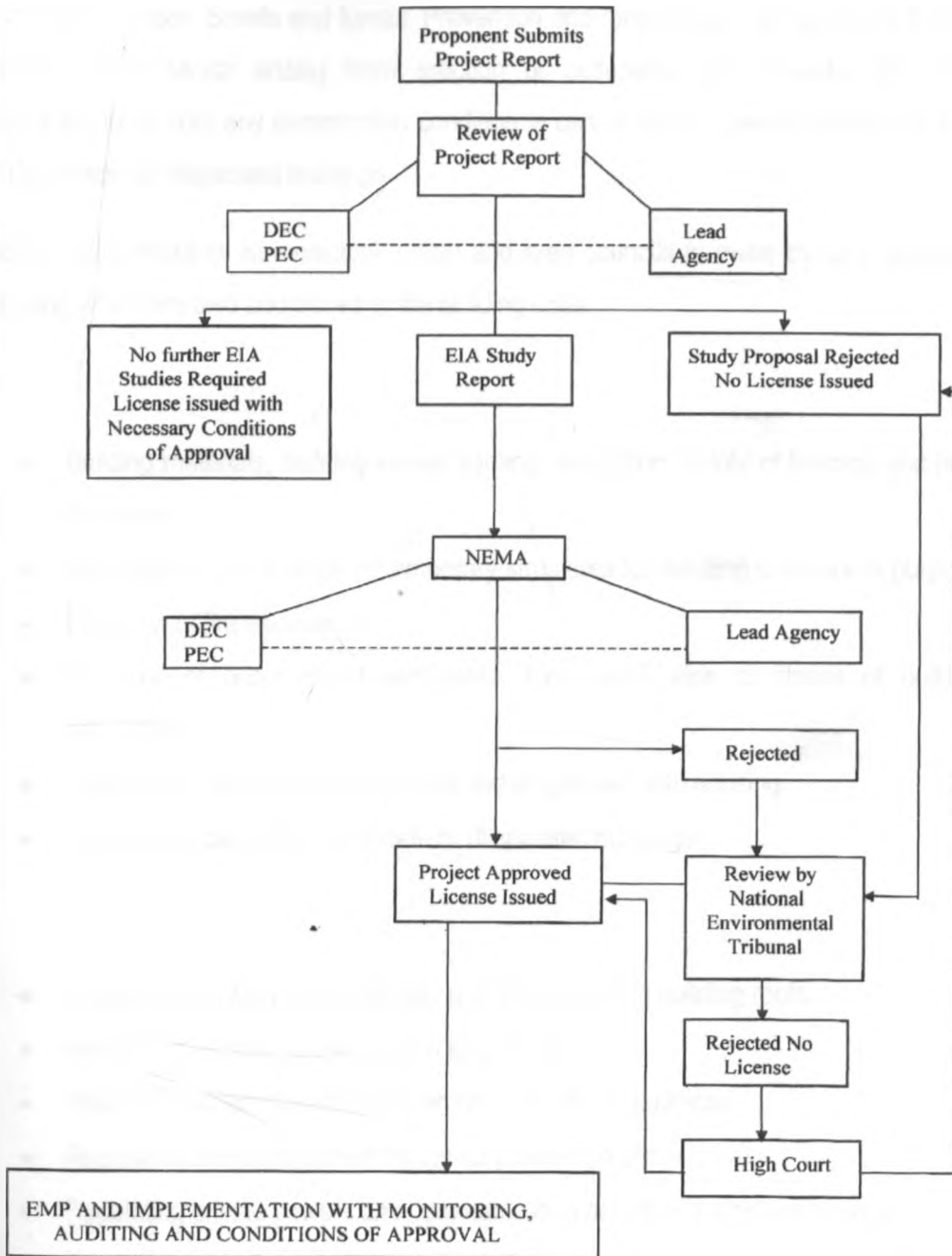
- Initiating and evolving procedures and safeguards for the prevention of accidents which may cause environmental degradation and evolving remedial measures where accidents occur;
- Promoting programmes and projects for effective and efficient management and use of cleaner production technologies.

**An environmental audit report compiled under NEMA Regulations should contain:-**

- a) a presentation of the type of activity being audited;
- b) an indication of the various materials, including non-manufactured material, the final products, and by-products, and waste generated;
- c) a description of the different technical activities, processes and operations of the project;
- d) a concise description of the national environmental legislative and regulatory frameworks on ecological and socio-economic matters;
- e) a description of the potentially affected environment on ecological and socio-economic matters;
- f) a prioritization of all past and on-going concerns of the project;
- g) an identification of all environmental and occupational health and safety concerns of the project;
- h) an opinion on efficacy and adequacy of the environmental management plan of the project;
- i) detailed recommendations for corrective activities, their cost, timetable and mechanism for implementation;
- j) an indication of the measures taken under the environmental management plan to ensure implementation is of acceptable environmental standards; and
- k) A non technical summary outlining the key findings, conclusions and recommendations of the auditor.



**Figure 2. 1 Environmental Impact Assessment Processes**



**Source:** National environmental management authority website

[www.nema.go.ke/departments](http://www.nema.go.ke/departments)

### **2.3.2. Public Health Act Cap 242**

This is an act of parliament to make provision of securing and maintaining health. Part IX deals particularly with sanitation and housing. It addresses such issues as

Discharge of waste, Smells and fumes, Prevention and remedying of all conditions liable to be injurious or to health arising from erection or occupation of unhealthy sites or from overcrowding or from any construction condition in use of space, Overcrowding and Authority for demolition of dilapidated buildings

Section 126D requires all municipal, urban and area councils to make by-laws regarding the following which are also addressed in the building code

A

- Building materials, building space, lighting, ventilation, height of building and height of chimneys
- Prohibition of the erection of temporary structures for dwelling or business purposes
- Provision of fire escape
- Provision of occupational certificates upon certification of fitness of building for occupation
- Compulsory provision to employers and employees with housing
- Compulsory demolition of unsafe or dilapidated buildings

B

- Regulating sanitary conveniences and drainage from building roofs
- Regulating excavations in relation to buildings
- Tanks and water supply for human consumption in buildings
- Regulating stores and other fittings for prevention of fire
- Regulating private sewers and communication between drains and sewers
- Regulating erection and use of scaffolding during construction demolition repair alteration or extension of any building
- Prohibition and regulation projections and obstructions in front of buildings and over streets

Issues under this act are addressed below the following clauses:

### 2.3.2.1. Rules under Part (clause126)

This clause gives the Minister powers on the advice of the board, may make rules and may confer powers and impose duties in connexion with the carrying out and enforcement thereof on local authorities, magistrates, owners and others as to—

- a) the inspection of land, dwellings, buildings, factories and trade premises, and for securing the keeping of the same clean and free from nuisance and so as not to endanger the health of the inmates or the public health;
- b) The construction of buildings, the provision of proper lighting and ventilation and the prevention of over-crowding;
- c) The periodical cleansing and whitewashing or other treatment of dwellings, and the cleansing of land attached thereto, and the removal of rubbish or refuse therefrom;
- d) the drainage of land, streets or premises, the disposal of offensive liquids and the removal and disposal of rubbish, refuse, manure and waste matters;
- e) The standard or standards of purity of any liquid which, after treatment in any purification works, may be discharged therefrom as effluent;
- f) the establishment and carrying on of factories or trade premises which are liable to cause offensive smells or effluvia, or to discharge liquid or other material liable to cause such smells or effluvia, or to pollute streams, or are otherwise liable to be a nuisance or injurious or dangerous to health, and for prohibiting the establishment or carrying on of such factories or trade premises in unsuitable localities or so as to be a nuisance or injurious or dangerous to health;
- g) the subdivision and general lay-out of land intended to be used as building sites, the level construction, number, direction and the width of streets and thoroughfares, the limitation of the number of dwellings or other buildings to be erected on such land, the proportion of any building site which may be built upon and the establishment of zones within which different limitations shall apply and of zones within which may be prohibited the establishment or conduct of occupations or trades likely to cause nuisance or annoyance to persons residing in the neighborhood;
- h) the inspection of the district of any local authority by that local authority with a view to ascertain whether the lands and buildings thereon are in a state to be injurious or dangerous to health, and the preparation, keeping and publication of such records as may be required.

### **2.3.2.2. By-laws as to buildings and sanitation (clause 126A)**

1. Every municipal council and every urban and area council may, and shall if so required by the Minister for the time being responsible for local government with the agreement of the Minister, make by-laws for all or any of the Following matters—

#### **(a) as regards buildings—**

- i. for controlling the construction of buildings, and the materials to be used in the construction of buildings;
- ii. for controlling the space about buildings, the lighting and ventilation of buildings and the dimensions of rooms intended for human habitation;
- iii. for controlling the height of buildings, and the height of chimneys (not being separate buildings) above, the roof of the buildings of which they form part;
- iv. for prohibiting the erection or use of temporary or movable buildings, whether standing on wheels or otherwise, and for prohibiting or restricting the use of tents or similar buildings for business or dwelling purposes;
- v. for requiring and regulating adequate provision for the escape of the occupants of any building in the event of an outbreak of fire;
- vi. for preventing the occupation of a new or altered building until a certificate of the fitness thereof for occupation or habitation has been issued by such local authority;
- vii. to compel employers to provide housing for their employees;
- viii. To compel owners to repair or demolish unsafe. dangerous or dilapidated buildings;

#### **(b) as regards works and fittings—**

- i. for regulating sanitary conveniences in connexion with buildings, the drainage of buildings (including the means for conveying refuse water and water from roofs and from yards appurtenant to buildings), the cleansing, drainage and paving of courts, yards and open spaces used in connexion with buildings and cesspools, and other means for the reception or disposal of foul matter in connexion with buildings;
- ii. for regulating excavations of any kind in connexion with buildings;
- iii. for regulating wells, tanks and cisterns for the supply of water for human consumption in connexion with buildings;

- iv. for regulating stoves and other fittings in buildings (not being electric stoves or fittings), in so far as by-laws with respect to such matters are required for the purposes of health and the prevention of fire;
- v. For regulating private sewers and communications between drains and sewers and between sewers;
- vi. For regulating the erection and use of scaffolding and hoarding during the construction, demolition, repair, alteration or extension of any building;
- vii. For prohibiting, securing the removal of and regulating projections and obstructions in front of buildings, and projections over streets, but no such by-law shall be inconsistent with or repugnant to any written law in force in the same area made under any other provision of this Act.

2. By-laws made under this section may include provision—

- a) As to the giving of notices and the deposit of plans, sections, specifications and written particulars; and
- b) as to the inspection of work the testing of drains and sewers, and the taking by such local authority as aforesaid of samples of materials to be used in the construction of buildings, or in the execution of other works; and for the payment of such reasonable charges and fees as the local authority may determine, for the doing of any of the things aforesaid.

If any work, to which building by-laws made under section 126A are applicable, contravenes any of those by-laws, the local authority which made them, without prejudice to its right to take proceedings in respect of the contravention, may by notice require the owner either to pull down or remove the work or, if he so elects, to effect such alterations therein as may be necessary to make, the comply with the by-laws

### **2.2.2.3. Latrines for factories and workshops, etc**

85. (1) The owner or occupier of every factory, workshop, workplace or other premises where persons are employed or in attendance shall provide such factory, workshop, workplace or other premises as aforesaid with proper and sufficient latrine accommodation, regard being had to the number of persons employed in or in attendance at such factory, workplace, workshop or other premises as aforesaid, and also, where persons of both sexes are or are to be employed or in attendance, with proper accommodation for persons of each sex, and such owner or

occupier shall, in the provision of such latrine accommodation, comply with the following requirements—

- a) in factories, workshops, workplaces or other premises as aforesaid where females are employed or in attendance, he shall provide one water-closet for every 25 females, or one pail closet for every 15 females ;
- b) in factories, workshops, workplaces or other premises as aforesaid where males are employed or in attendance, he shall provide one water-closet for every 25 males or one pail-closet for every 15 males:

Provided that, where the number of males employed or in attendance exceeds 100 and sufficient urinal accommodation is also provided, it shall be sufficient if there is one water-closet for every 25 males up to the first 100 and one for every 40 thereafter, or one pail-closet for every 15 males up to the first 105 and one for every 25 thereafter;

- c) he shall, in calculating the number of latrines required under subparagraphs (a) and (b) of this paragraph, reckon any number of persons less than 15, 25 or 40, as the case may be. as 15, 25 or 40 respectively;
  - i. he shall cause every latrine to be kept in a cleanly state;
  - ii. he shall cause every latrine to be under cover and so partitioned off as to secure privacy, and if for the use of females to have proper doors and fastenings;
  - iii. he shall cause all latrine accommodation to be so arranged and maintained as to be conveniently accessible to all persons employed in such factory, workshop, workplace or other premises as aforesaid at all times during their employment;
  - iv. he shall, where persons of both sexes are employed, cause the latrines for each sex to be so placed or so screened that the interior is not visible, even when the door of any latrine is open, from any place where persons of the other sex have to work or pass; and. if the latrines for one sex adjoin those for the other sex, the approaches shall be separate;
  - v. He shall, when so required by the local authority, because every latrine which is used at night to be provided with adequate lights kept lighted during the night.

(2) If it appears to the local authority that the provisions of this rule have not been complied with in regard to any factory, workshop, workplace or other premises where persons are employed or m attendance, the local authority shall serve a written notice upon the owner or occupier of

such factory, workshop, workplace or other premises as aforesaid requiring such owner or occupier, within a time specified in such notice, to provide proper and sufficient latrine accommodation in accordance with this rule. And any such owner or occupier, who fails to comply with the requirements of any such notice which has been served upon him, and that within the time specified, shall be guilty of an offence.

