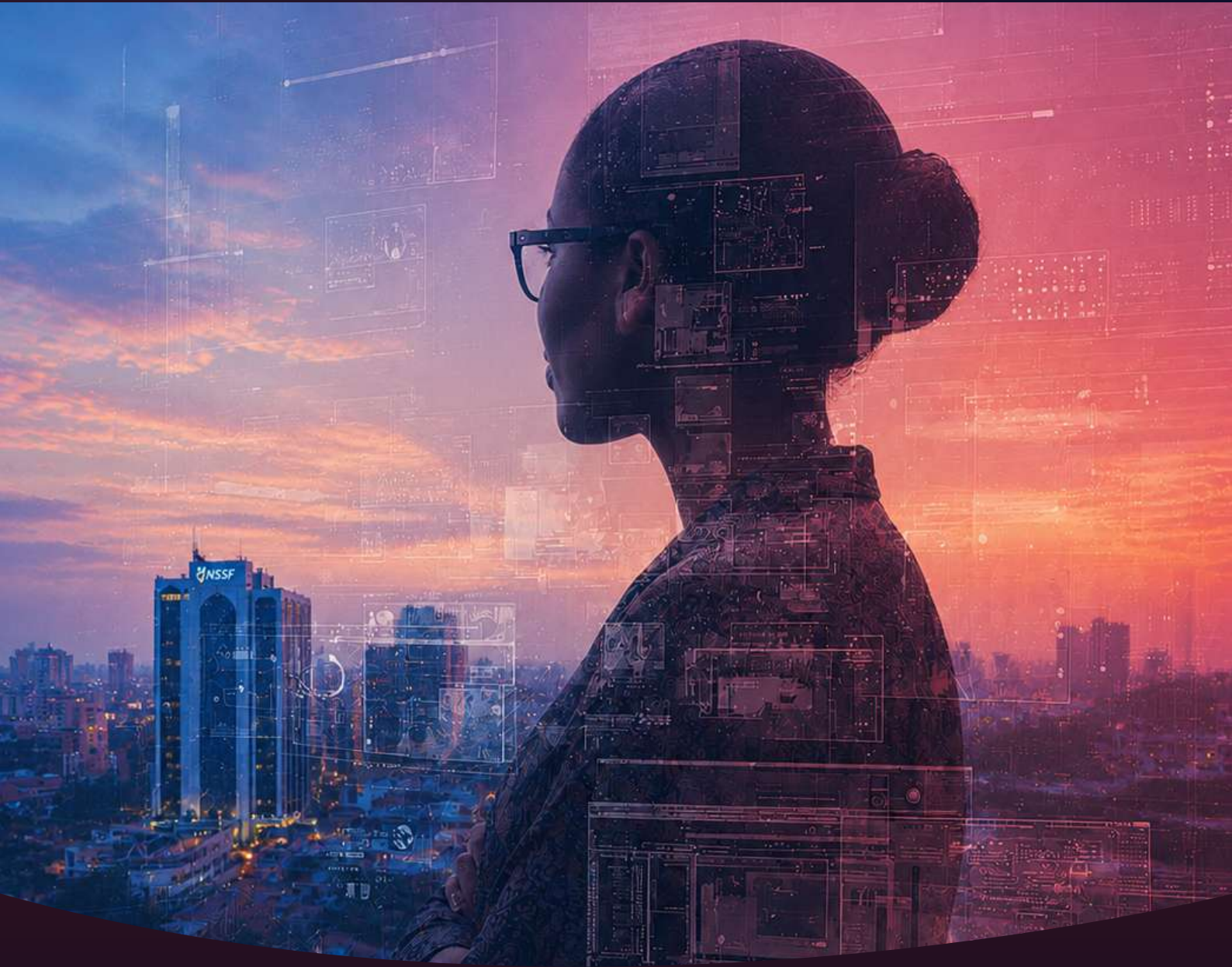


THE ENGINEER

ISSUE 5. JUNE 2026

NEWSLETTER



Smart Engineering for a
Sustainable Future through
Innovation and Digitalization

www.theengineers.co.ug

A Joint Newsletter for the Engineers Registration Board (ERB)
and the Uganda Institution of Professional Engineers (UIPE)

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THE EDITORIAL TEAM

Engineers Registration Board

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Eng. Achola Patricia Ocan	Electrical Eng.	Member
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Eng. Gumisiriza Ezra	Civil Eng.	Asst. Registrar
Ms. Kia Jacquelyn		HR & Administration Officer

Uganda Institution of Professional Engineers

NAME	DISCIPLINE	DESIGNATION
Eng. Keesiga Diana	Civil Eng.	Member
Eng. Dr. Namuli Rachel	Electrical Eng.	Member
Eng. Prof. Kabenge Isa	Agricultural Eng.	Member
Ms. Leah Alupo		Public Relations & Information Officer

FOREWORD



ENG. DR. HARRISON E. MUTIKANGA

CHAIRPERSON,
JOINT EDITORIAL COMMITTEE
– THE ENGINEER

This 5th edition of The Engineer newsletter highlights the engineering profession's growing contribution to Uganda's sustainable development through innovation, professional excellence, and institutional strengthening. It emphasizes structured mentorship as a cornerstone for developing competent and ethical engineers, while showcasing the profession's role in advancing the Fourth National Development Plan (NDP IV) and Uganda's Tenfold Growth Strategy through industrialization, infrastructure development, and sustainable economic transformation.

As we celebrated World Engineering Day under the theme "Smart Engineering for a Sustainable Future," this edition highlights key milestones that continue to shape the engineering profession in Uganda. The annual World Engineering Day Run once again brought together engineers and stakeholders in promoting health, professional solidarity, and public engagement, demonstrating that engineering extends beyond technical practice to fostering a united and resilient profession.

A major milestone featured in this edition is the official

launch of the ERB Digital Licensing System by Rt. Hon. Thomas Tayebwa, Deputy Speaker of Parliament, and Hon. Gen. Katumba Wamala, Minister of Works and Transport, are marking a significant step towards more efficient, transparent, and accessible engineering regulation.

Finally, this edition showcases the continued growth of Uganda's engineering profession through innovation, sustainable engineering solutions, skills development, and key professional milestones, including leadership transitions, professional recognitions, new enrolments into the UIPE and ERB, World Engineering Day celebrations, and the launch of the ERB Digital Licensing System. Together, these achievements reflect a dynamic profession committed to engineering excellence and Uganda's sustainable socio-economic development.

MESSAGE FROM *CHAIRMAN ERB*



PROF. ENG. HENRY ALINAITWE MWANAKI

CHAIRMAN,
ENGINEERS REGISTRATION BOARD

On behalf of the Engineers Registration Board (ERB), I commend the Joint Editorial Committee and all contributors for producing another insightful publication that promotes technical knowledge, professional discourse, and institutional cooperation within the engineering fraternity.

This edition rightly emphasizes strengthening the profession through structured mentorship for graduate engineers. Mentorship is vital in bridging the transition from academic training to professional registration, equipping young engineers with the competence, ethical values, and practical experience required to serve society with excellence and integrity.

As the statutory regulator of the engineering profession, the Engineers Registration Board (ERB) remains committed to upholding professional standards, protecting public safety, and promoting responsible engineering practice. This edition additionally highlights the profession's pivotal role in advancing industrialization, infrastructure development, technological innovation, and sustainable economic growth, while showcasing practical engineering

solutions to national challenges through local innovation, sustainable practices, and technical skills development.

