

Flaws in the Current Building Code and Code Making Process in Kenya

Kabando K. Erastus^{*1,2} Pu Wuchuan¹

1.School of Civil Engineering & Architecture, Wuhan University of Technology
Wuhan, 430070, P. R. China

2.Department of Building & Civil Engineering, Nyeri National Polytechnic
P.O. Box 465-10100 Nyeri, Kenya

* E-mail of the corresponding author: tasstap@gmail.com

Abstract

For safe, decent and affordable housing, a proper code of practice is vital. A proper building code of practice should enhance growth, regulate and revolutionize housing sector and utilization of the available local materials without limitations. As the stakeholders are revising and reviewing the code of practice and administration of many counties prepare to take the initiative of executing the code, various aspects concerning it should not be overlooked. The current housing and infrastructure policies and adaptive by-laws have led to calamities and epidemics being reported all over. Poor planning, administrative procedures and inadequate enforcement strategies are a few challenges facing the current building code in Kenya. This paper discusses the various flaws that are observed in the current code of practice. As the building sector is preparing to acknowledge, implement and adopt KScore 2009; emphasis has been put on description of various principles concerning code development, adopting and implementation processes. This paper may also act as a guideline for currently concerned bodies revising the code of practice. Provisions of minimum standards, safety of lives, health and security of one's property should be emphasized in any code of practice used.

Keywords: building code, flaws, implementation, materials, planning, buildings

1. Introduction

A building code is a set of rules and laws which govern and specify the minimum agreed levels of safety for the structures and buildings. There exist various models which specify these guidelines depending on different countries. Currently in Kenya the building code (Ministry of Local Government, 1969) which is in force is being regulated by the Local Government Authority and the content was formulated from the then existing British Imperial Codes. For an effective model, building code legal capacity and status should be enforced so that it's adopted by all the stakeholders in the building industry. Building codes should provide minimum standards that should be followed to ensure building standards, safety, health and security of the property from all hazards that may occur to the structure.

Different countries have established and adopted different procedural and regulatory systems used when structures and buildings are to be conceived. Research that has been carried out by various bodies all over the world depending with the needs and the nature of their countries is ample. Bodies like FEMA, BSI, IBC controls most of the influential codes in the world but all in all Kenya has to come up with a control mechanism for its construction industry. According to Article 42 (KENYA, 2010), all the citizens are entitled to clean and healthy environment. This applies also on how the buildings are to be planned, designed and constructed. From the beginning of the administrative operations of the county offices in Kenya, all aspects in implementing and usage of the codes in the planning and designing of structures should be emphasized and be spread up to the national level.

Kenya Building Code (Ministry of Local Government, 1969) is sub-divided into various sections which under carry various functions in the integration of the construction process. It's usually subdivided as general information, Siting and Space about Building and Building Materials and this subdivision doesn't show proper characteristics for a good building code.

2. Shortcomings as observed in the Building code (1968)

The 103 statues which forms the construction laws contradict each other in many cases and are subjective. This building code came into law in 1968 during the post-colonial era and some of the clauses were and still are subjective since the post-colonial government. The clauses by then were borrowed from the former colonial experts who were in practice and they made the code according to the needs of the country by then and in their favor.

A few of the observed flaws that are currently being experienced in the Kenya Building Code (Ministry of Local Government, 1969) are as follows:

- a. The International System of Units (SI units) measurements that are adopted in the Adoptive By-laws of 1969 are Imperial units (feet and inches) however currently Kenya is using the metric system (metres).

