Volume 3

Digital Construction - A new era in the construction industry

NCC CONSTRUCTION SCHOOL SKILLS BULLETIN

Building Futures

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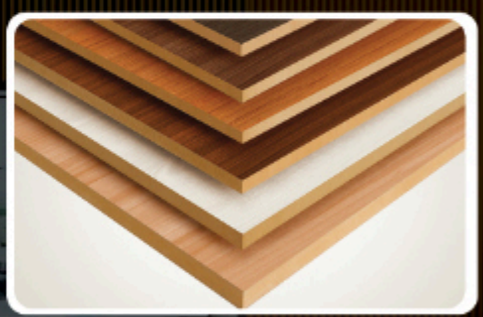

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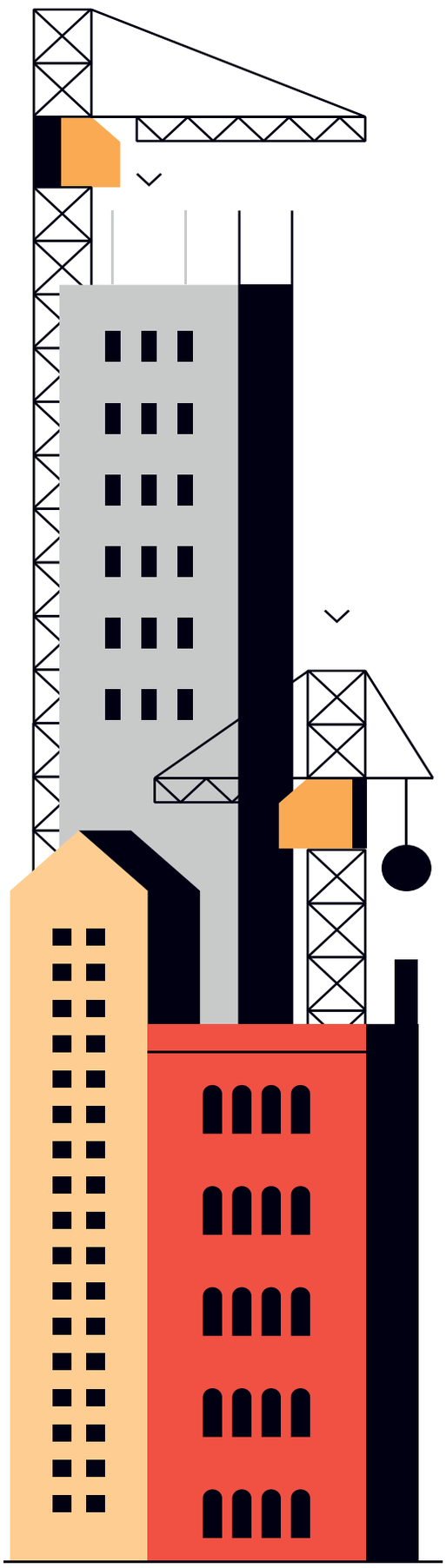

FOREWORD

The construction industry is witnessing a profound transformation as we embrace the era of digital construction. This evolution, driven by rapid advancements in technology, is reshaping the way we design, build, and manage infrastructure.

Digital construction is not just about the adoption of new tools and software; it represents a fundamental shift in our approach to construction processes, communication, and collaboration. In this issue, we explore the latest trends and innovations in digital construction, from Prokon and Autodesk as NCC signed an MOU with their agents in Zambia Trio Consult. These technologies are revolutionizing every stage of construction, enabling greater precision, efficiency, and sustainability.

As we delve into these topics, it is essential to recognize the importance of upskilling the workforce to meet the demands of this digital age. The skills required for digital construction are evolving, and there is a growing need for training and education that equips professionals with the knowledge to leverage these new technologies effectively.

This magazine aims to provide insights and guidance on how to navigate this digital transformation. Whether you are a seasoned professional or a newcomer to the industry, digital construction offers valuable perspectives on how digital tools can enhance your work, improve safety, reduce costs, and ultimately, contribute to the creation of smarter, more resilient infrastructure.

We hope this issue inspires you to embrace digital construction and to be at the

forefront of this exciting new chapter in our industry.

Prof. Paul L.K. Makasa
EXECUTIVE DIRECTOR
NATIONAL COUNCIL CONSTRUCTION

PRINCIPALS REMARKS

In today's rapidly evolving construction industry, the convergence of traditional and modern techniques is reshaping the way we approach infrastructure development. As we explore the third edition of our skills magazine, labour-based technology and digital construction are two approaches that both hold the potential to transform not only the way we build but also the socio-economic landscapes of the various corners of Zambia.

Labour-based technology has long been recognized for its capacity to create employment and infrastructure development, particularly in developing economies. By utilizing local human resources, local building materials and simple tools, this approach not only enhances community involvement but also fosters skills development and

sustains livelihoods in regions where unemployment and poverty are prevalent and in our case drought effects. As we continue to face challenges such as drought and economic downturns, labour-based construction methods offer a resilient solution that addresses immediate infrastructure needs while simultaneously empowering local communities.

On the other hand, digital construction is at the forefront of innovation, offering unprecedented efficiency, precision, and sustainability in the construction process. The integration of technologies is revolutionizing how we design, plan, and execute projects. Digital tools enable us to visualize complex structures, optimize resource use, and predict potential challenges before they arise, ultimately leading to more cost-effective and environmentally friendly outcomes.