I congratulate the newly elected 2026–2028 Council of the Uganda Institution of Professional Engineers (UIPE), recognize our distinguished award recipients and recent executive appointments, and warmly welcome the newly enrolled members of both the UIPE and the Engineers Registration Board (ERB).

I thank the Joint Editorial Committee, authors, and contributors for their dedication to this publication. Together, let us continue to uphold excellence, professionalism, integrity, and innovation as we build a stronger engineering profession in the service of our nation.

MESSAGE FROM *PRESIDENT UIPE*



Eng. Peterson Mwesiga

Dear UIPE Members, Engineering Professionals, Development Partners, and Members of the Public,

I welcome you to this edition of The Engineer, the joint newsletter of the Uganda Institution of Professional Engineers (UIPE) and the Engineers Registration Board (ERB), covering the period of April to June 2026.

Having assumed the office of President of UIPE on 30th April 2026, I am deeply honoured by the confidence entrusted in me by the membership. Together with the newly elected Council, I reaffirm our commitment to the core values of responsibility to the public, accountability to the membership, and professional ethics. These values will continue to guide every initiative we undertake as we strengthen the Institution and enhance the value we deliver to our members and the nation.

One of the historic milestones registered during this quarter was the successful conduct of the first-ever elective Council

elections, marking the full implementation of the amended UIPE Constitution of 2025. This significant achievement fulfils the constitutional requirement for an elected Council comprising the President, three Vice Presidents, Honorary Secretary, Honorary Treasurer, representatives of Engineers (3), Technologists (1), Technicians (1), Branch representatives (3) and the Immediate Past President.

I wish to sincerely commend the UIPE Electoral Commission for conducting a transparent, credible and professional electoral process. I equally congratulate all members elected to serve on the 2026–2028 UIPE Council, the various Council committees subsequently constituted, and the elected leadership at the branches. Thank you for accepting the responsibility to serve our profession. Your leadership, expertise and commitment will undoubtedly shape the future of engineering in Uganda.

I congratulate the engineers who were sworn in as Members of Parliament, those appointed to ministerial, executive, and board leadership positions, newly enrolled UIPE members, and engineers who have attained registration with the Engineers Registration Board. These accomplishments are evidence to the growing recognition of engineering leadership across public and private sectors.

One of our most transformative initiatives this quarter was the launch of The UIPE Voice. This initiative provides engineers with a consistent national platform to contribute expert opinions on matters of public interest, influence policy discussions and showcase

engineering solutions to Uganda's development challenges. Through The UIPE Voice, we are strengthening the visibility of the engineering profession, positioning engineers as trusted advisors on national issues and amplifying the collective voice of the profession in shaping sustainable development.

The Institution continued to register significant milestones during the quarter. Among these achievements was the publication of the first-ever Women in Engineering Newsletter, which showcased the achievements and contributions of women engineers to national development. We also introduced the UIPE Membership Digest, which profiles newly enrolled members and organized a successful National Engineers' Prayer Breakfast. The event was complemented by the publication of the inaugural National Engineers' Prayer Breakfast magazine, documenting the proceedings and reinforcing the importance of integrity, faith and professionalism in engineering practice.

The Institution also continued strengthening strategic partnerships that expand opportunities for our members. We engaged the Kampala Capital City Authority (KCCA) through

the Office of the Lord Mayor, His Worship Ronald Balimwezo Nsubuga, to explore areas of collaboration aimed at strengthening engineering leadership and urban development. Our regional engagement also remained active through participation in the Third East African Community Multi-Stakeholder Forum on the Effective Implementation of Mutual Recognition Agreements and Cross-Border Mobility, reaffirming our commitment to promoting regional professional integration and expanding opportunities for Ugandan engineers within the East African Community.

As we reflect on the achievements of this quarter, I extend my sincere appreciation to our members, Council, Council committees, branch leadership, Secretariat, partners and every stakeholder whose dedication continues to strengthen our Institution.

I wish you an insightful reading.



Eng. Peterson Mwesiga
President, Uganda Institution of Professional Engineers (UIPE)

STRENGTHENING GRADUATE ENGINEERS' REGISTRATION JOURNEY THROUGH STRUCTURED MENTORSHIP



Eng. Diana Keesiga

Vice President MET

The Graduate Engineers Registration Mentorship Programme is a practical Career and Technical Report Writing Clinic to support graduate engineers preparing for UIPE corporate membership and professional registration.

The Uganda Institution of Professional Engineers (UIPE) has introduced the Graduate Engineers Registration Mentorship Programme (RMP), a practical initiative designed to support graduate engineers as they prepare for professional registration.

The programme responds to a common challenge faced by many graduate engineers: they may have valuable project experience, but often need guidance on how to present that experience clearly, professionally, and in line with UIPE and Engineers Registration Board requirements. In particular, many candidates require support in preparing Career and Technical Reports, demonstrating their personal engineering role, documenting technical decisions, and presenting evidence of engineering judgement.

The RMP has therefore been designed as a structured bridge between graduate experience and professional registration readiness. It provides graduate engineers with guided mentorship, technical writing support, professional practice guidance, and exposure to experienced professional engineers who understand the registration process.

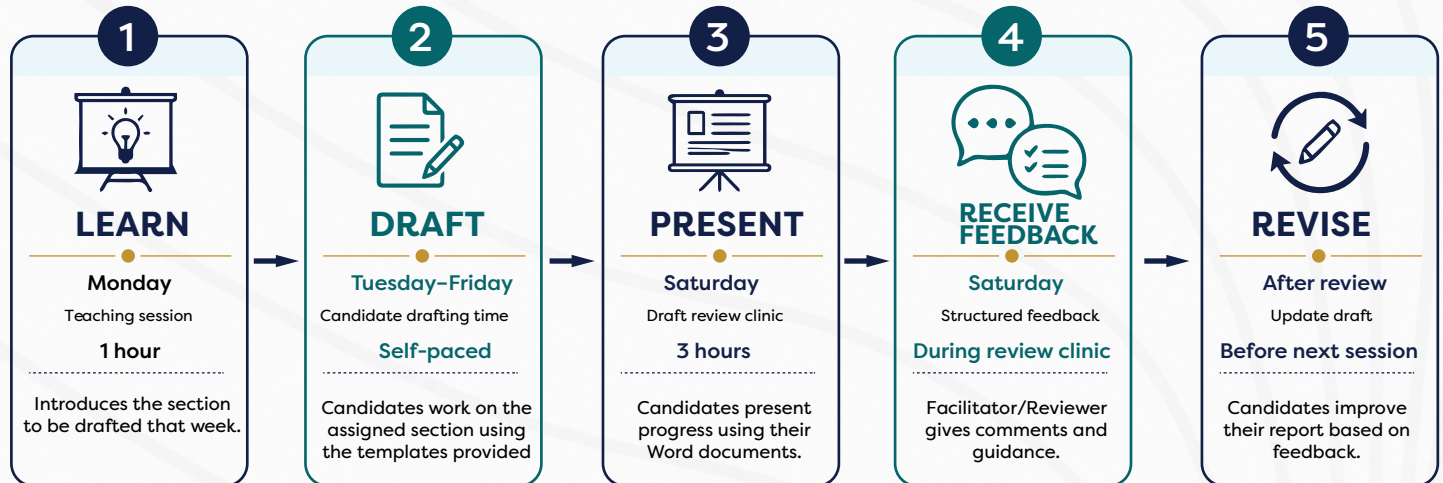
I How the clinic works

Delivered virtually over four weeks, the programme follows a practical weekly rhythm: learn, draft, present, receive feedback, and revise. This rhythm is deliberately repetitive because good professional writing is built through practice, reflection, feedback, and continuous improvement.