- This may lead to erroneously calculated results in any field which is using the measurements adopted and the ones the code applies. Kenya adopted the metric system of SI units from Imperial system early 1970s. Metric systems is easily adoptive since it represents a better scientific measurements if need be.
- b. With the introduction of new building materials in the market it's difficult to come with a well-designed structure based on (Ministry of Local Government, 1969) since the design perspective of the code is based on materials and some of the materials were not factored in and the code has not been reviewed since then. Load factors and material properties are very crucial in designing a structure and wrong parameters results in disastrous output. However, the principles of developing building codes should not only be based on materials alone but also other factors should be put into considerations. In Kenya the local government has the mandate of regulating and implementing the code and as evident it has failed in many areas (Akivaga et al., 1985). The mandate of implementing the code of practice should be given to another authority which is solely responsible with dealing with buildings and housing/ natural hazards as proposed by KSCode (2009). Different authorities that govern the code use have come up with different codes for different functions. For example, Federal Emergency Management Authority (FEMA) coordinates the federal government's role in preparing for, preventing, mitigating the effects of, responding to, and recovering from all domestic disasters, whether natural or man-made, including acts of terror. This management authority has come up with a set of building codes which can be utilized by different states in USA. These codes includes:
- i. **International Building Code (IBC)** which applies to almost all types of new structures and buildings
 - ii. **International Residential Code (IRC)** which applies to new town houses not more than 3 stories and one- and two-family structures
 - iii. **International Existing Building Code (IEBC)** which applies to the addition, change in occupancy of existing structures, repair and alteration
 - iv. **FEMA 154, ASCE/ SEI 31-03, ASCE/ SEI 41-06, FEMA 356, FEMA 547, FEMA E-74** among others caters for new and old structures which are to be resistant to earthquakes.
- c. As observed in (Ministry of Local Government, 1969) all the safety factors are based on PART III of the code in which not all materials are considered since the code have not been revised since 1968. In addition Architectural, Structural, Electrical and Mechanical provisions for buildings are all in the same document in which the expertise on each field is not well dealt with.
- d. The Building codes should not be an impediment towards growth of building sector, they should help to regulate and revolutionize the industry instead. In general, good code practices enhances better standards for the housing and building sector. The use of British Building codes as basis of material specifications may also lead to unnecessary costs in establishing a stable structure. The standards of materials which are specified in the code (Ministry of Local Government, 1969) are either expensive or imported materials from European design standards in which these materials conform to conditions experienced in Europe (for example snow loads on the roofs-CP110/BS8110). Currently, the manufactured materials which dominates market are either made from China (Chege, 2006) or from the local industries which imports the raw materials from China. The large construction contracts that have been tendered has shown a lot of Asian companies allocated the tenders and some of these tenders comes with strings attached with most of the materials required for construction being imported from the Arabic (Industry, 2004) and Asian countries. This has opened up more gap for substandard materials in the market which do not conform to our needs as a country. Kenya requires its own specifications for the quality of materials to be imported or manufactured since the trade patterns may change with time with our own regulations.
- e. In PART II of (Ministry of Local Government, 1969) section 17(1) *"A domestic building shall be so sited as to leave an open space immediately in front thereof which extends along the whole width of the front of the building and is not less than 20 ft. wide measured at right angles there from: Provided that if the building fronts on a street of a less width than 20 ft. The width of such open space may be not less than the width of the street plus one half of the difference between that width and 20 ft."* This clause was to ensure planning in the construction of various structures in the town streets. The clause limits the architects and the concerned parties to be creative in coming up with a good structure. This however has not been followed, and as observed from many sites in towns, there is non-conformity. In some instances the structures have been built a step further from the roads and some centimeters away from each other.
- f. The code (Ministry of Local Government, 1969) have stated that Local government which is responsible for implementing this code should never accept second hand materials to be used in any construction work. For the materials not to conform as specified by the code, a test should be done to get the results

proving that the material is no longer usable as a building material. The basis of refuting the use of the materials should not only rely on the code, other bodies concerned with material specification should be involved. Reduce, reuse and recycle has been so much emphasized in all areas even in construction. As observed (Huang et al., 2002) and (Kibert, 2012), the reuse of demolished construction materials can become a part of reducing the cost of materials in any project as long as the materials being reused meets all the standard.

- g. Also to achieve the minimum housing requirements (Ministry of Local Government, 1969) specifies that the building shall be built from masonry (natural stone) and should consists of at least two (2) bedrooms each measuring a minimum of 7m² with a separate kitchen and flue ventilation. For the poor and the middle income families this condition is too harsh to follow and this is beyond their means. Many Kenyans income bracket is below the standard poverty levels (Geda et al., 2001), this has led to poor housing to which (Ministry of Local Government, 1969) has not addressed. For a code to be effective, it should cater for new and alternative solutions that can be helpful to every citizen of its country.
- h. As per clause 124 of (Ministry of Local Government, 1969). *“Unless the council otherwise agrees, a person proposing to erect a building of a type described in by-law 127 of these By-laws, shall employ for the purpose of the architectural design thereof, a registered architect, and for the purpose of the structural design thereof, a structural designer and shall retain the services of such architect or structural designer for the purpose of supervising the erection of such building.”* This may be one of the various reasons that has led to many “quacks” and unregistered contractors since the council has all the authority of the approval of various parties and activities concerned on construction and also power to approve the plans or otherwise. This has been attributed by the fact that, the position of a mayor (political position) in the local authority has the final say on the plans of the buildings.