### **2.3.3. The factories act chapter 514**

This is an act of parliament making provision for health safety and welfare of persons employed in factories and other places and for matters incidental thereto and connected there with. This act came into operation on 1<sup>st</sup> September 1951

For the purposes of this act building site is considered as a factory. Under this act building operation is defined as the construction structural alteration, repair or maintenance of a building (including repainting, redecoration and external cleaning of the structure), the demolition of a building and the preparation for and laying the foundation of an intended building, but does not include any operation which is a work of engineering construction within the meaning of this Act

An employee in a construction site is exposed to a myriad of risks and care should be taken to ensure protection of persons and property of the employee. The contractor who does not take adequate reasonable measures to protect the employee from any kind of risk is strictly liable for the consequences thereof. Reasonable care involves not exposing the employees to any risks which the employer can reasonably foresee. The employer should safeguard the employees against risk and to ensure that high standards of cleanliness are maintained at all times. Machinery should be properly fenced and all the machines should be of good condition. Sound materials of adequate strength which are free from latent defects should always be used. The employer is also required to ensure that the site is safe by ensuring that passages are free from any obstruction or slippery substances.

The act covers

All areas or premises where persons are employed on manual labour and work for gain

The act covers all premises in which construction, reconstruction, structural alterations, maintenance, repair and demolitions

This act provides that every site should be registered with the chief inspector under this act. The registration requires that one should apply in writing, satisfying the inspector that you are taking care of health and safety of workers

Non compliance of this act constitutes an offence under law and the defaulter can be prosecuted

#### **2.3.3.1. Ventilation of work places (clause 15)**

This act also provides for ventilation of work places under section 15. (1) Effective and suitable provision shall be made for securing and maintaining, by the circulation of fresh air in each workroom, the adequate ventilation of the room.

#### **2.3.3.2. Overcrowding (clause 14)**

This act also states that any work place should not be overcrowded as in section 14. (1) A factory shall not, while work is carried on, be so overcrowded as to cause risk of injury to the health of the persons employed therein.

#### **2.3.3.3. Cleaning (clause 13)**

This act also requires the factory or any work place to be kept clean as in PART IV—HEALTH—GENERAL PROVISIONS clause 13 which states that every factory shall be kept in a clean state, and free from effluvia arising from any drain, sanitary convenience or nuisance, and, without prejudice to the generality of the foregoing provision—

- a) accumulations of dirt and refuse shall be removed daily by a suitable method from the floors and benches of workrooms, and from the staircases and passages
- b) the floor of every workroom shall be cleaned at least once in every week by washing or, if it is effective and suitable, by sweeping or by any other method



#### **2.3.3.4. Lighting in the workplace (clause16)**

The act requires that the work place should be lighted as in clause16.

(1) Effective provision shall be made for securing and maintaining sufficient and suitable lighting, whether natural or artificial, in every part of a factory in which persons are working or passing.

(2) All glazed windows and skylights used for the lighting of workrooms shall, so far as practicable, be kept clean on both the inner and outer surfaces and free from obstruction: Provided that this subsection shall not affect the whitewashing or shading of windows and skylights for the purpose of mitigating heat or glare.

#### **2.3.3.5. Use of machinery (clause 24)**

This act in clause 24 also gives instructions on the use of machinery by the workers and gives the provisions on the use of such transmission machinery on site

- a) the examination, lubrication or other operation as aforesaid is carried out by a male person who—has attained the age of eighteen years; and
- b) has been appointed by the occupier of the factory, by certificate attached to the general register, to carry out such examination, lubrication or other operation, and has been furnished by the occupier with a signed copy of such certificate; and
- c) has been sufficiently trained for the purposes of the work entailed by, and is acquainted with the dangers of moving machinery arising in connexion with, such examination, lubrication or other operation; and
- d) has been provided by the occupier with and is wearing a close-fitting single-piece overall suit in good repair, which is fastened by means having no exposed loose ends and has no external pockets other than a hip pocket; and
- e) another person, instructed as to the steps to be taken in case of emergency, is immediately available within sight or hearing of any person carrying out such examination, lubrication or other operation; and
- f) any ladder in use for the carrying out of such examination, lubrication or other operation is securely fixed or lashed, or is firmly held by a person stationed at the foot of the ladder.

### **2.3.3.6. Training and Supervision of Inexperienced Workers (clause 29)**

The act also provides for Training and supervision of inexperienced workers in clause 29 which states No person shall be employed at any machine or in any process, being a machine or process liable to cause bodily injury, unless he has been fully instructed as to the dangers likely to arise in connexion therewith and the precautions to be observed, and—

- a) has received a sufficient training in work at the machine or in the process; or
- b) Is under adequate supervision by a person who has a thorough knowledge and experience of the machine or process.

### **2.3.3.7. Hoists and lifts (clause 30)**

This clause gives guidelines on hoists and lifts used in the construction sites. It gives a detailed description on the use of these lifts. This clause provides:

- (1) Every hoist or lift shall be of good mechanical construction, sound material and adequate strength, and be properly maintained.
- (2) Every hoist or lift shall be thoroughly examined at least once in every period of six months by a person approved for the purposes of this section by the chief inspector by certificate in writing, and a report of the result of every such examination, in the prescribed form and containing the prescribed particulars, shall be signed by the person making the examination and shall within fourteen days be entered in or attached to the general register.
  - a) Where the examination under subsection (2) of this section shows that the hoist or lift cannot continue to be used with safety unless certain repairs are carried out immediately or within a specified time, the person making the report, shall within seven days of the completion of the examination, send a copy of the report to the chief inspector who may issue an improvement notice or a prohibition notice as appropriate.
  - b) The powers conferred on the chief inspector by subsection (2A) of this section except this power of delegation may be delegated to any inspector by the chief inspector by notice in the Gazette.
- (3) Every hoist way or lift way shall be efficiently protected by a substantial enclosure fitted with gates, being such an enclosure as to prevent, when the gates are shut,

any person falling down the way or coming into contact with any moving part of the hoist or lift.

- (4) Any such gate as aforesaid shall be fitted with efficient interlocking or other devices to secure that the gate cannot be opened except when the cage or platform is at the landing and that the cage or platform cannot be moved away from the landing until the gate is closed.
- (5) Every hoist or lift and every such enclosure as aforesaid shall be so constructed as to prevent any part of any person or any goods carried in the hoist or lift being trapped between any part of the hoist or lift and any fixed structure or between the counterbalance weight and any other moving part of the hoist or lift.
- (6) There shall be marked conspicuously on every hoist or lift the maximum working load which it can safely carry and no load greater than that load shall be carried on any hoist or lift.
- (7) The following additional requirements shall apply to hoists and lifts used for carrying persons, whether together with goods or otherwise—
  - a) efficient automatic devices shall be provided and maintained to prevent the cage or platform overrunning;
  - b) every cage shall, on each side from which access is afforded to a landing, be fitted with a gate, and in connexion with every such gate efficient devices shall be provided to secure that, when persons or goods are in the cage, the cage cannot be raised or lowered unless the gate is closed, and will come to rest when the gate is opened;
  - c) in the case of a hoist or lift constructed or reconstructed after the passing of this Act, where the platform or cage is suspended by rope or chain, there shall be at least two ropes or chains separately connected with the platform or cage, each rope or chain and its attachments being capable of carrying the whole weight of the platform or cage and its maximum working load, and efficient devices shall be provided and maintained which will support the platform or cage with its maximum working load in the event of a breakage of the ropes or chains or any of their attachments.

(8) In the case of a hoist or lift not connected with mechanical power—

(a) Subsection (7) of this section shall not apply; and

(b) for subsection (4) of this section the following subsection shall be substituted— (4) Any such gate as aforesaid shall be kept closed and fastened except when the cage or platform is at rest at the landing.; and

(c) in subsection (2) of this section, for the reference to six months there shall be substituted a reference to twelve months.

(9) For the purposes of this section, no lifting machine or appliance shall be deemed to be a hoist or lift unless it has a platform or cage the direction of movement of which is restricted by a guide or guides.

(10) If it is shown to the satisfaction of the chief inspector that it would be unreasonable in the special circumstances of the case to enforce any requirement of this section in respect of any class or description of hoist, lift, hoist way or lift way, he may, by notice published in the Gazette, except from such requirement hoists, lifts, hoist ways or lift ways of that class or description; and any such exception may be unqualified or may be subject to such conditions as may be contained in the notice

#### **2.3.3.8. Cranes and lifting machines (Clause 32)**

This clause provides for the quality of the materials, parts for the cranes and lifting machines and also provides for their inspection

(1) All parts and working gear whether fixed or movable, including the anchoring and fixing appliances, every lifting machine shall be of good construction, sound material, and adequate strength and free from patent defect, and shall be properly maintained.

(2) All such parts and gear as aforesaid shall be thorough examined, at least once in every period of fourteen months, by a person approved for the purposes of this section by the chief inspector by certificate in writing.

### **2.3.3.9. Safe means of access and safe place of employment (clause 34)**

This clause gives directions on what should be done to ensure that there is safe access to place of work and also the place of work generally. These are addressed as follows:

All floors, steps, stairs, passages and gangways shall be of sound construction and properly maintained.

All openings in floors shall be securely fenced, except in so far as the nature of the work renders such fencing impracticable.

There shall, so far as is reasonably practicable, be provided and maintained safe means of access to every place at which any person has at any time to work.

For every staircase in a building or affording a means of exit from a building, a substantial hand-rail shall be provided and maintained, which, if the staircase has an open side, shall be on that side, and, in the case of a staircase having two open sides, such a hand-rail shall be provided and maintained on both sides; and any open side of a staircase shall also be guarded by the provision and maintenance of a lower rail or other effective means.

All ladders shall be soundly constructed and properly maintained.

Sufficient clear and unobstructed space shall be maintained at every machine while in motion to enable the work to be carried on without unnecessary risk.

Where any person is to work at a place from which he will be liable to fall a distance more than ten feet, then, unless the place is one which affords secure foothold and, where necessary, secure handhold, means shall be provided, so far as is reasonably practicable, by fencing or otherwise for ensuring his safety.

Every teagle opening or similar doorway used for hoisting or lowering goods or materials, whether by mechanical power or otherwise, shall be securely fenced, and shall be provided with a secure handhold on each side of the opening or doorway; the fencing shall be properly maintained and shall, except when the hoisting or lowering of goods or materials is being carried on at the opening or doorway, be kept in position

### **2.3.3.10. Supply of drinking water (Clause 46)**

- 1) An adequate supply of wholesome drinking water shall be provided and maintained at suitable points conveniently accessible to all persons employed.
- 2) A supply of drinking water which is not laid on shall be contained in suitable vessels, and shall be renewed at least daily, and all practicable steps shall be taken to preserve the water and vessels from contamination, and a drinking water supply (whether laid

on or not) shall, in such cases as an inspector may direct, be clearly indicated by a notice in English and in such vernacular languages as the inspector may require.

#### **2.3.3.11. Washing facilities (Clause 47)**

There shall be provided and maintained for the use of employed persons adequate and suitable facilities for washing, which shall be conveniently accessible and shall be kept in a clean and orderly condition.

#### **2.3.3.12. Accommodation for clothing (Clause 48)**

There shall be provided and maintained for the use of employed person's adequate and suitable accommodation for clothing not worn during working hours.

#### **2.3.3.13. First-aid facilities (Clause 50)**

- (1) There shall be provided and maintained so as to be readily accessible a first-aid box or cupboard of the prescribed standard, and where more than one hundred and fifty persons are employed an additional box or cupboard for every additional one hundred and fifty persons.
- (2) For the purposes of subsection (1) of this section, the number of persons employed in a factory shall be taken to be the largest number of persons employed therein at any one time, and any fraction of one hundred and fifty shall reckoned as one hundred and fifty; and, where the persons employed are employed in shifts, the calculation of the number employed shall be according to the largest number at work at any one time.
- (3) Nothing except appliances or requisites for first-aid shall be kept in a first-aid box or cupboard.
- (4) Each first-aid box or cupboard shall be placed under the charge of a responsible person, who shall always be readily available during working hours, and a notice shall be affixed in every workroom stating the name of the person in charge of the first-aid box or cupboard provided in respect of that room.

#### **2.3.3.14. Protective clothing and appliances (Clause 53)**

Where in any factory workers are employed in any process involving exposure to wet or to any injurious or offensive substance, suitable protective clothing and appliances, including, where necessary, suitable gloves, footwear, goggles and head coverings, shall be provided and maintained for the use of such workers

### **2.3.3.15. Protection of eyes in site processes.( Clause 54)**

Where in any factory electric arc welding is carried on, effective provision shall be made, by screening or otherwise, to prevent persons employed (other than persons employed in the welding process) being exposed to the electric arc flash.

## **2.3.4. The conditions of contract and the bills of contract**

There are various provisions in the bills of quantities which govern the safety of workers in the construction sites, the works themselves and the public either directly or indirectly. These are

### **2.3.4.1. Insurance of the works**

Under this clause it is the responsibility of the contractor to provide medical and other compensation to the employees when they are injured in the course of duty on the sites. The contractor should insure the works against the loss and damages and such insurances shall cover all the work executed and all unfixed materials and goods delivered to, placed on or adjacent to the works and equipment owned or hired by the contractor or any subcontractor. He should keep such work, materials and goods so insured until practical completion of the works. (Clause 13.12)The contractor should produce a certificate of inspection which is documentary evidence that the policies are properly endorsed and maintained (clause 13.13)

### **2.3.4.2. Sanitation of the works**

This is always provided in the contract documents; here the consultants should satisfy themselves that the site's sanitation is adequate and clean. It is the obligation of the contractor to ensure that these are enough adequately illuminated (where the works are to be carried out during the night), well labeled (male and female) and that they are to the acceptable standards.

### **2.3.4.3. Handling debris on site**

Debris is a major cause of dust in construction sites. The conditions of contract state that debris should be removed from site as soon as it is practicable and shall be constantly watered to minimize as long as the debris is on site and during the operation of removal.

### **2.3.4.4. Sign board**

The conditions of contract provide that a sign board should be erected by the contractor on the site to the satisfaction of the architect. This provides to the public information about the project. It notifies relevant authorities on the existence of the site should the contractor fail to register the project with the statutory or other authority.

### **2.3.4.5. Hoarding**

The conditions require that hoarding should be kept in place at all times. This should be kept clean at all times. Hoarding protects the sites and provides privacy of the site keeps off all intruders. A clean hoarding provides a neat and welcoming working environment hence this should be neatly constructed and well painted .Hoarding should be strong enough to ensure the safety of the public and adjoining properties from damage due to falling materials and other site processes.