As we navigate the future of construction, it is essential to recognize the value of both technologies. By embracing the strengths of labour-based technology and digital construction, we can build a more inclusive, sustainable, and innovative industry that benefits all.

We hope this edition of our magazine provides valuable insights into these two approaches to driving the construction industry forward into a new era of possibility. Enjoy this edition of the magazine as we feature other exciting stories and experiences.

Eng. Wendy Nambule Mukape
PRINCIPAL
NATIONAL CONSTRUCTION SCHOOL

Students listening to Mr Mwaba as he explains on the properties of gravel

SITE VISIT: AN IMPORTANT PART OF HANDS-ON EXPERIENCE FOR LEARNERS

By Pethias Mwaba

The Construction school aims at providing students with an appreciation of actual practical experience on the construction sites while offering hands-on training. In line with this objective, the Construction school of the National Council for Construction (NCC) undertook a learning site visit to the Lusaka-Ndola Dual Carriageway construction site in Katuba on a project under construction by Macro Ocean Investment Corporation (MOIC). The two intakes of students undertaking training for certificates in Materials Testing and Sustainable Building Works Supervision where given an opportunity to participate on this construction project site visit.

The aim of having students undertake the construction site visit was to make them familiar with practical and field aspects of designing and detailing of various structural elements and materials analysis on construction projects

Further, it was hoped that the students would get a better understanding of construction methods and techniques in view of quality control and the importance of materials testing for such as the soils, aggregates, concrete and asphalt The students were exposed to various types of materials testing conducted in the cement, soils, concrete, steel, and asphalt-bitumen laboratories, as well as why materials must be transported to the laboratories for testing. The Students learnt why construction materials are subjected to rigorous testing and analysis in a laboratory in order to guarantee that the materials meet construction standards and specifications without jeopardizing the structural integrity of the structure. They further learnt how laboratory tests helped determine the right proportions for strength and durability.

The students also had an opportunity to observe the practical laying of steel reinforcement which was in progress during the site visit. The experience helped them to correlate the theoretical aspects of design and detailing of various structural elements with the practical concept that is usually applied on a construction project in the field.

The students were taught about structural planning, orientation of structural layout, reinforcement and their significance, and the pavement layout of the dual carriageway.

They were also briefed in general about the ongoing construction activities on the upgrading of Lusaka – Ndola dual carriageway and the aspects of the project and its specifications such as overall stretch of the road, the sections and structural elements involved. It was a worthwhile undertaking and experience for the students, who appreciated the visit as they were able to relate the theory to the practical aspects of road construction.

WORLD YOUTH SKILLS DAY

By Wendy Nambule

On July 15, 2024, Zambia joined the rest of the world to commemorated the World Youth Skills Day under the theme "Youth Skills for Peace and Development".

The World Youth Skills day is a global initiative declared in 2014 at focused on empowering the next generation of leaders and innovators and emphasizes the immense potential of the youth.

World Youth Skills Day unites the world in recognizing the potential of young people as agents of peace and commit to providing them with the skills and opportunities to address challenges and contribute to a peaceful, prosperous, and sustainable future.

In 2014, the United Nations General Assembly declared 15 July as World Youth Skills Day, to celebrate the strategic importance of equipping young people with skills for employment, decent work and entrepreneurship.

The world faces a multitude of challenges today, many of which affect the youth. Violent conflicts disrupting education and stability, a polarized online environment fostering negativity, and persistent economic inequality limits opportunities. These issues threaten not only individual futures but also the overall stability of societies. It is crucial to equip youth with the necessary skills for fostering a culture of peace, nurturing responsible global citizens, and promoting sustainable development to build a more just, inclusive, and sustainable future for all.

The NCC under the auspices of WorldSkills Zambia celebrated the day through hosting of debates from various debate clubs.

NCC TRAINS WILMAR INDUSTRIES ZAMBIA LIMITED EMPLOYEES IN OPERATION OF FRONT END LOADER

By Jeffery Lifumbo

Seeing the training gap of its employees and the importance it attaches to capacity building, Wilmar Industries Zambia Limited decided to train its employees in Operation of the Front End Loader.

The employees who were trained where Jonathan Nkhoma, Felix Kaluka and Emmanuel Nkandu. The three indicated that the training they undertook had really helped to shape their skill in the operation of the Front End Loader. They regarded the training as a huge boost not only to their personal career but also to the institution.

Wilmar Industries Zambia Limited is a Ndola based company formerly known as Refined Oil Products (ROP) back in the days and is involved in the manufacturing of oil products such as cooking oil and soap.

Due to demand on their products and with less man power to supply coal to the boilers in the production process, Wilmar Industries saw the need to upgrade its employees from their current status as drivers to being machine operators to ensure continuity and less down time.

The training services by the NCC was by way of an In-house training conducted right in their plant, which made it even more beneficial for the trainees.

"We are really inspired by the way the training has been arranged and rolled out and we would recommend more of our peers to be trained with the NCC as the course was very essential, beneficial and practical" the three said.

NCC conducts on site and off site tailor made practical trainings for organisations that are willing to ensure their staff are capacity built.

The NCC Construction School is a leader in the provision of Earth Moving Plant Operator training in equipment such as Excavator, Grader, Frontend Loaders, Forklifts, TLBs, Articulated Dump Trucks and other heavy equipment.