In 1990 efforts by Intermediate Technology Development Group (ITDG) showed initiative to start using building practices which were conforming to the living standards. In 1995, Code 95 was developed and the parliament approved it, but the implementation and adoption of this code was not put to effect seriously in the construction industry. As indicated by (Jha and Duyne, 2010, Majale, 2003, Yahya et al., 2001), the use of Code 95 which was performance based reduced the cost of building by 30%.

The efforts of coming up with a new building code in Kenya has not been achieved so far. The proposed KSCode (2009) is still not implemented and it has its hindrances specifically on the Section of Structures and Materials since most of the particulars were borrowed from adoptive laws of 1969. The use of BS standards in United Kingdom was withdrawn in March 2010 and the Euro codes started to play an important role in the design and analysis of structures and buildings. As observed in Section FF2 (structural design) in (KSCode, 2009), all the code regulations relating to materials and design adopted are outdated and should be changed to conform to Euro codes (BSI, 2014, Nethercot, 2005).

3. The tragedy in the making

Physical planning is an important aspect for any building code in regulating and enhancing the physical look and aesthetics of any locality. The current building code is faced with many flaws and has not been able to control the planning of the structures. This may be attributed to the lack of enforcement of the regulations, lack of qualified physical planners, corruption and negligence by the local authority. Fig 1 and Fig 2 is an example of how the negligence by the local authority have led to mushrooming of slums inside the city. This has been duplicated in almost all the cities in the country. With alternative construction materials and physical planning this situation can be controlled and the livelihood of the people would be improved.

Over 100 death calamities were reported between May 1996 and July 2006 due to collapse of buildings through failure related cases and infernos. In all of the incidents reported, investigations showed that the incidents were caused due to negligence by the local authority not condemning the aged structures, inadequate preparedness and lack of enforcing building safety, under-designed concrete columns and poor building process (curing method) through rushing of the building process and lack of clear passages and exits in case of fire (Nyangweso, 2007). The author also indicates that the absence of a competent authority in the implementation and certifying the requirements of the structure maybe one of the reasons behind all the mayhem.



Figure 1& 2: Kibera slums and Mathare slums in Nairobi City, where it's approximated that more than one million people live

4. Developing the codes of practice and standards

The building codes of practice and standards in any country should meet some goals and objectives as outlined:

- Should define the minimum standards required
- Should strike a balance between explicit and implicit requirements
- Should have legal framework and capacity
- Should enhance the safety of the lives and secure property
- Should assist the authority and agencies concerned in implementing it
- Should bring uniformity in the design and analysis process of the structures
- Should reduce the risks and uncertainties involved in the building process

On many occasions, building codes have become explicit and the inner details and requirements are often overshadowed. As observed by (Shapiro, 1997, Coeckelbergh, 2006) the implicit directives are more difficult to implement and relies more on explicit directives which does not make the building code safer to use. Furthermore, it would be impractical to overshadow the importance of each of the two elements since both plays an important role. If the building codes become too explicit, the innovation is hampered and the role of the experts is only seen as that of simply following technicians (Coeckelbergh, 2006). Building codes should not be too complicated which makes it difficult for the experts in the building field to use much efforts and requirements in justifying a specific course in design and neither should the building codes be too simple such that concerned party may find it irrelevant in its usage. The building code should always strike a balance between the explicit and implicit requirements.

As previously observed, trade between different countries should not be hampered and the market needs for any society must be met. Kenya as any other growing country is in partnership with many countries in and out of African continent. As observed by (Matsushita et al., 2006) the technical Barriers to Trade Agreement may be promoted by the use of a certain kind of code regulations. Thus as the country prepares itself in adopting the new code of practice, the trade and cooperation between various countries should still commence as before without being hindered by the new code of practice. A regulatory body which enforces and regulates the specification of the materials in use should be well furnished with the expertise on all the fields, for example (KEBs).

