AAK ANNUAL

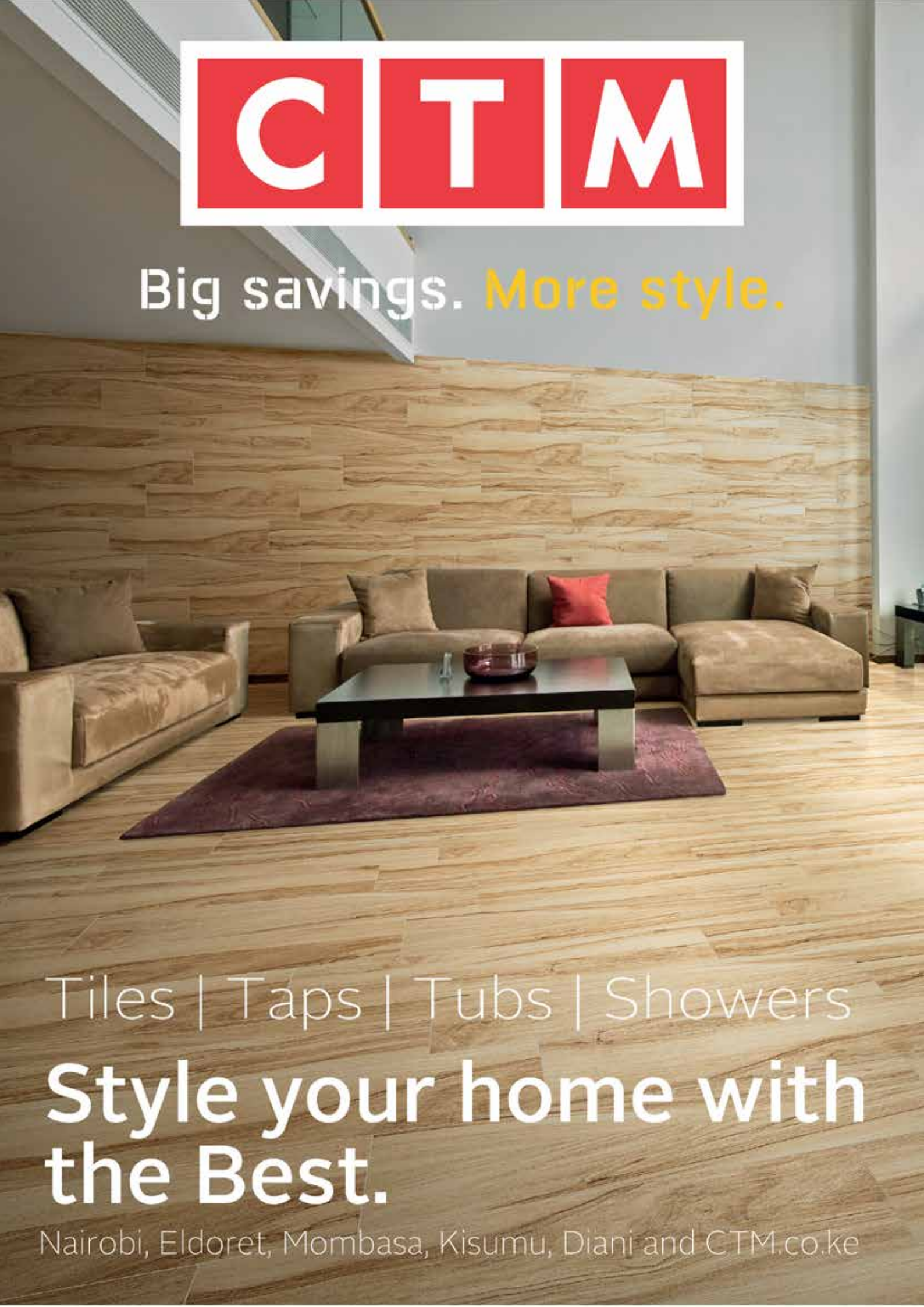
CONVENTION 2021

The Built Environment and Climate Action: An Impactful Way Forward

SAROVA WHITESANDS BEACH RESORT, MOMBASA

THE BUILT ENVIRONMENT AND CLIMATE ACTION

AN IMPACTFUL WAY FORWARD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Editor's Note

As the UN Climate Change Conference (COP26) fast approaches, countries the world over have been taking stock of their nationally determined contributions (NDCs) in a bid to better implement strategies geared towards reduction of greenhouse gas emissions. The 2021 AAK annual convention is therefore timely as it comes against this backdrop, a global focus on climate action.

This year's magazine is a melting pot of ideas, concepts, facts, and illustrations; all crafted around contextualising climate change within the built environment. The articles will get you thinking far and wide on your role as a built environment professional or stakeholder. For instance, have you encountered the 7Ps of the Landscape Resilience Framework? And when it comes to sustainable construction materials, what would you say embodies sustainability? Well, it goes beyond sourcing, into manufacturing/ processing, transporting, lifecycle and so much more. We delve into the green rating of buildings and envision what the building of the future will look like. Moreover, urban regeneration is becoming a more holistic urban planning concept, which better considers the physical environment within the urban space. We shall look at it not only from the planning perspective but also from a landscape architectural viewpoint. Finally, and not least, we shall temporarily shift our focus from technical issues and take a closer, in-depth look at mental health at the workplace.

As always, I take this opportunity to say 'asante sana' to everyone who has made this publication the success that it is. Our regular and new contributors, sponsors, the convention committee, the AAK secretariat, the AAK leadership, the magazine design and layout team, publishing team, the entire AAK membership and you, our reader.

Once again, enjoy the magazine and let your voice be heard!

Patricia K. Baariu

Editor, Convention Magazine
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Convenor's Foreword

L. Arch Ambrose Ofafa

Ass. Honorary Secretary AAK
Convenor, AAK Annual Convention 2021

Welcome to the AAK Annual Convention 2021!

The year 2020 brought with it great uncertainties as the world focused on fighting a global pandemic that literally threw life as we know it completely off balance. This year's Convention theme, 'The Built Environment and Climate Action: An Impactful Way Forward' comes as the focus gradually shifts from the pandemic to climate action, which is undoubtedly a phenomenon of immense global concern.

The UNEP 2020 Global Status Report for Buildings and Construction states that the construction sector is responsible for 35% of global energy use and 38% global GHG emissions. The discussions at this year's Convention will be our industry's response to this realisation. Our sub themes, outlined below, each respond to a particular aspect of this.

- ***The Future of Buildings in a Climate Affected World***
- ***Sustainable Building Materials***
- ***Tools for Green Design***
- ***Urban Regeneration for Climate Action***
- ***The Cost Implication of Building for Climate Resilience***

We have lined up speakers from all corners of the globe, whose rich experience will result in insightful, thought-provoking deliberations. The AAK Environmental Design Consultants Chapter will also be launching the Safari Green Building Tool. This is the first ever home-grown tool that will be used to rate green buildings. We shall also host the East Africa Institute of Architects (EAIA) Annual General Meeting for our Architects' Chapter members.

I welcome you to actively interact with our partners in the exhibition arena; both physically and virtually, as well as indulge in our social events. As we say here in Mombasa, 'Karibuni nyote!'. Welcome all!

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CEO's Foreword

Jacob Mwangi

CEO, Architectural Association of Kenya

Coming from a year bogged down by the pandemic and many other uncertainties, we are hopeful that this year will see us start on a stable recovery path, with offerings of great opportunity for business and investment as a whole.

Climate action is a key issue in today's world as it affects all of us in one way or the other. This year's theme aptly addresses this. We hope that from this Convention, great papers will be written to inform the national and possibly the international agenda on climate.

Our Association has been active in its efforts to mitigate the impact of the industry on the climate. We are pleased to report that we are in collaboration with 14 Trees, which is a LafargeHolcim and CDC Group joint venture aimed at fast-tracking the provision of affordable housing in Africa. The partnership is intended to introduce 3D printing of buildings in Kenya, a solution that will have great positive impact on the climate and development of affordable housing and other social infrastructure. We are also working with key partners – Konkuey Design Initiative, Royal Academy of Engineering, Arup and Akiba Mashinani Trust to promote the principles of Inclusive, Integrated Infrastructure, especially in support of the informal settlements in Kenya. Moreover, during this year's Convention, we will launch the Safari Green Building Index, another milestone in our Association's effort to promote green building in the region.

"Thank you for being part of this year's convention!

We thank all our partners and sponsors for their participation in this year's Convention. Indeed, their constant support goes a long way in making our Convention a success year in year out.

We also thank you, our attendee, for choosing to be part of this great debate – physically and virtually- and for heeding our call to attend this discussion. From all of us at the AAK Secretariat, we invite you to indulge and enjoy each and every bit of the Convention!
Subalkheri!

President's Foreword

Arch. Wilson Mugambi

President, AAK

"The AAK Annual Convention is here yet again!

It is always exciting to host you at this great event. Over the years, this has been our premier event at AAK. Year by year we have met to discuss sector-specific topics that have resulted in action both locally and regionally. In the past, we have hosted other regional and international bodies like the Africa Association of Quantity Surveyors (AAQS), the Commonwealth Association of Architects (CAA), the East Africa Institute of Architects (EAIA) and the International Society of City and Regional Planners (ISOCARP) among others, during the Convention. This has continued to further our agenda of collaborating with other like-minded agencies, associations and bodies for the advancement of our industry.

Our theme for this year rotates around a topic that is literally the world's heartbeat in this year and the millennium in general. It is a given fact that we all have felt the effects of climate change in one way or the other. It is also a fact that buildings and other works of infrastructure have a great impact on the natural environment; a phenomenon that calls for a discourse, with the professionals who plan, design, build and manage them. This would mean that we curtail the effects of climate change brought about by the sector, right from where it starts – the blueprint.

As we deconstruct this year's theme together, it is my sincere hope that as an industry we shall come up with tangible proposals on how to combat this global issue and that we shall produce position papers that will inform the same discourse at regional and international levels.

I welcome you to connect, network, learn and enjoy this year's convention.

Karibuni!

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The Future of Buildings in a Climate Affected World

Arch. Herbert Makori

For as long as humanity has existed within the environment, shelter has been an integral part of his survival and evolution. From the caves of early man, humans began migrating due to altered climate patterns and resource variabilities. They began to build for themselves adequate facilities closer to resource- endowed regions, in a bid to shelter themselves from the elements and predators.

The evolution of buildings has always been a function of the contemporary technology, environmental conditions and building materials available.

With the advent of division of labour and specialization, buildings have had to adapt themselves to the activities intended for them. Hence the emergence of building types like hospitals, factories, residential apartments, recreational arenas, sports stadia among others.

The climate has always been the consistent background on whose basis building designs have evolved. With the increased sophistication and scale of human activities, technology and population growth, climatic patterns have gradually become human driven.

Therefore, increased levels of greenhouse gas emissions have resulted in a continued rise in global temperatures and hence depletion of the protective ozone layer, which results in increased Ultraviolet radiation from the sun. Further, ambient temperatures have risen to about 2 degrees per year, resulting in the melting of glaciers, rise in sea levels, a change in rainfall patterns (both in quantity and seasons).

What does all this have to do with buildings?

Changes to environmental and climatic conditions create new challenges that affect the way we build, and what we use to build. For instance, traditional materials are more likely to fail to perform as anticipated, thereby leading to unhealthy and uncomfortable internal environments, which are not fit for the purposes intended.

To mitigate these, energy is expended in either active cooling or heating or evacuation of heat, thereby leading to constant and increased frequency of maintenance and repair regimen. This may in turn result in unanticipated high building running costs. It becomes important that we evaluate and consciously select materials that are likely to achieve a net zero carbon and energy footprint.

What will buildings look like in this climate affected world?

The elements used to assemble buildings shall see an increased scrutiny from certifiers and statutory bodies. Certification from environment standards watch dogs will become a necessity for a particular material or component to be used in construction. Designers will either by law, or by industry standard, be expected to use green building tools, for example, our very own Safari Green Building Tool developed by the Environmental Design Consultants Chapter of the AAK. There is likely to be an increased demand by developers for buildings with a recognized and certified rating. There is likely to be an increase in requirement for traceability of source of construction materials & components. Manufacturing processes are likely to only use renewable energy or materials with a (near) net zero energy and carbon footprint.

The miniaturization of computing devices and the IoT (Internet of Things) technology may see the integration of intelligence and data collection of building elements becoming common place. For example, door locks or door closers that communicate with windows to control the air-conditioning systems, toilets seats and faucets and shower/bathtub systems that control and only deliver just enough water to reduce wastage of water, and at precisely the temperature preferred by the user. Switches that integrate motion and light sensors to only switch on when there is human presence in a room.

We live in an increasingly data driven world. Despite the privacy debates, there is no denying that data collected and stored in personal devices is likely to be fed to building systems, to influence the internal climates to suit the user requirements in the buildings.
The building typology is also likely to witness a transformation. More and more designers and clients are requiring building facades, or roofs to accommodate or compensate for vegetation cover lost on the building site. Indoor plants have long been associated and found to possess therapeutic and mood uplifting properties for users of internal spaces.

Systems have also been invented to allow for planting of vegetables vertically within spaces like balconies and extra rooms, thereby complementing the dietary needs of users.

With the improvements in the efficacy of the solar panel technology (photovoltaics) and proliferation of wind power generators, buildings of the future will have the capacity to be energy self-sufficient with a possibility of getting permanently off the mains grid or even contributing power to the mains grid.

A climate affected world will require the buildings of the future to re-evaluate waste management and disposal practices. Appropriate waste management requires a 4-pronged approach; discourage, reuse, renew or recycle. It is imperative that we discourage or avoid the generation of potential waste or garbage to only what is necessary. A good example is that organizations are adopting paperless practices and minimizing printing to only what is necessary. Access registers and security checks are either going biometric or digital card-based rather than paper-based registers. Building signage is now adopting digital screens as opposed to hardcopy printed banners and signs.

Plumbing systems are being designed to separate, store and reuse grey water from wash hand basins, and showers for black water applications like flushing toilets.

Rain and storm water harvesting systems and Bio-digesters have also come into play, so that wastewater is recyclable for use on site, rather than going to soak away and/or causing erosion and flooding downstream. This results in reduction of freshwater resource burden, especially for water used in irrigation of gardens and black water uses. Where it is socially acceptable, grey water and recycled water has the potential to achieve purification levels making it potable and fit for human consumption.

In the event potential waste must be generated, care is taken to ensure that expendable materials can undergo several cycles of reuse before ultimately being disposed of. Greater focus is being put to ensure materials are bio-degradable so that landfill footprints can be reduced in urban areas. The buildings of the future will therefore have more elaborate waste management systems.

> **Greater focus is being put to ensure materials are bio-degradable**

It therefore follows that for buildings to remain passive, and competitive for human endeavors rather than resource hogs, it is imperative that developers, architects, designers and specifiers embrace and adopt green building best practices to help mitigate climate change.