### **2.3.4.6. Working space**

The contractor is obliged to provide adequate working space for the works .this ensures that there is no obstruction or interference with the public and other adjoining properties as well as reducing fatigue to workers. Working space is always priced and hence the contractor should provide for this space for the purposes of the work.

## **2.4. Site hazards**

The various laws governing the construction industry aims at achieving maximum safety for the workers on site, protecting the public and the environment against everything that would be injurious during the process of construction. It is recommended that you contact your relevant enforcing authority or other bodies before starting work to ensure that one knows all the requirements for health and safety.



**Before work starts on site;** Health and safety should be designed into constructions, before, during and after the building phase. It is cheaper and easier to control the risks to workers in construction before work starts on site, for example by:

- putting in place a purchasing policy for machinery and work equipment (for example, buying tools with low noise and vibration emissions);
- setting health and safety requirements in tender specifications (meeting national legislation as a minimum);
- planning the work process to minimize the number of workers who could be harmed (for example, schedule noisy work when the least number of workers are likely to be exposed);
- starting your control activities before getting to site (for example, by planning, training, site induction and maintenance activities);
- setting down the procedures for effective consultation and participation of workers on OSH issues;
- Ensuring all persons, including managers, are trained and able to carry out their work without risk to the safety or health of themselves or other workers.

#### **2.4.1. Management on site**

Employers, with project supervisors, must cooperate and protect workers' health and safety.

This can be achieved by:

- avoiding risks to all workers as much as possible
- evaluating risks that cannot be avoided and hence design the means and ways of handling them whenever they happen
- combating risks at source;
- using collective measures to protect workers;
- using individual measures where there are no other alternatives;
- establishing emergency procedures;
- informing workers of the risks present and the necessary control measures;
- Ensuring the appropriate training is given. The process of evaluating risks that cannot be avoided is called a risk assessment. It should identify:
  - potential dangers (hazards);
  - who might be harmed and how seriously;
  - how likely this harm might happen;

- the actions required to eliminate or reduce the risk to workers;
- Which actions should be taken first? The control measures should be put in place and checks made to ensure that they are working and are meeting legal requirements.

## **Worker consultation**

Consulting the workforce on health and safety measures is not only a legal requirement; it is an effective way to ensure that workers are committed to health and safety procedures and improvements. Employees should be consulted on health and safety measures and before the introduction of new technology or products.

### **2.4.2. Key hazards and risks at the construction sites.**

There are many ways to be killed, injured, or suffer ill health on a construction site, including:

- i. **Falling from a height;**
  - a) **Scaffolds**

Scaffolds and work platforms should be erected, altered and dismantled by competent persons

Scaffolds should be of the acceptable quality and strength to support the weights

Safe access method for example a ladder should be provided to the scaffold platform to ensure that the operatives do not stretch to reach the platform.

Uprights should be provided with base plates (and, where necessary, timber sole plates) or prevented in some other way from slipping or sinking which could lead to tipping of the scaffolds leading to falls.

Uprights, ledgers, braces and struts should be put in position to ensure that the operatives could fall off the scaffolds.

Scaffold should be secured to the building or structure in enough places to prevent collapse which could hence lead to falls of the operatives.

Scaffolds should have adequate guardrails and toe boards or an equivalent standard of protection at every edge from which a person could fall 2 m or more. Intermediate guardrails should be fitted hence the worker could fall off.

## b) Ladders

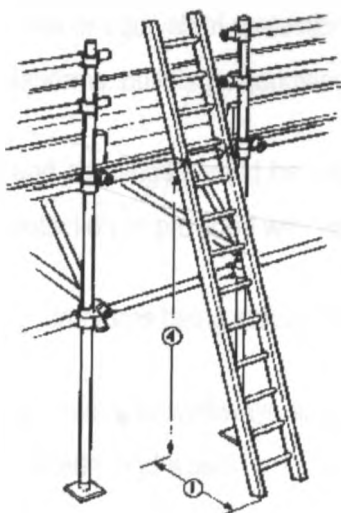
Ladders supplied should be the right means of access for this project or job. Ladders used by the contractors and our sub-contractors should be in good condition and of good material of acceptable strength

Ladders should be secured to prevent them slipping sideways or outwards which could lead to falls. Ladder's sections must be raised to a sufficient height above their landing place otherwise if not, other hand-holds should be available to ensure that the operatives do not fall off as they stretch

Ladders should be positioned so that users don't have to over-stretch or climb over obstacles to work

Ladder being used should be rested against a solid surface and not on fragile or insecure materials which could cause them to fall or slip causing injuries. Figure 1.0 shows a well secured ladder. The ladder should be inclined at a ratio of 1:4

**Figure 2. 2 Well Secured Ladders**



Source: <http://www.healthandsafety.co.uk>

### **c) Roof work**

This could be avoided by;

There should be enough barriers in place and other edge protection as applicable, to stop people or materials falling from roofs.

The roof battens should provide safe hand and foot holds. If not, are crawling ladders or boards should be provided and used to prevent workers from falling.

During industrial roofing, precautions should be taken to stop people falling from the leading edge of the roof or from fragile or partially fixed sheets, which could give way.

Suitable barriers, guardrails or covers, etc should be provided where people pass or work near fragile material such as roof lights.

Crawling boards should be provided, where work on fragile materials cannot be avoided.

### **d) Access to safe places of work on site**

Gangways, passageways, passenger hoists, staircases, ladders and scaffolds should be in good condition as a means of access to work places on site.

Guard rails or equivalent protection to stop falls from open edges on scaffolds, mobile elevating work platforms, buildings, gangways etc should be provided.

Holes and openings should be securely guard railed, provided with an equivalent standard of edge protection or provided with fixed, clearly marked covers to prevent falls.

Working structures being stable adequately braced and not overloaded.

Working areas and walkways should be level and free from trip hazards, obstructions such as stored material and waste

Work area and interior being adequately lit and having sufficient additional lighting provided when work is carried on after dark or inside buildings for clear vision.

## **ii. Being involved in a vehicle accident;**

This can be avoided by;

There should be separate pedestrian, vehicle access points and routes around the site. If not, vehicles and pedestrians should be kept separate wherever possible.

One-way systems or turning points should be provided to minimize the need for reversing and where vehicles have to reverse, they should be properly controlled by a trained banksman.

Vehicles should be well maintained to ensure that the steering, handbrake and footbrake work properly. Drivers should have received proper training.

Vehicles should be securely loaded

Passengers should not be allowed riding in dangerous positions.

## **iii. Getting an electric shock**

This can be avoided by;

Lowest necessary supply voltage for tools and equipment the lowest necessary for the job (using battery operated tools and reduced voltage systems, e.g. 110V, or even lower in wet conditions)

Failure to use trip devices e.g. residual current devices (RCDs) provided for all equipment where mains voltage has to be used.

Protecting RCDs (residual current devices) from damage, dust and dampness. Users must check them daily

Protecting the cables and leads from damage by sheathing, protective enclosures or by positioning them away from causes of damage.

Providing proper connections to the system, and suitable plugs must be used.

Appropriate system of user checks must be performed formal visual examinations by site managers and combined inspection and test by competent persons for all tools and equipment.

Scaffolders, roofers etc or cranes or other plant, must not work near or under overhead lines while the electricity supply has not been turned off, or have other precautions, such as 'goal posts' or taped markers not being provided to prevent them contacting the lines.

Underground electricity cables must be located (with a cable locator and cable plans), marked, and precautions for safe digging been taken

#### **iv. Being buried during excavation work**

This can be avoided by;

Adequate supply of timber, trench sheets, props or other supporting material must be provided before excavation work begins as well as providing materials which are strong enough to support the sides of the excavations.

Safe method should be used for putting in the support, i.e. one that does not rely on people working within an unsupported trench

Sufficient angle to prevent collapse should be provided for the excavations where the sides are either sloped back battered.

The contractor should provide a safe access to the excavation, e.g. by a sufficiently long, secured ladder.

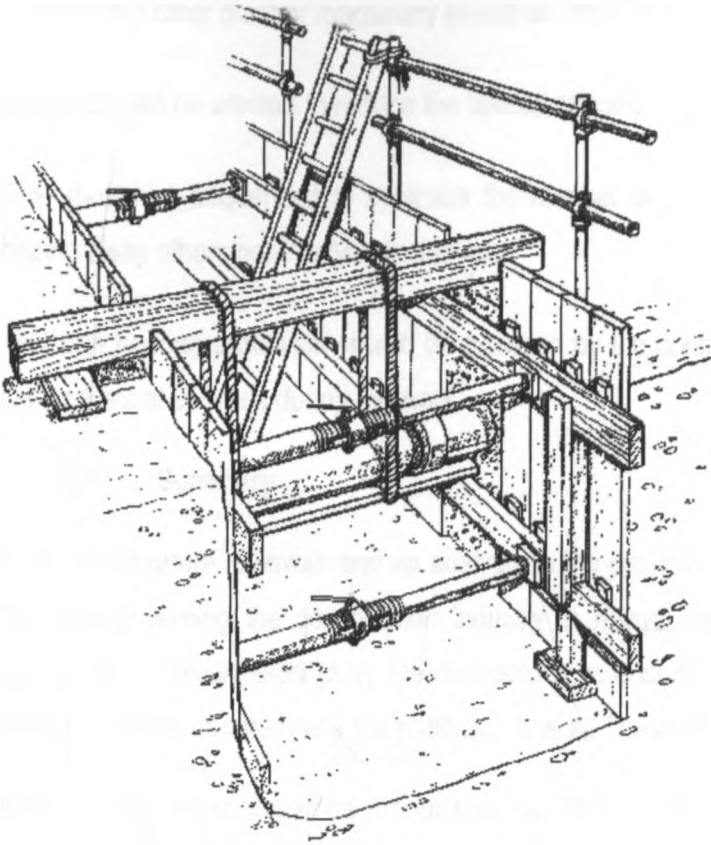
Guardrails or other equivalent protection to stop people falling in must be provided.

Properly secured stop blocks provided to prevent tipping vehicles falling in must be provided.

Storing materials spoil or plant should not be stored near the edge of the excavation to avoid the likelihood of a collapse of the side.

Excavation should be inspected by a competent person at the start of every shift, after any accidental collapse or event likely to have affected its stability.

**Figure 2. 3 Safe Foundation Shoring**



Source: <http://www.healthandsafety.co.uk>

**v. Suffering a bad back from handling heavy materials;**

This can be avoided by;

Assessing the risk of manual handling injuries

Minimizing the use of hoists, wheel-barrow and other plant or equipment which are used for manual lifting and handling of heavy objects.

Materials such as cement should be ordered in reasonable weights

The team should avoid the handling of heavy blocks.

**vi. Suffering hearing loss from loud noise;**

This can be avoided by;

Breakers and other plant or machinery should be fitted with silencers

Barriers should be erected to reduce the spread of noise

Work should be sequenced to minimize the number of people exposed to noise as well as keeping away others not involved in the work

Suitable hearing protection should be provided by the contractor and must be put on by the workers at all times during the work.

**2.5. Summary**

From the literature reviewed and an analysis to the provisions in the constitution of Kenya on the laws governing the construction industry in Kenya, several issues are raised. These issues should be adhered to by the contractors, to ensure site health and safety as well as safety of the environment and the public in general. These are summarized below.

Noise control, there should be proper noise controls on site to ensure that there is no noise pollution. This obliges the contractors to provide for noise control strategies on site

Prevention of overcrowding on sites, this ensures the health of site workers and hence the contractors should ensure that the sites are not overcrowded.

The contractors should also ensure that waste, refuse and debris are disposed correctly so as not to pollute the environment and that the construction site should be kept clean at all times. It also provides that the sites should be regularly watered so as to contain dust.

The provisions in law also provide for fire protection and hence the contractors should provide for fire fighting equipments and also provide for escape from the areas of work in the case of an out break of fire.

It's also a provision under law that the employer (contractor) should provide latrines and sanitation for use on site. The law also provides that such latrines should be adequate and should be kept clean at all times. It also provides the minimum numbers of each to be provided. It also demands that they should be separated for both sexes and sealed for vicinity of their inside by the members of the opposite sex.



The law provides that the work places should be well ventilated to ensure adequate circulation of air and this ensures the health of the workers thereto.

The law also provides that the work places should be well lighted. This is meant to ensure the safety of the workers who work in dark parts for example basements and where work is done at night

The law also gives guidelines on the use of machinery on the work places and provides that the machines should be of good condition, and well maintained. The operators of these machines should be competent so as not to risk the lives of other workers on site.

The laws provide that the inexperienced workers should be trained for the work and that they should be supervised by a competent person. This is to ensure that these workers do not risk their lives as well as the lives of the other workers on site and also the public.

The laws give guidelines on the use of cranes and other lifting materials and this ensures the safety of the workers on site as well as the safety of the operators of these machines. Hoists and lifts are also covered in these laws and guidelines provided to control their use.

The law provides that every worker should have a safe means of access to the place of work and that the place itself should be safe. This obliges the contractors to ensure that guard rails are in place and that the staircases, ladders passenger hoists and scaffolds are safe to use.

The laws provide that the employer should provide safe drinking water for the workers on site and this ensures the health of the workers on site.

The law requires that the employer should provide washing facilities for the workers on site. This is to ensure that their health on site is maintained.

It also requires that the contractors or employers should provide for accommodation for the clothing not worn during the work.

The law requires the contractors to provide proper protective clothing and appliances appropriate for the work. It also requires the contractor to ensure that these protective clothing are worn by the workers at all times.

The law requires the contractors to provide for first aid facilities on the sites and that these first aid facilities should be adequate for all the workers on site.

The contractors are obliged by these laws to ensure that they provide for protection of eyes in site processes

The law requires the employers to insure the workers against the risks that may happen in the process of the work.

The contractors are obliged by these laws to provide adequate hoarding for the works in order to protect the public and the site operatives from being hit by falling materials.

The law requires the contractors to provide a sign board on a visible place which acts as a warning to the public on the works in progress.

The law gives guidelines to the contractors on the use of scaffolding and requires that such scaffolds should be of a strong material which can support the workers and the materials stored thereon.