Each week combines a short teaching session and a focused review clinic. The teaching session introduces the expectations, structure, common mistakes, and weekly assignment. The review clinic gives candidates an opportunity to present their Word document drafts, receive structured feedback, and improve their reports before the next session.

Weekly Clinic Rhythm

Learn → Draft → Present → Receive Feedback → Revise



Each week follows a simple cycle: learn the expectations, draft the assigned section, present progress, receive structured feedback, and revise before the next session.

Figure 1: The weekly clinic rhythm: learn, draft, present, receive feedback and revise.

| Four-week structure

The four-week structure is designed to build the reports step by step. In Week One, candidates focus on the Career Report, helping them tell their professional story clearly and identify the engineering projects they have participated in. In Week Two, the focus shifts to the Technical Report project and Chapter One, including the project title, problem statement, objectives, scope, and the candidate's role.

Week Three focuses on the technical core chapters, where candidates demonstrate engineering depth, professional judgement, standards applied, calculations where applicable, and evidence of personal contribution. Week Four brings everything together through the final sections, full report review, corrections, and submission readiness.

Clinic Structure

4-Week Career and Technical Report Writing Clinic

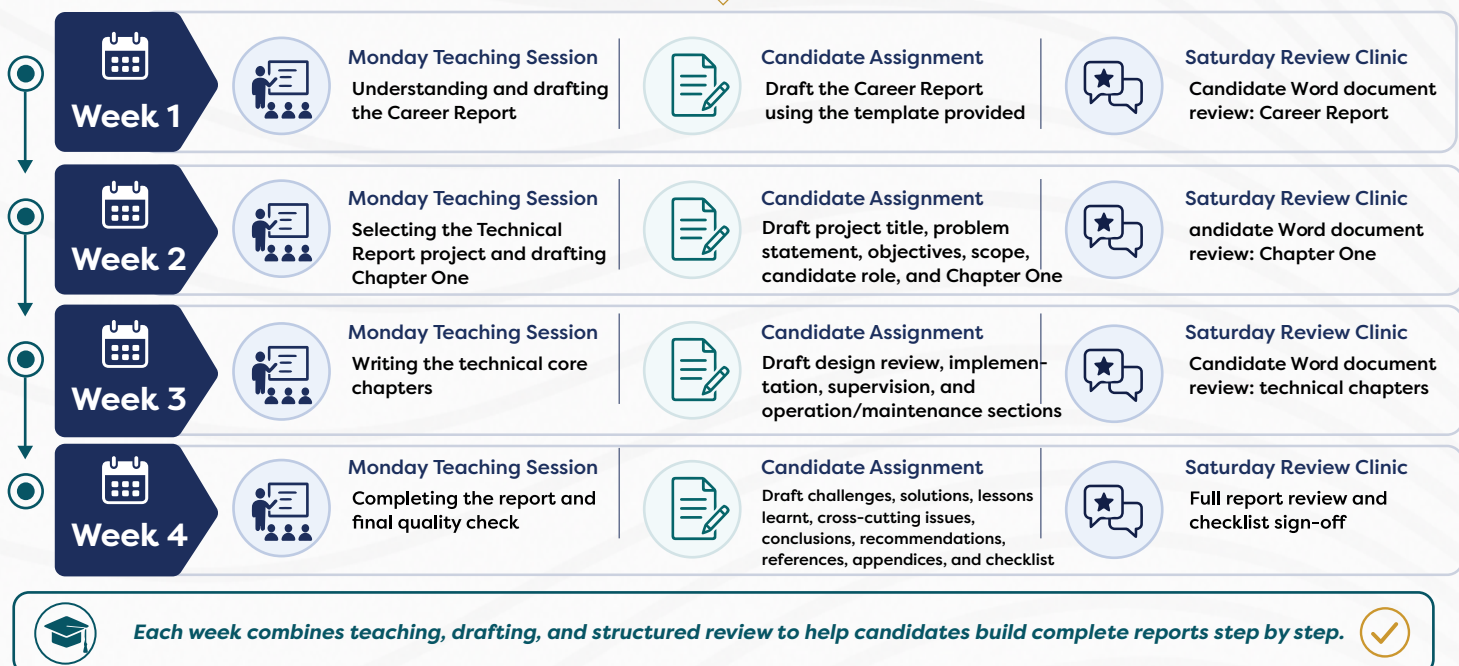


Figure 3: Current Registration Assessment Process for the Career and Technical Report pathway.

Expected outputs and quality standard

By the end of the clinic, each candidate is expected to have made clear progress towards submission-ready documents. The expected outputs include a complete draft Career Report, a complete draft Technical Report, a Career and Technical Report CPD Certificate, and a completed Final Quality Checklist.

Quality standard

Each report should be clear, honest, evidence-based, and specific to the candidate's own engineering experience. The report should show what the candidate personally did, the decisions made, the standards or principles applied, and the lessons learnt.

The review process focuses on the issues that matter most in professional assessment. Reviewers look for evidence of the candidate's personal role, project-specific challenges and solutions, engineering depth, coherence between objectives and conclusions, and overall submission quality. Candidates are therefore encouraged to avoid generic statements and instead show what they personally did, what engineering decisions they made, what standards or principles they applied, and what lessons they learnt.

Link to the registration assessment pathway

The RMP is directly linked to the UIPE registration assessment pathway. Through structured mentorship, candidates receive guidance and feedback before formal submission, helping them prepare stronger Career and Technical Reports.

As a result, candidates who successfully complete the clinic and meet the required standard may move from Step 1: Submit Reports directly to Step 5: Assessor Review, skipping Steps 2, 3 and 4 of the initial MET review and revision process.

This reduces avoidable back-and-forth and helps candidates enter the formal assessment stage with clearer, evidence-based and submission-ready reports.

Current Registration Assessment Process

Career and Technical Report pathway to professional interview



Figure 3: Current Registration Assessment Process for the Career and Technical Report pathway.

Phased payment structure

To support affordability, the proposed programme fee is structured in phases aligned with the candidate's progress. The full cost for UIPE members in good standing is **UGX 1,250,000**, payable in three phases: **UGX 500,000** before enrolment for the Registration Clinic, **UGX 450,000** upon submission of reports for assessment, and **UGX 300,000** after UIPE Council election to cover annual subscription and certificate fees.

For non-members of UIPE or members not in good standing, an additional **UGX 200,000** is charged at the **Registration Clinic phase only**, bringing the Registration Clinic fee to **UGX 700,000**. The assessment, annual subscription, and certificate fees remain unchanged.

Phased Payment Structure

Payment is aligned to the participant's progress through the pathway.