Arch. Herbert Makori

Practicing Architect and Secretary of the AAK Mombasa Branch Chapter

AAK Tools for Green Design: Linking the Landscape Resilience Framework to Seven Management Principles

Cecilia A Wandiga

Reducing emissions from building construction requires a change of construction methods, in addition to measurement of building efficiency. The biggest challenge in sustainably managing the built environment is designing for adaptability. Buildings as we currently design them are structural elements with large blocks of material that have no bio-climatic adaptive responses. We talk of building shells and building skins, but we do not design building shells as microbial barriers or building skins as hydration systems (Ask Nature Team, 2016; Ask Nature Team, 2017). By focusing on construction methods that are optimized for different ecosystems and landscapes, we can begin to shift towards a reduction of total embodied carbon instead of just measuring emitted output during building operations.

Total embodied carbon is a measure of all greenhouse gases (particularly, carbon dioxide, methane, nitrous oxide, sulfur dioxide) emitted in the total lifecycle of the construction of a building (UK Green Building Council, 2017). In other words, if silicate binders are used as an aggregate composite in clay or cement, the GHG emissions of silicate extraction are calculated, in addition to emissions from converting silicate into a construction binder and transporting the binder to the facility in which the binder will be mixed as an aggregate.

Therefore, an eco-friendlier approach to utilization of silica would be to extract it from agricultural waste, such as rice husks, as opposed to mining it (FMO, 2015). Rice husk silica extraction would reduce methane emissions from the decomposition of rice husk waste as well as reduce carbon emissions from mining. In addition, rice husk has been shown to produce beneficial soil microbes such as Bacillus sp and Trichoderma spp (Research Outreach, 2020). The production of beneficial microbes using rice husk silica potentially reduces the toxicity of building materials, hence the shell walls of the building are beneficial to the soil surrounding the building.

Embodied carbon is estimated to account for between 11-50% of the whole life (embodied + operational) carbon emissions of a new building (Architecture 2030, n.d.; Circular Ecology, n.d.).Energy epidemiology is an exciting new field in which the health impacts of building stocks and building energy usage is evaluated (Hamilton, Summerfield, Oreszczyn & Ruyssevelt, 2017; RCUK Centre for Energy Epidemiology, 2017).

If the building construction site is taking place in an area where rice is not grown, the ecosystem landscape approach would require the identification of an equivalent substitute, e.g., wheat husk or sorghum husk.

Understanding landscape resilience from a biocapacity perspective is essential for successful transitions towards buildings that are socially and environmentally embedded. Social activities determine the rate of deterioration or rehabilitation of the ecosystems surrounding a building. Beller, Grossinger and Grenier's (2015) Landscape Resilience Framework has seven principles that facilitate the assessment of a building's ecological impact: setting, process, connectivity, diversity & complexity, redundancy, scale, people. Ecological principles are sometimes challenging for those who are not trained to think about biological systems and interdependencies. Construction is an industry in which industrial activity is more focused on inorganic matter than organic matter. Both inorganic and organic matter are biological and reactive or non-reactive depending on environmental stimuli. For instance, sulfur dioxide is used frequently in industrial scrubbers that purify emissions before release into the atmosphere (EPA, 2019); yet it is a greenhouse gas that changes form based on temperature and can bond to other chemicals.

Despite its potential toxicity, sulfur dioxide is also used as an affordable and highly effective food preservative (Perkins, 2018). Should we therefore be developing building façade envelopes (the equivalent of shells) that absorb sulfur dioxide for reuse instead of

designing industrial scrubbers in factories or should we abandon the use of sulfur dioxide in all industries?

There are no clear-cut answers to these questions. Each evaluation is inherently a place specific deliberation about trade-offs. The baseline scenario for evaluation is not the status quo but rather the conditions under which our social activities, including industry, will cause less ecological damage. To this end, as Centre for Science and Technology Innovations (CSTI), we have adapted the commonly known business tool, 7Ps of marketing, to align with the 7Ps of Beller, Grossinger and Grenier's (2015) Landscape Resilience Framework. The goal of the Centre for Science and Technology Innovations (CSTI) framework is to facilitate transdisciplinary discussions across different industry sectors. By focusing on socially embedded eco-industry in the construction sector, we begin to look at embodied carbon as different states of matter that cause different biochemical reactions (Boons, F. & Howard-Grenville, 2009). The circular systems framework reminds us that materials and chemicals flow through buildings and environmental systems in the same way that blood and the chemicals we are exposed to flow through our bodies.

CSTI Framework:
The 7Ps of Natural Capital Management:
A Guide to Socially Embedded Industrial Ecology

Policy (Connectivity)

Governance mechanisms are needed to ensure industrial products for GHG emissions and toxic chemicals reduction also generate biodiversity products and social resilience practices that are well suited for place specific ecosystem restoration while improving circular material flows.

Profits (Diversity & Complexity)

Are gains of natural capital that are obtained from restoration activities which are designed and priced to benefit members of distressed communities in addition to the middle- and upper-income markets.

Place (Setting)

Is the geographically specific rehabilitation of IUCN Red List species and beneficial indigenous species for biodiversity enhancement of ecosystem landscapes within which industrial activity is occurring.

Promotion (Redundancy)

Of natural resource conservation and management principles as knowledge sharing between industry, communities, scientists, and government.

People

Performing safer industrial activities that are climate resilient as well as beneficial for long-term (over 5yrs) environmental, local employment, and systemic health.

Processes

For ecological restoration must be integrated with industrial processes for GHG emissions and toxic chemicals reduction while improving circular material flows.

Physical Evidence (Scale)

Of baseline conditions and quantifiable improvements that can be verified through independent audits.

Cecilia A Wandiga

Executive Director, Centre for Science and Technology Innovations (CSTI), Nairobi


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Is the Built Environment Fueling a Problem it is Trying to Solve?

Rachel Patience Mulondo

As we continue the debate on climate change and the built environment's role in combatting it, an environmentalist challenged me about the culpability of built environment professionals in land degradation – a major catalyst of climate change. Do we exercise responsible design and construction practices as we continue to advocate for actions against climate change? Do our practices from design inception to handover of a completed facility equate to consideration of the environment in design, construction and operation, as required by the World Green Building Council?

In a rush to capitalize on the increasing, but unbalanced demands of urbanization and industrialization, disproportionate land management and construction practices have led to environmental contamination, especially air and noise pollution.

This has in effect led to a questionable quality of life. Case in point, whereas economists celebrate the sprouting of apartments as an indicator of increased economic growth and improved standards of living, the accompanying health complications arising from poor air quality, inadequate natural lighting in buildings, just to mention a few, challenge this claim. It is time to rethink project purposes and processes with profit being one of the key factors and not just the main driver.

What is Sustainable Design?

Sustainable design envisions facilities that are built mostly from renewable resources with minimal impact on the environment both during their construction and lifecycle. The design and construction processes should ensure that the environment these structures stand in will still be allowed to thrive in terms of habitation during the lifetime of the facility, Ie natural air renewal, plant growth, natural water flow where there are water bodies, etc.

This focus on sustainability begins with a design that has the least impact on the environment during construction and usage of the facility, and selection of appropriate materials for construction. The designs should highlight efforts to have a minimal footprint, with destruction of the natural habitat limited to the physical space of the structure and plans for how to restore other areas that will be affected during construction. It also considers how energy will be saved by the structure, and how waste production and disposal will be managed by the facility during its lifetime.

When considering construction materials, professionals must highlight the processes to be used for extraction of raw materials and how they will be processed into their final construction forms and used during construction. It is also important to plan for construction waste production and disposal.

Unsustainable Use of Materials

Construction materials are by-products of both natural and man-made sources. The natural sources include natural occurring substances and minerals like mud; clay; rock; lime; ice; wood; cement ingredients which include limestone, shells, and chalk or marl combined with shale, clay, slate, blast furnace slag, silica sand; and iron ore.

Consider timber, derived from trees that purify our air and contribute to rainfall. As consultants, do we care to find out where the timber for the specified structural works and finishes come from and whether the trees cut for their production were replaced? Do we request for certifications showing that the wood used came from responsibly managed forests, accounting for both environment and community health and lifestyle?

Every tree that is felled had its role in habitation, food, and medicinal production; a function which ultimately came to an end because of its harvesting. That is a negative environmental impact. Another case in point is concrete, which is currently the most used construction material; made from mixing water, cement, aggregates, and reinforcement. Its production has a high environmental footprint; huge quarries are left unrehabilitated, air pollution from production of cement, and a lot of wastage during its use on site.

Also, its constituent raw materials are not easily renewable as they are formed over millions of years.

Solutions from the past

As an industry, it is time to consider re-integration of ancient building materials that have been known to be environmentally friendly, with modern materials. This will allow natural resources to regenerate over time and ensure they aren't entirely depleted or that the surrounding ecosystems aren't permanently damaged. Most materials have substitutes that are either renewable or whose manufacturing process is environmentally friendly, for example, bamboo in lieu of timber whose reduced use will allow the forests time to renew and play their part in our ecosystem.

Re-shaping Africa's construction path

Responsible design and manufacturing processes are the key to a sustainable future. As a continent working to match international standards of development.

As we continue to decrease our green spaces to increase the magnitude of concrete in our environment, a section of developed countries in other continents are trying to decrease their concrete jungles and adopt more green spaces.

Our construction should adapt to our ecosystem and needs. Design reports to Clients should include the impact of the project and its construction cycle to the environment in the short and long-term including the cost and social implications that come with it.

The primary purpose of green building should be its eventual benefit to the ecosystem and not to increase the financial value or expected returns of a facility, as much as a project is an investment. Lest we forget, we are developing facilities for future generations, and whose impacts on the ecosystem will last for a long time to come. Therefore, green buildings should be affordable spaces for the majority and not a preserve of A-list properties for more construction projects to go green.

Rachel Patience Mulondo

Director at Amazon Consultants Ltd;
Registered QS with over 11 years' experience in construction cost management;
Current Hon. Treasurer, AAK.

Sustainable Building Materials: A Social, Economic and Political Approach

Kibera Francis Muriithi

Is the building just a puzzle of materials put together? The picture we often paint is that a building is just stones, mortar, and concrete. Then why should it be expensive? We forget the science behind it all. A building once completed becomes part of our being. According to (Timm & Gray, 2018), 90% of our time is spent indoors. Thus, we ought to understand the consequences of indoor living on our health and well-being.

Human activities are depleting natural resources in a quest to artificially create conducive living environments. There is a need to re-think and re-design our ingenuity on the nature of materials that we ought to go for when putting up and manipulating our built environment.

For instance, Korolija (2011) states that energy consumption has increased with regards to heating, ventilating and running of air conditioning systems, which have become essential in the demand for thermal comfort. The topic on Sustainable building materials thus is one that spans material research and innovation to individual responsibility, socio-cultural and economic attributes.

In the opinion of Brownell (2017), the currency of sustainable design is carbon, yet we still treat it as an abstract concept based on estimates of how much carbon dioxide is produced throughout a material's life cycle. Although conceptual carbon accounting is an important process for measuring environmental effects, we forget that carbon is also literally stored within certain substances.

When we speak about sustainable building materials, the first thing that comes to mind is the range of eco-friendly materials. However, the debate should be on 'depositing' carbon versus effectively 'withdrawing' it in a concrete or steel structure. With more emphasis being put in the use of locally available materials, there is a need to understand the carbon footprint from the same; and the responsibility squarely falls on built environment professionals.

As professionals, the built environment reflects our thinking. Where the need to put up buildings, roads, and civil works arises, we are put to task to creatively provide solutions. Thus, the quality that we give is an illustration of how we think through the process, and for a long time, we have done this through a uni-directional approach.

One way to reconfigure our design thinking and employ the use of local material sustainably, is through the "Design for Disassembly (DfD) method that demonstrates an awareness of eventual deconstruction and employs measures to facilitate the process.

It is seen as a pivotal tool for reducing construction and demolition waste. The approach champions principles such as the use of standardized components and reconfigurable connections (Brownell, 2017).

Social Inputs

Knowledge transfer, improved environmental quality, neighborhood restoration and reduced health risks from pollutants associated with buildings forms the social framework of sustainable materials. Nevertheless, more focus has been on the evolution in construction techniques and materials acquisition, to reduce waste, energy and various inefficiencies at building sites and less on the labor requirements.

Political Input

When it comes to the utilization of sustainable materials within the construction industry, there are stipulated laws, guidelines and regulations that guide on the best way to do so. However, professionals have more and more neglected to adhere to them, including neglecting to have materials analyzed in materials laboratories.

Policy makers too ought to increase scrutiny on the construction industry's material employment and use patterns and dynamics. In addition to this, training and skill development needs to be advocated more, especially in the wake of international companies securing major infrastructure contracts within our borders.

Economic input

According to Zhou & Lowe (2003), from *an economic point of view, sustainable construction is an unusual activity, which changes business patterns from a linear to a cyclic process. As the original stimulant, it is essential to detail the economic principles of sustainable construction and investigate their application in practice.*

Construction activities integrate a number of different stakeholders whom in addition to ensuring the realization of a project, should be accountable to each other. Further, it is important to note that contractors are profit oriented and it is the onus of the professionals to give clear specification and constructability documentations; whose implementation must be inspected, to reduce the instances of the use of unstandardized materials by unscrupulous contractors in order to cut costs.

Environmental inputs

Approximately 70% of our time is spent within buildings. Given that the average life expectancy of an individual is 70 years, there is a need to consider the long-term effects that a building; and hence its materials, has on human health and well-being. How often do we psychologically get over-burdened when we wake up and interact immediately with a concrete jungle? Or do we find that we are in constant tension within ourselves as we dwell in the buildings or structures that we are in? Did we stop to consider that this might be due to poor material building material use; since the materials used cannot meet and conserve our environment?

Changes in the global climate conditions and the advent of extreme weather events has been attributed to human activities such as deforestation and poor waste management. The question then ought to shift from, ***'what is your background in the built environment practice?'***, to, ***'what is your contribution to humanity?'***. The shift in this mind-set will make one better make the decision on what materials to specify during design.

Kibera Francis Muriithi

Graduate Assistant
at Epic Value Consultants

Innovations and Changing Trends in Development Control

Nakoli Maloba

Urbanization and population growth in Kenya have been increasing at an uneven rate and have become among the biggest challenges to planners in most counties. In the past decade, urbanization has been so intense that many counties are struggling to provide their population with adequate infrastructure and services that they desire and deserve to have. Consequently, cases of overcrowding, traffic jams, cropping up of unsanitary settlements, environmental degradation, homelessness, and disease outbreaks have been on the rise; due to poor planning.

To alleviate the effects of rapid urban development, infusing aspects of development control is critical in the planning and management of urban areas.

One of the instruments of development control that forms a basis of proper planning is the issuance of building approvals and permits. In recent times, the construction permitting process has turned into a nightmare for potential developers and investors alike. It has been observed that a prospective developer in Nairobi must navigate a cornucopia of bureaucratic hoops to obtain a construction permit to develop their land.

An arduous process which in 2019 was estimated to take an average of 159 days, according to Doing Business report by the World Bank. Most buildings are constructed without the requisite approvals, even though a building construction permit is required for all proposed developments.

According to a study on Development Control Framework in Kenya (2011), 70 per cent (or more) of construction in all local authorities are carried out without permission especially in low-income neighbourhoods.

Developers get discouraged from submitting their proposed plans for permitting due to the constrains therein including system downtime, unreasonably lengthy turnaround times, punitively high costs of obtaining approvals, lack of public awareness and access to zoning regulations, rampant corruption by officials, unclear procedures and requirements for approval, inappropriate regulatory framework, lack of institutional capacities, political interference and poor leadership practices. In the end, they end up submitting their plans for regularization which is basically approval of a proposed development after the fact, which does not assure building quality.