NCC CONSTRUCTION SCHOOL

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CBU STUDENTS ON THEIR VISIT TO NCC

Copperbelt University Students from the School of the Built Environment under the Construction Economics and Management department visited the National Council for Construction On the 20th of march 2024. 33 students pursing a Bachelor's degree in Construction Management and Quantity Surveying visited the NCC for an industrial educational tour let by their lecturers Dr. Simushi and Mr. Chimuka Milandu. The NCC is always happy to welcome students and give them some industrial experience and motivation as they prepare to join the construction industry. Below are some highlights from the visit.

Name: Emmanuel Zulu
Year of Study: 3rd Year

Program: Construction, Economics, and Management

I recently embarked on a transformative journey through the National Council of Construction (NCC) visit on 20th March, 2024 during an educational tour. This event provided an immersive exploration into various aspects of the construction industry, from laboratory tests to regulatory oversight. I participated in sessions and practical demonstrations, gaining invaluable insights into lab tests, NCC roles and NCC training school through their vivid presentations.

The experience was essential for navigating real-world construction projects with confidence and armed with the knowledge acquired from the NCC visit, my career prospects in Construction have been significantly enhanced and now I am eager to advance my career and drive positive change in the field of Construction.

Name: Faith Muyunda Mundia
Year of Study: 3rd

Program: Construction Management

During our insightful visit to the National Council for Construction (NCC), we were warmly welcomed and introduced to the pivotal role the NCC plays in regulating, promoting, and enhancing capacity within the construction sector. Through interactive and practical sessions in concrete, soil, and asphalt labs, I gained hands-on experience in quality assurance tests crucial for the durability and safety of construction projects. These activities underscored the importance of material quality and the impact of handling on the properties of construction materials.

The visit also featured discussions on the NCC's efforts in enforcing policies, supporting contractor development, and promoting continuous professional development and soft skills among professionals. The introduction to various short courses offered by the National Construction School highlighted NCC's commitment to capacity building and addressing industry challenges such as access to financing and accountability among contractors.

Key takeaways from the visit include the significance of education in public infrastructure maintenance, the value of discipline and time management, and the inspiration to pursue a career that considers cost engineering alongside the broader impacts of construction on society and the environment. The visit has broadened my perspective on potential thesis topics and the importance of integrating green construction practices for resilient designs. I am keen on embracing continuous learning and developing a strong foundation in both technical and soft skills.

Name: Bihemba Nyundu
Year of Study: 4th Year

Program: Construction Management

The visit to NCC was successful, the objectives were achieved and much more than anticipated. The objectives of the trip included; understanding how quality control is achieved, how NCC regulates, promotes and develops the construction industry in Zambia, to better comprehend how we can expand our skills in the industry and to understand what lies ahead in the industry after attaining a degree.

We learnt so much about the construction industry and the role that NCC plays in Zambia. Aside from conducting laboratory tests for quality control, NCC also offers short term courses which ran from 2 weeks to a year at most. These classes educate on several matters such as the tendering process for contractors, AutoCAD lessons, road construction in rural areas, occupational health and safety but to mention a few.

Furthermore, we learnt that NCC registers contractors either as a large-scale contractor, medium scale contractor or small-scale contractor in accordance with the grade and class of registration

Name: Siame Ndanji
Year of Study: Year

Program: Construction Management

The Visit to the NCC provided valuable insights into the construction industry's regulatory framework, development, and training in Zambia. The visit also clarified that the NCC is a statutory body under the Ministry of Infrastructure, Housing and Urban Development, and it plays a crucial role in promoting and regulating the construction industry. We were also shown their efforts in registration and regulation, construction materials testing, public relations, and more.

we had a privilege of interacting with Professor Paul Makasa who is the CEO of the National council of construction who gave us words of encouragement on attitude towards work and academics with emphasis on punctuality on assignments or projects that are due.

I CHOSE MATERIALS TESTING COURSE BECAUSE I WANT TO CONTRIBUTE TO MY COUNTRY ZAMBIA BY PROVIDING HIGH-QUALITY SERVICES IN THE CONSTRUCTION INDUSTRY NATASHA ZULU.

By Pathias Chisanga Mwaba

Natasha Zulu, who recently completed a course in construction materials testing with the NCC's National Construction School expressed that she wished to contribute to the nation by providing high-quality services in the construction industry and that's why she chose to do Construction Materials Testing course. She further said she believed materials testing was an important part of construction and felt that it was frequently overlooked. ''I chose of Construction Materials Testing course because I want to contribute to the nation by providing high-quality services and I believe it is an important part of construction that is frequently overlooked" she said.

Natasha who completed her high school at Arakan Secondary School says she wants to dispel the myth that certain types of construction works are exclusively done by men. "So, as a woman, I want to show the world that I, too, can do construction-related professions, and it is just incorrect to state that this is for males only, as women can also participate and contribute. This is why I have decided to set an example for many more women who want to pursue male dominated careers" she said.

Natasha, who was part of the students had taken part in a construction site tour of the Lusaka - Ndola Road Dual Carriageway Project says she felt driven, and I realized the value of the course in the construction sector. Natasha Zulu stated that she had learned a lot and was greatly impressed by the knowledge and abilities she gained throughout the construction materials testing course.