It also gives guidelines on the use of ladders and requires the contractors to ensure that these are made of a strong material and should be regularly inspected to ensure the workers safety.

The law also gives guidelines on excavations and excavation works in order to ensure the safety of the workers working on these excavations, the public and the adjoining properties

The law provides for the drainage for the site in order to prevent flooding on site and stagnation of water on site which could lead to breeding of mosquitoes and hence obliges the contractors to ensure good drainage for the works.

## CHAPTER THREE

### 3.0. RESEARCH DESIGN AND METHODOLOGY

#### 3.1. Introduction

This chapter in depth discusses the study area, population, sampling techniques research methodology and details of used in data collection, data measurement and data analysis needed to test the hypotheses as well as to fulfill the objectives of the study.

#### 3.2. Research design

Research design is a conceptual structure in which the research is conducted; it constitutes blue prints for the collection, measurement and analysis of data (Abwanza A, 2006). It is used to structure the research and show all other major parts of the research project. The research strategy used to achieve the study objectives should conform to ethical standards and legal requirements for research participants. These include amongst other issues such as a formal legal permit and seeking of management's permission before visiting any of the sites (Omullo P, 2005)

According to Donald C. and Pamela S., (2003) there are various definitions of research design but no one definition imparts the full range of important aspects.

Research design constitutes the blueprint for the collection measurement and analysis of data it aids the researcher in the allocation of his limited resources by posing crucial choices. I.e. is the blueprint-to include experiments, interview observations, analysis of records simulation or some combination of these? Are the methods of data collection and the research situation to be highly structured? Is an intensive study of a small sample more effective than a less intensive study of a large sample? Should the analysis be primarily quantitative or qualitative?

Research design is the *plan* and *structure* of investigation so conceived as to obtain the answers to research questions. The *plan* is the overall scheme or program of the research. It includes an outline of what the researcher will do from writing hypotheses and their operational implications to the final analysis of data. A *structure* is the framework, organization or configuration of the relations among variables of a study. A

research design expresses both the *structure* of the research problem and the *plan* of investigation used to obtain the empirical evidence on relations of the problem.

The purpose of the study was to evaluate the extent to which the contractors fulfill the construction laws at the construction sites. The researcher was aware of the sensitivity of the nature of the kind of information needed and that's why had to be assured confidentiality. To achieve the study objectives of this study the research was conducted through survey approach whereby data collection was based on a survey on a representative sample of construction sites within Nairobi. (Abwanza A, 2006). A survey is the method of securing information concerning a phenomenon under study from all or selected number of respondents of the concerned universe. (Kothari 2004)

### **3.3. Background of the study areas**

Nairobi is the capital city of Kenya. It is located at an altitude of 1675m (above sea level), inland from the Indian Ocean coast of Mombasa and approximately 350km from Lake Victoria shores of Kisumu on the further west. Moreover it is also situated on a well watered plain adjoining the highlands of central Kenya; the city is 140km south of the equator (Wikipedia, 2007). Specifically Nairobi is positioned at 1°16'S 36°48'E. The British originally founded the city as a railway encampment as they pushed westwards building the Uganda railway in the last decade of the 19<sup>th</sup> century; 1890s. In 1919 it was declared a municipal and granted city status in 1954. It occupies an area estimated (established in 1963) to about 690km<sup>2</sup> with a current population estimated at 4million persons. Administratively, Nairobi is both a district and a province that hosts nearly all national government officers. It is subdivided into eight divisions, which are in turn made up of a total of twenty nine locations and sixty four sub locations. (Wikipedia 2006)

Rampant growth and development of Nairobi as a result of location issues has led to the need of many housing to cater for the needs of the ever increasing population.

#### **3.3.1. Nairobi city council- City Planning and Architecture Department**

Guiding, coordinating and supervising urban development was initially handled by the Planning section in the Engineers Department. The section was up-graded to a full department in 1981 to better able to deal with the of stakeholder interests of the fast growing metropolitan City of Nairobi. The department has been undergoing re-organization since 1981

geared to streamline operations for better organization. Given the dynamism of Nairobi residents, re-organizations are healthy when new techniques in management of urban systems continue to evolve. To better deal with the urban development issues, the department is organized into specialized sections with specific spheres of operation or supportive specialized services. The sections are: -

#### **3.3.1.1. Development Control**

The urban development is mainly carried out by private and institutional organizations. Development guidance is implemented through development control section. It is a statutory requirement as per the physical planning act and the building code that all developments within the local authority boundaries be approved. The section deals with all planning applications to ensure all planning development guidelines are complied with before planning consent is given. Planning applications include, land sub-divisions, land or property change of user, property extension of user, land lease extension and major urban projects.

#### **3.3.1.2. Building and survey (Formerly Development control)**

This section deals with building proposals as is required by the building code and the physical planning act. All building proposals must get development consent before construction commences. The guideline for the type, nature and size of the building is contained in the structure and zoning plans. While space standards and specifications are contained in the building code, this section ensures that the building development proposals comply with the planning and building regulations before giving development consent.

This section further ensures the building plans are implemented as approved by regular inspections during construction and issues occupation certificates when the building construction is practically complete.

The section's inspectorate staffs are besides inspections for purposes of issuing occupation certificates involved in other statutory inspections for safety certificate, boundary encroachments, property sub-division, building related nuisances etc

### 3.3.2. Compliance & Enforcement Department- NEMA

The department was formed after NEMA was inaugurated on the 7th April 2003,

The Department ensures compliance to environmental legislations and regulations among all stakeholders.

This is a department of NEMA which was formed by the environmental management and coordination act no. 8 of 1999. This department keeps the register with all the EIA and EA licenses issued and it performs the duty of inspection of all the projects to ensure that they meet the set requirements and standards for a safe and clean environment.

### 3.4. Investigation methods

#### 3.4.1. Topical scope -Case Descriptive study

This places more emphasis on a fine contextual analysis of fewer events or conditions and their interrelations. Although hypothesis is often used, the reliance on qualitative data makes support or rejection more difficult. An emphasis on detail provides valuable insight for problem solving evaluation and strategy. This detail is secured from multiple sources of information. It allows evidence to be verified and avoids missing data.

In contrast to exploratory study this is a more formalized study with clearly stated hypotheses or investigative questions

#### 3.4.2. Research techniques

For the purposes of this study both *attributes* from qualitative techniques and *variables* from quantitative techniques of investigation were incorporated

**Qualitative techniques** are techniques that don't carry nominal variables but rather carry attributes or character of something. An attribute is the essential character or nature of something. It denotes meaning, definition, analogy /model or metaphor characterizing something. Thus it involves in-depth conversational interviewing, participant observation, photographs, case studies, elite/ expert interviewing and document analysis.

On the other hand, quantitative techniques produce variables, measurable quantities. It answers the question how much. It assumes meaning and refers only to the measure of it.

### 3.4.3. Research control of variables

For the purposes of this study research deals with ex post facto design, this is where the investigator has no control over the variables in the sense of being able to manipulate them. The researcher can only report what happened or what is happening. The researcher is limited to holding factors constant by judicious selection of subjects according to strict sampling procedures and by statistical manipulation of findings.

### 3.4.4. Types of data used in this study

**Table 3. 1 The Types of Data Used**

Type of data	example
Nominal	{Yes} and {no}.
Ordinal	Very Good, Good, Satisfactory, Poor
Interval	Annually, half yearly, quarterly monthly

## 3.5. The population

### 3.5.1. Contractors

*Population* is the total collection of elements about which one would wish to make some inferences. *Population element* is the subject on which the measurement is being taken. . It is the unit of study. *Census* is the count of all elements in a population.

The study targeted construction sites within Nairobi and whose contractors are registered with the ministry of works (MOW). The list as dated July 2006 had 1799 registered contractors who are categorized from class A to class H depending on the size of construction projects they are capable of handling.

**Table 3.2 Category and Number of Contractors**

<b>Category</b>	<b>Number of contractors</b>	<b>Value of work (Ksh.)</b>
<b>A</b>	105	Unlimited
<b>B</b>	69	Up to 100 million
<b>C</b>	101	Up to 75 million
<b>D</b>	138	Up to 50 million
<b>E</b>	225	Up to 25 million
<b>F</b>	279	Up to 10 million
<b>G</b>	553	Up to 5 million
<b>H</b>	329	Up to 2 million
<b>Total</b>	1799	

**Source: Ministry of Public Works (2006)**

**Source ministry of works list of contractors, July 2006**

For the purposes of this study, the sites visited should be approved by the city council.

A comprehensive database of the number of all approved projects was obtained from the city council's city planning and architecture department. According to this department Nairobi is divided into twenty (20) subzones. Due to limitations of time and finances to the researcher three subzones were selected for the purposes of this study. This was due to their proximity to the researcher. These were

- The central business district
- Kilimani
- Westlands



### 3.5.2. Enforcing authorities

The researcher also interviewed the enforcing authorities who included:

- the city council of Nairobi- city planning and architecture department who are in charge of approving the plans and perform stage-to-stage inspection for the fulfillment of the statutory requirements
- the national environmental management authority who are in charge of issuing the environmental impact assessment licenses and also enforce the environmental laws as stipulated in the environmental management and coordination act ]

### 3.6. The sample

Most people intuitively understand the idea of sampling. The basic idea of sampling is that by selecting some of the elements in a population, we may draw conclusions about the entire population. There are several compelling reasons for sampling, including;

- low cost,
- greater accuracy of results,
- greater speed of data collection, and
- Availability of population elements.

The ultimate test of a sample design is how well it represents the population it purports to represent. Validity of a sample depends on two considerations: accuracy and precision.

Accuracy is the degree to which bias is absent from the sample. An accurate (unbiased) sample is the one in which the underestimates and overestimates are balanced within the members of the sample. Precision

No sample will fully represent its population in all respects. The numerical descriptors that samples may be expected to differ from those that describe populations because of random fluctuations inherent in the sampling process. This is called the *sampling error* and reflects the influences of chance in drawing the sample members. Precision is measured by the *standard error of estimate*, a type of standard deviation measurement; the smaller the standard error of the estimate, the higher is the precision of the sample. The ideal sample design produces a small standard error of estimate.

### **3.6.1. The sampling technique for the construction sites**

The nature of the research required that the sample contain a variety of contrasting sites giving sufficient variance in the factors being studied. It was therefore desirable that the sample be broadly of important parameters of the industry. The researcher found out that the council approves over five hundred projects per month. The researcher was also aware that not all the approved projects were ongoing hence he conducted a field survey on the selected subzones.

From the three subzones selected a random sample was conducted and a total of 42 sites were selected 14 from each subzone selected. This was higher than the recommended sample size of 30. (Cohen and Marion, 1985)

For a site to be visited it had to be approved by the city council and the contractor should be registered with the ministry of public works. The researcher conducted a field survey, identified the sites then counterchecked the approval with the city council list and the registration of the contractor with the ministry of works list.

### **3.7. Data collection instruments and procedures**

Primary data collection methods included the following:

#### **3.7.1. Observation/surveys**

With the aid of a checklist, evaluation was done on the level of contractors' compliance to the laws and regulations which govern the construction industry. The requirements were checked against what was happening at the site and hence the researcher used his own judgment to fill in the checklist. The checklist was structured to capture all the legal requirements that contractors should comply with as stipulated in the laws discussed in Chapter two. The checklist was chosen because of the nature of the information required where the contractors or his site representative would give information which could not really reflect what the situations were like on the site.

#### **3.7.2. Questionnaires**

The questionnaires, main method of data collection on the enforcement of the laws and regulations governing the construction industry, they were self administered to the following groups of authorities.

- **NEMA- Compliance & Enforcement Department**
- **The NCC- City Planning and Architecture Department**

Interviews were also conducted with the heads of these departments. This is because they were best suited to answer the nature of questions for the purposes of this study. The questionnaires were aimed at capturing information on the nature of the current enforcement to the laws and regulations in relation to the legal requirements to provide the same. The questionnaires also sought to establish the requirements that the contractors should comply with in the process of constructing to ensure the safety of the environment, the workers, the public and the adjoining properties.

### **3.7.3. Photography**

Photography was used to capture the existing conditions at the construction sites due to the failure to comply with the construction laws and regulations with respect to aspects such as the nature of scaffolding used at the sites, nature of protection to openings, the nature of clothing workers put on during work and the types of ladders that are used during the execution of the works.

### **Data presentation and analysis**

Data collected with the use of checklist and the interviews as well was analyzed and presented in form of charts to aid better understanding. The data collected through use of questionnaires was analyzed in the form of descriptive statistics such as distribution tables and percentages. The data is presented in the form of graphic presentation (charts and tables and plates) for ease of interpretation to the researcher and ease of understanding to the reader

## CHAPTER FOUR

### 4.0. DATA ANALYSIS AND PRESENTATION

#### 4.1. Introduction

This chapter discusses the analyses of data collected from the sample of the population. The analysis of data is based on qualitative method of data analysis using tables, pie charts and plates.

The field study set out to study the extent to which contractors fulfill the construction laws with reference to Nairobi. Its main aim was to establish the fulfillment of these laws at the construction sites.

#### 4.2. Field Response

The researcher administered two questionnaires, one to NEMA (compliance and enforce department) and the other Nairobi City Council (city planning and architecture department).

These questionnaires targeted the enforcers of the laws and regulations governing the construction industry under various statutory requirements discussed in the literature review. Response was got from the two enforcing authorities interviewed.

The researcher also used a checklist to ascertain the real situation at the construction sites and establish the extent of compliance to the laws and regulations. The researcher filled the checklists personally at the construction sites on the site visits. He used his own judgment to the various elements of the statutory regulations and requirements based on the knowledge on the statutory provisions to establish whether they are applied accordingly or not. The researcher also asked oral questions to answer questions whose answers could not be established by looking, or where need arose for such questions to be asked. These were mainly asked to the site workers and the supervisors. However at the construction sites the researcher never wanted the contractors to feel like they were being investigated. In 29% of the sites, the researcher was restricted to enter certain parts of the project or was completely

denied access. This is shown in table 4.2. In the sites where partial or no access was granted the researcher sought another site to replace it and these sites were not evaluated and analyzed.