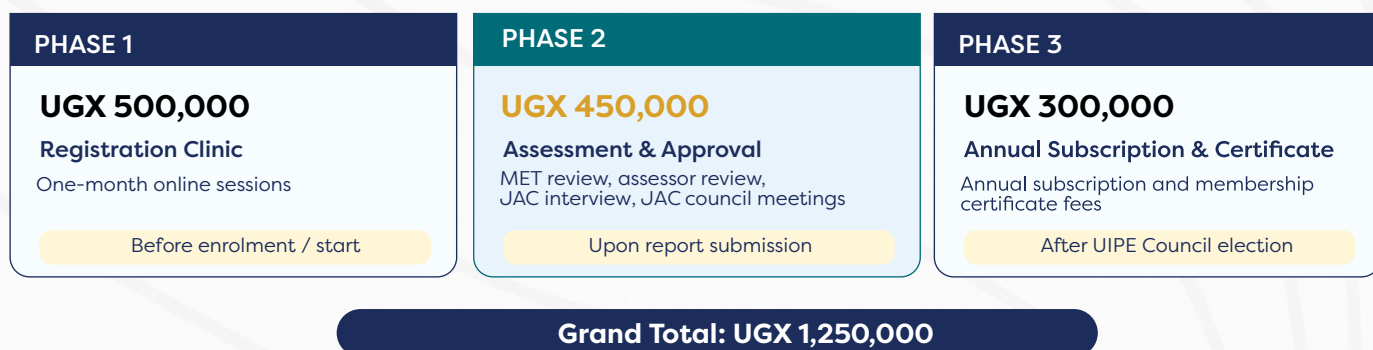


Figure 4: Phased payment structure aligned to the candidate's progress.

I Shared responsibility for success

The success of the programme depends on each participant playing their part. Candidates are expected to attend sessions, come prepared with Word document drafts, present their progress, record feedback, and revise their work. Facilitators are expected to teach, guide, review, and provide structured feedback. Other candidates are also part of the learning process by listening, asking relevant questions, and applying lessons from peer reviews to their own reports.

Core principle

The candidate owns the draft; the facilitator strengthens the draft; and the cohort supports learning.

Beyond report writing, the RMP promotes a stronger culture of mentorship within the engineering profession. It reminds graduate engineers that professional registration is not only an administrative milestone, but a journey of growth, competence, ethical practice, and service to society.

What Success Looks Like

At the end of the clinic, every candidate should clearly answer:

- ✓ What engineering problem was solved?
- ✓ What was my personal role?
- ✓ What principles and standards did I apply?
- ✓ What decisions did I make?
- ✓ What evidence supports my work?
- ✓ What lessons will improve my future practice?

Clear. Honest. Evidence-based. Specific.

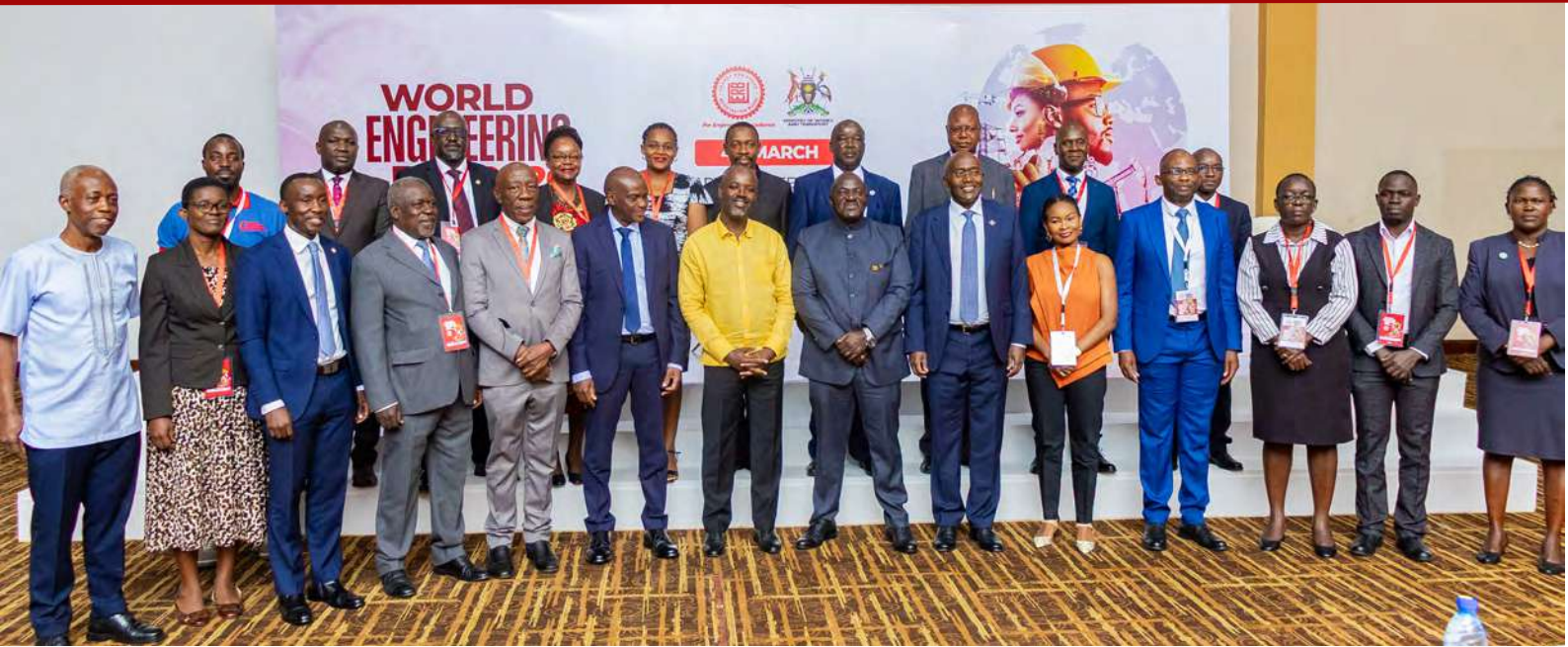
Figure 5: Six questions every candidate should be able to answer at the end of the clinic.

I Conclusion

Through this programme, UIPE is investing in a stronger professional engineering pipeline and reaffirming its commitment to preparing engineers for the future. The RMP gives graduate engineers a practical pathway to improve their reports, receive structured feedback, and build confidence as they move towards corporate membership and professional registration readiness.

SMART ENGINEERING FOR A SUSTAINABLE FUTURE

Uganda Celebrates World Engineering Day 2026



Every year on 4th March, the global engineering fraternity celebrates World Engineering Day (WED) for Sustainable Development, a UNESCO-designated occasion that recognises the role of engineers in building resilient societies, driving innovation, and advancing the Sustainable Development Goals (SDGs).

The 2026 celebrations were held under the theme “Smart Engineering for a Sustainable Future through Innovation and Digitalisation,” reflecting the growing importance of digital technologies, innovation, and data-driven solutions in addressing global development challenges. The theme aligns with Uganda’s Vision 2040 and the National Development Plan IV, where engineering remains central to infrastructure development, industrialisation and sustainable economic growth.

In Uganda, the celebrations were organised by the Engineers Registration Board (ERB) in collaboration with the Uganda Institution of Professional Engineers (UIPE) and the Ministry of Works and Transport (MoWT), with support from a number of sponsors and partners including Dynaco Ltd, Sandbolt, UETCL, UEGCL, Aquafina, National Enterprise Corporation (NEC), Peachers, UNABSEC, Old Mutual, NWSC, UPF, UPDF Engineering Brigade and Roofings Limited. The event brought together over 900 participants including engineers, government leaders, academia, development partners, students private sector and the members of the public to celebrate engineering excellence and explore innovative solutions for national transformation.



The four-day programme commenced on 2nd March 2026 with the Annual Engineers' Run at Kyambogo University Playground. The event brought together engineers, students, representatives of sponsors and government agencies and members of the public in the 21.1 km, 10 km and 5 km race categories, promoting health, teamwork, networking and public engagement while reinforcing the message that engineers not only build infrastructure but also build healthy, connected and resilient communities.