Adopting internationally recognized building codes as a basis for design of structures may be acceptable to some extent as long as the code meets the needs of the country in achieving the safety of the structures. Familiarity with the building code provisions is very essential in adopting the code regulations. The country has been using the British codes of practice from 1968 and since we are familiar with the clauses, we should then use the provisions to our needs. The new curriculum adopted by the KIE technical institutes all over the country for the building and civil engineering courses are currently using BS standards in all the designs, e.g. BS8110 in structures in which the (Ministry of Local Government, 1969) indicates that CP110 should be used instead. With this in mind, the curriculum developers have already implemented the use of BS8110 in the curriculum even when the (KSCode, 2009) is still being revised and not yet adopted for use in the country. There should be some consistency in the use of code of practice in our teaching curriculum and also in practice to avoid conflict of interest and other unforeseen calamities.

4.1 Steps towards effective adoption and implementation of a code of practice

The steps towards implementation, adoption and popularizing codes of practice plays a crucial role in life span of its existence. Figure 3 shows a summarized implementation process of a building code. To enhance an effective implementation system in building code of practice the following steps are important;

a) Collection of Information

A good code of practice should gather all the general and specific information in addressing the various subjects or problems that the country is facing. Kenya is divided into 47 counties (KENYA, 2010) and each has various needs concerning buildings and specifically on materials in their locality. For example, mangrove species (*Rhizophora mucronata*) is a species of materials which is mostly found in Mombasa county and its use and

adoption has not been documented in (KSCode, 2009). The stem of this plant has been used as an additional reinforcement to slabs even with inadequate documented results of its strength performance and durability. The use of soil bags and use of geo-textile sacks has been utilized in dykes, retaining walls as an alternative to gabion boxes. The use of sacks filled with soil is mostly used in the construction of rural roads but of current the construction of Thika Highway also made use of them. In light of this, the questions that arise are;

- i. Which existing code of practice is addressing the problems at hand with ease, cost effective and with safety of factor?
- ii. Who will be involved in the developing process, implementation and adoption of the various sections in the code?
- iii. How will the codes be implemented and enforced with various kind of needs being involved within different jurisdiction?
- iv. When will the codes become functional?
- v. How will the already existing structures be affected with the implementation of the new code of practice?

The answers to these questions may be a good starting point in making a decision on the way forward in selecting and making a choice of a good code of practice.

b) Technical expertise in developing the codes

The explicit and implicit nature of the code requirements may be determined by the technical expertise available or used in developing the codes of practice. The effort devoted on developing the code of practice should ensure the practicability of the code in all the stakeholders in the building industry. For example, the engineers and architects will use the code of practice in their designing and planning of the structures while the government bodies will use the same code as a tool to enforce law and order by using the various sections of the code in its administrative and legal issues. The code of practice should not be developed so as to end up wasting a lot of money and in return the effect of its usage doesn't bring any change on the building economy. The mandate of Engineers Board of Kenya (EBK) is setting of engineering standards and development of general practice for engineering (EBK, 2014) and as the institution of National Planning and Building Authority (KSCode, 2009) comes to play their roles, the mandate of the two institutions should not conflict in performance of their duties.

c) Recognition of various partners

One organization cannot be able to come up with its own code of practice without borrowing other professionals' expertise who also forms part of the code usage. For example, Physical planning, siting and site preparation requires the expertise of architects, surveyors and planners; Building services requires the expertise from mechanical and electrical engineers; structures and materials requires the expertise from civil and structural engineers; safety, disaster risk management and maintenance requires the expertise from all stakeholders in the building field (KSCode, 2009). There exists some qualified bodies BORAQs, ISK, EBK, KEBs in the country which can help in giving their expertise in the various sections which concerns the code of practice. Apart from our local expertise, foreign countries expertise and experts who have successively formulated and implemented on their country's code should be engaged. This may give the reasons why most of the building codes have standard organizations that are engaged in development of the codes of practice. For example, the following organizations have played a great role in establishing various codes in USA; American Society of Mechanical Engineers (ASME), American National Standards Institute (ANSI), Institute of Electrical and Electronic Engineers (IEEE), International Standards Organization (ISO).