Globally, the trends in development control revolve around the legislation and enforcement of clear and coherent laws in construction, evaluation of projects according to risk categories, ensuring that the building quality control and safety mechanisms are in place, improvement of accessibility to regulations and transparency, and introduction of the use of one-stop shops to improve coordination and increase the efficiency of obtaining construction permits.

Recent trends in Singapore and Hong-Kong include the introduction of clear rules for risk-based inspections which improved their building quality control processes and allowed them to mandate inspections based on buildings' risk category and use type. According to the Doing Business Report of 2019, it is now a practice that quality control is undertaken by private supervising engineers in Moldova. In addition, with no need to acquire clearances from health and environmental agencies for low-risk projects, dealing with construction permits has become much easier. Further, through the streamlining of the approval process and promotion of operational efficiency of its one-stop shop for construction permitting, Pakistan made obtaining a construction permit easier and faster. Also, worth noting is Azerbaijan's efforts, which streamlined its construction permitting process by enforcing the acquisition of permits through a single-window system.

Closer home, Sub-Saharan Africa continues to have the highest number of economies undertaking construction permitting reforms. The concerted efforts in this region are directed towards enforcing adequate building quality controls. Eswatini, Kenya, Togo and Zimbabwe enhanced transparency of obtaining a building permit by making requirements publicly available online.

Botswana made dealing with construction permits easier by streamlining the inspection system using an in-house or a third-party engineer, as reported by the Doing Business report of 2019.

In Kenya we have made significant milestones on development control this year. Agencies in the construction permits value chain, through an initiative of the government, earlier this year penned down their commitments to improving their individual processes through various public notices, in a bid to improve the efficiency, cost-effectiveness and reduce the time taken for the process. As per the global best practice, Kenya adopted a risk-based classification for project approvals and simplified the permitting process by streamlining interactions with agencies.

The National Environmental Management Authority (NEMA) in Legal Notice No. 31-32 of 2019 reduced the time taken for licensing to 5 days and the Authority is also automating their licensing process to increase efficiency. The National Construction Authority (NCA) amended the Act of 2011 to anchor the Building Code and enforce it. The Authority through a public notice in February this year announced the reduction of the number of days taken for registration of a project to 1 day down from 7 days. The Nairobi City County Government (NCCG) reduced the time taken for approvals to 9 days for both architectural and structural drawings, introduced weekly committee meetings for approval of applications and introduced the QR code system to replace the manual stamping of approved drawings at City Hall.

Overall, the three agencies improved transparency by publishing information on their websites to improve the accessibility of information on their legislations, processes, and application requirements. The end goal of it all being, integration of all the application processes into a one-stop-shop, which when completed will be one of the biggest reforms in the construction industry in Kenya to date.

County Governments should consider charging approval fees in the form of clusters or bands. Setting a small, fixed fee for approval of small buildings is considered a global best practice. It makes sense to institute minimum fees since the cost of issuance of approvals is not directly proportional to the area or cost of the building; a minimum charge will, therefore, cover enforcement costs for small projects. Large projects with substantial permit fees will typically cross-subsidize smaller projects.

To bridge the current gap of inadequate capacity in the agencies, a legal and regulatory review can be initiated to consider the introduction of licensed private sector professionals to carry out third party inspections to verify project compliance with building code requirements and approved building plans. Leveraging resources from the private sector to strengthen the capacity for inspections will serve as a quick fix as the institutions go through the processes of building their capacities. Doing Business data shows that private third-party involvement in building controls is associated with better building quality in construction as measured by the building quality control index.

Development of a one-stop-shop centre for construction approvals should be top on the agenda of strategies that should be adapted locally. The agencies responsible for construction permitting should work on improving the reliability and efficiency of their current online systems, integrated into one platform and harmonize the platform for all counties.

This will improve efficiency, coordination and will be more cost-effective than having each of the 47 counties developing their own systems.

Through its advocacy role, the Architectural Association of Kenya (AAK) and other private sector players have been at the forefront of advocating for the improvement of services in the development control sphere. Involvement of the private sector in regulatory activities has proved to be necessary, as a means of ensuring transparency and accountability. We all need to come on board to support the initiatives put forward to improve development control.

Nakoli Maloba

Construction Project Manager, Vice-Secretary of the AAK Construction Project Managers Chapter.

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Landscape Architects in Urban Regeneration for Climate Action

Ruth Wanjiku

Vertical Kitchen Gardens at a Private Residence in Nairobi
Landscape Architect; Caroline Wanza

A walk through Nairobi City or any other major city in the world reveals sections of the city in dire need of urban renewal. According to UN-Habitat, urban regeneration awakens underutilized resources, and redistributes resources hence improving the quality of urban life by applying solutions such as densification, heritage preservation and reactivation of public space.

Nairobi has various old estates owned by the Nairobi City County in need of urban renewal, and which have in the last several years been earmarked for upgrading. Densification of these estates has commenced with the recently completed Pangani Project, whose aim is provision of affordable housing. Other examples of urban regeneration projects include the pedestrianisation of Luthuli Avenue and the reclamation of the Nairobi River riparian reserve.We need to ask ourselves how climate resilient the different urban regeneration methods and what can landscape architecture contribute towards this process.

The planning and design of human communities, the utilisation of resources, and the conservation and protection of ecosystems impacts on the capacity of people and environments to withstand environmental changes. It also affects the ability of future generations to guarantee their security and prosperity.

To ensure a prosperous future and a sustainable environment, we must create societies characterized by an enhanced capacity for resilience, a willingness to transform to a better state, and a commitment to ensuring the long-term sustainability of environments, cultures and well-being for all.

In 2017 the Executive Committee of the International Federation of Landscape Architects (IFLA) ratified the **'IFLA Global Accord – adaptation for a changing world'** that is hinged on the principles of resilience, transformation, and sustainability.

Living wall at Social House Nairobi Landscape Architect; Lorraine Odhiambo

According to IFLA, Landscape Architects have experience in working across environmental and cultural systems, and hence are uniquely positioned to engage professions, industries, and governments in new alliances, which would be better equipped to address complex social and ecological problems and to fully express the opportunities inherent in principles of equity, sustainability, resiliency and democracy. The landscape is the fabric that wraps together the other elements of the built environment, and hence contributes to the overall environment's resilience.

Resilient societies and systems possess the requisite tools to tackle hardships and to seize opportunities in a changing climate. Landscape architects can bring various solutions to the urban regeneration table through design of cooler cities, increasing carbon sequestration as well as enhancing storm drainage. Introduction of green walls and green roofs in densification projects increases thermal cooling for the buildings, reduces the speed of surface runoff and provides plant life that aid in carbon sequestration.

Transformative societies embrace change and are characterized by a philosophical, practical and strategic shift in the way people think, feel, and act.

While planning for urban renewal, it essential that we shift from traditional planning and designing methods, and adopt methods that respond to a changing climate. Landscape Architects have expertise on plant selection as well as appropriate plant grouping which are crucial in ensuring provision of ecosystem regulatory services. Through site specific designs, landscape architects plan for low-carbon places that reduce the embodied carbon of outdoor space and that employ green and blue infrastructure rather than engineered solutions.

As we move towards ensuring that we have complete streets in our urban areas, it is crucial that these complete streets provide environmental functions as well. The road median as well as the separators between the different modes should be vegetated and planned as bioswales.

Bioswales along roads that enhance on storm water management
Source: City of Mobile

These areas will serve multiple purposes that shall include carbon sequestration; storm water reduction, thermal cooling, and visual aesthetics. It is important for our urban area planning and management to shift focus from the aesthetic function of the landscape to the scientific function. It is therefore vital to include landscape architects in road infrastructure design teams as they are experts in the design and installation of bio-swales.

Landscape Architects develop planting lists which if correctly and fully implemented, create climate resilient spaces. For instance, trees with higher biomass have more sequestration potential than those with lower biomass making tree species selection a key element of landscape planning. In addition, landscape architects advice on the most suitable ground cover option for various open spaces. Traditionally, lawns have been the go to option in many plans and designs. While lawns enjoy widespread acceptance, and provide some urban ecosystem services, under typical management they consume extensive irrigation water and their maintenance needs such as herbicides and fertilizers are ultimately detrimental to climate action.

Landscape architects should therefore inform urban regeneration policy to ensure that regeneration plans are developed and implemented under transformative policies that are alive to the ever changing climate.

Sustainable societies ensure that the decisions they make today do not compromise the capacity for future generations to meet their needs. Healthy and sustainable environments increasingly rely on the protection, conservation and wise use of resources by humans, while protecting systems and species to ensure their continued viability, especially under increasingly trying climatic conditions. Landscape Architects apply scientific principles to address ecological sustainability, health of landscapes, preservation of heritage and culture, and territorial justice. In addition, they provide adaptation and mitigation solutions that manage the interaction between the natural and cultural ecosystems by creating spaces that anticipate social and economic well-being. Landscape planning can be used to tackle food security through the planning and incorporation of food production into urban landscapes, thereby reducing 'food miles' as a result of transportation and promoting more localized self-sufficiency.

Michuki Park Nairobi (2007)

Michuki Park Nairobi (2021)

The Michuki Park located on the fringes of the Nairobi CBD, is a reclaimed urban space along Nairobi River that showcases how landscape planning and design can be utilized in reclamation and rejuvenation of Urban areas. The area on which the park stands was previously a dumpsite and through collaboration of various stakeholders that included the Ministry of Environment, the UN-Habitat, Nairobi City County, among others, the area has been transformed into a vibrant public park.

It is important for landscape architects in collaboration with other allied professionals to apply the above outlined principles, namely; resilience, transformation, and sustainability to ensure that urban regeneration is a holistic process, and that the final product is climate resilient. It is therefore crucial that urban regeneration teams include landscape architects so that the green infrastructure that includes public open spaces, road medians, road reserves and other incidental spaces, are designed to provide the necessary ecosystem services and enhance the overall urban environmental quality.

Finally, we need to ensure that policies and regulations in place are clear on the character and form of the various green infrastructure components in urban area as we work towards climate action and resilience.

Greening High Density Projects; The SkyVille , Singapore

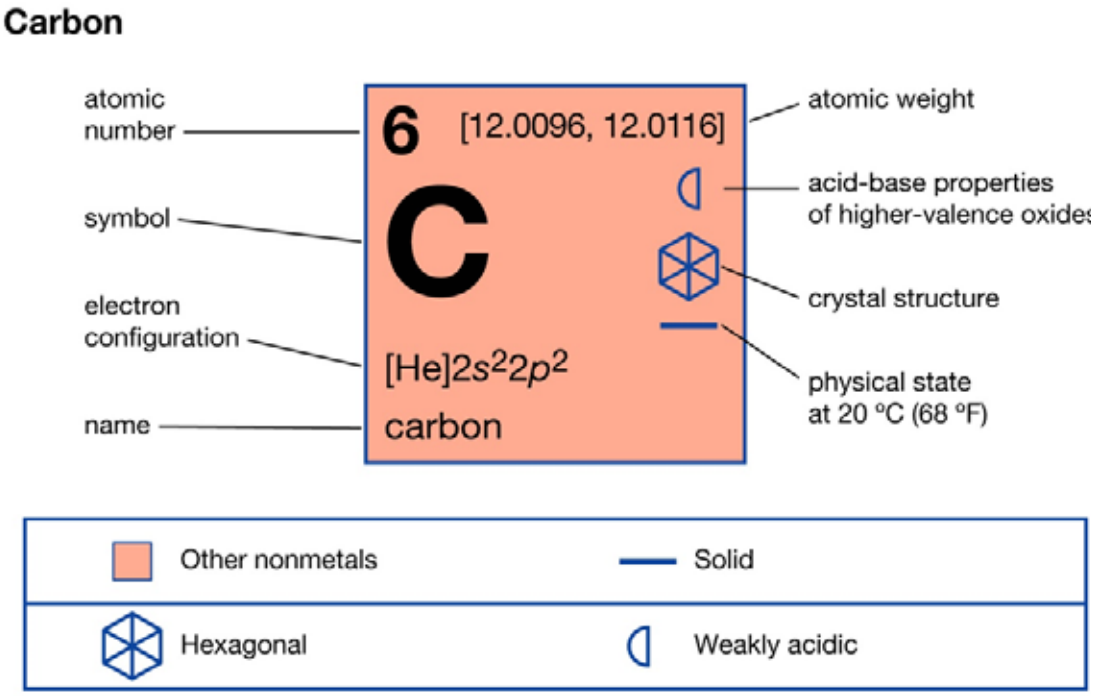
Ruth Wanjiku

Chairperson,
AAK Landscape Architects Chapter
Principal Landscape Architect at
Muzura Ecospaces.

CARBON NEUTRAL?

A Primer For A Carbon-based Life Form

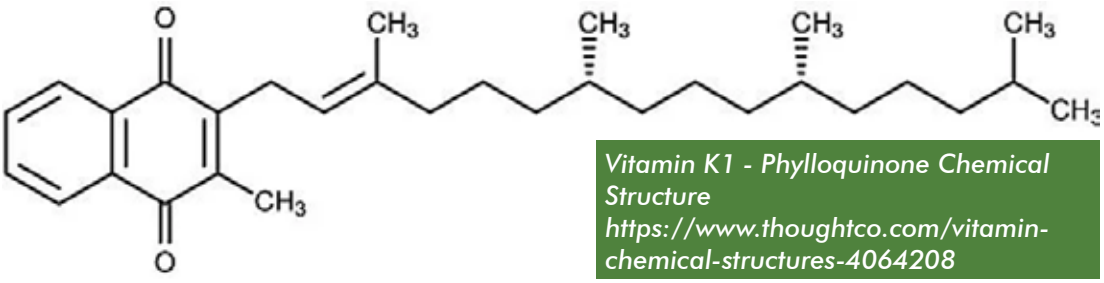
Arch. Eric Kigada



A common theme in Sci-Fi movies or books is for the human characters to head off to another planet or planetary system and discover a life form that is not carbon based. The premise is for that life form to be silicon based. The reason for this is that although carbon is widely distributed in nature, it is not particularly plentiful—it makes up only about 0.025 percent of the earth's crust—yet it forms more compounds than all the other elements combined. (Encyclopaedia Britannica., 2021)

Since carbon is such an elemental part of compounds, it is in nearly everything we humans consume, like proteins, vitamins and naturally occurring carbohydrates. The carbon cycle is a crucial part of life on earth.

In construction, carbon forms compounds of common materials such as limestone, marble and coral, which is calcium carbonate. Where it is not embedded in a material, we expend carbon mostly in the form of an emission or infusion to materials to convert a material from the raw form to another form. For example, iron ore is infused with carbon to make steel. Fuel is burnt in the cement making process, making it one of the largest contributors of greenhouse gases emissions.