The event was flagged off by Eng. Ronald Namugera, Registrar ERB, Eng. Stephen Kitonsa, Engineer in Chief MoWT and officiated by the Chief Guest, Hon. Musa Francis Ecweru, State Minister of Works. Who particularly praised the growing participation of women in engineering and encouraged more girls to pursue STEAM and called for more deliberate exposure and mentorship of young engineers. He concluded by reaffirming government's commitment to infrastructure development and local capacity building.



On 3rd March, the focus shifted to nurturing the next generation of professionals through the NextGen Engineers Webinar. The virtual mentorship session was aimed at preparing engineering students, graduate engineers and early-career professionals for the realities of the modern engineering workforce. The session was facilitated Eng. Diana Keesiga, Dr. Eng. Leonard Mwesiga, Eng. Musinguzi Begumisa, Eng. Ezra Gumisiriza, Eng. Ronald Namugera and moderated by Ms. Elizabeth Kisaaka, a graduate engineer. Collectively, the presentations addressed innovation, digitalisation, sustainability, employability, ethics and the pathway to professional registration. Speakers encouraged participants to embrace emerging technologies, continuously develop their skills and position themselves to solve real-world challenges through engineering.

The highlight of the celebrations was the Annual Engineering Conference, held on 4th March 2026 at Hotel Africana Kampala. The conference convened government leaders, legislators, engineering professionals, academia, development partners, private sector, students, regional delegates and sponsors and exhibitors for a strategic dialogue on how innovation and digitalisation can transform engineering practice and accelerate sustainable development.



The conference featured opening remarks by Prof. Eng. Henry Alinaitwe, Chairman ERB and Eng. Henry Mpuuga, Vice President Membership Education and Training representing the UIPE President, keynote addresses by Dr. Dominic Mundrugo Ogo-Lali, UNESCO National Commission and Eng. Stephen Kitonsa, Engineer-in-Chief MoWT and technical presentations and panel discussions on digital engineering, Building Information Modelling (BIM), Geographic Information Systems (GIS), climate-resilient infrastructure, smart technologies, engineering governance, local manufacturing through 3D printing and opportunities arising from major national infrastructure projects such as the Standard Gauge Railway.



A major highlight of the conference was the launch of the ERB Five-Year Strategic Plan (2025/26–2029/30) and the unveiling of the ERB Digital E-Licensing System, two landmark initiatives aimed at modernising engineering regulation, improving service delivery and enhancing transparency within the profession.



The celebrations were officially opened by the Deputy Speaker of Parliament, Rt. Hon. Thomas Tayebwa, who reaffirmed Parliament's commitment to strengthening the engineering profession through legislation and oversight. He praised the contribution of engineers to Uganda's development and encouraged more engineers to engage in public service and political leadership while the Minister of Works and Transport, Gen. Edward Katumba Wamala, recalled the successful hosting of the 11th UNESCO Africa Engineering Week and the 9th African Engineering Conference in Uganda and urged engineers to reflect on how conference resolutions can be translated into national results. He also noted that the ERB Strategic Plan had been approved and challenged all stakeholders to support its implementation, particularly in expanding registration, strengthening CPD compliance, improving service delivery and accelerating digitalisation of regulatory processes.



A defining feature of the celebrations was the recognition of excellence within the engineering fraternity. During the Annual Engineers' Run, outstanding participants were honoured for their athletic achievement across the various race categories. The 21.1 km race winners included Alfred D. Kamara, Henry Byomire and Mutono Brian. Eng. Henry Byomire received special recognition as the Best Engineer in the half marathon category while Akello Yvonne was recognised as the first female finisher in the 21.1 km race. The medals were presented by the ERB and UIPE Leadership. Other participants were recognized at the Annual Engineering Conference awards ceremony for their

outstanding contributions to engineering practice, innovation and professional development



The celebrations concluded on 5th March 2026 with the Engineers' Oath-Taking Ceremony held at the ERB offices in Kyambogo. The ceremony reaffirmed the profession's commitment to integrity, competence, ethical conduct and public service while welcoming a new generation of engineers entrusted with safeguarding lives and driving Uganda's development.

More than a commemoration, World Engineering Day 2026 demonstrated the growing transformation of Uganda's engineering profession into one that embraces digital innovation, strengthens regulation, nurtures young talent and delivers sustainable solutions to national challenges. As Uganda continues implementing Vision 2040 and the National Development Plan IV, engineers remain at the forefront of building resilient infrastructure, advancing industrialisation and shaping a smarter, more sustainable future for generations to come.





UIPE LAUNCHES *THE UIPE VOICE*

To Strengthen Engineering Input In National Development



The Uganda Institution of Professional Engineers (UIPE) officially launched The UIPE Voice. This new monthly public engagement platform will amplify engineering perspectives in national discourse and position engineers as trusted advisors in Uganda's development agenda.

Launched on 25 June 2026 at Hotel Africana Kampala under the theme "Engineering Matters: Strengthening the Voice of Engineers in National Development," the initiative brought together over 70 participants, including engineers, policymakers, Parliament, academia, industry leaders, development partners, media practitioners and the public to discuss engineering issues that shape the country's socio-economic transformation. The launch programme featured a documentary on the engineering profession, remarks from the UIPE President and a panel discussion on why engineering voices matter, an interactive media session and the official unveiling of the platform by the Chief Guest.

Eng. Peterson Mwesiga, President UIPE, said The UIPE Voice was established to bring the engineering profession into the national conversation, emphasizing that engineering is a nation-building profession. He described the platform as UIPE's official public engagement channel for communicating institutional priorities, programmes,

achievements, and engineering issues that affect the public, while promoting evidence-based policy dialogue and stakeholder engagement.

He also called for the urgent enactment of the long-awaited Construction Industry Law, noting that strong infrastructure requires a robust regulatory framework. According to him, the proposed legislation will strengthen regulation, improve accountability and quality assurance, enhance public safety, and create greater opportunities for Ugandan engineers through increased local content in infrastructure development.





The Guest of Honour, Hon. Eng. Hillary Onek Obaloker, Minister of State for General Duties in the Office of the Prime Minister, conveyed greetings from H.E. President Yoweri Kaguta Museveni and reaffirmed the President's belief that science, technology, and engineering are key drivers of Uganda's socio-economic transformation. He described the launch of The UIPE Voice as a timely initiative that will strengthen public engagement, policy dialogue, and engineering advocacy while bridging the gap between technical expertise and the public.

He commended UIPE for creating a platform that promotes dialogue between engineers, policymakers and the public. He reaffirmed the Government's commitment to strengthening the engineering profession and urged engineers to uphold integrity, professionalism and ethical practice while delivering solutions that respond to Uganda's development needs.



The launch also featured a panel discussion titled "Why Engineering Voices Must Be Heard," bringing together engineering and media professionals to examine how evidence-based engineering perspectives can enrich public debate and support better decision-making. The subsequent interactive session gave journalists, engineers, academia and industry representatives an opportunity to



share expectations, ask questions and identify areas for future collaboration, demonstrating the shared commitment to strengthening communication between the engineering profession and the public.



The platform also seeks to strengthen collaboration with the media by providing journalists with direct access to engineering experts, technical insights and data-driven perspectives on issues of national importance. Through this partnership, UIPE aims to enhance public understanding of the engineering profession and demonstrate its contribution to economic growth, public safety and sustainable development.

UIPE Voice is expected to become a leading platform for informed dialogue on engineering and development. By bringing together engineers, government, academia, industry and the media every month, the initiative reinforces the profession's commitment to providing innovative, ethical and sustainable engineering solutions that improve lives and contribute to national transformation.