**Table 4. 1 The rate of access granted to construction sites and checklists completed.**

Number of sites visited	Number of sites that granted access	Number of sites where access was denied	Percentage denied	Percentage granted
42	30	12	29	71

**Source: field survey, 2008**

According to Mugenda (1999) while administering questionnaires, a response of 50% is adequate for analysis and reporting, 60% is good while 70% is very good.

The first questionnaires targeted the enforcers of the laws and regulations governing the construction industry. The researcher

### **4.3. Fulfillment of the laws and regulations**

It is important to note that there is no short cut to law. The law gives guidelines which should be followed to the letter. For the purposes of this study, the researcher used these guidelines to establish whether or not the contractors had complied with these laws and regulations.

**Objective 1: To establish to what extent do the contractors abide to the rules and regulations in the construction sites.**

#### **4.3.1. Welfare of the workers**

**Provision for proper and adequate latrines and sanitation on site:** Failure to provide adequate sanitation to meet the statutory requirements was rated at 80.00 %. Here twenty four sites of the thirty visited did not have enough toilets as it is the legal requirement. Despite the number of workers at the site most of the contractors only provide one toilet for all the workers. This leads to the workers opting to use the fence for the urinal needs. This is either because the toilets are occupied or they are located

far from where the worker is working. This could lead to many diseases to the workers. Twenty four sites which had an average of 30- 50 workers per day provided only one water closet unlike the required statutory requirement of 1 water closet for every twenty five workers. In a site where there was a female worker she used the same toilet as the male workers- this is against the law.

**Provision for safe drinking water at the site:** Failure to provide clean drinking water for the employees was rated at 23% (seven sites) these workers are at a high risk of contracting diseases and other water borne infections. In many cases workers drink the same water they are using for the site works for drinking. There is no assurance that this water is safe for drinking. Many workers did not seem to care about the cleanliness of the water. In twenty three sites (77%), that the contractors had made arrangements for providing safe drinking water. The researcher found out that there were no clean containers for storing clean water or even cups for drinking. In many instances the workers were drinking the water directly from the pipes as they work.

**Provision for washing facilities:** Non availability or failure to provide for washing facilities which include water, soap and towels at the construction sites where workers could bathe after work or before meals so as to reduce the chances of contracting diseases was rated at 72%. Mainly the employees were using dirty water to wash their hands before meals and sometimes they go dirty. Due to this they mainly put on polythene bags on their hands while eating. After they are through with the days work they usually do not bathe and when they bathe they do it using dirty water because they share the same water put in dirty containers.

**Provision for shelter for clothes not worn during the work by the workers:** Failure to provide for shelter for clothing not worn during the working hours by the workers was rated at 89%. At these sites the employees hang their clothes out side their work stations where they are prone to dust and other substances which include cement dust. These could lead to skin infections to the workers. Employees at the sites sometimes put their clothes at the site store where they get to contact with dust and cement dust. The researcher found out that employees never had the idea that accommodation for their clothes not worn during the work should be provided for by the employer.

**Provision for proper and adequate first-aid facilities on site:** The researcher found out that most contractors had first-aid kits on site. However some of these first-aid kits were not fully equipped. 87% of the sites visited had first-aid kits on site. However only six out of the thirty sites visited (20%) had fully equipped kits with a trained first-aider on site at all times. twenty out of the thirty sites visited (66.67%) had first-aids kits which were either not fully equipped or they had no trained first aider onsite. four of the thirty sites visited (13%) did not have the first aid kits completely. Here workers use crude methods to nurse themselves incase of injuries on site. For example in one of the sites the workers were using worn out pieces of clothes to cover wounds on one of employees.

**Table 4. 2 Failure of the contractors to provide for specific welfare of the workers**

<b>Failure to provide for:</b>	<b>percentage</b>
Sanitation for the site	78%
Clean and safe drinking water	22%
Washing facilities	72%
Shelter for clothing not worn during work	89%
Proper and adequate first-aid facilities on site	80%

**Source: Field Survey, 2008**

#### **4.3.2. Health**

**Overcrowding:** the sites visited had an average of 30- 60 workers on each site per day. In all these cases there enough space to work on and no overcrowding was been observed in all the sites. Where there were many workers on site the workers were distributed in different parts of the site and hence there was no overcrowding.

**Ventilation and air circulation:** In twenty nine sites out of the thirty sites visited (97%) there were no enclosed rooms and each room had adequate windows. In only one site (3%) had a basement under construction which was enclosed and stuffy. The only opening was at the staircase and lift shaft. There was no alternative means of ventilation available.

**Lighting:** In six sites out of thirty visited (20%) had inevitably dark rooms. One out of these rooms was a basement under construction. Alternative temporary lighting was provided

however it was inadequate since some parts did not have enough light. The other five had deep rooms which did not receive adequate lights from the openings. In one case the workers had to work under these conditions. These are prone to trips, falls and other injuries.

**Table 4. 3 The failure to provide for specific health requirements for the workers.**

<b>Failure to provide for:</b>	<b>Frequency</b>	<b>Percentage out of 30</b>
Overcrowding	0	0
Ventilation and air circulation	1	3
Lighting	6	20

**Source: Field Survey, 2008**

#### **4.3.3. Safety of the workers**

**Provision for proper protective clothing and appliances:** Protective clothing to be worn depends on the nature of the work a worker is doing. Eleven out of the thirty sites visited (33%) provided the helmets, hand gloves and overalls or overcoats as well as dust masks on site. In 3 of these sites no one was allowed into the site without putting on all the required protective clothing. All the visitors were also required to put on hard hats before getting into the site. In twelve of the sites (40%) protective clothing was provided but worn out. In some of these sites not all the protective clothing were provided either hard hats were provided but no hand gloves are provided and in most cases shoes, gumboots were not provided. However in seven sites protective clothing was not provided at all. Here those workers who had private overalls wore them on site. In some case where this was not provided no worker on site wore any protective clothing on site. Contractors basically provide helmets and sometimes gumboots but rarely provide other protective clothing like overalls as shown in Plate 4.1



**Plate 4. 1 The state of protective clothing worn on site by workers**



**Source: Field Survey, 2008**

**Use of protective clothing and appliances:** In only three sites out of the thirty visited (10%) had all the workers wearing the protective clothing at all times. In these sites it was mandatory to put on these protective clothing and any worker who was found not wearing them was summoned by the site management.

However in the twenty sites (7%) where protective clothes were provided there was no enforcement by the site management for the workers to put them on. Many workers put on cloth caps or caps instead of the hard hats. Instead of the workers putting on the dust masks to cover their noses, they hang them on their fore head even when working in dusty places.

On the seven sites (23%) where the protective clothing was not provided at all, the workers work with their torn clothes. Where they work in wet conditions then the workers put on or ties polythene bags on their feet. They work on extremely dusty places without dust masks.

**Provision for protection of eyes in site processes:** The sites that had welding works in progress were eleven. The nineteen other sites did not have welding works in progress at the time the study was carried out. Nine out of the eleven sites (82%) had proper goggles provided to the welders as they carried out the work. These welders had these goggles on while they worked.

However in the two sites representing 18 % did not have the goggles on while welding, they looked back while welding but they ended up looking at the light at some points. This could lead to infections in the eyes and sometimes lead to blindness.

**Provision for proper hearing protection:** For workers working in noisy places they should be provided with earmuffs or other equivalent ear protection. In only two sites out of the thirty visited (7%) had contractors provided for hearing protection. The other twenty eight sites (93%) had workers working in the concrete mixers, the drillers; the workers working with vibrators, workers who were hammering did not have any kind of hearing protection. In some of these parts the noise was too loud yet the workers were working under such conditions without the required hearing protection.

**Table 4. 4 Failure to provide for safety of workers on site**

<b>Failure to provide for:</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Provision for proper protective clothing and appliances</b>	19	63
<b>Use of protective clothing and appliances</b>	7	23
<b>protection of eyes in site processes</b>	2	18
<b>Proper hearing protection</b>	28	93

**Source: Field Survey, 2008**

#### 4.3.4. Protection of the public

**Hoarding:** Hoarding protects the public and the works, its mandatory that appropriate hoarding should be put in place. In twenty seven sites (90%) there was hoarding or equivalent fencing separating the public and the works. This was appropriately put hindering entry and sometimes vision into the site.

However in the three other sites (10%) there were inadequate hoarding in place, there were no gates to the works. In one case there was a short cut within the site and this risked the safety of the public since they could fall into the foundation trenches or be hit by falling objects at the site. Here they were no proper separation of the public and the works.

**Sign board:** It is a requirement that a contractor erects a sign board to the approval of the architect on a conspicuous part of the site. This acts as a warning to the public for the on going works. Majority of the sites 80% (twenty four sites) had a sign board which had the name of the contractor, the name of the client, professionals involved with the project and/ or the subcontractors involved. However six sites (20%) did not have the signboards on these sites or the sign boards were damaged or worn out.

**Public roads and path ways:** Contractors should always make sure that the public roads and path ways should be kept clean free from debris and any other materials that would hinder movement. Any damages to these roads should be made good as soon as it is possible by the contractor. 93% of the contractors had complied with this requirement in these sites there were appropriate traffic controls and clear notices in the case where there were large trucks turning, however two contractors (67%) had not complied; in one case where the road was damaged by the trucks delivering materials on site and one part of the road was blocked in the other case the trucks transporting spoil had poured large pieces on the road which had not been cleaned.

**Drainage for the works:** The site should be such that no water will stagnate there to. In majority of the sites 93% (twenty eight sites) of the sites had all such hollows appropriately filled such that water from rainfall or from any other source would flow freely and that the sites would be kept free from all stagnated water where mosquitoes would breed against the requirements. However 7% (two sites) of the sites visited had places left open where water would stagnate. These places were foundation trenches not completely filled or other such ground where soil was scooped to fill in ground in the initial stages of construction.

**table 4. 5 The failure to provide the protection to the public**

<b>Failure to provide for:</b>	<b>Frequency</b>	<b>Percentage out of 30</b>
Hoarding	3	10
Sign board	6	20
Public roads and path ways	2	7
Drainage for the works	2	7

**Source: Field Survey, 2008**

#### **4.3.5. Training the workers**

The site managers on site were asked an oral question whether they had any programmes for training workers when they recruit them. 93% of the site managers said that there were no such programmes for training the workers. They said that they hire the workers with the expectation that they are experienced and that no training was offered on site. They said that the employee turn-over ratio was too high and that it would be quite impossible to train them every time a new lot is hired. However in one site (7%) the site manager said that they had training sessions on

- Safety during work,
- Use of machinery and equipment,
- Handling of materials,
- Fire fighting procedures,
- Healthy practices during work,
- Use of protective clothing and appliances.

This was done at the initial stages of the project when the employees are hired. Site meetings are usually held to remind workers of these things. Employees here are therefore expected to adhere to the rules at all times.

**Table 4. 6** The rate of training the workers on site

	frequency	Percentage out of 30
Do not offer training	28	93
Offer training	2	7

**Source: Field Survey, 2008**

**Pie Chart 4. 1** The Rate of Training the Workers on Site



**Source: Field Survey, 2008**

#### **4.3.6. Safe access to places of work**

**Use of Ladders on site:** Ladders used in the majority of the sites (60%) were made of strong material. These ladders were in good condition and were used appropriately. In these sites ladders were mounted safely so that they don't risk the safety of the user. Here the ladders were either tied firmly or else another worker would support it as the other worker climbs over. However in 40% of the sites some ladders were in bad condition, some members missing or broken and their strength was poor. In some sites the users had to strain to get to their work place while on the ladder. The nature of the ladders used are shown in Plate 4.2

**Plate 4. 2 The type of ladders used by workers at the construction sites**



**Source: Field Survey, 2008**

**Erection, use and dismantling of Scaffolding:** twenty one sites visited had scaffolding at the time the study was done. Fourteen of these sites (67 %) were using steel scaffolding while seven sites (33%) were using timber scaffolding. Where the steel scaffolding was used it was erect properly with enough attachments to the building to ensure it does not collapse and these were strong enough to support all the weight. However in the cases where timber scaffolding was used, there were many problems, these were made from strong wood but where the timber was reused it was weak. In almost all these cases where timber scaffolding was used there were no guard rails and intermediate guard rails. The workers were at great risk because they would easily fall over the scaffolds.

The timber scaffolding was fastened using sisal ropes which, when exposed to external weather conditions, they tend to wear out fast. This is shown in Plate 4.3. This would not be appropriate where the scaffolds would remain for long periods.

**Plate 4. 3 The unsafe scaffolding used at some of the sites**



**Source: Field Survey, 2008**

**Protection of openings in the places of work:** All openings and holes should be clearly marked and protected so that the workers do not fall into. All weak points and fragile material should also be identified and protected. In all the sites visited these openings and holes were well protected and marked. Tapes were put around the opening to ensure that anybody passing by would see it. Weak points especially in the roof lights were also marked so as the roofers would not step on them which could lead to falls. However stronger barriers should be put and the sites should be adequately lighted to ensure visibility hence ensure that no one falls into these openings and holes. However some of the protections to these openings are not as adequately covered. In most cases barely pieces of timber are laid around these openings as shown in Plate 4.4

#### Plate 4. 4 The type of protection to the openings



**Source:** Field Survey, 2008

#### 4.3.7. Use of plant and machinery on site

**Use of cranes, hoists and other lifting equipments:** In the three sites which had cranes on sites they were being used correctly. All the cranes used had safe load indicators which were properly working. In these sites the cranes were hired and the operators were provided by the crane owner together with the banksman and the signaler. The signaler and the banksman first established the corresponding radii and the weight of the load before lifting it. They also made sure that the load was attached properly before it was lifted. In all cases the cranes had an inspection tag displayed.

**Fire protection:** Majority of the sites (93%) did not provide any fire fighting equipment on sites. In these sites there were no any signage or warning to the workers on site on the procedures of what one should do in the case of a fire. In these sites there are no indications of fire prevention being a consideration. In these sites there is no training of workers on fire fighting procedures.

7% of the sites had fire fighting equipments on site. These contractors conducted training to the workers on the use of the fire fighting equipments at the initial days of employment. The



fire fighting procedures were well displayed on site. There were warnings on areas where highly flammable materials were stored for example “no smoking”. This is a clear indication that the contractor was conscious of the fire prevention and fire fighting at the site.