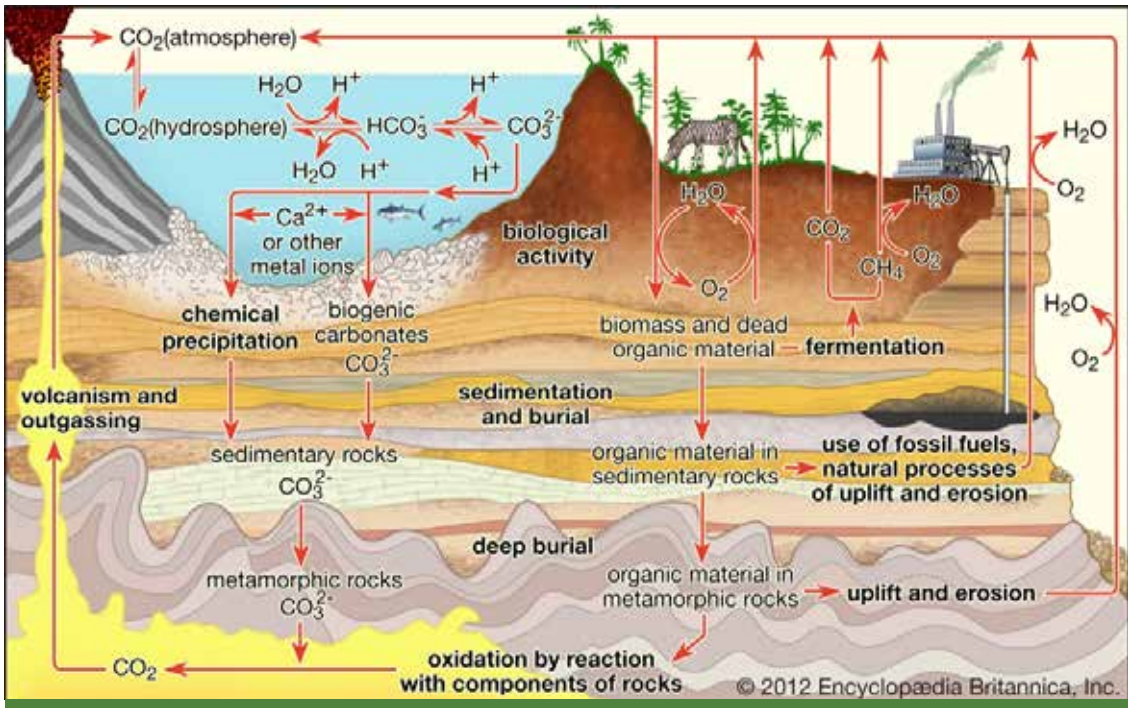


Vitamin K1 - Phylloquinone Chemical Structure
https://www.thoughtco.com/vitamin-chemical-structures-4064208

A greenhouse gas is any gas that has the property of absorbing infrared radiation (net heat energy) emitted from the earth's surface and re-radiating it back to the earth's surface, thus contributing to the greenhouse effect. Carbon dioxide, methane, and water vapour are the most important greenhouse gases. (To a lesser extent, surface-level ozone, nitrous oxides, and fluorinated gases also trap infrared radiation.)

Natural sources of atmospheric CO2 include outgassing from volcanoes, the combustion and natural decay of organic matter, and respiration by aerobic (oxygen-using) organisms.

These sources are balanced, on average, by a set of physical, chemical, or biological processes, called "sinks," that tend to remove CO2 from the atmosphere. Significant natural sinks include terrestrial vegetation, which takes up CO2 during photosynthesis. Several oceanic processes (solubility & biological pumps) also act as carbon sinks.pumps) also act as carbon sinks.Human activities increase atmospheric CO2 levels primarily through the burning of fossil fuels (principally oil and coal, and secondarily natural gas, for use in transportation, heating, and electricity production) and through the production of cement, as mentioned earlier.



The Carbon Cycle.
Source: https://www.britannica.com/science/carbon-cycle

Other anthropogenic sources include the burning of forests and the clearing of land. Anthropogenic emissions currently account for the annual release of about 7 gigatons (7 billion tons) of carbon into the atmosphere. Anthropogenic emissions are equal to approximately 3 percent of the total emissions of CO2 by natural sources, and this amplified carbon load from human activities far exceeds the offsetting capacity of natural sinks (by perhaps as much as 2–3 gigatons per year).

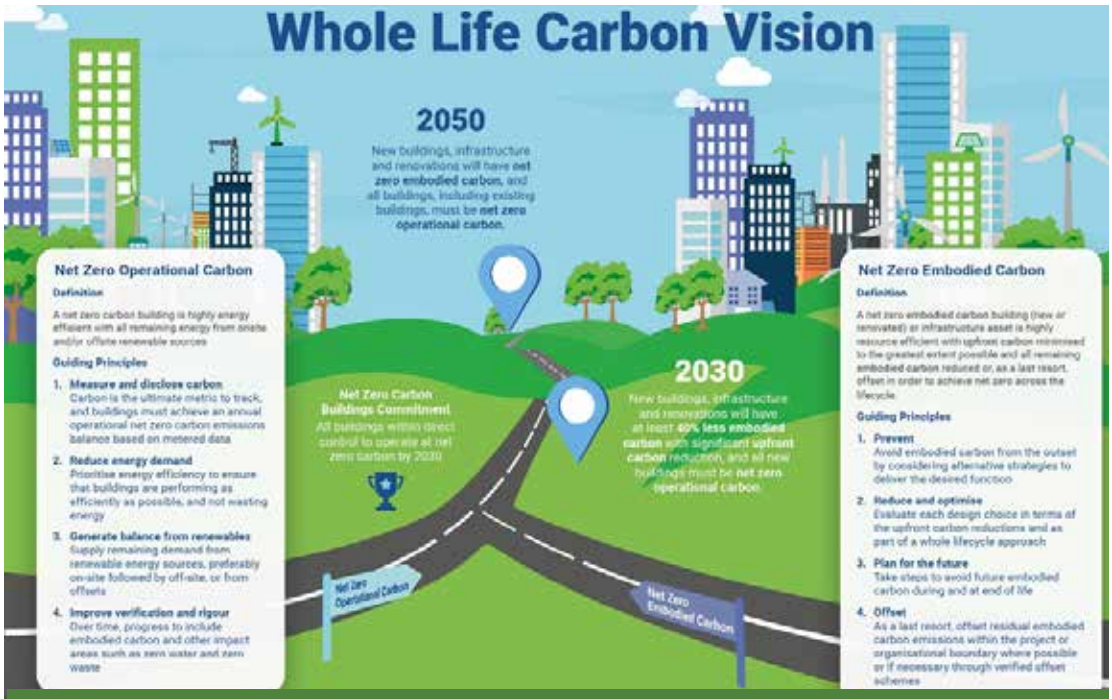
For years now, the "green" industry has focused its climate efforts on operational-energy consumption from lighting, heating, cooling, hot water, and other plug loads. Great strides have been made in increasing efficiencies and renewable-energy supplies. Even with space travel, we are now reusing booster rockets; something a decade ago was unthinkable. Electric cars charged using solar photovoltaic will be a game changer in Kenya. It would be good if we had planning policies incorporating photovoltaic electrical production and electric car charging in our building code like Rwanda. That said, there is another, less obvious source of greenhouse gas emissions associated with buildings: embodied carbon.

Embodied Carbon in the Construction Industry

Embodied carbon consists of all the greenhouse gas emissions associated with building construction, including those that arise from extracting, transporting, manufacturing, and installing building materials on site, as well as the operational and end-of-life emissions associated with those materials. "Cradle to gate" embodied carbon refers to the emissions associated with only the production of building materials, from raw material extraction to the manufacturing of finished products; it can be thought of as supply-chain carbon.

Unfortunately, embodied carbon is more difficult to measure and track than operational carbon, which is relatively simple to extrapolate from occupants' energy bills. Determining the embodied carbon of any building material is impossible to ascertain from the finished product alone and requires self-assessment and process transparency on the part of the manufacturer. Two materials may look identical, cost the same amount, perform to the same standard—but have totally different embodied carbon characteristics.

> **"Anthropogenic emissions currently account for the annual release of 7 gigatons of carbon into the atmosphere.**



https://www.worldgbc.org/advancing-net-zero/whole-life-carbon-vision

For example, a 100 percent recycled-steel beam produced using renewable energy may appear identical to a virgin-steel beam produced using a coal-fired furnace—but have significantly different levels of embodied carbon. Where each steel beam came from and how far it was transported add further complexity. As a result, a non-profit consortium of construction-industry players came together to develop what is now known as the Embodied Carbon in Construction Calculator (EC3): (https://www.buildingtransparency.org/) a free, cloud-based, open-source tool that utilizes data to power better materials choices and tackle cradle-to-gate embodied carbon. (Cameron, September 2020)

If we look at embodied carbon for materials in Kenya, a lot of work still needs to be done. Remember carbon is in our limestone (natural stone walling material), coral rock if you are at the coast, kiln fired brick, cement, roofing sheets etc

Embedded Carbon in Commonly used construction materials

I expect an assessment of limestones embedded carbon to follow this path: the quarry mining equipment efficiency. Does the quarry have a restoration plan once the limestone is exhausted? Stone cutting or shaping (manual or machine cut). Does the machine use a diesel generator or grid electricity? If it's grid electricity, is it from a thermal power plant or a renewable source? The loading onto a truck, the age of the truck and its emissions. Most trucks used for delivery of stones, sand or materials are trucks built in the 80's. This, in my opinion, is the biggest carbon contributor in the supply chain.

Materials like roofing sheets must consider that we import steel coils, which are manufactured elsewhere then shipped into Kenya for shaping and powder coating. Most of the paint is also not manufactured in Kenya. It too will have to consider the transportation segment into its embedded carbon footprint.

Source: Author ©2012

The paint might be low VOC, but it is not locally manufactured thus adding transport emissions to its embedded carbon footprint. This is going to be a lot of work and will need the cooperation of everyone involved in the construction industry.

With what I am suggesting, **once we account for all the embedded carbon in local construction materials, we will find that most of our buildings are not actually as green as we consider them to be.** We might have to build a considerable recycling infrastructure for building materials to offset the embodied carbon in our buildings. What we will have to keep in mind is the myth of precision.

The Myth of Precision

There is a performance and precision fetish that exists in the modern world due to technology. For example, an architect's drawings are the ones used to take a design from concept to reality. They are an instruction set and a declaration of intention. They are also a signal to the builders as to the architect's intentions and to some degree, his or her credibility.

It is then with trepidation that one sees drawings arrive on the construction site that are dimensioned to the millimetre (or tenths or hundredths of millimetres).

In Europe, one half of a centimetre is the acceptable tolerance for building dimensions. Dimensions expressed in millimetres are already five times too precise. Any more precisions in the drawings only serves to reduce the credibility of the architect by at least so much (Russell, 2004). Every building material will have carbon in some form, making it impossible to achieve a completely carbon free building. The danger is that we will continue measuring, find more carbon embedding / missions and condemn perfectly good materials as not being environmentally friendly. You can change a result by measuring!

Oh, and about the possibility of humans encountering a silicon-based lifeform, note that there are estimated to be 3.5 times as many carbon atoms as silicon atoms in the universe. (Encyclopaedia Britannica., 2021). We are in the end a carbon-based lifeform.

Eric Kigada

Principal Architect of B&A Studios.

Eric holds a master's degree in architecture from The RWTH University of Aachen, Germany

JBCC Chairman and AAK Chapter Chairpersons during the release of the Status of Built Environment January – June 2021 Report. L – R: Muchiri Waititu, JBCC Chairman; Mary Odhiambo, QS Chapter; George Arabbu, Architects' Chapter; Gideon Olawo, EDC Chapter; Cyrus Mbisi, Town Planners' Chapter; Ruth Wanjiku, Landscape Architects' Chapter; Jacton Mwembe, Engineers' Chapter Registrar

Part of the AAK Secretariat during the release of SBE Report. L - R: James Odongo, Research and Advocacy Manager; Winjoy Karendi, Program Officer JBCC; Lina Jamwa, Membership and Communications Manager; Christine Mwaura, Communications Officer; Faith Lirhu, Membership and Chapter Intern; Jacob Mwangi, AAK CEO.

2021: A Year In Photos

L - R: Muchiri Waititu, JBCC Chairman; Florence Nyole, AAK Vice-President; Kang'ethe Thuku, Deputy Director General, Nairobi Metropoiltan Services; Wilson Mugambi, AAK President; S. G Mwangi, Director Lands, Housing and Urban Development, Nairobi Metropoiltan Services.

L-R: Kang'ethe Thuku, Deputy Director General, Nairobi Metropoiltan Services; Wilson Mugambi, AAK President; S. G Mwangi, Director Lands, Housing and Urban Development, Nairobi Metropoiltan Services.

Some of the students who attended the Beyond Architecture event

2021: A Year In Photos

Some of the exhibits during the Beyond Architecture event

Arch. George Arabbu, AAK Architects' Chapter Chairperson, receiving a gift from ASA Official during the ASA UoN Beyond Architecture event that was held at the institution on 9th July 2021

Arch. Florence Nyole, AAK Vice-President, receiving a gift from ASA Official during the ASA UoN Beyond Architecture event that was held at the institution on 9th July 2021

Urban Regeneration: A Quest to Regain Cities' Lost Glory

Dennis Abuya &
Christine Njuhi

Cities and other urban areas have been faced with challenges mainly stemming from rapid urbanization and urban sprawl. These include the high rate of unemployment, social and economic imbalances, disaster vulnerabilities, crime, poor quality of urban services, dilapidated housing, lack of good quality open spaces, decayed urban streets, greenhouse gas emissions, generation of waste and pollution. To cope with urban decay, urban regeneration tries to rebuild the image, economy, environment, and social fabric of old dilapidated urban areas.

It aims to reclaim the spaces rapidly and curb the possibilities of urban sprawl, a phenomenon that modern cities are grappling with. Urban regeneration re-organizes and upgrades the built environment through demolition and rebuilding, renovation and repairs or environmental restoration.

Due to the ravaging and devastating effects of the Covid-19 pandemic, cities are looking for prospects of changing their fortunes through urban regeneration.

This is because they have realized the need to rebuild the city and rethink complex urban related issues especially where public health matters such as lack of adequate health facilities and quality public open spaces are concerned. New concepts of having superblocks and 15-minute cities have therefore been proposed. These concepts are envisioned to optimize the urban design of a city or region.

The element of urban regeneration which aims at transformation of the economic, environmental, and socio-cultural dimension of a place requires good coordination between the government, private sector, and communities. Without **political goodwill** and good governance in terms of effective implementation of policies and availability of civil rights for institutional, managerial, and financial support, it will be very difficult to achieve urban regeneration. This requires the formulation of a new policy and planning framework which incorporates citizen involvement.

Equity and Affordability

Urban regeneration restores decayed urban areas and advances sustainability as opposed to the early decade's interventions that focused on gentrification. These strategies did not take cognizance of all the social classes represented in urban areas and therefore didn't distribute opportunities equally, for the benefit of all urban dwellers.

Gentrification led to the increase in prices of developments such as housing that only the high-income class would afford, subsequently resulting into urban segregation through the displacement of the low-income classes.

The exclusion of certain urban dwellers from the opportunities and prospects of the city has trivialized the potential of the urban space which would otherwise fully manifest by granting equal opportunities to all its citizenry. Urban managers can devise ways and strategies of reactivating the urban areas through redevelopment of brownfields, promoting mixed use and denser developments, to diversify economic activities and foster integration of activities. As such, the key focus of urban regeneration should be affordability and equity in service provision. This would then enhance accessibility to services by all and boost the ease of doing business while prioritizing the involvement of the populace through public participation as enshrined in our supreme law.