She has encouraged many young people and women in this country to enroll in the various courses offered at the NCC like she did in Construction Materials Testing Course, which she says has given her a practical experience which was very useful in the construction industry.

"Since then, I have learned about various testing methods and techniques, as well as the value of quality control, the course has had a significant positive impact on me because it has provided me with knowledge and skills for conducting various tests, making me a more valuable asset to the construction industry, Natasha said.

Natasha has revealed that taking up materials testing course helped shape her viewpoint about the construction industry and her desire to learn about the complexities of building operations motivated her. "I've always been fascinated by how structures were built, the materials utilized, and the significance of maintaining their quality and integrity so, enrolling in this course has given me the opportunity to get specific knowledge and hands-on experience in assessing, testing, and assuring the quality of construction materials, which is an important part of the construction business that assures safety, durability, and quality" Natasha added.

She hopes for a successful career in the construction industry as a youth with the training and knowledge acquired.

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NCC PARTNERS WITH ZAMBIA SUGAR PLC TO TRAIN MAZABUKA SMES

By Eng. Martin Daka

The National Council for Construction and Zambia Sugar Plc have signed a Memorandum of Understanding MOU to skill, upskill and re-skill the Mazabuka based contractors through a programme called Supplier Development Programme.

Through this programme, Zambia Sugar Plc intends to upgrade approximately 2,000 entry level housing units over the next 3 years. This programme is intended to train Site Agents, Site Foremen and Artisans from 20 SME's. The first session of training was in work measurements and costing to enable contractors to gain capacity in pricing for tenders.

The aim of the training was to ensure Zambia Sugar capacity builds Mazabuka SMEs and create a skills pool for various talents and to ensure they contribute to ensuring they are getting value for money on their projects. It is also aimed at building capacity even out side the Zambia Sugar as part of their CSR.

IRCP National Coordinator Mr. Mwata Sekeseke receiving a plaque from Deputy Inspector of Police DCG Jeanne Chantal Ujeneza during the benchmarking tour of Rwanda

LABOUR BASED TECHNOLOGY A DEFINITE APPROACH OF EMPLOYMENT CREATION: A BENCHMARKING TOUR TO RWANDA ON LABOUR BASED TECHNOLOGY (LBT)

BY Eng. Martin Daka & Eng. Wendy Mukape

The creation of employment for positive impact through Labour Based Technology (LBT) is immense and is used by various governments as a way of employment creation.

This has to be done through deliberate decisions by policy makers. The construction industry presents itself as an important sector for employment creation through road rehabilitation and road maintenance using LBT.

Zambia is implementing a road sector project called the Improved Rural Connectivity Project funded by the World Bank. Some of the key objectives of the project include the rehabilitation of primary feeder roads to improve rural connectivity as well as enhancing institutional capacity in road sector institutions. The Institutional enhancement and capacity building efforts include mainstreaming labour based initiatives in the construction sector.

In line with the objectives of the project to mainstream labour-based practices in the construction sector as a job creation strategy a team comprising project implementing staff of the IRCP project led by the National Coordinator Mr. Mwata Sekeseke under took a benchmarking exercise to Rwanda.

Rwanda has a deliberate strategy to increase job opportunities for its citizens especially the under privileged through labour based intensive construction approaches in a well-structured and coordinated manner that encompasses all stakeholders across many sectors. Youths and local community members are engaged and contribute to the infrastructure construction and maintenance efforts of the government, which in turn gives them the much-needed income to sustain their lives and improve their living standards.

Two major lessons drawn from Rwanda's approach include: :

- Having 'home grown solutions' inspired by local culture
- Good Practices inspired by lessons from other countries. "Adopt and Adapt" was the motto.

ROAD MAINTENANCE USING LABOUR BASED PRACTICE IN RWANDA

Labour based Initiative has been taken seriously in Rwanda Which has a road network that covers 38,803.40km and are classified into national, District Roads Class I, District Roads Class II and Unclassified Roads. LBT has contributed to the government's job creation efforts in the construction sector using two main approaches. The first is through the community participation approach and the other being the use of emerging contractors.

The study team visited Kamonyi District to have a deeper and practical understanding of how the two methods were operationalised. It was learnt that their main target of participants on the rural community participation method is the poor and unemployed with the objective of giving them jobs and helping them get an income which in turn uplifts their livelihood. In Kamonyi District alone up to 3,000 people get employed per annum.

To ensure benefit is spread across various households, only one person from each household is employed, however, if budget allows they employ many more.

Further, employment of women is prioritized as it was reported that there are more women than men in the population of Rwanda, hence even numbers follow suit when employing.

a. Community Participation Approach

Under this model, rural communities are engaged to maintain non-gazetted (unclassified) roads and are paid for doing so. The main scope includes clearing vegetation and desilting of side drains and clearing of debris from the carriageway. A gang leader is selected from amongst the community members who will be responsible for supervision, maintaining the time book and preparation of pay sheets and submission to the district for payment. Each worker is expected to spend 5 hours on site. The period of work is 10 days before preparation of pay sheets and payment is not expected to exceed 15th day. This is done to ensure frequent income to the community members. The District Engineer verifies the work done before release of funds. Monitoring and supervision is cardinal for labour based hence standards are set from the onset.

Supervision is done at local level through the district local authorities technical department. However, Monitoring is done at both district and national level through the Road Transport Development Agency (RTDA).