**Excavation and excavation works:** Only twelve out of the thirty sites visited were at the excavation stage or had excavation works in progress. Out of these twelve sites, three sites were using mechanical excavators to excavate this was especially where there were basements to be constructed. Nine sites used manual labour to excavate. None of the sites had shoring on the foundation trenches which were being excavated. However in most sites (83%) the trenches were firm enough and there were no sign of collapse. In two sites (17%) had signs of collapse on foundation trench sides. There were large lumps of soil falling into the foundation trench. Spoil was placed at quite some distance from the foundation trench edge. However in two cases where spoil was placed so close to the edge and hence resulted to some of it falling back to the trench and/ or collapse of the foundation edge.

#### **4.3.8. Environmental factors**

**Correct Disposal of waste, debris and spoil:** Nine sites out of the thirty sites visited (30%) did not have adequate plans and programs for waste disposal. In most of these sites there was rubbish accumulated on the site which was not collected. This included spoil, waste cement papers, debris and waste scaffolds which were damaged. However in twenty one sites (70%) there was no accumulated rubbish on site.

**Correct Disposal of effluents generated on site:** All the sites visited did not have any effluents which could damage the environment. The water which spilt during mixing was not allowed to flow any further from where the mixing was being done.

**Correct Disposal of hazardous materials used on site:** In almost all the sites which were visited there was proper disposal of paint tins and the metal wastes were collected and taken by the contractor and mainly are sold to the metal recycling companies.

**Proper Use of radio active materials:** There was no instance of use of radio active materials used on site. This is because in no instance was there any blasting at the time that this study was conducted

**Proper Management of fumes and gasses generated on site:** The major source of gases and fumes on the sites were the exhausts from the vehicles, plant and machinery used at the sites. In the sites where mechanical plants like the mixers, excavators and cranes there was considerable production of smoke from the fuel.

#### **4.4. Requirements and enforcement of the laws and regulations**

**Objective 2:** To establish the degree of enforcement of these laws and regulations by the relevant authorities.

##### **4.4.1. Interview with NEMA**

The respondent was successfully interviewed. She said that the main goal of the organization was to ensure that the environment is safe and clean at all times.

NEMA is involved in the management of construction projects. This is because constructions change the general use of the environment permanently and thus should be such that it does not harm the environment. This is achieved through:-

- Ensuring that building owners carry out Environmental Impact Assessment and presenting them to the authority for approval before the construction begin.
- By giving licenses to the building owner with the set of conditions that he or she should comply with.

The respondent appreciated that the owner of the building project which acquires the license and the contractor implements all the conditions of compliance that are stipulated in the license. Hence the contractor has the responsibility of ensuring that all the set conditions are met to the letter.

The respondent said that it was mandatory for any construction project to be registered and approved with the organization. The building owner should hire a private environmental analyst to conduct an environmental impact assessment survey and write a report which is then taken to the authority for approval. After approval then a license is issued if it is found that the project has fully considered environmental safety.

NEMA has approximately 80 inspectors who inspect the projects around Nairobi which are registered with the authority. These inspectors are also mandated by EMCA of 1999 to

conduct inspections to projects both which are licensed and also those that are unlicensed and also compels those that have not registered their projects with the authority to do so. This could be mainly attributed to the public complaints forwarded to the authority.

NEMA approximately registered 146 projects in human settlement and architecture in the last quarter of 2007. This is in the month of September to December.

The NEMA inspectors are supposed to visit these projects at least once weekly to ensure that the contractors comply with the laws and regulations.

Amongst the elements which the inspectors inspect during their visits to the sites are

- Correct disposal of wastes, debris and spoil generated at the site
- Correct disposal of any fluids/ effluents generated at the sites
- Disposal of hazardous materials which are used at the sites for example some types of paints, some metals like lead which could be dangerous to the environment
- Use of radio active materials on site for example which are used for blasting
- Management of gases and other fumes which are generated at the site
- Choice and use of building materials- these should be such that they are not harmful to the environment.
- Protection of the public from noise pollution

The respondent rated the fulfillment to the laws and requirements as satisfactory. She appreciated that the contractors do not fully comply with the environmental laws and regulations. She attributed this to:

- Ignorance to the laws by the contractors
- Low level of awareness and low social responsibility at individual and corporate levels on environmental matters
- Inadequate solid waste collection and disposal infrastructure and facilities (about 60% of solid waste not disposed of at designated sites)
- Poor access to and use of environment friendly technology

The respondent rated the level of enforcement of the laws and regulations as satisfactory. This means that the level of enforcement is lacking. She attributed this to challenges faced by the authority which include:

- Failure of compliance with the set license conditions by the contractors at the construction sites
- High levels of ignorance to the environmental laws
- Inadequate environmental monitoring systems
- Low compliance due to weak enforcement of the environmental provisions

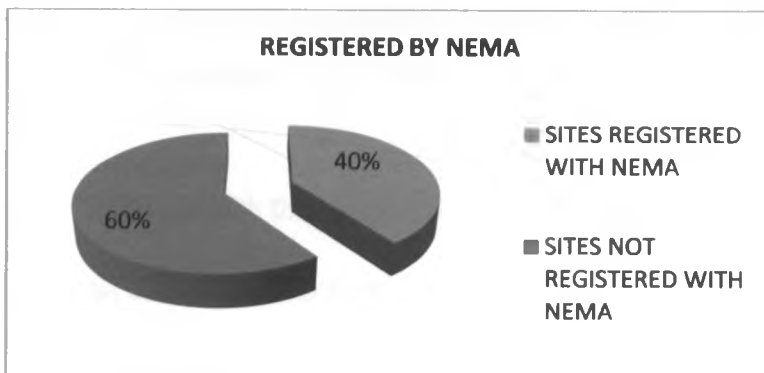
The respondent said that the penalties for non compliance with the set laws and regulations included:

- Suspension of the license
- Stopping the project until the laws were complied with.
- Prosecution of the offenders who are fined (between KSH 200,000 and KSH 2,000,000).

#### 4.4.2. Interview with the site managers

Out of the thirty sites visited only twelve had had environmental impact assessment conducted before the project was started. Only these twelve sites (40%) had their projects licensed NEMA. The interview with the site managers of the other eighteen sites (60%) shown that either they had not had the environmental impact assessment conducted or even did not know that it was a requirement to be registered with NEMA. Pie chart 4.2 shows the rate of registration of projects with NEMA.

**Pie Chart 4. 2 The Rate of Registration with NEMA**



Source: field survey, 2008

Out of the twelve sites registered with NEMA had the NEMA inspectors visiting the sites has shown in the table 4.10

**Table 4. 7 The frequency of visits of sites by NEMA inspectors**

<b>Number of sites</b>	<b>Period on site</b>	<b>Average Frequency of visits by NEMA inspectors</b>
6	1-6 months	9
4	6-12 months	7
2	12-18 months	6

**Source: field survey, 2008**

Table 4.10 shows that inspections are conducted approximately once in every two weeks for the first six months. However the rates of visits reduce as the period on site increases where by for the sites which had been ongoing for one and half years were visited approximately once in every month.

In the sites where the project was not registered with NEMA only two had had NEMA inspectors visiting the sites. This was attributed to public complaints to the authority. In the case where the developer has not registered the project with NEMA, the authority compels the developer to conduct an environmental impact assessment stating the ways of mitigating the environmental concerns. These developers are fined as it will be determined by the authority.

#### **4.4.3. Interview with the Nairobi city council- city planning and architecture department**

The goals of this department are:

- Guiding, coordinating and supervising urban development
- This section ensures the building plans are implemented as approved by regular inspections during construction and issues occupation certificates when the building construction is practically complete

- The section's inspectorate staff is besides inspections for purposes of issuing occupation certificates involved in other statutory inspections for safety certificate, boundary encroachments, property sub-division, building related nuisances etc

The respondent said that Nairobi is divided into 20 sub-zones each of which has a chief inspector. Each chief inspector is supposed to conduct inspections in the respective subzone. During inspections he is accompanied by city council *askaris* who arrest the people who have not complied with the laws and regulations.

During inspections the inspectors look at:

- Proper and appropriate hoarding, fencing, barricades e.t.c.
- Removal of rubbish, debris, spoil from site as well as dumping it properly
- Appropriate scaffolding
- Quality and use of ladders at the construction site
- Stability and strength of working structures e.g. the scaffolds, ladders
- Good working conditions of Cranes, Hoists and lifting appliances
- Excavations and excavation processes
- Drainage and disposal of effluents generated on the site
- Plant and machinery used at the site
- Fire protection for the site
- Availability and use of hazardous materials
- Noise control at the site
- Dust control at the site
- Proper and correct use of building materials

The respondent said the Nairobi city council approves over 500 projects in every month. However not all the projects are ongoing, some projects are stalled and others fail to kick off. The respondent appreciated that the council does not have a way of knowing the ongoing projects and those that were not ongoing at each particular time. According to the respondent the inspectors were enough to perform the inspections to all the projects.

Every construction project is supposed to be registered with the city council and the plans approved before any works start on site.

Inspections by the city council inspectors can be conducted at any time during the time of the project at any reasonable time of the day. These inspections, according to the respondent are conducted randomly at any time of the project.

The respondent rated the contractors' compliance with the laws and regulations as 60- 80% which means that the contractors do not fully comply with these laws. The respondent attributed this to negligence by the contractors. The respondent said that the penalties are:

- Offenders are prosecuted and charged in the city court and are either jailed for six months or fined between KSH500 to KSH 1000 or both.
- The development license can be withdrawn until the contractors comply with the laws.

The respondent sited some of the challenges faced by the inspectors during the enforcement as:

- There is no mechanism of knowing the ongoing sites and the non ongoing sites
- Poor monitoring mechanisms
- Slow process of prosecution of offenders at the city court- many pending cases
- Bureaucracy at the city council.

#### **4.4.4. Interview with the site managers on inspection by the city council inspectors.**

All the site managers interviewed said that their projects had been approved by the city council. Table 4.11 shows that there is no consistency on the city council inspections. Either it shows that very few inspections are conducted by the city council inspectors. For the projects which have been on site for up to twenty four weeks the average number of times visited is five, meaning that at least once in every five weeks. This rate further reduces as the projects stay onsite. For the projects which have lasted 48-72 weeks the rate of visits is averaged at once in every twelve weeks.

**Table 4. 8 The frequency of visits of sites by city council inspectors**

<b>Number of sites</b>	<b>Period on site</b>	<b>Average Frequency of visits by city council inspectors</b>
6	1-24 weeks	5
4	24- 48 weeks	4
2	48- 72 weeks	2

**Source: field survey, 2008**

### **Measures for enhancing fulfillment of the laws and regulations**

From the interview with the NEMA, the respondent said that in order to achieve maximum compliance with the environmental laws and regulations on site by the contractors, the following should be done;

- Serious monitoring by the authority through thorough inspections by the NEMA inspectors.
- Provision of a link between the city council such that no project is approved by the city council without first producing a license from NEMA
- The general public should act as a watch dog for NEMA and should report any wrong doings by the contractors to the authority

From the interview with the city council's city planning and architecture department, the respondent said that in order to achieve maximum compliance with the laws and regulations governing the construction industry the following should be done;

- Computerization of the city council registration system to ensure that data with details of the sites can be easily and readily found.
- The fines charged to the offenders should be increased so as to ensure that contractors comply with the laws and regulations.
- The speed of handling the cases at the city court should be enhanced so as to ensure that delays can be avoided. This could be achieved through increasing the number of magistrates at the city court.



- The workers should report the contractors who deny them their legal requirements at the construction sites.

#### **4.5. Summary of findings**

Although it is a requirement under EMCA act of 1999 all construction sites should be registered with NEMA, this is not done. Only 40% of the sites had been registered with the authority. There is however weak enforcement by NEMA to enforce the laws and regulations and also compel all the developers to register their sites before constructions begin and also ensure that all the projects have conducted environmental impact assessment and have been licensed.

There is a weak and inconsistent inspection by the city council inspectors. They rarely inspect the sites under construction. There are no updated records showing the ongoing projects and those that have stalled at the city council.

The penalties for the offenders which are charged by the city council are too lenient. The research shows that the fines charged range between KSH500 and KSH 1000 which is too little to compel the contractors to comply with the laws and regulations. Also there was weak and inconsistent enforcement through inspection by the city council inspectors.

The welfare of the workers is not adequately considered by the contractors; from the study 80% of the contractors do not provide adequate toilets and sanitation for the workers on site. They also fail to provide clean drinking water for the employees (23%). Washing facilities for the workers are also not taken into consideration by the contractors despite being a requirement under factories act. 72% of the contractors do not provide this basic requirement. Failure to provide for shelter for clothing not worn during the working hours by the workers was also not provided by majority of the contractors (88%).

First aid facilities were not provided in some of the sites (13%) however some sites(66.67%) had first-aids kits which were either not fully equipped or they had no trained first aider onsite.

Health of the workers while working on site is not considered by many contractors; some sites (3 %) do not have adequate ventilation to ensure adequate exchange of air. Contractors sometimes (20%) fail to provide for adequate lighting for the works while working in dark areas Safety of the workers was not adequately catered for by the contractors, some contractors fail to provide the proper protective clothing for the workers (23%) while other contractors provide worn out protective clothing (40%) while some other contractors provide some protective clothing while neglecting others. Contractors or his agents (7%) do not ensure that the workers put on the appropriate protective clothing at all times. Contractors (18%) fail to

provide appropriate goggles for the welders. They (93 %) also fail to provide for hearing protection for the workers working in noisy areas.

Protection to the public is also not fully provided; 10% of the contractors had not provided for adequate hoarding to the sites, also 20 % of the contractors had not provided for appropriate sign boards which act as a warning to the public of the existence of the works. Appropriate traffic controls and clear notices were also not provided by 7% of the contractors. Despite of the requirements of the public health act 7% contractors do not provide for appropriate drainage for the site to prevent stagnation of water.

Majority of the contractors do not provide for orientation and training of the workers before they are enrolled for the works. 93% of the contractors do not have adequate considerations for the provision of this training and orientation.