As Uganda advances the implementation of Vision 2040 and the Fourth National Development Plan (NDP IV), The



POSITIONING ENGINEERS

To Support the Implementation of Uganda's National Development Plan IV and Tenfold Growth Strategy.



Eng. Andrew Ambazimana

Corporate Member UIPE

Uganda set itself an ambitious course through the Fourth National Development Plan (NDP IV). This National Development Plan - 2025/26-2029/30 (NDPIV) is the fourth in a series of six National Development Plans (NDPs) aimed at accelerating the socio-economic transformation of the country. It is the first of three 5-year NDPs that will deliver the 10-fold economic growth.

The Tenfold Growth Strategy is a blueprint for rapidly expanding Uganda's economy in a transformative, sustainable, and inclusive manner. The goal of the Strategy is to grow the capacity of the country's economy to its double-digit growth potential. The strategic target under this goal is to expand the country's GDP from nearly US\$ 50 billion (2023) to US\$500 billion (2040).

NDP IV seeks to increase productivity, create jobs, strengthen industries, improve public services, and raise the standard of living of Ugandans. Achieving these goals will require more than government programmes and financial resources. It will require people with the knowledge and skills to design, build, maintain, and improve the systems that support economic and social development. Among these professionals, engineers have an important contribution to make and the engineering fraternity must intentionally position themselves to be at the centre of both the policy making and implementation of these plans.

Whenever national development is being discussed, focus is often on policies, budgets, and institutions. Yet behind every road, factory, water system, power line, telecommunications network, and public facility are engineers who turn plans on paper into reality. Their work touches almost every aspect of daily life, often without attracting much attention. As Uganda moves into the implementation phase of NDP IV, there is a need to ensure that engineers are given the opportunity to contribute fully to the country's development agenda.

Many of the challenges Uganda faces today are practical in nature. Farmers need reliable irrigation systems. Industries need affordable and stable power. Communities need clean water and proper sanitation. Urban centres need better transport systems and waste management services. Government institutions require efficient systems to deliver services to citizens. Addressing these challenges requires technical solutions, careful planning, and proper implementation. Engineers are trained to analyse problems, evaluate options, and develop workable solutions. They understand how systems function and how resources can be used efficiently to achieve desired results. Their

contribution is therefore not limited to construction projects; it extends to improving productivity, supporting innovation, and enhancing service delivery.

One of the major priorities under NDP IV is industrialization. Uganda has made progress in attracting investment and establishing industries, but there is still considerable room for growth in manufacturing and value addition. Engineers have an important role in helping industries become more productive and competitive. They design production systems, improve manufacturing processes, maintain industrial equipment, and identify ways of reducing waste and operational costs. The country's efforts to add value to agricultural products, minerals, and other natural resources will also depend significantly on the availability of competent engineering professionals.

Over the years, Uganda has invested heavily in roads, energy projects, water systems, and other public infrastructure. Such investments are essential for economic growth. However, building infrastructure is only part of the task. Equally important is ensuring that infrastructure is properly designed, maintained, and able to serve communities for many years. Engineers provide the expertise needed to ensure that public investments deliver value for money. They help identify suitable technologies, supervise construction, monitor quality standards, and develop maintenance plans that extend the lifespan of public assets. As NDP IV places emphasis on expanding and improving infrastructure, the involvement of engineers will remain essential.

One area that deserves attention is the involvement of engineers in policy discussions and development planning. Too often, technical experts are consulted after major decisions have already been made. Yet many challenges encountered during project implementation can be traced back to shortcomings at the planning stage. Engineers should therefore be involved from the beginning when development priorities are being identified, projects are being designed, and resources are being allocated. Their technical knowledge can help decision-makers understand what is feasible, what is sustainable, and what risks need to be addressed. Including engineers in planning processes can improve project outcomes and reduce costly mistakes.

If Uganda expects engineers to contribute effectively

to NDP IV, there must be continued investment in engineering education and professional development. Universities and training institutions need adequate facilities and equipment to prepare graduates for the demands of the modern workplace. Young engineers should be given opportunities for practical training and mentorship and experienced professionals should be encouraged to continuously update their knowledge and skills. The country also needs to promote research and innovation. Many of Uganda's challenges can be solved through locally developed technologies and approaches that reflect local realities. Supporting engineering research is therefore not a luxury; it is an investment in national development.

The implementation of NDP IV should not be viewed as the responsibility of government alone. It requires the combined efforts of the public sector, private sector, academia, development partners, and professional bodies. Engineers are among the professionals who can help bridge the gap between development goals and actual results. Their knowledge and experience can contribute to better infrastructure, stronger industries, improved public services, and greater productivity across the economy. For this to happen, they must be recognized as partners in development and given the space to contribute their expertise.

Uganda's development ambitions are achievable. The country has the resources, the opportunities, and the human talent needed to make significant progress over the coming years. Engineers will be an important part of that journey. Their contribution will be seen in the roads that connect communities, the industries that create jobs, the systems that improve service delivery, and the infrastructure that supports economic growth.

As the implementation of NDP IV gathers momentum, the question is not whether engineers have a role to play. The real question is whether the country is making full use of the skills and expertise they bring. Positioning engineers more effectively within national development efforts will not only strengthen the implementation of NDP IV but will also help Uganda build a more productive, competitive, and prosperous future.

• IMPROVING TRACTOR • HITCH RELIABILITY • THROUGH LOCAL ENGINEERING INNOVATION



Eng. Jolly Joe Ocan
Principal Engineer, Ministry of
Agriculture, Animal Industry and
Fisheries (MAAIF)



Eng. Ivan Watta
Ag. Principal Engineer, Ministry of
Works and Transport



Eng. Peter Olinga
Mechanical Engineer, (KTHS)
Ministry of Agriculture, Animal
Industry and Fisheries (MAAIF)

Redesign of Stabilizer Check Chains for New Holland TT4.75 Tractors in Karamoja, Uganda

Abstract:

The Karamoja Tractor Hire Scheme (KTHS) was introduced to enhance agricultural mechanization and productivity in Uganda's Karamoja sub-region. Despite high demand for tractor services, operational performance was constrained by frequent failures of three-point hitch stabilizer check chains on New Holland TT4.75 tractors. These failures resulted in excessive implement sway, increased downtime, and reduced land preparation efficiency.

This paper presents the engineering review, redesign, local fabrication, and field implementation of an improved stabilizer check chain using High Tensile Steel Grade 70. The redesign was informed by load analysis, material selection, and structural verification, followed by laboratory and field testing. Field results indicate improved structural reliability, elimination of chain failures during the pilot period, and an increase in daily tillage output from five to eight acres per tractor. A cost-benefit analysis demonstrates a payback period of approximately ten working days and a first-month return on investment exceeding 100%.

The study demonstrates that context-specific, locally engineered solutions can significantly improve the performance and sustainability of agricultural mechanization programs in challenging operating environments.

1. Introduction

Agricultural mechanization is a key enabler of increased productivity, reduced labour constraints, and improved food security. In Uganda's Karamoja sub-region, farming remains largely subsistence-based despite the availability of extensive arable land suitable for mechanized cultivation. To address this gap, the Government of Uganda, through the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), in collaboration with Operation Wealth Creation (OWC) and NARO ZARDI-Nabuin, established the Karamoja Tractor Hire Scheme (KTHS).

The scheme deployed New Holland TT4.75 tractors to provide affordable land preparation services. However, early implementation revealed persistent mechanical challenges, particularly frequent failures of three-point hitch stabilizer check chains. These failures undermined tractor availability, operator safety, and service delivery efficiency. This paper documents an engineering intervention undertaken to resolve this challenge through redesign and local fabrication of a more robust stabilizer check chain system.