d) Code of Practice Acclimation process

The adaptation process begins by establishing technical committees which should plan and schedule on how the code is to be adopted in the jurisdiction. Each county should establish a technical committee to evaluate and determine the needs, make decisions on implementation of the code, training of how to use the code on all aspects. This technical committee is made up of all the stakeholders in the building sector i.e. engineers, academic experts, builders, architects, quantity surveyors, contractors and suppliers. Since the jurisdiction areas needs may vary, the technical committees should come up with provisions to revise the country code of practice rather than changing the sections of the code of practice in whole. This will reduce erosion of the new code with revisions all the time. Training of how to use the code should be started all the way from the curriculum of the various subjects concerning building and all the stakeholders who might be affected by the code of practice should be trained. A motion from the parliament should help in guarding and enforcing its use in all jurisdiction.

e) Enforcing the code of practice adopted

Implementing the code and guarding it for its use is very crucial for the realization of the required goals. An implementation plan should contain

- i. Capacity Building
This involves resources, finance and technical capacity
- ii. Training on how to use the code
Training all the stakeholders in the usage of the code is very important. This should start by including

- the use of the code in the building and civil engineering curriculum all over the country. This implies that the professionals in the public works and the educational institutes should be trained on its usage. Also customized training by different institutions to already practicing engineers and other experts can also act as a way of disseminating information. The forums of different material manufacturing companies should also form some basis of sensitizing on its use.
- iii. Certification
The personnel dealing with the implementation of the code should be certified in carrying out various functions stipulated in the code. Standard proficiency exams from a standard body should be carried out and issue a recognized certificate in the use of the code. The personnel to be certified should know their duties and be familiar in handling matters related to the code.
 - iv. Review of the code
The code should be reviewed after a specific period of time as agreed upon. This is done to enhance and make changes of the current issues which might have not been stated previously and/or are affecting the code adoption. Most of the building codes are reviewed after every three years.
 - v. Monitoring
A monitoring system should be established on reporting on the functionality of the code to the concerned departments from every county to the Building Authority. This will help in evaluating the various provisions on the code and how the code is adopted and utilized on various sections of the housing economy and other related sectors. The report should be according to categories of the code and on its operations.
 - vi. Legal obligations
The code of practice should have legal obligations on all the parties concerned. This will help in its implementation and the parties who act contrary to the provisions on the code shall face legal actions and face some penalties.

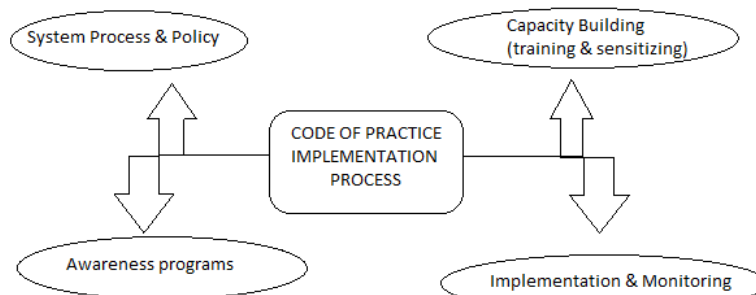


Figure 3: Summary of code of practice Implementation process

5. Conclusion

Building code of practice serves as an instrument of guiding and reforming the building sector in any economy. Disasters as fire which are due to poor planning and failure of structures should not happen as long as we have an efficient and effective system of checking on our building plans and the sector in general. The failure of structures due to poor workmanship, poor construction practices, aging of structures and failure to adhere to provisions on material specifications should not be as rampant as currently being observed. The various stakeholders and administrative authorities need to perform their duties in curbing the illegal structures mushrooming in the cities. Ignoring the safety of these structures is an invitation to a large scale disaster. All the authorities' concerned in the implementation of the code needs to play their part and stick to their provisions to ensure safety in construction field. The proposed building authority has to regulate the industry and promote safety and good planning so as to avoid the misfortunes that are already being experienced. Enforcing the provisions as stipulated by the code of practice forms a sane platform for adopting and implementing it. Collaborating with other relevant sectors will also form a basis of sensitizing on the usage of the code countrywide. By laying down a well format timeline for adopting, implementing and reviewing the code of practice, its effect will be observed with ease. By including the use of the code in the curriculum of higher learning institutions offering courses relating to building and civil engineering will form a future plan for its use.

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