Eng Wendy Mukape compacting gravel using a pedestrian roller on a labour based road maintenance site in Rwanda while the Zambian and Rwandan delegation looks on.

b. Emerging Contractors Approach

The other model is done where fresh graduates are taken into an incubation type of contracting. These include an Engineer in construction, a qualified accountant and a technician. The three are empowered with basic equipment such as a handheld roller drum compactor and other tools on loan which they have to pay back with each Interim Payment Certificate (IPC). These emerging contractors are given three-year contracts not exceeding 20Km of road upon which they are renewed every year depending on the performance. These contractors are mandated to employ villagers in the area of operation using labour-based method of construction as a deliberate method of employment creation. Four Labourers are assigned one kilometre to maintain. Currently the Republic of Rwanda has 158 registered emerging contractors spread out across the whole country and were selected through the Ministry of Youth and Art from an initial list of more than 800 youth companies that expressed interest. Kamonyi District has 3 emerging contractors currently with running contracts. For the site visited by the Zambian delegation the emerging

contractor had a 14.2km of road, and had employed 52 workers from the area of construction. The scope included pothole patching, desilting of side drains and culverts, vegetation control as well as debris removal and other maintenance needs such as clearing embankment sections, debris removal from bridge openings and small landslides that may occur along the road. These contractors are contracted on previously rehabilitated road sections to ensure they keep them in maintainable state.

c. Existing Contractors

Other model is where they use existing contractors through the main procurement systems to rehabilitate / upgrade the District Class II Roads. The main scope for LBT on these contracts is mostly drainage construction such as excavation and erosion protection works through stone pitching. Rwanda implements labour-based both for sealed and unsealed roads. Sealing is a relatively new idea where small sections have been done and still under observation. The seals include cold mix asphalt, surface dressing and cape seal.

CONCLUSION

In conclusion, it's clear to see that LBT is helping to generate employment for Rwandese people. One key aspect that is making it successful is consistent funding for LBT contracts whereas the implementation structure sits well with the Local Government Ministry which is charged with rural roads.

A number of LBT initiatives in the road sector have been done in Zambia before such as the Lusaka – Mongu (2007 – 2009) corridor project, the Feeder Roads Project – Eastern Province (1996 – 2000), the Emergency Drought Recovery Project (2001 – 2002) to mention a few. The distinct feature of all these interventions is that they were externally funded through DANIDA, UNCDF/UNDP and World Bank respectively while the Republic of Rwanda commits annual budgets from the Central Government for LBT.

Currently the Zambian road sector still practices LBT through off-carriageway routine maintenance of the trunk, main and district roads. On-carriageway maintenance of paved roads has been done through pothole patching either through contracting or force account by the Road Development Agency.

Therefore, having a structured approach and consistent funding, Zambia can implement LBT through both road rehabilitation and maintenance of gravel and earth roads, mainly in the rural parts of Zambia to ensure they are given job opportunities.

In Zambia, the Primary Feeders, which constitutes the largest section of the road networks presents a good opportunity for implementation of Labour-Based Construction Methods.

DIGITAL CONSTRUCTION - THE NEW ERA IN THE CONSTRUCTION INDUSTRY. NCC AND TRIO LAUNCHES AUTODESK AND PROKON TRAINING COURSES

By Catherine Machiko

The construction industry is witnessing a transformative era, driven by rapid technological advancements and innovative practices. In Zambia, the construction industry is taking significant strides to align with global standards and leverage these innovations to enhance the sector.

A key milestone in this journey was the recent launch of a partnership between the NCC and Trio Consult Ltd introducing the Autodesk, and Prokon training.

Recognizing technological challenges, Trio Consult Ltd has joined forces with NCC to Offer Autodesk and Prokon Training Courses to spearhead a movement towards a more advanced and efficient construction industry in Zambia. This partnership aims to bridge the technological and skills gap by introducing cutting-edge tools and training programs to our local professionals.

Autodesk is a global leader in design software, offering powerful solutions like Building Information Modeling (BIM), which allows for the creation of digital representations of physical and functional characteristics of places. BIM is revolutionizing the way construction projects are designed, managed, and executed by improving collaboration, reducing errors, and enhancing efficiency.

Prokon is renowned for its structural analysis and design software, which complements Autodesk's offerings by providing robust tools for engineers. The training provided by Prokon Reseller and Trainer ensures that Zambian engineers are proficient in using these tools, ultimately improving the quality and safety of our construction projects.

The partnership will offer Comprehensive training sessions for professionals in the construction industry to build their capacity in using Autodesk and Prokon tools and Working with government agencies to develop policies that support the integration of advanced technologies in the construction sector.

NCC Executive Director Prof. Paul Makasa and Trio Consult CEO Mr. Lee Muzala after signing an agreement

WORLD BANK IRCP PROJECT COORDINATOR IMPRESSED WITH LABOUR BASED TECHNOLOGY TRAINING BY NCC IN KANAKANTAPA

By Eng. Martin Daka

A clear determination to contribute to the struggle against high unemployment rate among the youths, and the general wellbeing of the nation can be seen in Mr. Mwata Sekeseke's passion to help the unemployed, as he embraces Labour Based Technology in the road sector as a job creation strategy.