In well-coordinated developments, urban regeneration can trigger the local economic development of an area or a region through creation of employment opportunities and other trickle-down effects. Such regeneration projects may target land re-utilization, redevelopment of brownfields through densification, with the renewed plot bonus ratios, reconstruction of old housing estates, renewal of commercial developments and social-cultural improvements of urban areas.**Synergies and partnerships** between the government, private sector and communities is what urban regeneration requires to facilitate involvement and engagements through public participation of all stakeholders. This will ensure that no one is left behind from sharing their vision and tailoring the projects to meet the expectations of the local community.

It also requires good leadership and governance. The urban regeneration process can be achieved through legislative, policy and governmental reforms with high level of effective governance. This should be integrated with long term urban planning through technocrats to attain a balance between economic, environmental, and social goals within its jurisdictions and provide solutions that will lead to the sustainability of our urban areas.

Safeguarding of green open spaces

Policy reforms that support regeneration of urban areas should be prioritized to protect and safeguard green spaces and to achieve tree cover of at least 10% in every homestead; to minimize air pollution levels and increase natural absorption of Green House Gas emissions. Green spaces should be integrated within walkable distances as they have positive impacts on human health. The lack of open spaces is a health concern which should be prioritized in the process of urban regeneration. Notably, in some cities, open spaces cover a larger area than that covered by the built-up area.

It should be a policy requirement that property owners include greenery and vegetation within their developments, while ensuring that the resulting green spaces create a sense of safety and security for their users. Further, urban agriculture is an urban regeneration measure that should be promoted as both an economic activity and as lungs or breathers in the built-up areas. In the spirit of protecting and conserving the environment, there should be emphasis on waterfront planning especially in coastal towns and Lake Region areas to protect the marine waters and promote tourism. At the County level, Physical and Land Use Planning should embrace the eco-town planning concept by promoting green energy through advocacy of recycling options for wastewater, solar lighting and harnessing of wind energy. On matters development control, planning and development should be key with permissible development plot ratios and ground coverage limited to allow room for water percolation to minimize incidences of flooding, and other disasters and risks associated with congested and over-built areas. In addition, spatial land use conflicts resolution should be prioritized to ensure harmony of land uses and hence an environment which is habitable and humane.

Christine Muchiri

Vice Chair, Town Planners Chapter;
CEO & Founder Maca Plan Consulting;
Lecturer - TUK;
Registered Physical Planner and Lead Expert

Dennis Abuya

Registered Physical Planner with the Physical Planners Registration Board in the Republic of Kenya. He is a corporate and active member in professional associations including, the Kenya Institute of Planners, Architectural Association of Kenya (Town Planners Chapter).

Bamboo Application in the Construction Industry in Kenya: Recent Advances

Arch. Sylvia Essendi

In the wake of climate change, alternative construction materials are emerging. Bamboo is one such material, whose use in the country is exponentially growing. In 2019, bamboo was classified as a scheduled crop by the Government of Kenya. In the same year, the country developed its first bamboo policy dubbed the National Bamboo Policy. The country's cover of bamboo is growing rapidly as a result. Currently the mapped area under cultivated bamboo in the country stands at 2,000 hectares, while that growing naturally in forests is 133,273 hectares.

Kenya will soon roll out a TVET course on Bamboo Technology. The International Network for Bamboo and Rattan (INBAR), in consultation with TVETA-CDACC is in the process of preparing a training curriculum for Bamboo Technologists.

The consultative process is currently underway with major input from industry players. This is a huge boost to the acceptance and use of bamboo in the country, and more specifically, for the construction industry.

Moreover, INBAR in consultation with KEBS is in the process of promoting standards development for the bamboo industry locally. Key to note is that some standards, such as terminology, preservation for both non-structural and structural uses and guidelines for sustainable management and harvesting of bamboo have already been developed. Additional standards that are important to the construction industry and which are under development are standards for bamboo flooring products as well as standards for bamboo furniture.

Harvested and cross-cut bamboo in a workshop, ready to be utilized.
Source: Author

Locally manufactured bamboo parquet installed in a house in Rongai.
Source: Author

Opportunities for bamboo in the construction industry include construction (structural), scaffolding, bamboo timber (bamboo scrimber and laminated bamboo), decorative (floor, wall, and ceiling finishes), outdoor decking, doors and windows, roofing and fencing among others.

Locally, we have a few companies that are producing construction products from bamboo. Ecopole is producing composite poles from bamboo and polyurethane and encased in high density polyethylene.

Mianzi Designs, working under the technical support of the Kenya Forestry Research Institute is developing bamboo floor finishes. There is gradual progression in the use of bamboo in the construction industry from local players. The aim is that as these advances are made, the construction industry will become a big player in the use of bamboo thereby contributing to environmental conservation.

Arch. Sylvia Essendi

Assistant Manager in the Department of Registration, National Construction Authority;

Products Designer, Mianzi Designs

Convention Sponsors

Responding to the Climate Change Crisis in the Kenyan Built Environment: Towards a Circular Economy Model

By Thomas Kimani, Dr. Ochungo, Dr. Mugwima

Globally, the climate change crisis is now recognized as a major problem. The built environment is implicated in many ways despite it being an important economic growth catalyst. In Kenya, the building sector contributes significantly to the gross domestic product (GDP) of the country. In developed nations, the circular economy model has taken root in all sectors. In Africa, however, most countries are in a race to catch up on this model and Kenya is no exception since existing policies are focused on waste management and renewable energy methods. There isn't a policy solely dedicated to the circular economy, especially where the building sector is concerned.

Kenya Built Environment and Circular Economy

Research shows that climate change is real. Glaciers are retreating, sea levels are continually rising, precipitation patterns are changing, and the earth is getting warmer. Kenya has experienced climate shocks many times in the past, which resulted in devastating losses and the projections indicate that the risk for future loses is still high. According to The United Nations Inter-Governmental Panel on Climate Change (IPCC), climate change is largely driven by human activities and as of December 2020, construction accounted for 19% of global greenhouse gases (GHG) emissions. This is a slightly lower proportion of emissions compared with the 39% seen in 2018 because of the decrease in transport and other construction related industry emissions. The volume of natural resources used in buildings and infrastructure projects grew 23-fold between 1900 and 2010. This trend is set to continue especially in emerging economies where construction is gaining momentum and 40% of natural resources consumption is in the building sector.

Construction and demolition (C&D) waste has reached 30-40% of the total solid waste generated globally and this is expected to increase in the coming years because of accelerated global development caused by population growth and rapid urban expansion.

What is a Circular Economy?

A circular economy (CE) is one that is restorative and regenerative by design. With the adoption of certain CE strategies, frugality may occur by creating proper systems that retain value and keep the resources flowing in a circular manner. Circular solutions are essential in tackling the imminent challenges of global warming, depleting resources, and emerging environmental problems. With the discussion on using the circular economy currently raging, this paper argues that little has been done to illuminate the situation in Kenya's building industry.

Closed Loop System

The paper deployed an inductive qualitative approach to gain an enhanced understanding of the climate change crisis and how the circular economy model has been used in the construction industry to mitigate the same. From the relevant peer review articles sourced from the internet, the authors conducted a dedicated context mapping to examine the definition, concepts, application, and all related sustainability approaches on the circular economy model in the construction industry.

From a general point of view, African countries are lagging behind in the transition to a circular economy model. In the catch-up story, Kenya is a front runner.

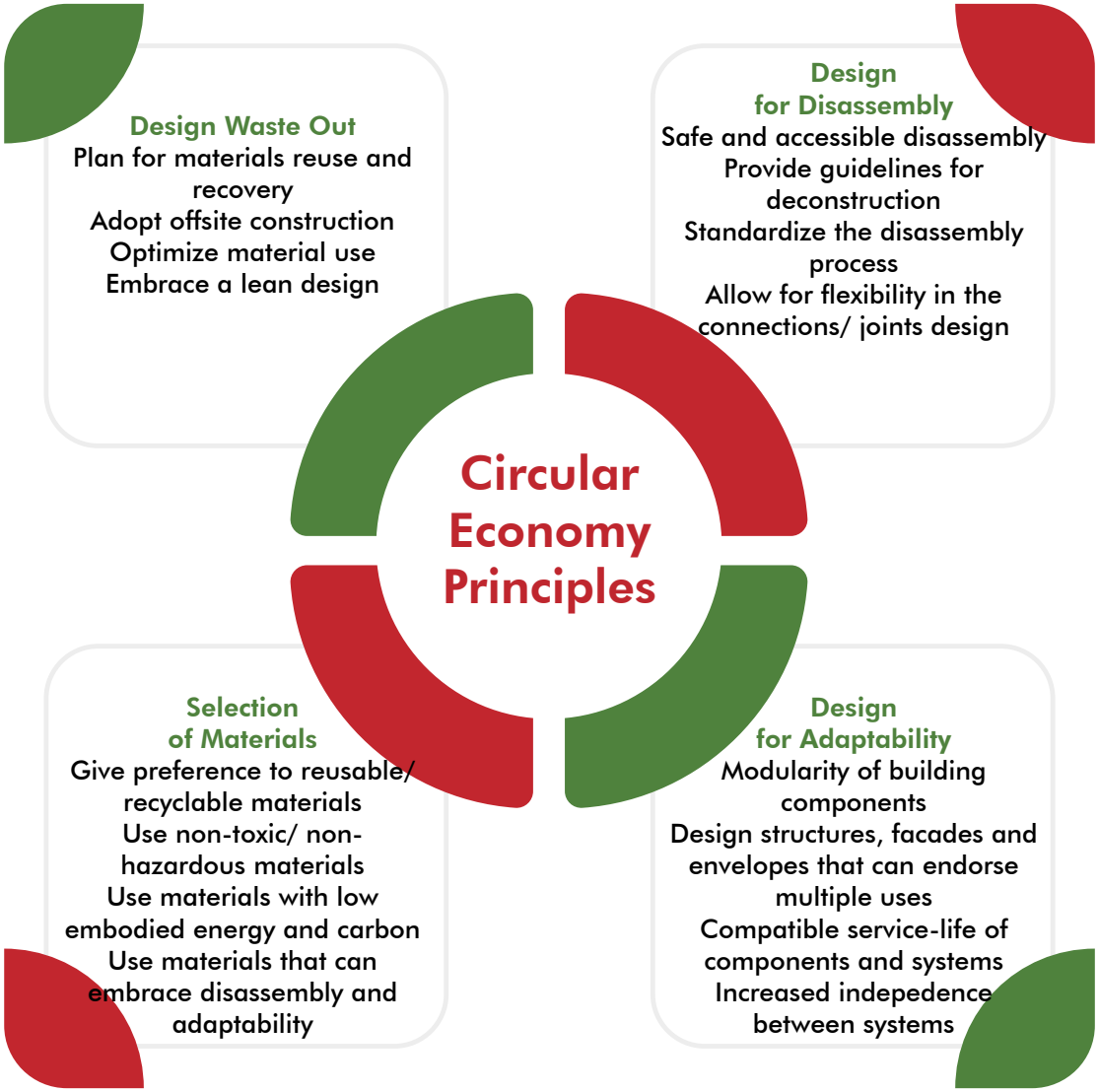
It is in record that Kenya's industrial policies aimed at transitioning her to an industrial nation are ambitious for they also incorporate sustainable and, particularly, green industrial policies. The first ambitious industrial policy in Kenya was launched in 2008, the 'Kenya Vision 2030', aiming to convert Kenya into a newly industrializing country providing a high quality of life to its citizens in a clean and secure environment. This has been followed by the 'Green Economy Strategy and Implementation Plan' (GESIP) for 2016–2030, supported by the National Climate Change Action Plan (NCCAP) 2018–2022 and the Nationally Appropriate Mitigation Act (NAMA) based on the Circular Economy Solid Waste Management Approach. These policy shifts have however not been customized to the building sector.

It is the view of this paper that a lifecycle of buildings should be the guiding path towards the incorporation of circular economy model in the sector. This will bring a closed loop system where components are optimally used and retained at their highest value. For this to be achieved, the circular building practice should be used in the planning, designing, building, operating, maintaining, and deconstructing of buildings in Kenya in line with CE principles which follow the Ellen MacArthur Foundation's (EMF) method.

> **The first ambitious industrial policy in Kenya was lauched in 2008**

The EMF's principles are (1) Decouple resources, (2) Re-circulate resources and (3) Increase efficiency. This requires flexibility, adaptability, and disassembly to enable reversibility and salvage the value of the building's products.

Starting from the planning and design stages, this will guarantee the decreased use of raw materials and consequently reduce waste generation as is the case in the proposed framework below.



Successful adoption of CE strategies can be seen in the Circular Building in London developed by Arup in 2016.

The circular building in London (Source: Arup).

The full-scale prototype is intelligently designed and constructed with materials that can be removed with minimal damage and with this, each component retains its value. This and other case studies around the world provide real life examples of how the construction industry can adopt the paradigm shift.

With pressure on the existing resources, heavy environmental damage and the emergence of the CE model, the Kenyan construction industry stakeholders should consider adopting it and implementing its principles in building practices.

The adoption of CE principles in the built environment will reduce the consumption of resources and waste production while at the same time retaining the value of resources, if possible, within the system. The paper proposes the enactment of a policy on CE within the building sector.

Thomas Kimani

Corporate Member of IEK and AAK; Council Member, AAK Engineers Chapter; Member of Climate Change & Sustainability Basics Society of Kenya; Member of KEBS Technical Committee on Roads and Road Furniture.

Prof. Arch Mugwima Bernard Njuguna

MAAK (A), M.ICOMOS,
Based at the Centre for Urban Studies, Jomo Kenyatta University of Agriculture and Technology (JKUAT). He runs the Phi Architecture + Heritage.