2. Problem Definition and Operational Context

Field operations under KTHS showed that the original equipment manufacturer (OEM) stabilizer check chains, fabricated from steel-zinc alloy, were inadequate for Karamoja's operating conditions. Tractors routinely operate on rocky terrain, uneven fields, and dusty environments, often under dynamic and shock loading from mounted implements.

Observed failure modes included fracture of chain links, rapid elongation due to wear, and deformation or tear-out of anchorage brackets. These failures resulted in excessive lateral movement of implements, frequent operational stoppages, increased maintenance requirements, and reduced daily output. Consequently, average productivity was limited to approximately five acres per tractor per day.

3. Design Review and Engineering Methodology

3.1 Design Objectives

The redesign aimed to:

- Improve load-bearing capacity and fatigue resistance
- Enhance implement stability and operator safety
- Maintain compatibility with existing TT4.75 hitch geometry
- Provide a cost-effective solution suitable for local fabrication

3.2 Material Selection and Design Basis

High Tensile Steel Grade 70 (ASTM A514) was selected due to its superior mechanical properties, including higher yield and ultimate tensile strength compared to the original steel-zinc alloy. Design calculations considered the weight of mounted implements, dynamic shock factors, and appropriate factors of safety consistent with agricultural equipment standards.

Chain link diameter, pin size, and bracket thickness were determined to ensure induced stresses remained within allowable limits. Provision was made for adjustability to accommodate variations in implement width and tractor configuration.

3.3 Fabrication and Quality Assurance

Fabrication was undertaken locally using controlled cutting, bending, and welding procedures. Low-hydrogen electrodes were used to reduce the risk of weld defects, followed by basic post-weld heat treatment to mitigate brittleness. Quality control measures included dimensional verification, visual inspection, dye-penetrant testing, and tensile testing conducted at Kyambogo University and Uganda Industrial Research Institute.

4. Field Implementation and Performance Evaluation

The redesigned stabilizer check chains were installed on 15 New Holland TT4.75 tractors and deployed across selected districts within the Karamoja sub-region. Field testing was conducted during active ploughing operations under engineering supervision.

Key performance outcomes included:

- Elimination of stabilizer chain failures during the pilot period
- Significant reduction in implement sway and improved tractor handling
- Increase in average daily output from five to eight acres per tractor
- Reduced downtime and improved operator confidence

Over 2,800 acres were ploughed during the implementation phase, benefiting farmers across multiple districts.

5. Economic Evaluation

The average cost of redesign, fabrication, testing, and installation was approximately UGX 2.15 million per tractor. With increased productivity, monthly revenue per tractor increased from approximately UGX 11.0 million to UGX 17.6 million, representing an additional UGX 6.6 million per month.

The investment achieved a payback period of approximately ten working days and a first-month return on investment of about 207%. This confirms the economic viability of the redesigned stabilizer check chain and supports its adoption across the KTHS fleet.

6. Conclusions and Recommendations

The redesign of the three-point hitch stabilizer check chain using High Tensile Steel Grade 70 successfully addressed a critical mechanical constraint within the Karamoja Tractor Hire Scheme. The intervention improved structural reliability, enhanced operational safety, increased daily productivity, and delivered rapid economic returns.

It is recommended that:

- The redesigned stabilizer check chain be standardized across all KTHS tractors.
- Similar mechanization programs consider localized operating conditions during component specification.
- Continued collaboration with local engineering institutions be promoted to support innovation, testing, and skills development.

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• NAVIGATING UGANDA'S • WEAK FOUNDATIONS • AND ERODING SHORELINES THROUGH SUSTAINABLE SOLUTIONS



Eng. Jonathan Tugume
Managing Director,
Dynaco Limited



Mr. Brian Okello Alunyu
Products & Applications Manager,
Dynaco Limited

Introduction

When a nation begins to truly invest in infrastructure, the earth responds. Sometimes with shifting shorelines, sometimes with waterlogged clay, sometimes with stubborn rock. But it always responds. And when that response becomes a challenge where the land meets the lake, where the river dares to erode its own bank, where foundations meet unfathomable depths then the engineer is summoned not just to build, but to restrain, retain, resist. In such moments, solutions like sheet piling, bored piling, and rock armour emerge not merely as techniques, but as acts of structural diplomacy between nature and human need.

Uganda's infrastructural appetite is rising. From hydropower megaprojects on the Nile, to the oil and gas boom in the Albertine Graben, to the planned standard gauge railway corridors and ports along Lake Victoria, the terrain is no longer always dry, flat, or firm. We are building into wetlands, along floodplains, over reclaimed shores, and on embankments where the ground whispers uncertainty. It is in this context that deep foundation and shoreline protection technologies are no longer luxuries or foreign fascinations but rather necessities that we must incorporate in our plans.

Sheet Piling Shoreline Protection

Take sheet piling, for instance. Long regarded as the go-to solution for temporary earth retention and water cut-off in construction below the water table, sheet piles are now entering more permanent roles as quay walls, cofferdams, bridge abutments, and shoreline reinforcements. These interlocking steel, or composite sections act as both vertical barriers and retainers of earth or water, driven deep into the ground. Their performance lies in their continuity and in the soil's lateral resistance. The Kingfisher Oilfield, for instance, adopted sheet piling for protection of Oil Well Pads 1, 2, and 3 spanning an impressive 1.1Km along the shoreline of Lake Albert. This project involved deep foundation works using ZZ14-770 frontal sheet piles of 7.6m, 7.82m and 9.5m and 2.4m dead man anchor piles, anchored with U400 waling beams, 50mm tie rods, stiffened with bearing plates and nuts.

Bored Piles

But sheet piles are not alone in their depth. Bored piles cylindrical shafts drilled deep into the earth and filled with concrete and reinforcement have become a foundational mainstay in Uganda's bridge and multi-storey building projects. Unlike driven piles which rely on hammering, bored piles allow controlled insertion in urban or vibration-sensitive zones. Several bridge projects like the upcoming Ssezibwa bridge project, Katonga Bridge are designed to stand proudly on bored piles sunk tens of metres into the riverbed. The modern challenge in Kampala is no longer just about how to build up but how to do so safely, precisely, and sustainably



especially when you are constructing next to what already exists. This is where more specifically secant pile walls, step forward. A secant pile wall is a continuous wall formed by constructing intersecting bored piles reinforced and unreinforced in sequence, creating a watertight and earth-retaining barrier. It is the engineer's answer to excavation in tight spaces, where there is no room to slope back, no luxury of space for soldier beams or struts, and no tolerance for movement that could destabilize neighbouring buildings. In downtown Kampala, where colonial structures, arcades, and shopping complexes stand shoulder-to-shoulder, secant piles are fast becoming the silent guarantee that the old and the new can coexist one holding up the other.

The method is elegant yet demanding. First, a series of primary unreinforced piles is cast in-situ. Once cured, secondary piles, typically reinforced with steel cages, are drilled to cut through the adjacent concrete forming a continuous interlocking structure. This secant configuration serves as both a cut-off wall for groundwater and a retaining system for the excavation. Once the wall is in place, deep excavation can proceed with confidence, often to depths of 10–20m, revealing basements, parking levels, or utility spaces that were once unthinkable in Kampala's construction vocabulary.

The engineering principles governing secant pile walls rest on three pillars: soil pressure equilibrium, interlock integrity, and pile stiffness. Unlike conventional shoring methods, secant piles work as a monolithic wall, resisting both earth and hydrostatic pressures while controlling ground movement.