Mr. Sekeseke, who is the National Project coordinator of the Improved rural connectivity project IRCP, a World Bank funded project under the Ministry of Infrastructure, Housing and Urban Development has, in recent years embraced the concept and become one of the champions of labour based technology in the construction sector. The IRCP which he leads has a component that promotes mainstreaming of labour based technologies in the construction sector. When all started looking slow as regards implementation of LBT in the Country, the IRCP National coordinator has brought a renewed hope and determination to ensure labour based technology becomes a reality in Zambia to assist creating job opportunities for citizens especially the unskilled people in our society. His support of the NCC's implementation of LBT as it answers to the challenges of unemployment is inspiring.

Contrary to some who believe that LBT is a thing of the past, Mr. Sekeseke has urged people with that thinking to be realistic with the society they live in. according to him, there is no dispute that machinery is the best in terms of efficiency and quality, however, continued promotion of the use of machinery in a developing country like Zambia with high unemployment rate, majority of which are unskilled, does not provide the immediate remedy to the poverty status of the many unemployed people especially youths. He believes that Zambia still has a long way to go and requires to carry everyone on board and LBT is one way the underprivileged can be carried on board. He explained that LBT is working well in countries like South Africa, Rwanda and Kenya among others giving their citizen relief which they could not have had without this initiative.

Being supportive of LBT, Mr. Sekeseke visited students at the NCC Kanakantapa Practical Training Camp in Chongwe that were undertaking road construction course under the NCC using labour based Technology. Among the activities witnessed on site that the students were undertaking included culvert and

drainage construction, full gravelling, road maintenance using tractor towed technology and general road formation and rehabilitation. During the visit, he found the students had constructed a stretch of a road measuring 600 meters of full rehabilitation, including 50 meters gravelling and culvert installation.

Mr. Sekeseke who took time to interact with the students urged them to ensure they grasp the concepts very well and execute quality works. He was encouraged to see a good number of women taking part in training either as labour based contractors or workers. He urged the women to encourage other fellow women to develop interest in LBT and be trained as well. He said that the World Bank is fully supporting Government through IRCP to ensure that LBT in Zambia succeeds. Therefore, job opportunities in the area of labour based technology will increase over time, and those that have already embraced it will have an advantage.

The IRCP National Coordinator was impressed that the NCC was able to take students through the entire process of road construction by having practical trainings which ensured students get hands on experience and produce a road of reasonable quality using LBT which, if one is not explained to, may think it was constructed using machinery. Mr. Sekeseke was happy that as much as it was training, all tenets of labour based were practiced such as community participation through employment provision, and the students were both supervising and also doing the actual works.

He was full of praises for NCC for remaining resilient in the midst of many challenges to continue driving the agenda of LBT. He assured that he will engage Government high authorities and the World Bank to see how NCC can further be supported to ensure that such training is scaled up to build capacity to increase the number of students even more from the rural areas who in turn can be engaged to execute some feeder roads works in rural areas using LBT by way of utilizing part of the Constituency Development Funds (CDF)among others, which in turn can assist in reducing unemployment in rural areas.

NCC Management was happy with the visit and has been encouraged by Mr. Sekeseke's determination and inspirational words, and believe that if many more people come on board to appreciate and appreciate the benefits of LBT, the labour based technology will succeed in Zambia.

ADAPTING CONSTRUCTION PRACTICES TO EXTREME WEATHER CONDITIONS IN ZAMBIA

BY QS. Timothy Musole

Zambia consists of 10 provinces, each with distinct weather patterns. construction materials, subterranean conditions, the construction of domestic buildings, commercial structures, and government housing projects must navigate a variety of challenging weather conditions.

Some regions have experienced temperatures soaring above 35°C, winds exceeding speeds of 40 km/h during storm events, and annual rainfall dramatically varying, with certain areas receiving over 800 mm. Given these diverse conditions, it is crucial to carefully select appropriate construction materials, methodologies, and orientations to ensure the resilience, sustainability, and functionality of infrastructure.

Materials for Diverse Weather Conditions
In regions experiencing high temperatures, materials like bricks, concrete, and stones are ideal due to their high thermal mass, absorbing heat during the day and releasing it slowly at night. Roofs and walls can benefit from reflective materials or coatings, such as white or light-colored paints, to reflect solar radiation and reduce air conditioning needs. For high-wind scenarios, robust materials like reinforced concrete and heavy-duty steel frames ensure structural integrity. Securely fastened metal roofs are particularly effective against such conditions. In environments prone to heavy rains and potential flooding, water-resistant materials such as concrete, treated wood, and galvanized steel are critical. Elevated structures supported by strong pillars or stilts help mitigate flood risks, and using materials that dry quickly without deteriorating is also advantageous.

Methodologies Tailored to Local Climates
Adapting construction methodologies to local climates is crucial. In hot areas, passive cooling strategies like strategic shading (using large overhangs and covered porches) and cross ventilation are vital. Buildings should also feature elevated roof ridges to facilitate hot air escape. To mitigate damage from high winds, buildings can be aerodynamically designed to allow winds to flow around, over, or through with minimal resistance. Implementing hurricane straps and wind-resistant shingles or tiles can minimize wind damage. For heavy rains and floods, implementing proper site drainage systems like French drains and elevated foundations is critical, complemented by waterproofing measures such as sealants and membranes.

Optimal Building Orientation
Building orientation is key to maximizing comfort and efficiency. To minimize sun exposure during the hottest parts of the day, buildings should have windows and larger glazed areas facing north and south rather than east and west. For wind, buildings should align with predominant wind directions to reduce impact, using natural vegetation barriers for additional protection. In flood-prone areas, building orientation should enhance natural drainage and be situated on elevated sites to minimize flood risks.