Dr. Ochungo Elisha

Circular Bio-economy Post-doc Researcher, Institute for Climate Change & Adaptation, University of Nairobi

Mainstreaming Affordable Green Technology in Construction

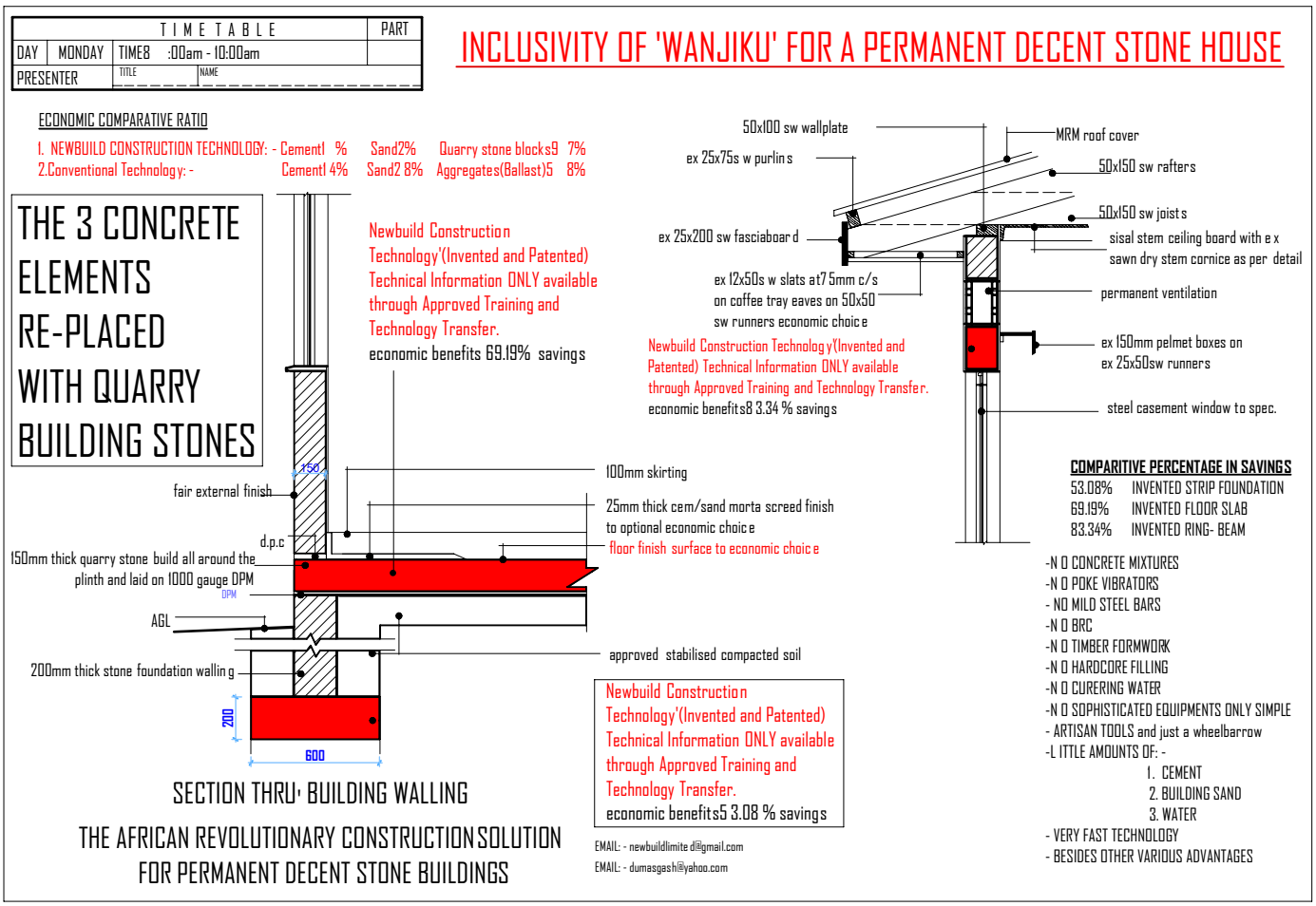
John Dumas Gachara

Lady Ann Delamere School

The rising cost of construction is becoming a stumbling block for investors and real estate developers at all levels of the social strata. Several technologies have emerged in the recent past, whose aim is to, among others; reduce construction time and reduce the cost of construction while enhancing environmental protection. Newbuild Ltd came up with one such technology, which has been in application within the local market since the year 2007. Having been patented by its inventor, the technology has been touted by the company as having the ability to drastically cut the cost of construction of a single level permanent house by 30%. This is made possible by eliminating concrete and reinforced concrete elements in the strip foundation and floor slab.

The technology took 15 years' Research and Development before it was patented at Kenya Industrial Property Institute (KIPI) and African Regional Intellectual Property Organization (ARIPO). ARIPO is present in 14 African countries and hence the technology may be adapted to all of them. These are: Botswana, The Gambia, Ghana, Kenya, Lesotho, Malawi, Sierra Leone, Somalia, Sudan, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe.

The first classroom building constructed using the Patented Technology was commissioned in 1999 by the then, former British High Commissioner to Kenya Sir Jeffrey James; courtesy of The Lord Delamere of Soysambu Estate, who donated 25 acres for a Girls' Secondary School Mbaruk, Nakuru County.



In the year 2010, the Newbuild Technology received the *'UN-World Habitat Day Best Practices Award 2010'*. This boosted Kenya's international image on the Global Innovation Index.

Newbuild Ltd has been seeking the Patented Technology be mainstreamed in the Building Code of Practice, to support, promote and protect its application /exploitation within Kenya's Constitutional mandate and Intellectual Property laws. So far, key stakeholders have recommended the application and exploitation of this technology in conformity with the aspirations of the national housing development policies, including The Big Four Agenda.

Adoption of this technology has the potential to trigger acceleration of housing transformation in low-income areas. According to Newbuild, 'It can eradicate poverty housing and alleviate the shortage that has beset Kenya and the region.' It is estimated that 1,500 sub-standard houses mostly of wood and mud, are built in rural Kenya each week. This exacerbates the housing problem for the close to 20 million Kenyans already living below the poverty line. Attention on housing is almost exclusively focused on urban dwellings, while rural housing needs have been almost totally ignored.

Residential House
(Note the Stone Ring Beam)

Relevance to Environmental Protection

The technology eliminates the use of timber formwork and related tree products such as props, resulting in protection of forest resources. Moreover, the technology doesn't use steel reinforcement, BRC, ballast or hardcore. It also doesn't need motorized construction equipment, thereby reducing carbon emissions and pollution.

Where water resource management is concerned, the unit empirical pilot project saved 2,000 liters of water, since there was no concrete curing. This makes it suitable for application in water scarce arid and semi-arid areas, hence contributing greatly to the war against climate change.

Further, the technology is easily adaptable, and hence the Newbuild technology aids in creating employment opportunities since semi-skilled and unskilled human resource can be employed during construction. This is particularly so in rural settlements where most conventional construction materials and technology are not readily available.

John Dumas Gachara

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COP 26: Any Specific Significance to the Built Environment in Kenya?

Patricia Baariu

The United Nations Framework Convention on Climate Change (UNFCCC) secretariat is the United Nations entity responsible for supporting the world to tackle climate change. The UNFCCC is the parent treaty of the Kyoto Protocol (1997) and the Paris Agreement (2015). Since 1995, the secretariat organizes the 'Conference of the Parties', the COPs which are global climate summits/UN climate change conferences with the aim of reviewing the implementation of the convention and other legal instruments.

The Paris Agreement

The Paris Agreement is a legally binding international treaty on climate change. It was adopted in Paris in 2015 and came into force in 2016. Its goal is to limit global warming to below 2 degrees Celsius by aiming to reach global peaking of greenhouse gas emissions. The Paris Agreement is a landmark in the multilateral climate change process because for the first time, a binding agreement brings all nations into a common cause to undertake ambitious efforts to combat climate change and its effects (UNFCCC - https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement).

Since the agreement works on a five-year cycle, countries were tasked with submitting their plans known as nationally determined contributions (NDCs) for climate action by the year 2020. In these NDCs, countries are to communicate the actions they will take to reduce greenhouse gas emissions and actions they will take to build resilience to adapt to the impacts of global warming.

Exploring Kenya's NDCs

Since Kenya is a signatory to the Paris Agreement, it first submitted its first NDCs in December 2016 where it committed to abate greenhouse gas emissions by 30% by 2030 in a business-as-usual scenario. This was fully conditional on international support. In December 2020, Kenya updated its NDCs and committed to abate greenhouse gas emissions by 32% by the year 2030. The country estimated that the total cost of implementing the mitigation and adaptation actions in the updated NDCs to be 62 billion USD. https://www.greengrowthknowledge.org/national-documents/kenya-nationally-determined-contribution-ndc. The funding for this is 13% local funding and 87% international support.

The mitigation actions in Kenya's NDCs are: Increasing of renewables in the electricity generation mix of the national grid; enhancement of energy and resource efficiency across the different sectors; making progress towards achieving a tree cover of at least 10% of the land area of Kenya; make efforts towards achieving land degradation neutrality; scaling up Nature Based Solutions (NBS) for mitigation; Enhancement of REDD+ activities; Clean, efficient and sustainable energy technologies to reduce over-reliance on fossil and non-sustainable biomass fuels; Low carbon and efficient transportation systems, Climate Smart Agriculture (CSA) in line with the Kenya CSA Strategy with emphasis to efficient livestock management systems; Sustainable Waste Management Systems; Harness the mitigation benefits of the sustainable blue economy, including coastal carbon Payment for Ecosystem Services (PES).

Adaptation Actions relevant to the Built Environment

Since Kenya's economy is mainly reliant on climate sensitive sectors, climate adaptation is the country's highest priority where climate action is concerned.

The NDC actions specific to sectors that directly affect the built environment are:

Road Infrastructure Sector:

- Upscaling the construction of roads to systematically harvest water and reduce flooding
- Enhance institutional capacities on climate proofing vulnerable road infrastructure through vulnerability assessments
- Promote the use of appropriate designs and building materials to enhance resilience of, at least, 4500km of roads to climate risk

Water and Sanitation:

- Conduct and Implement recommendations on climate and risk assessments on water, sanitation, and irrigation infrastructure.
- Build resilience infrastructure for the protection of dams and dykes and river lines
- Promote water harvesting and storage at county and household levels
- Mainstream climate change into water catchment management plans

Population, Urbanisation and Housing

- Introduce nature-based solutions in flood control especially around informal settlements selected urban areas
- Strengthen the enforcement of green building codes by national and county governments
- Conduct climate risk and vulnerability assessment of building/housing infrastructure especially to flooding and sea level rise.

As the world focuses on COP26 and implementation of the Paris Agreement, this summary of actions contained in Kenya's NDC document should be a focus for practitioners and stakeholders in Kenya's built environment.

They, along with other proposed sectoral measures should begin to take centre-stage within professional practice forums if the construction industry in Kenya is to progress towards real action against climate change.

Patricia K. Baariu

Principal Lecturer and Environmental & Social Safeguards Officer (EASTRIP) at KIHBT, a training division in the State Department for infrastructure, MoTIHUD&PW.

Promoting Mental Health in the Workplace

Sen. Arch. Sylvia Kasanga

The COVID-19 pandemic and the resulting economic recession have negatively affected many people's mental health and created new barriers for people already suffering from mental illness and substance use disorders.

The pandemic brought about excessive fear of contracting the virus and uncertainty of the future, loss of lives, unemployment, lack of physical contact with other family members, friends and colleagues, leading to people isolating themselves, the unfamiliar reality of working from home and children homeschooling. So many aspects of our lives as we know them changed drastically, a phenomenon that increased stress levels on majority of people all over the world, placing them at a higher risk of falling mentally ill.

Given the difficult times we are now living in due to the pandemic, this article explores issues of mental health at the workplace.According to the World Health Organization (WHO), mental health is "a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community"

Mental Health Statistics:

In Kenya, it is estimated that one in every 10 people suffer from a common mental disorder. The number increases to one in every four people among patients attending routine outpatient services. Depression and anxiety disorders are the leading mental illnesses in Kenya, followed by substance use disorders.

Kenya was ranked fourth with the highest number of depression cases (1.9 million) among African countries by a WHO report 2017. Moreover, one person dies every 40 seconds by suicide worldwide. Kenya is experiencing a rapid increase in suicides, mental health conditions, substance use and addictive disorders of an epidemic proportion, an indication of social challenges and unmet needs at societal level.

It is estimated that 50% of all mental disorders start by the age of 14 years and 75% by the age of 24 years. In addition, stigma and discrimination contributes to and perpetuates mental illness, while marginalizing persons with mental health conditions, psychosocial, intellectual and cognitive disabilities.

The burden of mental disorders continues to grow with significant impacts on health and major social, human rights and economic consequences in all countries of the world.

1. UNDERSTANDING MENTAL ILLNESS

i. Types of Mental Illnesses

Mental illness is a general term for a group of illnesses that may impact on a person's thoughts, perceptions, feelings and behavior. Mental illnesses include:

Depression - A mood disorder characterized by lowering of mood, loss of interest and enjoyment, and reduced energy.

Anxiety - Frequently having intense, excessive and persistent worry and fear about everyday situations.

Eating Disorder - A group of related conditions that involve extreme food and weight issues.

Anorexia Nervosa: Self-denial of food to the point of self-starvation due to an obsession about weight loss.

Binge Eating Disorder (BED): Loss of self-control on eating characterized by eating a very large amount of food in a short period of time. This leads to feelings of embarrassment, disgust, depression or guilt.

Alcohol and substance addiction - A substance use disorder (SUD) is a mental disorder that affects a person's brain and behavior, leading to a person's inability to control their use of substances such as legal or illegal drugs, alcohol, or medications.

Post-traumatic stress disorder (PTSD) – post-traumatic stress disorder (PTSD) is a psychiatric disorder that may occur in people who have experienced or witnessed a traumatic event such as a natural disaster, a serious accident, a terrorist act, war/combat, or rape or who have been threatened with death, sexual violence or serious injury.

Schizophrenia - A serious mental illness that affects how a person thinks, feels, and behaves. People with schizophrenia may seem like they have lost touch with reality. Specifically, individuals typically experience:

- Hallucinations, such as hearing voices or seeing things that aren't there
- Delusions, which are firmly held beliefs not supported by objective facts
- Thought disorder, which includes unusual thinking or disorganized speech

Obsessive compulsive disorder (OCD) - A common, chronic, and long-lasting disorder in which a person has uncontrollable, reoccurring thoughts (obsessions) and/or behaviors (compulsions) that he or she feels the urge to repeat over and over.

Bipolar disorders - A mental illness that causes dramatic shifts in a person's mood, energy and ability to think clearly. People with bipolar experience high and low moods—known as mania and depression—which differ from the typical ups-and-downs most people experience.

ii. Risk Factors of Mental Illnesses

General risk factors

- History of mental illness in a blood relative, such as a parent or sibling.
- Stressful life situations, such as financial problems,
- A loved one's death or a divorce.
- An ongoing (chronic) medical condition, such as diabetes.
- A traumatic experience
- Substance abuse
- Relationship problems
- A previous mental illness
- Developmental stress from physical, emotional and sexual childhood abuse.

Risk factors related to work Environment

There are certain key areas of work that, if not properly managed, are associated with poor mental health:

Demands – this includes issues such as workload, work patterns and the work environment.

Control – how much say the person has in the way they do their work.

Support – this includes encouragement, sponsorship and resources provided by the employer.

Relationships – includes promoting positive working to avoid conflict and dealing with unacceptable behavior.

Role – whether people understand their role, and whether the organization ensures they do not have conflicting roles.

Change – how organizational change (large or small) is managed and communicated in the organization.

iii. Fear of Disclosure

There is no reason that an employee living with a mental illness, who is properly managing their condition, cannot successfully work in whatever field they are otherwise qualified for. However, some employees remain hesitant to disclose their mental illnesses to their managers because of the fear of being stigmatized or becoming targets of prejudice and discrimination.

2. TAKING CARE OF THE EMPLOYEES' MENTAL HEALTH AT WORK

a. Why Care?

Improving the mental health of employees by making them mentally resilient to stress can improve thinking, decision-making, workflow, and relationships at work. All these translate to increased productivity since employees' productivity is linked to their health and well-being. However, more emphasis has traditionally been placed on physical health than on mental health and well-being.

In addition, investing in a mentally healthy workforce can have a cost saving effect by reducing absenteeism, reducing error rates, reducing the risks of occupational accidents and improving decision making among employees.

b. Myths about mental illness and the workplace

Myth 1:
Mental illness is the same as mental retardation.