Rock Armor Shoreline Protection

Still, sometimes the challenge is not beneath, but beside. Where rivers erode or lakes chew into infrastructure, the answer is not to drive but to armor. Rock armor or riprap, as it is sometimes known is a simple yet powerful solution. Large angular rocks are strategically placed along exposed shorelines or embankments to dissipate wave energy, slow erosion, and protect the interface between land and water. At Nalubaale and Kiira Hydropower Stations, Uganda has recently adopted rock armor protection to replace failing gabion systems, opting for durability over woven steel. In Entebbe, the Petroleum House building and the Ministry of Energy Peninsular is adopting rock Armor for protection from further regression. Around the world, from the Thames river in the UK to the levees of New Orleans, rock Armor has served not just as protection but as insurance against the fury of water.



Limitations of the Solutions

Each of these systems, however, dances with its own trade-offs. Sheet piles are rapid to install and removable, but their upfront cost and noise during driving can deter adoption. They struggle in rocky ground and may require specialized equipment not always locally available. Bored piles offer deep capacity and adaptability but are sensitive to soil collapse during drilling and demand high levels of quality control especially in slurry-supported drilling or in tremie concrete placement. Rock Armor is forgiving, relatively low-tech, and effective but requires massive quarry volumes, proper geotextile underlays, and thoughtful hydraulic design to prevent toe undermining and stone migration.

Design of these Solutions

The design principles behind these systems reflect engineering fundamentals, yet demand specific expertise. For sheet piles, the key lies in understanding lateral earth pressures, interlock friction, and depth of embedment. Stability depends on cantilever, anchored, or propped configurations. Software such as WALLAP, PLAXIS 2D, and D-Sheet Piling (from Deltares) is often employed to simulate bending moments, water pressures, and potential heave. Bored pile design, on the other hand, hinges on axial and lateral load transfer, shaft friction, end bearing, and pile group effects. Load tests static or dynamic must often validate assumptions. Packages like GEO5 Pile, Settle3, and PYWALL are frequently used. Rock armor demands hydrodynamic calculations wave run-up, overtopping, and stone size selection using Hudson's or Van der Meer's equations. Modelling tools like MIKE21, FLOW-3D, or even HEC-RAS with sediment transport modules can simulate the interaction of flow and Armor.

Conclusion

As Uganda's infrastructure story enters its next chapter with lakeside cities expanding, oil terminals rising, and transport corridors stretching beyond the Nile; there must be a deliberate pivot to advanced geotechnical and hydraulic solutions. Sheet piles will be called to line wharfs and ports; bored piles will shoulder the weight of cranes and pipelines; rock Armor will stand between investment and erosion.

This is not just engineering, it is stewardship. It is the quiet assurance that what we build will stand not just tall, but firm. That the banks of our rivers will hold, the footings of our bridges will not shift, and the future of our infrastructure will not be swept away by rising tides or sinking soils. It is time we dug deeper, quite literally, and embraced the science and strategy of ground and water.

UNEMPLOYMENT IS A SKILLS PROBLEM

Why Technical Training Matters Now More Than Ever



Mr. Kiddu Kawuki Andrew
Director Hightech International Institute

Peter Kazimero had graduated from Makerere University, probably making it to the Dean's List, and was tipped to join the booming oil industry in the Albertine region, where engineers were desperately needed, or so he thought. He applied for the first job, then the second, then the third. Before he knew it, three years had passed since graduation, and he still wasn't gainfully employed. He survived on scraps from construction sites, hoping for a break that never came.

Meanwhile, just a few kilometers away at Uganda Polytechnic College, Kigumba, Kevin Kikapu had completed her certificate in welding. Before she could even collect her transcript, a major oil conglomerate was courting her. Her inbox overflowed with emails asking

about her availability and when she could start.

Was Peter wrong to pursue a degree in Mechanical Engineering? Absolutely not. But the world has changed. The labor market no longer rewards degrees alone; it rewards practical, job-ready skills. Technical training, apprenticeships, and hands-on experience have become the fast track to employment. Employers are increasingly asking a simple question: What can you do? Not just what you know.

This is not in any way to demean the education credentials of anyone, but Kevin's story points to the challenges we must face in the engineering job sector. How prepared are we to meet the job market demand? This contrast highlights a critical truth: unemployment today is often a skills problem, not a lack of ambition or talent. In a rapidly changing economy, equipping young people with technical competencies helps create jobs, unlock opportunities, and turn potential into productivity.

Technical training works because it starts where the labor market begins, the junction of real work. Unlike traditional academic pathways that prioritize theory, technical and vocational education focuses on hands-on competence, industry standards, and immediate application. Learners spend more time in workshops, on sites, and in simulated work environments, building, fixing, testing, and producing. Technical and Vocational Education and Training (TVET) has roots going back to early industrialization when societies needed work-ready craftspeople and technicians. Countries such as Germany and Switzerland developed formal TVET systems starting from the 19th century, combining classroom learning with apprenticeships. In many highly industrialized nations, almost all secondary graduates enter vocational



training, helping keep unemployment low through structured, industry-linked learning.

In Uganda, TVET has evolved significantly over the past few decades. Between 2007 and 2017, enrolment in public TVET institutions increased from about 25,000 to roughly 129,000 students as the government expanded access to vocational skilling across districts. A tracer study by the Uganda Business and Technical Examinations Board (UBTEB) found that about 63% of TVET graduates secure employment within one year, with 50% employed within six months. Another UBTEB study observed that 82% of TVET graduates from 2016–2019 were employed, demonstrating the strong labour market relevance of vocational qualifications.

In many places in this nation, TVET is marginalized in public perception as a “fallback” track rather than a respected route to opportunity. In sectors such as oil and gas, construction, manufacturing, energy, and water services, employers are not simply looking for graduates; they are looking for people who can perform from day one. They need welders who understand safety codes, technicians who can read drawings, installers who can troubleshoot faults, and operators who can work with modern equipment. Technical training delivers exactly that.

When we decided to start High-tech International Institute, our focus was to train as many young people as possible with visible, verifiable, and immediately useful technical skills and make them

ready for the job market. Our courses are industry-linked training that aligns curricula with employer needs. A skilled mason, electrician, or mechanic does not wait endlessly for formal employment; they create value, start small enterprises, train others, and stimulate local economies. Training institutions like ours open doors for young people who may not thrive in purely academic environments but excel with their hands and minds working together. It creates pathways into decent work, self-employment, and small enterprise development, especially for youth and women.

The call to action is for stakeholders to fully harness this potential. For technical training to deliver its full impact, institutions must go beyond classrooms and workshops. Strong partnerships with industry, updated curricula, certified instructors, modern equipment, and internship opportunities are essential. Equally important is policy support—financing, accreditation, and public awareness that positions technical careers as respected, viable, and future-proof.

If Uganda is to bridge the gap between education and employment, the answer is clear: we must train for the jobs that exist and the industries that are growing. Technical training does not replace university education; it complements it by grounding development in skills that solve real problems.



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info@erb.co.ug | www.erb.co.ug | www.theengineers.co.ug

X: ERBUganda | Facebook, LinkedIn: Engineers Registration Board

Uganda Institution of Professional Engineers

Plot 2 Gloucester Avenue, Kyambogo

P. O. Box 1308 Kampala

+256 414671387 | Toll-Free Number: 0800256460

info@uipe.co.ug | www.uipe.co.ug | X: UIPE_Uganda

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