Contractors also have failed to provide for safe access to places of work for the workers; 40% of the contractors had not provided for proper ladders for the works. Also the type of scaffolding used did not have guard rails in place to prevent workers and materials from falling off. The mode of fastening of these scaffolding was lucking since some of the contractors used sisal ropes which wear out fast in external conditions. Protection of openings was also inadequate though provided for. On most cases there was inadequate lighting to these openings and the openings were barely protected using pieces of timber and guard rails were lucking.

Majority of the sites (93%) did not provide any fire fighting equipment on sites, in these sites there were no any signage or warning to the workers on site on the procedures of what one should do in the case of a fire. In these sites there is no consideration of fire prevention and also there is no training of workers on fire fighting procedures.

Contractors do not provide adequate shoring for the foundation trenches hence making some excavations unsafe especially where the foundation trenches are unstable.

Contractors in some sites fail to make adequate arrangements for making the sites tidy as well as disposing the rubbish, spoil and debris generated on site.

#### **4.6. Hypothesis testing**

The hypothesis of the study was effective application of the laws and regulations governing the construction industry are necessary for better working in construction sites by workers.

From the preceding discussion the hypothesis was accepted. This is because, it was shown that failure of contractors to effectively and fully comply with the laws and regulations forces the construction workers to work under very unfavorable conditions. These workers are vulnerable to injuries in the course of the work; they also are vulnerable to diseases and infections as well as long term health problems. Protection of the workers from these grave dangers and risks is a responsibility of the contractor. Nevertheless the contractors should ensure that the workers comply with these laws and regulations.

The contractors fail to train the workers on working procedures despite being a requirement under factories act. This leads to workers using unsafe methods and procedures while working at the construction sites thus risking their lives because this could lead to death, injury or disease to the workers. However effective training and supervision of the workers as in this provision could reduce the risks to the workers.

Further more provision of the primary health and safety concerns is a major boost to the morale of the workers; effective application of the laws and regulations ensures that the workers work under good working environment and this means that rate injury, death and diseases are reduced. The analysis of the data collected show that the welfare of the workers was neglected by most of the contractors and thus unacceptable working conditions at the construction sites.

#### **4.7. Problems encountered on site.**

1. Excessive bureaucracy in a number of places. This resulted in the researcher spending a lot of time before being directed to the concerned persons. This is more so with the Nairobi City Council where the researcher spent more than two weeks to obtain a research permit.
2. In some sites, the researcher was not allowed to get any information, the main reason being some contractors felt like they were being investigated. In other sites, the photographing activity was faced with mixed reactions. The researcher was allowed to take photos of only specific areas of the sites according to the discretion of the contractors or site managers.
3. Language barrier with some contractors who did not understand English or Swahili hence communication with them was difficult for example Chinese and Japanese. They provided workers to guide the researcher who did not have knowledge about some things.

#### **4.8. Summary**

This chapter has provided an analysis of the data collected from the construction sites, to establish the level of compliance with the construction laws and regulations by the contractors at the construction sites. It has been established that contractors do not fully comply with these laws and regulations. The basis of the analysis of the laws and regulations was established earlier in the literature review. The findings of this study have shown that site operatives are denied many things by contractors which are provided for in law.

## CHAPTER FIVE

### 5.0. CONCLUSIONS AND RECOMMENDATIONS

#### 5.1. Introduction

This chapter presents conclusions and recommendations of the study made in the light of the study objectives.

The objectives of this study were as follows:

1. To establish to what extent do the contractors abide to the rules and regulations in the construction sites.
2. To establish the degree of enforcement of these laws and regulations by the relevant authorities.

#### 5.2. Conclusions

From the findings it was found that contractors do not fully comply with the laws and regulations governing the construction industry. A great deal needs to be done to ensure that these contractors adhere fully to these laws and regulations. This will create a safety conscious environment which is suitable for the workers at the construction sites and the public in general.

Workers at the construction sites are forced to work under very unfavorable conditions in their course of work. These workers are forced to work without the adequate health and safety measures in place thus risking their safety at the site. Rarely do contractors put into consideration the needs of the workers safety and their health during the work despite being a legal requirement.

There is weak enforcement of the laws and regulations governing the construction industry by the authorities mandated by law to do the same these authorities are the city council and the national environmental management authority. The frequency of inspection is low; this means that these authorities rarely visit the respective construction sites for inspection.

The research also shows that developers do not register their projects with NEMA however it is a statutory requirement that any development that will permanently change the use of the environment should be registered with the authority.

### 5.3. Recommendations

From the findings and conclusions that have been made, the following measures are recommended;

- i. There should be a mechanism in place to ensure that all developers register their projects with NEMA and this should be done through streamlining the operations of the city council's city planning and architecture department with those of NEMA such that no projects are approved by the city council without producing the NEMA license.
- ii. NEMA should conduct more regular and thorough inspections to construction sites. This could be achieved through increasing the number of inspectors so as to meet the high number of constructions taking place. The public also should act as a watch dog and should report the offenders to the authority.
- iii. The city council inspectors should conduct more thorough and frequent inspections there should also be a computerized database for all the ongoing projects which is easier to use for record keeping and monitoring. The penalties charged to contractors who do not comply with the laws and regulations should be increased from KSH 500- KSH 1000 which is too lenient to an amount large enough to compel the contractors to abide to the respective laws.
- iv. In future projects the contractors should ensure that the welfare of the workers working at the site is considered and fully provided for. The following should be provided for the workers;
  - The contractors should provide adequate clean drinking water for the workers and the containers cleaned and the water changed at least once daily.
  - The contractors should provide adequate number of toilets as required by law for the workers. These toilets should be kept clean at all times.
  - Washing facilities should be provided for by the contractors for the workers to wash in. these should be sufficient and clean.

- Shelter for clothing not worn during work should also be provided for. This should be dry and clean.
  - Contractors should provide for sufficient and adequate first aid facilities at the site at all times. They should also ensure that these first aid facilities are fully equipped and drugs not expired. The name and contacts of the first aider who should be on site at all times should be displayed at conspicuous places within the site.
- v. Health of the workers working at the site should be maintained. The contractors should put this as a priority at all times. the contractors should provide for the following health requirements;
- Adequate ventilation in all parts of the work
  - Adequate lighting for all dark places within the work
- vi. Safety of all the workers working at the site should be provided for by the contractors. The following should be provided;
- Proper protective clothing and equipments for all workers, in their respective jobs. All the worn out protective clothing should be replaced immediately.
  - The contractor should ensure that all the workers put on the respective protective clothing at all times.
  - Goggles should be provided to all the welders.
  - Hearing protection should be provided to all the workers working in noisy places.
- vii. Protection to the public should be provided by the contractor at all times. The following should be done;
- Adequate hoarding should be provided.
  - Sign boards should be in place at all times.
  - Appropriate traffic controls should be put in place where public roads are used.
  - Appropriate drainage for the site should be provided.
- viii. Appropriate orientation and training of the workers should be done as soon as they are enrolled for the works.
- ix. Contractors should provide safe access to places of work for all workers working at the site. The following should be done;
- Proper ladders should be provided for; these should be stable and strong enough to support the weight of the operative and his tools.
  - All the scaffolding must be strong enough to support the weight of the operatives and the materials. These should have all the members for example the guard rails and

intermediate guard rails to ensure workers and materials do not fall off. They should also be fastened using strong materials.

- Protection of openings at the site should be provided for. These openings should be well lightened to enhance vicinity and also appropriate guard rails should be put in place to ensure workers do not fall into.
- x. Contractors should provide for fire protection at the site, they should also train workers on the fire fighting procedures. They should also provide appropriate signage at the site for example "no smoking" or "flammable materials" which should be placed at conspicuous places
- xi. Contractors should provide for adequate shoring for all excavations. These should be strong enough to support the sides of the excavations. Appropriate guard rails should be placed to ensure that operatives at the site do not fall into the trenches.
- xii. Contractors should make adequate arrangements for keeping the site tidy as well as disposing the rubbish, spoil and debris generated at the site. Dumping approvals should also be sought by the contractors to ensure that these are dumped appropriately.

#### **5.4. Areas of Further of research**

Further research is recommended for the following areas;

- i. The cost- benefits analysis of complying with the construction laws and regulations to the contractors and the workers.
- ii. The level of awareness in regard to death, injury and disease due to non- compliance with the construction laws and regulations.



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**Appendix 2: Questionnaire to National Environmental Management Authority**



**University of Nairobi**

*Questionnaire to the National Environmental Management Authority*

My name is **Muriuki Desmond Murithi** student from the University of Nairobi **registration no. B03/0308/2004**, conducting a survey to find out and evaluate the **extent to which contractors fulfill the construction laws at the construction sites**, in the partial fulfillment of my degree course in **Bachelor of Art (Building Economics)**. Any information given herein will be treated in confidentiality and for purposes of this research only. Thank you.

**Required: please tick option(s) and give reason(s) where applicable**

1. How is **NEMA** involved with the management of construction sites?  
.....  
.....
2. In your own opinion, do contractors uphold environmental laws in the process of construction?  
.yes   
.no
3. Is it mandatory for a construction project to be registered with you before the construction start?  
.yes   
.no
4. Who is supposed to register the project with you?  
 The client  
 The contractor

5. If **yes** in question 3 above, how many construction sites that are on going, that are registered with you within Nairobi city?

.....

6. What are the requirements that should be fulfilled for a site to be approved and a license granted?

.....  
.....  
.....  
.....  
.....

7. What are the licenses given after the approval of a project?

.....  
.....  
.....

8. Do **NEMA** inspectors inspect the construction sites so as to ensure that contractors comply with the laws and standards as regard the environment in the process of construction?

.yes (  )

.no (  )

9. If **yes** in question 8, how many inspectors do you have that inspect the construction sites and the construction process as a whole?

.....

10. If **yes** in question 8 above, what are the intervals of inspection in a particular construction site?

.....  
.....  
.....

11. What among these do your inspectors look at, at a construction site

- a)  Correct disposal of wastes, debris and spoil
- b)  Correct disposal of effluents that are generated on the sites
- c)  Disposal of hazardous materials used on site
- d)  Use of radio active materials on site e.g. used for blasting
- e)  Management of fumes and other gasses generated on site

*Others (specify)*

.....  
.....  
.....

12. What are the penalties for non compliance with the laws and regulations stipulated in the license?

.....  
.....

13. In your own opinion what is the current level of fulfillment of the environmental laws by the contractors in Kenya

14. In your opinion, what causes the contractors not fully fulfill the environmental laws?

Very Good	Good	Satisfactory	Poor

- a)  Financial
- b)  Ignorance to the laws
- c)  Negligence

*Others (specify)*

.....  
.....

15. How would you rate the enforcement of environmental laws regarding construction sites and the construction process generally?

Very Good	Good	Satisfactory	Poor	Absent(no enforcement)

16. What in your opinion what are the major constraints you face being involved in managing environmental concerns in the construction sites in Kenya?

.....  
.....  
.....

17. What would you recommend for the contractors to fully comply with the environmental laws in the construction process at the construction sites?

.....  
.....  
.....

Date .....

Signature .....

Official stamp .....

Thank you.

**Appendix 3: Questionnaire to City Council of Nairobi**

---

**UNIVERSITY OF NAIROBI**

**DEPARTMENT OF REAL ESTATE AND CONSTRUCTION MANAGEMENT**

**RESEARCHER: MURIUKI DESMOND MURITHI**

**REG. NO. B03/ 0308/ 2004**

**CONTACT: 0723 242 200**

**QUESTIONNAIRE TO CITY PLANNING DEPARTMENT**

**NAIROBI CITY COUNCIL**

**CONTRACTOR COMPLIANCE TO CONSTRUCTION LAWS**

*The aim of the questionnaire is to perform an analysis of the level to which contractors fulfill construction laws. The objective here is to acquire information about the requirements and the extent to which the contractors fulfill the construction laws.*

*The purpose for the information is **academics only and confidentiality will be upheld***

**NOTE: PLEASE TICK IN THE BOX WHERE APPROPRIATE**

**1. What is your main goal?**

.....  
.....  
.....

**2. How many inspectors do you have?**

.....



3. *How many constructions are on going at the moment that are under your jurisdiction?*

.....  
.....

4. *Are inspectors enough to perform the inspections to all the constructions in progress?*

Yes

No

5. *How many days before the commencement of the contractor register the project with you?*

.....

6. *What are the intervals of inspection during the construction process?*

.....

7. *What among these do the inspectors inspect at the construction site?*

- a)  *Proper and appropriate hoarding, fencing, barricades e.t.c.*
- b)  *Removal of rubbish, debris, spoil from site as well as damping it properly*
- c)  *Appropriate scaffolding*
- d)  *Quality and use of ladders at the construction site*
- e)  *Stability and strength of working structures e.g. the scaffolds, ladders*
- f)  *Cranes and lifting appliances*
- g)  *Hoists*
- h)  *Excavations and excavation processes*
- i)  *Drainage and disposal of effluents generated on the site*
- j)  *Plant and machinery used at the site*
- k)  *Fire protection for the site*
- l)  *Availability and use of hazardous materials*
- m)  *Noise control at the site*
- n)  *Dust control at the site*
- o)  *Provision of proper and adequate sanitation on the sites*
- p)  *Provision of clean drinking water for the workers*

- q)  *Provision of adequate first aid facilities on site*
- r)  *Provision and use of proper protective clothing on site*
- s)  *Use of radio active materials on site*
- t)  *Lighting and ventilation for the works*

*Others specify*

.....

.....

.....

.....

.....

.....

**8. (a) Do contractors fully fulfill the requirements, laws and regulations governing the construction industry?**

**Yes**

**No**

**(b) If NO above, in your own perspective to what extent do contractor fulfill the requirements, laws and regulations that govern the construction industry?**

0- 20%

20- 40%

40- 60%

60- 80%

*Others specify*

.....

.....

.....

9. *What are the penalties for non compliance with the laws and regulations?*

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

10. *If NO in question 8(a) in your own perspective what is the reason for the non-fulfillment to these requirements, laws and regulations*

*Financial*

*Ignorance to these laws and regulations*

*Others specify*

.....  
.....  
.....  
.....