Facts: These are two distinct disorders. A diagnosis of mental retardation is chiefly characterized by limitation in intellectual functioning as well as difficulties with certain daily living skills. In contrast, among persons with psychiatric disabilities, intellectual functioning varies as it does across the general population.

Myth 2: Recovery from mental illness is not possible.

Facts: Long-term studies have shown that majority of people with mental illnesses show genuine improvement over time and lead stable, productive lives.

Myth 3: Mentally ill and mentally restored employees tend to be second-rate workers.

Facts: Employers who have hired these individuals report that they are higher than average in attendance and punctuality and are as good or better than other employees in motivation, quality of work, and job tenure.

Myth 4: People with psychiatric disabilities cannot tolerate stress on the job.

Facts: This oversimplifies the complex human response to stress. People with a variety of medical conditions, such as cardiovascular disease, multiple sclerosis, and psychiatric disorders, may find their symptoms exacerbated by high levels of stress. However, the source of personal and job-related stress varies substantially between individuals. Workers with psychiatric disabilities vary in their response to stressors on the job. In essence, all jobs are stressful to some extent. Productivity is maximized when there is a good match between the employee's needs and working conditions and is not dependent on whether the individual has a psychiatric disability.

Mentally ill and mentally restored individuals are unpredictable, violent, and dangerous.

Facts: The vast majority of these individuals are not dangerous or violent.

3. GOVERNMENT'S EFFORT IN PROMOTION OF MENTAL HEALTH

The Kenya Mental Health Policy

The Kenya Mental Health Policy 2015-2030 provides for a framework on interventions for securing mental health systems reforms in Kenya. This is in line with the Constitution of Kenya 2010, Vision 2030, the Kenya Health Policy (2014- 2030) and the global commitments. The development of the Mental Health Policy was informed by the need to reform the mental health systems in Kenya.
The policy seeks to address the following:

- To align the mental health services with the Constitution of Kenya, and with the National and Global health agenda
- To address the mental health systemic challenges, emerging trends and mitigate the burden of mental disorders
- To integrate the mental health services within the Kenya Essential Package for Health (KEPH)
- To promote, respect and observe the rights of persons with mental disorders in accordance with national and international laws

Mental Health and Wellbeing - Towards Happiness and National Prosperity Taskforce Report.

In line with a presidential directive on 1st June 2019, a taskforce on mental health was formed. The taskforce report 2020 titled, "Mental Health and Wellbeing - Towards Happiness and National Prosperity" provides the status of mental health in Kenya.

Kenya Mental Health Action Plan (2021-2025)

The Mental Health Action Plan (2021-2025) provides a framework for both National and County Governments and stakeholders to implement the Mental Health Policy through strategic objectives with specified priority targets and indicators. It also guides the implementation of recommendations by the Taskforce on Mental Health with strategic actions and investments to bring transformative reforms in the following key areas:

- Policy and Legal reforms.
- Reforms to improve access to quality mental health services.
- Financial reforms and investments.
- Cross-sectoral mental health reforms.
- Administrative Actions.

3. MENTAL HEALTH AMENDMENT BILL, 2020

The Mental Health Amendment Bill seeks to amend the Mental Health Act, 1993 currently in force that is outdated and not aligned to the Constitution of Kenya, 2010. It also seeks to actualize Section 73 of the Health Act, 2017 which calls for the establishment of a mental health legislation.

The Bill generally aims to mainstream provision of services for mental health. It proposes better organization in treating mental health where *all hospitals, doctors and nurses would be able to handle some levels of mental health matters.*

It aims to reinforce the right to dignity & access to medical help, as well as the right not to be separated, abused or harmed because of mental disability.

The Bill promotes getting help at the community level, rather than being locked up in hospitals. It also provides for the right to medical insurance for persons diagnosed and/or living with mental illnesses.

4. RECOMMENDATIONS

The article has illustrated that there is a need for employers to recognize mental health issues as a legitimate workplace concern and seek to offer support.

Employers should ensure health insurance plans cover mental health and formulate mental health work plans: stress & well-being management, work-life balance, etc.

Employers should also promote activities that raise awareness and reduce stigma on mental health in the workplace as well as offer a good working environment and a clearly defined job description.
Further, employers can promote mental health in their workplace through providing a mechanism for giving support to vulnerable staff i.e. hire counsellors, offer safe spaces and develop "individual based strategies" on how to deal with people with recurring mental health issues.

Employers should also review company policies, to motivate staff to come out and seek help.
Lastly, regular, honest appraisals should be undertaken, where arising concerns regarding an employee's performance are appropriately discussed, with an opportunity to follow up and review progress.

The full article may be accessed on the AAK website

Sylvia Mueni Kasanga

RIBA Chartered Architect;
Founder and Managing Director of Sycum Solutions Company;
Council member of the Chartered Institute of Arbitrators Kenya and a member of the UK Chartered Institute of Arbitrators;
Nominated Member of Parliament in the Senate

Convention Programme

DAY 1: Thursday 23rd September

0900 - 1010 SESSION ONE: OFFICIAL OPENING

Moderator: Florence Nyole, Vice President, AAK
Rapporteur: Isabel Njoroge, Registrar, Architects Chapter

Remarks by **Jacob Mwangi,** CEO, AAK
Remarks by **Mary Kimani,** Planner, Chair of Board of Trustees, AAK
Message by **Wilson Mugambi,** President, AAK
Remarks by **QS Patrick Bucha,** MBS, Acting Managing Director, National Housing Corporation
Remarks by **Major General(Retired) Gordon Kihalangwa,** Permanent Secretary for State Department for Public Works

Keynote Speech by **James Wainaina Macharia,** E.G.H, Cabinet Secretary, Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works

Launch of Safari Green Tool by AAK Environment Design Consultants **(EDC) Chapter**
Sponsor Presentation by **Bamburi Cement**

1030 - 1230 SESSION TWO: THE FUTURE OF BUILDINGS IN A CLIMATE AFFECTED WORLD

Moderator: Mumbua Musyimi, Hon. Secretary, AAK
Rapporteur: Muguru Wairimu, Assistant Secretary, Engineers Chapter

Sponsor Presentation by MRM

The Future of Buildings in a Climate Affected World by **Arch. Musau Kimeu**, Chair, Department of Architecture and Building Science, University of Nairobi

Designing Buildings for Multi-Hazard Resilience by **Eng. Shammah Kiteme**, Vice-chair, Engineers Chapter AAK, Council Member, IEK

Open discussion session led by **Arch. James Gitoho**, Director, Triad Architects
Sponsor Presentation by **Rhombus Concrete**

1400 - 1550 SESSION THREE: SUSTAINABLE BUILDING MATERIALS

Moderator: George Arabbu, Chairperson, Architects Chapter
Rapporteur: Maloba Nakoli, Vice Chair, Construction Project Managers Chapter

Sustainable Building Materials - A Case for Bamboo by **Arch. Cecilia Wahinya,** Director, Triad Architects

3D building Technology by **Colm Halley,** General Manager, 14 Trees

Traditional Russian timber architecture, manual labour and resilience by **Arch. Gleb A. Sobolev,** Assistant Professor, Moscow Architectural Institute

Timber as an alternative to Concrete and Steel by **Arch. James Mitchel,** Founder and CEO, BuildX Studio

Sustainable building materials by **Arjan Shankla,** Director, Somers Engineering & Eco Concrete

1700 - 1930 EVENING COCKTAIL BY RHOMBUS CONCRETE

Theme: Something Red

Welcome remarks by **Rachel Patience Mulondo**, Hon. Treasurer, AAK
Presentation by **Rhombus Concrete**
Remarks by **Wilson Mugambi,** AAK President
Remarks by **Eng. Margaret Ogai,** Registrar & CEO of the Engineers Board of Kenya
Entertainment

Convention Programme

DAY 2: Friday 24th September

0900 - 1100 SESSION FOUR: TOOLS FOR GREEN DESIGN

Moderator: Nickson Otieno, Chairperson, EDC Chapter
Rapporteur: Brenda Nyawara, Vice Chair, Architects Chapter

Welcome remarks by **John Mwaniki**, Hon. Registrar, AAK
Sponsor Presentation by **CTM**
Tools for Green Design by **Arch. Gideon Olawo**, Architect, Environmental Design Consultant
Tools for Green Design by **Arch. Brian Babu**, Symbion Consulting Group; Founder, ARQI Solutions Studios

PANEL DISCUSSION:
Ted Otieno - Chair, Kenya Green Building Society
Arch. Dom Cox - RIBA III Architect, BIM Architect
Pln. Sam Mburu - Physical & Land Use Planner; Associate Expert - NEMA
Judith Owigar - Founder, JuaKali Workforce Ltd

1130 - 1250 SESSION FIVE: THE COST IMPLICATION OF BUILDING FOR CLIMATE RESILIENCE

Moderator: Rachel Patience Mulondo, Hon. Treasurer, AAK
Rapporteur: Patricia Karamuta, Editor, BuildPress Magazine

Sponsor Presentation by **East Africa Portland Cement**

PANEL DISCUSSION:
QS Rewel Maigua - Turner & Townsend
John Kalungi - Founder & Chief Technical Consultant BESIC Group
L.Arch. Ruth Wanjiku - Chair, Landscape Architects Chapter, AAK
QS Mary Odhiambo - Quantity Surveyor at Kenya Airports Authority, Chair, Quantity Surveyors Chapter AAK

Sponsor Presentation by **Jumbo Chem**

1400 - 1600 SESSION FIVE: URBAN REGENERATION FOR CLIMATE ACTION

Moderator: Pln. Christine Muchiri, Vice-Chair, Town Planners Chapter
Rapporteur: Herbert Makori, Secretary, Mombasa Branch

Integrated Inclusive Infrastructure Presentation by **Jack Campbell Clause**

Opportunities for Planning Research Agenda by **Dr. Romanus Opiyo,** Planner; Programme Leader for Sustainable Urbanisation at SEI Africa

MK Africa: Challenge for Sustainability on ESG by **Muthoni Kanyana,** Founder, CEO, MK Africa

PANEL DISCUSSION:
Pln. Cyrus Mbisi - Director at Greenspace Planning and Environmental Consultants; Chair, Town Planners Chapter
L. Arch. Jack Clause - Design Director, Kounkuey Design Initiative
Dr. Romanus Opiyo - Planner; Programme Leader for Sustainable Urbanisation at SEI Africa

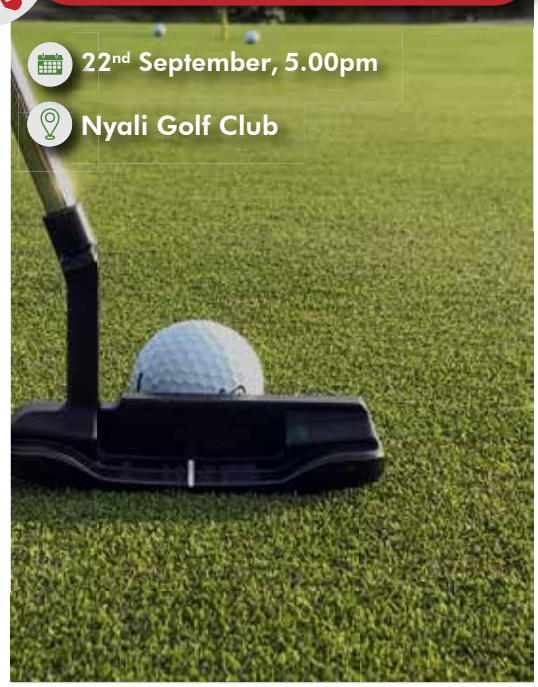
1800 - 2000 GALA DINNER BY CTM

Theme: Different Cultures around the World

Opening Remarks by **Florence Nyole,** Vice President, AAK
Sponsor Presentation by **CTM**
Remarks by **Wilson Mugambi,** President, AAK
East Africa Institute of Architects Handover Ceremony
Vote of thanks by **Caleb Mong'are,** Chair, Mombasa Branch
Entertainment

Social Events

Golf Tournament



22nd September, 5.00pm

Nyali Golf Club

Evening Cocktail

23rd September, 5.00pm

Theme:
Something Red

RHOMBUS CONCRETE

Gala Dinner

24th September, 6.00pm

Theme:
Different Cultures Around the World

CTM

Build Tour

25th September

Mombasa Town

RHOMBUS CONCRETE

Key Events
September - December 2021

22nd September
World Care Free Day

4th October
World Architecture Day

4th - 8th October
Customer Service Week

31st October
World Cities Day

8th November
World Town Planners Day

2nd December
AAK President's Dinner 2021

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4381	NYAGA DENNIS MWENDA
4646	KENNETH WAYNE MUTUMA
4794	KARIUKI MARK ANTHONY
4800	KARANJA DAVID KAMAU
4841	ODHIAMBO VINCENT
4970	OTIENO DAVID OCHIENG
5041	JOHN OTIENO OPIYO
5085	OCHANDA FREDRICK ONDARI
5111	HENRY CHEGE NJAMI
5150	PATRICK MUGENDI MUGO
5280	DAVID MORONTI NTOOKI
5311	NGUGI NJENGA PETER
Graduate Members	
1531	OWOUR WILSON

Membership No.	Name
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2682	OPIATA CHRISPIN
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2845	MATHU WAMBAA
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3249	OTIENO NICKSON
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Members in Good Standing
as at 20th August 2021

ARCHITECTS' CHAPTER

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3329	MWAURA MORIS
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3347	STEPHEN JOSEPH
3369	VAN DER EERDEN JOHANNES
3384	KARIUKI DUNCAN
3404	MWANGI BILLY
3412	WAINAINA MICHAEL
3422	KAMAU GERALD
3443	BUSIENEI JESE
3451	GITHINJI KEVIN
3455	KANINI EMMANUEL
3456	NZUKI SOLOMON
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3485	MBAISI EMMA
3486	WET JOHANN
3533	KANTARIA RAKHEE
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3607	RONO CALEB
3610	MUHANJI JAMES
3631	OMBATI ANTONIO
3657	OYARO JAMES
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3692	OPWONDI PETER
3693	WARUHIU NICHOLAS
3695	KAARA SAMUEL
3698	SIMWICHI NICHOLAS
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3731	SIBOE LARRY

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4107	ABIMELECH MARONGA
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4109	GIKURU IVAN MACHANULE
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4113	GITHAIGA GICHORA
4120	NJERU EVANS
4123	JOSEPH MUTUA
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Members in Good Standing
as at 20th August 2021

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4139	MPURIA MARTIN KIOGORA
4140	ALEX WAIGURU
4141	SAMUEL OKWEMBA
4168	NYAGWOKA FRANK
4175	KAMAU WANGARI NAOMI
4177	PIGOTT SHAWREN
4201	LEONARD BETT
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4253	CHRISTOPHER ONDWASI
4258	CONSOLATA MUENI MUTUA
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4261	ISABEL MUTHONI NJOROGE
4282	ROSEMARY OMWOMA
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4306	JOHANNES JACOBUS MARIA
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4322	MEREMIYA HUSSEIN
4337	HEMPSTONE NYAWANDA
4358	CYRUS MURAGE MUNYI
4362	BRENDAH GATWIRI GITONGA
4364	IAN NDUNGU NJUGUNA
4368	CHRISPINE MAKANA
4369	WENDY WARIGIA
4370	MALECHE DANIEL LUNALO
4373	MICHAEL KINYUMU MBITHI
4377	MICHAEL MURIUKI
4378	PATRICK GIKUNDI MURITHI
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4383	ANDREW MUGO WARURUA