Additional Considerations
Using local materials supports the local economy and reduces environmental impacts associated with material transport. Embracing sustainable practices and seeking green building certifications like LEED can guide construction toward environmental sustainability. Additionally, it is crucial for building designs to respect local architectural styles and community preferences to ensure cultural relevance and community acceptance.

Consultation with Experts
Effective integration of traditional practices with modern technologies tailored to local climate and environmental challenges requires consulting local experts, including architects, engineers, and climatologists.

NEVER STOP ACQUIRING KNOWLEDGE NO MATTER THE SITUATION - KETIWE SIBANDA

Pathias Mwaba

The Construction School at National Council for Construction (NCC) encourages people engaged in the construction industry to enrol for the various courses they offer for capacity building and continuous professional development. I did my primary education at Chandiza primary school, my junior secondary at Luwingu basic school and completed my senior secondary education at Kasama girls high school. I am a mother of four and I work with Sable transport company, I decided to expand my knowledge and skills hence I participated in a Construction Materials Testing course offered by the NCC.

The Materials Testing course broadened my knowledge and abilities beyond my understanding of construction. I learned how to conduct soil, concrete, and asphalt - bitumen tests in the laboratory, as well as how to apply materials on construction sites. However, unlike other courses, the Material Testing course is more hands-on and practical, and I've observed that materials play an important role in the construction sector in order to offer quality infrastructure.

I would like to urge young people, especially the women out there to be open-minded, pursue their passions, and never stop acquiring knowledge and striving to be the best versions of themselves. I would also like to urge them to enroll in a school like the Construction School at the NCC because it is not only recognized by the country but also by other countries, and it provides good lectures that consider both theory and practice, allowing students to do their job without difficulty. I found the National Council for Construction to be a fascinating institution in the construction sector, and I would love to enroll with them again for another course. Ketiwe Sibanda said.

TRAINING OF ROAD SECTOR SMEs IN SOLWEZI

By Eng. Martin Daka

The Africa Development Bank (AfDB) through the Ministry of Commerce Trade and Industry has sponsored the training of Road Sector SMEs in Solwezi under the Lobito Corridor Trade Facilitation Project. The Construction School will train the SMEs in Road Construction and Maintenance Supervision in Solwezi.

The programme has targeted to train 40 contractors using the labour based technology (LBT) and Tractor towed Technology (TTT). NCC continues to enjoy a good partnership with the Solwezi Trades Training Institute (SOTTI) in executing works under the Lobito Corridor. Other partners involved include the Solwezi City Council.

BEST STUDENT IN MANAGEMENT OF CIVIL ENGINEERING CONSTRUCTION PROCESSES COURSE, MR. AUGUSTINE MUSONDA,

By Eng. Wendy Nambule Mukape

I enjoy learning especially that the construction industry is dynamic and new ideas and new ways of doing things keep coming up", says NCC student Mr. August Musonda.

Mr. Musonda who graduated top of his class in the two months long skills award course in Management of Civil Engineering Construction Processes course for 2024, further added that doing capacity building courses was his way of keeping himself updated with new technologies.

He said having worked on a lot of projects, the NCC courses have assisted him in many ways as they gave him hands on experience. "I encourage my fellow construction industry practitioners and their personnel to do these courses" he said.

He added that capacity building has built in him great skills in contracts management and supervision which have also assisted him in managing projects.

"when people come to learn here, they will see the difference. Its only trained competent supervisor that can achieve a project from commencement to completion and ensure that there is good workmanship, quality and within the right time frame and budget" he said.

Mr. Musonda added that he has done a few other courses with NCC including AutoCAD, Sustainable Building Works Supervision and painting aside the course he just completed.

Mr. Musonda has been in the construction industry for 26 years and says he will continue upgrading himself through knowledge acquisition.



CAREERS TALKS – ENCOURAGING MORE FEMALES TO JOIN THE CONSTRUCTION INDUSTRY

By Catherine Musunga Machiko

With women enrolments continuing to be low, the NCC in its efforts to encourage more women participation in the construction industry has continued to stimulate interest through conducting careers talks to girl's schools.

The NCC is yet to achieve an enrolment of above 15% of women in training as well as with the registration of female contractors. The industry has seen works being reserved for women as part of the positives to encourage women participation and this can be seen through tenders from the Road Development Agency (RDA) and Rural Electrification Authority (REA).

NCC, in its quest to play its part in women participation in the construction industry, continues conducting careers talks and has since undertaken some careers talk programs in Muchinga and part of Central Provinces from 13th to 17th May, 2024. The targeted groups were the grade 12s in girls' Secondary schools.

The aim of these careers talks is to inspire a lot of these girls to choose a career in construction by selecting among the many career programs and opportunities that we have in the construction industry after completing their secondary school.