11. *What challenges do you face in the enforcement of the laws at the construction sites? What need to be done to ensure maximum compliance to laws and regulations governing the construction industry?*

.....  
.....  
.....  
.....

**Thank you so much**

**Appendix 4: checklist for the construction sites**

**University of Nairobi**

Department of real estate and construction management

**YES**  
**NO**  
**Not**  
**Applicable**

**Construction laws compliance Checklist**

<b>Contract Name</b>	<i>(optional)</i>
<b>Contract Description</b>	<i>(optional)</i>
<b>Contractor</b>	<i>(optional)</i>
<b>Worksite Location</b>	
<b>Date</b>	

**NOTE:** The purpose of the information is **academics only** and **confidentiality will be upheld.**

**1. Safe means of access to places of work**

Can every one on the project reach their places of work safely e.g. are roads, gangways passenger hoists, ladders and scaffolds in good condition?			
- Are guard rails or equivalent protection availed to prevent falls?			
Are holes and openings guard railed and clearly marked?			
- Are working structures stable adequately braced and not overloaded?			

**2. scaffolds**

Are all the scaffolds and work platforms erected, altered and dismantled by competent persons?			
- Is there safe access method (ladder) to the scaffold platform?			
Is the scaffolding secured to the building in enough places to avoid collapse?			
Are the scaffolds of a strong material and does it have all component parts (upright, ledgers, braces, struts,			

**University of Nairobi**

Department of real estate and construction management

**YES**  
**NO**  
**Not**  
**Applicable**

<i>guardrails and intermediate guard rails)?</i>			
--	--	--	--

**3. ladders**

<i>Are all the ladders used by the contractor and the subcontractors in good condition?</i>			
---	--	--	--

<i>Have they been secured to prevent them from slipping outward or sideways?</i>			
--	--	--	--

<i>Are the ladders positioned such that users do not stretch or climb over obstacles and are they of sufficient height above landing place, the correct angle to structure 1:4and the Metal ladders not used near live exposed electrical equipment?</i>			
--	--	--	--

**4. Proper protective clothing**

<i>Is proper adequate protective clothing and equipment provided for all the workers?</i>			
---	--	--	--

<i>- Are the protective clothing and equipment in good condition and worn at all times by the workers?</i>			
--	--	--	--

**5. Site cleanliness**

<i>Work areas free from rubbish and obstructions, Free from slip/trip hazards and materials stored safely?</i>			
--	--	--	--

<i>Are there proper arrangements for collecting and disposing wastes generated on site?</i>			
---	--	--	--

**6. Training of workers**

<i>Are all workers trained for the job and are the inexperienced workers supervised by a competent person?</i>			
--	--	--	--

**7. Use of cranes and lifting equipments**

<i>Is the mobile or static crane working on a level base?</i>			
---	--	--	--

<i>Are all operators trained and competent?</i>			
---	--	--	--

<i>Has the banksman, slinger, signaller been trained to attach loads correctly?</i>			
---	--	--	--

<i>Is the crane in good working condition?</i>			
--	--	--	--

<i>Are the safe working loads and corresponding radii known and considered before lifting begins?</i>			
---	--	--	--

**University of Nairobi**

Department of real estate and construction management

**YES**  
**NO**  
**Not**  
**Applicable**

**8. Mobile Plant and Equipment**

Are plant and equipment in good condition?			
Are operators trained and licensed?			
Are warning and instructions displayed, Warning lights operational reversing alarm operational and satisfactory operating practices used?			

**9. Plant and Machinery**

Is the right machinery being used for the right job?			
Is the machinery maintained in good repair and all safety devices working correctly? All dangerous parts for example chain drives guarded?			
Are all operators trained and competent?			

**10. The public**

Is there appropriate and adequate hording put in place to ensure safety of the public?			
Is there clear and conspicuous signage of the site processes to warn the public?			
Is the debris watered to minimize the generation of dust from site?			
Are appropriate barricades, fencing, hoarding, gantry secure and in place?			
Is suitable lighting for public access as well as Footpaths clean and free from debris?			
Is site access controlled as well as Traffic control procedures in place?			

**11. Over crowding on sites**

Are the sites overcrowded and that the right numbers of employees are employed on site?			
Where it is unavoidable are there adequate measures in place to ensure the health and safety of the workers?			

**12. Excavations**

<i>Is the material strong enough to support the sides?</i>			
<i>Are all materials and spoil stored away from the edge of the excavation in order to reduce the likelihood of collapse of the sides?</i>			
<i>Are there guard rails and other equivalent protection to stop people from falling in? Is there safe access to the excavation?</i>			
<i>Are they properly secured stop blocks provided to prevent tipping vehicle from falling in?</i>			

**13. Ventilation for the work**

<i>Is the work place well ventilated to ensure sufficient air supply during the work especially when working in the basements?</i>			
--	--	--	--

**14. welfare**

<i>Have suitable and sufficient numbers of <b>toilets</b> been provided and are they <b>kept clean</b>?</i>			
<i>Is safe <b>water for drinking</b> by the site workers provided? Are the containers cleaned and the water changed at least once daily?</i>			
<i>Are sufficient <b>washing facilities</b> provided for use by the workers on site?</i>			
<i>Is <b>safe accommodation for clothes not worn during the work</b> provided?</i>			

**15. First Aid**

<i>Are the Cabinets and contents clean and orderly?</i>			
<i>Do the stocks meet requirements?</i>			
<i>Are the First aiders' names, location and phone numbers known and displayed?</i>			
<i>Are the first aider(s) qualified?</i>			

**16. Lighting**

<i>Is there adequate lighting in all areas of work and free from glare?</i>			
<i>Is the lighting clean and efficient for all works?</i>			
<i>Is emergency lighting system in place especially where the work is to be done at night?</i>			

**17. Fire Control**

<i>Are extinguishers in place, serviced/tagged, and have appropriate signing?</i>			
<i>Emergency exit signage, Exit doors easily opened from inside Exit path ways clear of obstruction?</i>			
<i>Are precautionary measures taken e.g. adequate alarm/communication system, Banning smoking and putting Minimum quantities of flammables at workstation taken?</i>			
<i>Emergency personnel identified and trained and Emergency telephone numbers displayed?</i>			

**18. Environmental factors**

<i>Is there Correct Disposal and damping of waste, debris and spoil generated on site?</i>			
<i>Are all the effluents from the site correctly discharged so as not to pollute the environment?</i>			
<i>Is the Disposal of hazardous materials used on site done correctly?</i>			
<i>Is Use of radio active materials controlled and adequately licensed?</i>			
<i>Is there Proper Management of fumes and gasses generated on site?</i>			



## Questions to the site manager or the contractor's representative on site

1. How long have you been on site?

.....

2. Is your project registered with city council of Nairobi?

Yes

No

3. If **yes** in question 2, how many times have city council inspectors visited your site?

.....

.....

4. What are the intervals of these visits

Weekly

Monthly

Randomly

Others

(specify)

.....

.....

.....

5. Is your project registered with NEMA?

Yes

No

6. If **yes** in question 2, how many times have NEMA inspectors visited your site?

.....

.....

7. What are the intervals of these visits

Weekly

Monthly

Randomly

Others

(specify)

.....

## **Attachment 1: Nairobi city council research authorization**

### **M E M O**

**FROM: CHIEF ADMINISTRATIVE OFFICER**

**TO : ASSISTANT DIRECTOR (UDD)**

**REF : CPD/ADMIN./M/1824/GA/Inn**

**DATE : 2<sup>ND</sup> MAY, 2008**

**RE: AUTHORITY TO SEEK INFORMATION ON INSPECTIONS AND STANDARDS  
FOR DESMOND (RESEARCHER)**

The above named is a student at the University of Nairobi pursuing a B.A. degree in Building Economics

Kindly allow him to collect information from your section in the form of interview and questionnaires

  
**G.A. AJWANG**  
**CHIEF ADMINISTRATIVE OFFICER**



## Attachment 2: university of Nairobi research authorization



### UNIVERSITY OF NAIROBI

DEPARTMENT OF REAL ESTATE AND CONSTRUCTION MANAGEMENT

P.O. Box 30197, 00100 Nairobi, KENYA, Tel: No. +254-2-2724525/9 Fax: +254-2-2718548

E-mail: [dept-recm@uonbi.ac.ke](mailto:dept-recm@uonbi.ac.ke)

21 April 2008

TO WHOM IT MAY CONCERN

RE: MURIUKI DESMOND MURITHI – BO3/0308/2004

The above named is a student of this Department pursuing a Bachelor of Arts Degree in Building Economics. He is currently in his final year of the course and is writing a project paper titled: - *"An investigation into the extent to which the contractors fulfill the construction laws at the construction sites. Case Study: Nairobi"*

The purpose of this letter therefore is to request you kindly to allow him access into any kind of material he may require from your organization to enable him complete the project paper successfully. The information given will be used for research purposes only.

Yours faithfully,

A handwritten signature in black ink, appearing to be 'H. Gichunge'.

Dr. Hezekiah Gichunge  
Chairman

Department of Real Estate and Construction Management

DEPARTMENT OF REAL ESTATE  
AND CONSTRUCTION MANAGEMENT  
UNIVERSITY OF NAIROBI

**Attachment 3: Introduction Letter to NEMA and Research Authorization**



**University of Nairobi**

Department of real estate and construction management,

LETTER OF INTRODUCTION

MURIUKI DESMOND MURITHI

DEPARTMENT OF REAL ESTATE AND CONSTRUCTION MANAGEMENT,

UNIVERSITY OF NAIROBI,

P.O BOX 30197.

NAIROBI-KENYA.

6/05/08

Dear Sir/Madam;

**RE: RESEARCH ON AN INVESTIGATION CONTRACTORS COMPLIANCE WITH ENVIRONMENTAL LAWS AT THE CONSTRUCTION SITES**

I am a student at University of Nairobi carrying out a research on the above mentioned topic with special reference to Nairobi.

I would like to obtain research information as well as your views concerning the subject matter.

Any information given shall be treated with strict confidentiality and shall be for research purposes only.

Attached herewith, please find a questionnaire for expressing your views.

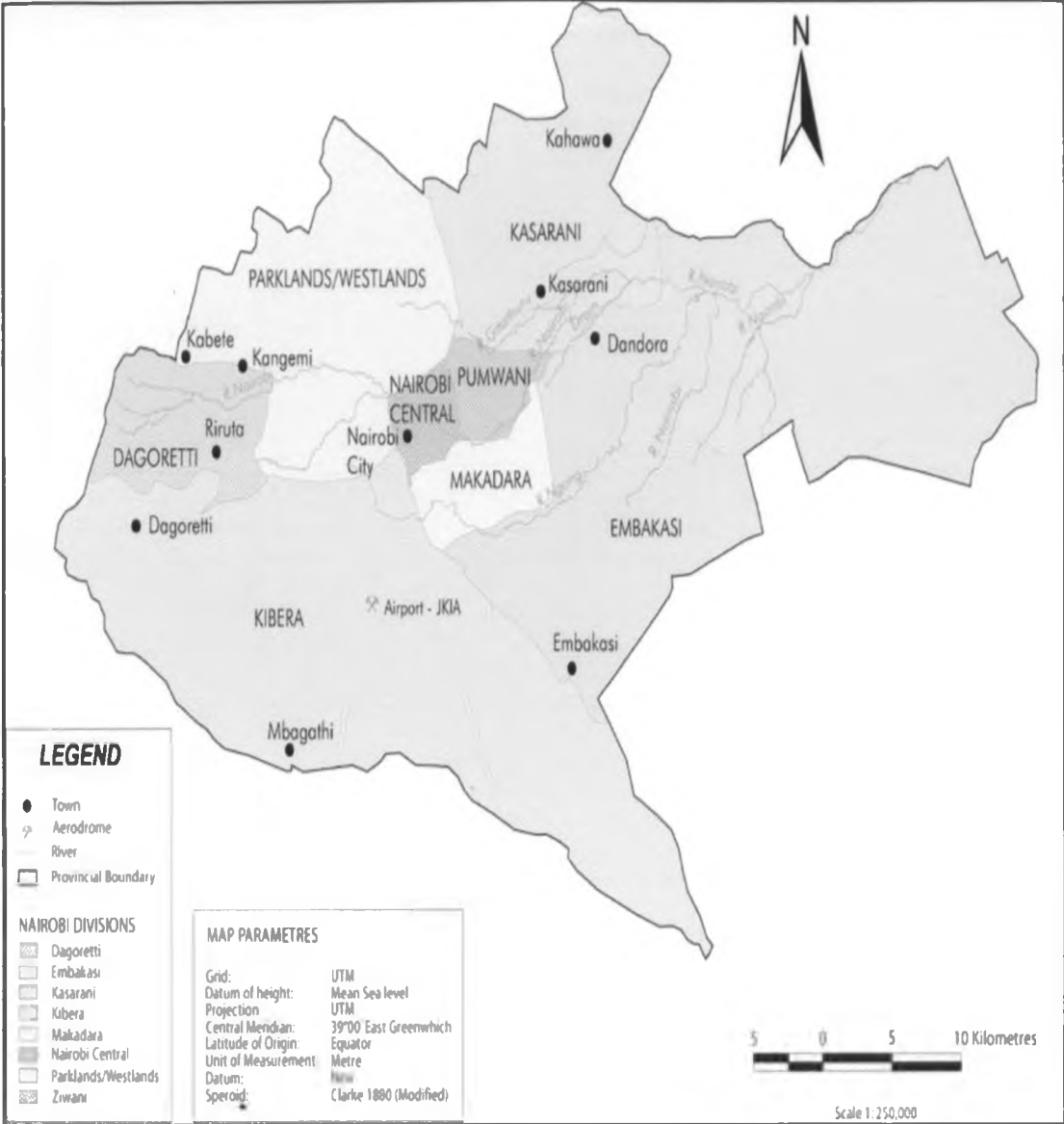
Thanks in advance for your time and co-operation.

Yours sincerely,

MURIUKI DESMOND MURITHI

UNIVERSITY OF NAIROBI  
ADD MBRARY

**Attachment 4: Map of Nairobi**



Source: nairobimaps.com