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4396	LUCY WANJIKU GACHOGU
4397	DIANA MACHOKA
4471	MURTAZA KHUZEMA
4473	MATTHEW KILONZI WAMBUA
4474	JOHN DICKSON MWANGI
4475	VICTOR NYAKUNDI
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4636	MARY WANGUI MUNGA
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4668	GLORIA CHEPNGENO KIMETTO
4691	OLUM DAVID JUMA
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4704	BENEDICT WAMBUGU GATHII
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4712	JAGJIT SINGH KHOKHAR

Members in Good Standing
as at 20th August 2021

ARCHITECTS' CHAPTER

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4722	WALTER MANGUTHA
4726	STEPHEN JOHN BEKHOR
4729	RUTH JEPKOECH LELEI
4731	KELVIN SALASYA WAKHULE
4741	BECKY ONYANCHA
4792	KASEMBELI DAN KUKUBO
4796	MUSAU SARAH MWENDE
4799	CHESANG BRIGID JEMUTAI
4802	MUKINDA JIM D. GITONGA
4803	JAMES NGUMA KIMANZI
4823	MBUTHIA RITA NUNGARI
4831	HAZARY NIC
4832	KIMWELE VIOLET
4833	OKOTH CHARITY ACHIENG'
4856	BACIA KAMAU KANAIYA
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4876	NYAMASERO ROBI CAROL
4894	MULI KIMEU
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4907	NGENO NOAH CHERUIYOT
4908	KIMARU ALEXANDER
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4935	MUTAI GILBERT
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4981	ONDARA VINCENT ABUYA

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5105	VINCENT KIPCHIRCHIR
5110	ALEX KIPKORIR GICHURU
5112	BISHER HAKIM
5113	ELISHA MELEJI SEKIONDO
5121	SHARON MURUGI NJIRU
5122	KEVIN MURIMI GACHOKI
5124	MUHAMED FAARAH IBRAHIM
5125	ROY GITHAIGA MAINA
5134	JAMES KAGIRI
5135	MUHAMMAD ALI MUHAMMAD
5137	SOLOMON KIPKOSGEI SIRON
5138	OWINO BILLY
5140	ALEX MIRITI MBAE
5141	STEVEN NDUBI
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5147	PAUL APIYO ODIERO
5148	NAWAL ABDALLA MOHAMED
5149	DAVID KATHURIMA GITONGA
5151	BRIAN AMKE ODEO
5158	ALBERT KIPLETING RUTO
5159	TOM MBOYA
5160	TOM ONGOLO
5161	MARTIN KINYUA WAMAI
5162	SHARON CHERONO NYAMBATI
5163	BENSON KIMATA KIARIE
5170	ADELINE MMBONE
5171	FRANCIS MUSOMBA NZELU
5172	SAMUEL GATONYE MWAURA

Members in Good Standing
as at 20th August 2021

ARCHITECTS' CHAPTER

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5176	LINDA KARIMI
5177	RUTH MWENDE MALU
5178	TRACY MANGARE
5179	CHARLES OTIENO ALOO
5180	NELSON NDEGWA MUGO
5181	DESMOND DAIKI KONDO
5182	AZIZ AMIRALI MOHAMEDALI
5183	DANIEL BALONGO ASONGA
5190	LEAH NJERI MUREITHI
5191	WYCLIFFE MOKONG'U
5192	STEPHEN K. NJUGUNA
5193	LESTER LUSEKA KANALI
5194	GEORGINA KINUTHIA
5195	BERNICE MUCHIRI
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5197	DISMAS KIMUTAI KIRONGO
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5199	MUNTAHA ABUBKAR ZUBEDI
5200	NJIRU PATRICK NJAGI
5201	TIMOTHY ODUOR ABONGO
5209	DENNIS NDUNGU MBUGUA
5212	PRISCILLA NAMUKOYA WERE
5213	JOB KOGI KIMANI
5214	MWANGI SAMMY JONNES
5216	ZACHARIAH NJUGUNA
5218	ANTHONY MUREITHI CHEGE
5219	RITA GACHERI MBERIA
5222	DONALD KIPLANGAT
5226	DAINA MURUGI NJAGI
5227	EDGAR LUKALIA MUSETI
5228	BRIAN MWAMBI GATUMA

Membership No.	Name
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5230	JOAN NALIANYA
5231	JOHN MUNIALO BAYAYI
5232	LULUA JUJAR LOKHANDWALA
5234	WAMBUA SARAH MWENDE
5235	MUANGE SYLVESTER MASIKA
5236	OBED KIMATHI KAMWILU
5237	CYRUS WAHOME MUREITHI
5238	JOHN KAEKE MUTUKU
5239	ANDANJE OKUTHE KHALFIN
5241	ROBINA NANJALA NDOMBI
5243	GERVASE NDUNGU MACHUGU
5244	JAMES KEVIN MUIRURI NJAU
5245	CAROLYNE BOR
5246	LINDA MURIUKI
5249	TEDDY WAMWANA TIMOTHY
5250	MARTIN KARANJA WARUI
5251	SYLVIA WANGU RUIRII
5252	AMBROSE EBENYO MAIYO
5253	MACHARIA MBUGUA
5254	JESSE OWALA
5255	AUDREY UMARA
5257	VICTORIA KIMANI
5258	OBONYO TREVOR OMONDI
5262	EMMANUEL OMUYAKU
5267	LEON MUTUA GATHECHA
5270	WILLIAM OTUKE
5271	JOSEPH KIMWOMI
5273	MERCY KANZE BIRYA
5277	TEDDY ODHIAMBO ABONYO
5278	MARIAM RAFIQ OSMAN
5281	CHERUIYOT KIBET WESLEY
5283	NAOMI CHEBET KOECH
5284	STACY NJOROGE

Members in Good Standing
as at 20th August 2021

ARCHITECTS' CHAPTER

Membership No.	Name
5286	ABEID ALI
5288	VINCENT KIMANI KURIA
5291	KEVIN KEMOI LOYATUM
5292	OSORO JAMES ONDIEKI
5293	JONATHAN CHIRCHIR
5295	JACKSON BETT
5298	CLARENCE CHEMJOR
5300	SHALEEN CHEROTICH
5301	DAVID KAMAU NJOROGE
5304	LEON UJAGO MUSASIA
5305	EDWIN KAMAU
5313	JANET RUTO
5316	ELSHAMMAH MWANGI
5329	MARTIN NJOROGE
5331	STELLA MARINDA
5344	MUNEER KHALID ALKIZIM

Technician Members

2311	BOLO DENNIS
2721	LIMO LEONARD
2740	MUNYORI SIMON
2914	CHHANIYARA BHARAT
3402	MULWA ERIC
3751	MWASI SIMEON
3854	SAID FAIZ
3907	HAWRAN A. AHMED
4017	JEFF MUNYI
4050	PAUL NYONGESA
4226	PETER MUIRURI
4227	ERIC ABUGA
4524	ANTONY KARIUKI KARANJA
4556	DAVID GACHOHI NGUGI
4660	LUCAS ODHIAMBO ONGAWO
4724	JERIM ELLY LIYAYI
4732	SHETTY PRAMOD SANJEEVA

Membership No.	Name
4816	MAINA SYLVIA JEMIMAH
4817	KAMAU PETER RUKUNGU
4839	DANIEL MAJIWA
4847	WANJIKU GEORGE M.
4851	JAOKO DINAH LETTY
4872	AUKA VITALIS AWUOR
4898	MURAGE DENNIS MUGAMBI
4899	MTUI WYCLIFFE SHADRACK
4927	KAGECHU JAMES GICHUHI
4980	MAGU VINCENT KINYUA
5052	GEORGE MAITHO MURIUKI
5056	WILLIAM MALACHI
5084	GEOFFREY MUGI MAINA
5118	KEVIN MACHIRA KIRIGWI
5119	AUGUSTINE ALOO
5139	JAMES GITAU
5167	PATRICK MURIITHI MACHARIA
5188	KIPNGETICH SIGEI KENNETH
5240	GERALD WAMBIU
5260	ARTHUR KAMANJA GIKANDI
5264	EDWARD NJOROGE WARUINGI
5274	ADAM ANDREW KIMANI
5315	LARRY ODILA ONYANGO
5326	ALICE NAMUNYAK DIKIRR
5332	ANTONY NGANGA MUTHONI
5338	KENNEDY KHAOYA RAPANDO
5341	EMANMAN LOKALALE DAVID
5345	KENNEDY WANJAU GATIMU

INSULATION FOR GREENER, COST EFFECTIVE CONSTRUCTION

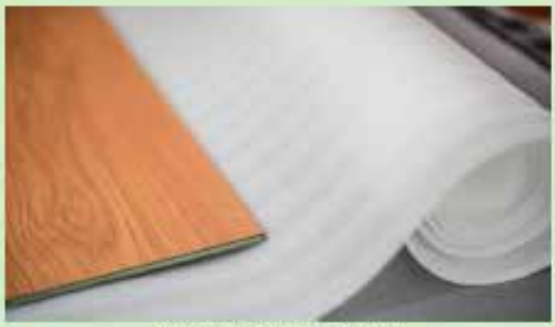
The trend towards green architecture is on the increase in global circles and with it the need to provide green and sustainable solutions to the construction industry. Green architecture calls for the employment of new and innovative ideas and concepts to tackle age old issues in building such as heat and noise as well as adding to the comfort of the people who will inhabit the buildings. Sustainability is inherently found in providing built environments that are embraced by those who use it.

In the construction industry the application of artificial systems in buildings, such as the fitting of air conditioning has been rampant. Such applications prove to be expensive to maintain over time due to increased energy output costs and some have adverse effects on the health of the population.

Jumbolene roof insulation

Driven by the need to provide quality, cost-effective and practical products, Jumbo Chem (K) Ltd, has stepped in to offer innovative solutions to energy saving with a product range that aims at achieving sustainable building practices in insulation that serve to reduce energy costs as well as increase sustainability. The JUMBOLENE® brand comprises of heat, sound and impact insulation products as well as expansion joint filler, Damp Proof Membrane, Floor Underlay and packaging materials.

Jumbolene® Roof Insulation is an effective way to improve the energy efficiency of a building. Insulation of the building envelope helps keep heat in during cold seasons, but lets heat out during hot seasons to improve comfort and save energy. It is an effective 3-in-1 reflective foil insulation solution combining benefits of a reflective insulation, conduction barrier and a moisture barrier. Its efficient performance ensures that 97.1% of radiant heat is reflected to keep optimal working and living space.



Jumbolene floor underlay

Jumbolene wall insulation

Jumbolene gypsum partition filler

As evidenced by Mr. Nishit of P.G Bison Ltd, Jumbolene® Roof Insulation Insulation has enabled the company to cool its industrial showroom without using air conditioning thus saving significantly on energy costs.

Jumbolene DPM

Jumbolene soundproofing foam

Through its superior insulation properties and effective cost management, Jumbolene® Roof Insulation solution is set to revolutionise residential and commercial construction through direct translation to long term cost savings through optimum heat-insulation performance and durability.

"We have been able to cool our industrial showroom without using air conditioning thus saving significantly on energy costs."
Mr. Nishit, PG Bison

Members in Good Standing
as at 20th August 2021

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Firm Members	
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F00016	AFRICOST LIMITED
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F00040	CONSTING CONSULT
F00041	CONSTRUCTION COST
F00042	COSTWISE ASSOCIATES
F00044	GAKUYA & ASSOCIATES
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F00071	AEGIS DEVELOPMENT
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550	OTUKE JOSEPH
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610	KIHARA CHRISTOPHER

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730	JABBAL SUTINDER
738	KINYANJUI WILLIAM
763	NGUGI PAUL
764	OGAMA MATHIAS
768	MUGAKI PETER
770	MAUNGU NEWTON
771	KOIGI GEOFFREY
782	OBAE SAMSON
789	KARIGUH ROBINSON
802	BUNEI ROBERT
836	MUTISYA PATRICK
854	OKEROSI JOHN
859	MANDHRY ALI
866	MUSYIMI JOHN
869	NYAKIONGORA MOSES
898	WAIREGI WILFRED
1024	NGUYO DAVID
1092	WANYAGI JULIUS
1099	NDUNGU PETER
1100	KITHINJI BOORE
1125	MWANGI CHARLES
1157	ODHIAMBO EMMANUEL
1164	MOMANYI INNOCENT
1203	KAMICHA ALFRED
1206	KISIA PATRICK
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1249	NYAKUNDI HARON
1301	MUNALA BENSON
1367	HUSEIN HUSEIN WERE

Members in Good Standing
as at 20th August 2021

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1536	OKWETO ALPHONCE
1539	KANGARA DAVID
1551	MUCHINA JOHN
1641	RUKWARO STEVE
1655	KUNGU JOSEPH
1656	MUCHUNGU PHILIP
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1732	MUCHUNGU ANNA
1741	GICHUIRI JANE
1834	MUTAI NATASHA
1865	SAVALA DENIS
1872	MANYUIRA TIMOTHY
1874	MASESE GEORGE
1891	HIRANI NEELESH
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2396	CHEKATA GREGORY
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2572	NJOGU PETER
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2643	ALI MOHAMUD
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2724	KAHURIA THOMAS
2742	ODHIAMBO MARY THERESA
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3142	GREGORY OMITTO
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3350	MULONDO RACHEL
3503	KIMEMIA SIMON
3548	NDERI KEVIN
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3734	WAFUBWA MACDONALD
3860	MATHENGE ROBERT
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4336	SIMON SAILI MALONZA
4464	ALLAN AGESA ABWUNZA
4465	COSMAS ONYANGO
4684	MUSYOKA DIANA MUMBUA
4754	ODUU GODRICK EKISA
4785	EBOLE PAUL HABWE
5038	NICODEMUS CHEGE MAINA
5108	MUKUCCIA TIMOTHY
5152	ISABELLA NJERI WACHIRA
5169	ROBERT OUMA JOHN
5309	EUGENE WANDERA WAMALWA
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Graduate Members	
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1535	NJOROGE LOUIS
1786	HERD SIMON
2422	MANGWA DICKSON
3417	TONUI WESLEY

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as at 20th August 2021

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3798	OTIENO ARTHUR
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3844	NYAGWOKA GIBSON
4061	BEDE MWANGI MACHARIA
4065	ALOISIUS WANGUI
4077	VIOLA OBURA
4078	BENARD FRANCIS
4081	JAMES NJOROGE
4085	MARX MUTEA
4086	LUCY NZIOKI
4087	HELLEN KIMANI
4088	GODANA BORU
4219	NZANGI JAMES MUIMI
4302	JOEL NJAU KIHARA
4421	FRANK ANTONY MAINA
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4686	FELIX NDOLO KITWAA
4913	KIPKOSGEI NICHOLAS
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5109	DENNIS OKUTOYI
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5143	BILL CLINTON OMONDI
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F00115	PROFESSIONAL CONSULTANTS
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1455	VARSANI RATNA
2054	NJOROGE GEORGE MUIBORO
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2150	LOVEDAY JUDE
2151	MAC`ODAWA GEORGE
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