The four girl's schools visited included Mwenzo girls Secondary School in Nakonde, Lwitikila Girls Secondary School in Mpika, Chinsali Girls Secondary School and Kapiri Girl's Technical Secondary School. All in all, 482 girls participated in the careers talks as shown in the table below:

SCHOOL	ATTENDANCE(NO)	DATE	PROVINCE/DISTRICT
Mwenzo Girls Sec school	81	13/05/2024	Muchinga - Nakonde
Chinsali Girls Sec School	191	15/05/2024	Muchinga - Chinsali
Lwitikila Girls Sec School	118	16/05/2024	Muchinga - Mpika
Kapiri Girl's Technical Sec School	92	17/05/2024	Central - Kapiri Mposhi
TOTAL	482		

After making presentations and engaging the girls, most of the them showed interest in the many career prospects that construction industry offers and were open to learn more with so many questions asked. It is hoped that more girls will take up the mantle and join us in the construction industry

THE POWER OF PRACTICAL SKILLS: YOUNG VISIONARIES SHAPING ZAMBIA'S FUTURE – A CHAT WITH YOUNG ROAD CONSTRUCTION STUDENTS

By. Miracle Mumba

1.0 Introduction

The transition from high school to university is a significant milestone in a young person's life, encompassing not just academic preparation but also future readiness. Developing practical skills before entering university lays a solid foundation for both academic and personal success. These skills, ranging from time management and critical thinking to communication and technical proficiency, are essential for navigating the challenges and opportunities of university life.

Three young individuals exemplify the importance of acquiring practical skills before university, showcasing how these abilities can shape a rewarding university experience and a promising future.

2.0 Zakir Hussein Motala, 16-year Student

Zakir Hussein Motala, inspired by his grandmother's legacy in Zambia's construction industry, is determined to make an impact. He joined the Road Construction and Maintenance Supervision course at the National Construction Council (NCC), gaining hands-on experience that sets him apart from his peers. Despite personal losses during the COVID-19 pandemic, Zakir has applied to study medicine at The Copperbelt University, starting in November 2024. His dual commitment to infrastructure and healthcare reflects his desire to improve both sectors in Zambia.

3.0 Avhay Kakoma, 18-year Student

Avhay Kakoma's interest in road construction began in grade 10, guided by his father's influence. He joined the Roads course at NCC, finding the practical training both challenging and rewarding. With a background in design and technology since grade 8, Avhay's passion for construction has only grown stronger. He has enrolled at The Copperbelt University to study civil engineering, with plans to specialize in road construction. Avhay aims to leverage his skills to one day own a construction company, contributing significantly to Zambia's infrastructure development.

4.0 Antonio M'dumuka, 19-year Student

Antonio M'dumuka identified a business opportunity in Zambia's lack of paved roads. Choosing to study at NCC, he recognized the importance of connecting engineers and general workers for national development. Antonio's passion for innovation and infrastructure improvement drives his ambition to create a reliable construction company that will elevate Zambia's construction

NCC principal Eng. Wendy Mukape, Roads Eng. Kamarian mulilo and NCC Roads engineer Martin Daka pause for a picture with students

standards. His focus on practical application over theoretical knowledge highlights his pragmatic approach, with a long-term goal of funding his university education in civil engineering while positively impacting Zambia's future.

5.0 Conclusion

Zakir Hussein Motala, Avhay Kakoma, and Antonio M'dumuka are young visionaries dedicated to transforming Zambia's construction industry. Through their training at the National Construction School of the NCC, they have gained the skills and knowledge needed to contribute towards quality standards in the roads construction sub-sector. Their commitment to innovation and practical application promises a brighter future for Zambia's infrastructure development.

A VISIT TO THE GLUCOSE PLANT AT THE LUSAKA SOUTH OF MULTI FACILITY ECONOMIC ZONE LUSAKA EXCITES STUDENTS

By. Eng. Stephen Kuwani

A site Visit conducted by the students undertaking the management of civil engineering construction management course to the Multi Facility Economic Zone Lusaka (MFEZ) proved to be exciting to the students and a highlight during their training.

The students, as part of their training, are taken on various site visits to have experience on ongoing projects. The students visited the Proposed Glucose Plant at Lusaka South of Multi Facility Economic Zone Lusaka. The project was being undertaken by Concorde Construction Limited.

The site visit was conducted on 27thJune 2024 and aimed to observe and understand the construction process, project progress, quality control, safety measures and environmental impact of the project.

The site visit provided the students with an interactive experience that enhance learners understanding of real construction practices and better comprehension of the civil processes involved and further creating interactive learning environment for students and also providing exposure to a real-world spatio temporal experience of a construction project.

The proposed construction of a glucose plant at Lusaka south multi facility economic zone in Lusaka was an exciting development that had reached an advanced stage with the main structure of the plant been completed and the contractor indicating the project was on track with no delays reported.
An important aspect of the visit was on Quality Control ensuring the construction met the required standards and specifications. The students found out that regular testing of materials, such as concrete, and aggregates where done to ensure they met the specified requirements, detailed checklists ensuring compliance.

The students further where happy to see the different types of foundations used at the site which included strip foundation, Pad foundation and raft foundation.
The students also noted the construction site adherence to the safety regulations and protocols with a Mandatory safety training for all the workers being done and strict adherence personal protective equipment (PPE). They learnt that safety talks were always conducted on a regular basis to discuss potential hazards and ensure all workers were aware of safety protocols and procedures before starting work with safety rules being published on the notice board for all workers and visitors to follow.

The students appreciated the construction process, project progress, quality control, safety measures, environmental impact of the project. The site visit also provided the students with an interactive experience for further understanding of real construction practices and better comprehension of the civil processes involved. The site visit was a success and a good learning experience for learners.

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