

ERB

Engineers Newsbrief

Promoting Professionalism and Excellence in Engineering

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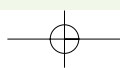
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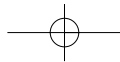
Eng. Prof. Awadhi Sadiki Mawenya Garneres the Most Prestigious ERB Engineering Award



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Half of back page: 200,000/=

On Engineers' Forum...

Engineers are hereby invited to
subscribe technical/engineering articles
in this special column, share your
views/experiences with fellow engi-
neers, comments/suggestions on how
to improve the ERB Engineers
Newsbrief.

In this issue, Engineers will share
views with Eng. Tunzo T. Mnzava on
A safe ride on the Wheel.

EDITOR'S NOTE

The ERB Engineers Newsbrief is a newsletter published by the Engineers Registration Board (ERB) with the objective of promoting professionalism and excellence in Engineering. Since its inception, the newsletter consisted of 12 pages mainly featuring engineering code of conduct and ethics as well as various topical issues.

In the current issue, new innovations have been made. These include a special cover page; improved design and layout changes in specified columns as follows:

Inside ERB: addresses all matters or topical articles pertaining to ERB. In this case, the October 2005 newsletter, will make most Engineers recall spectacular events of the 3rd Annual Engineers' Day that took place at Karimjee Hall on March 18-19, 2005.

Features: dwells on articles of technological/scientific bias. In this issue challenges on Technology Innovations, Development and Transfer are highlighted;

Engineers' Forum: This column is reserved for every Engineer. The Editorial Board would like to get comments and suggestions from stakeholders on how to improve the newsletter. In view of this, all Engineers should feel obliged to enrich each other through information sharing and transfer using the ERB Engineers Newsbrief.

Facts about AIDS: This is an educative column about AIDS.

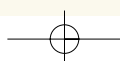
The ERB newsletter is usually sent to all registered engineers. The Board has noted that some engineers have changed their addresses and this makes it difficult for them to receive copies of the newsletter sent by post. In this case, ERB requests all engineers to provide the Editorial Board with current addresses. The change of address can also be made online through ERB website.

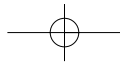
Lastly but not least, the Board wishes to caution all registered Consulting Engineers on the use of ERB Stickers and Standard Site Instruction Books at all Construction Sites. For further information read page 12.



On the Cover Page...

Eng. Mawenya being congratulated
by the Vice President of the United
Republic of Tanzania H.E. Dr. Ali
Mohammed Shein after receiving
the ERB Engineering Excellence
Award which he displays in the
insert photo.





FROM THE REGISTRAR'S DESK

The Annual Engineers Day and ERB Engineering Awards



Eng. A.O. Mkamba

Fellow Engineers,

The Annual Engineers' Day (AED) was launched by H.E. Benjamin William Mkapa, President of the United Republic of Tanzania in January 2003. The AED 2005 was thus the third such event to be celebrated by the engineering community in Tanzania. Activities of the event included, inter alia, presentation

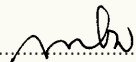
of ERB Engineering Excellence Awards and Distinguished Engineering Accomplishment Awards to engineers in recognition of their exceptional performance and contributions in engineering and socio-economic development of Tanzania.

ERB Engineering Awards are varied and they cover both individual engineers and engineering organizations. They are intended to acknowledge and recognize the best among the best engineers in the country. These are engineers who go above and beyond what is expected of them – engineers whose only limit is the sky. The awardees are recognized on the basis of a single significant contribution or contributions made over a period of time, which if taken together, constitute a significant contribution in engineering and national development. Objectives of the AED and the ERB Engineering Awards have been clearly articulated by the Board. Also clear are the

roles of engineers in the development of our country. In a developing country like ours, roles of engineers in socio-economic development are crucial, as virtually all facets of national development and good quality of life require engineering inputs. In this country wonderful opportunities abound where engineers are expected to develop and implement engineering solutions in order to realize the aspirations of the Tanzania Development Vision 2025. The awards thus aim at encouraging excellence in engineering practice and most importantly, provide enhanced motivation for engineers to be innovators.

While we salute the outstanding achievers who won our hearts in 2003, 2004 and 2005 the engineering community is reminded that AED 2006 is around the corner. This is now the time for engineers to start identifying those in our midst, who befit the ERB Engineering Awards and submit their names, including descriptions of their engineering contributions, to the Board. Engineers can also nominate themselves if they believe their engineering contributions are significant. In either case, the Board will evaluate the submissions, verify the information and finally select the best from the best.

LET US ALWAYS STRIVE TO BE AMONG THE WORLD'S BEST


 Eng. A.O. Mkamba
 Registrar

Inside ERB

Chairman's Statement on AED 2005



Eng. Prof. Mwamila

The Engineers Registration Board is a statutory body which has been re-established under the Engineers Registration Act, No. 15 of 1997 and has been given the responsibility for regulating engineering activities, conduct of engineers and engineering consulting firms.

Its main functions include, among others, the following:

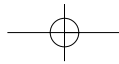
- To sponsor, arrange and provide facilities for conferences, seminars, workshops and consultations on matters related to the field of engineering.
- To promote and maintain professional conduct and integrity of the engineering profession.

In addition to the main functions, the Board conceived a Strategic Action Plan whose main objectives are:

- ❖ To promote enhanced status and image of Tanzania engineers and the engineering profession in the society.
- ❖ To promote innovativeness among local engineers
- ❖ To promote use of affordable technologies and locally available materials

Pursuant to the above functions and the need to promote an enhanced image of engineers and their profession, the Board resolved to dedicate a special day each year where engineers can show the general public, employers of engineers and other stakeholders in the engineering sector, what Tanzania engineers can do towards national development. The occasion is also intended to provide an opportunity for employers of engineers and stakeholders in engineering to identify capabilities of local engineers and local engineering organizations/firms.





This special day is the **Annual Engineers' Day (AED)** and was first launched in January 2003.

The specific objectives of the event include:

- ❖ To enable the engineering community to show the general public what Tanzanian engineers can do towards the development of our country through demonstrations and exhibitions by engineering companies, research, consultancy and training institutions.
- ❖ To enable the public recognize the valuable contributions made by Tanzanian engineers in socio-economic development of the country.
- ❖ To enable employers of engineers and consumers of engineering services identify capabilities of local engineers and engineering consulting firms.
- ❖ To recognize engineers and engineering organizations that has made outstanding contributions towards national development and so motivate others to excel in the engineering roles they play to the nation.
- ❖ To influence young minds towards the engineering profession.

The Annual Engineers Day 2005 incorporated the following activities:

- ❖ Presentation of 2004 Engineering Excellence Awards;
- ❖ Presentation of Engineering Promotion Award;
- ❖ Presentation of 2004 Distinguished Engineering Accomplishment Awards;
- ❖ Presentation of 2004 Best Final Year Engineering Student Awards to Graduates from prospective college of Engineering and Technology (pCET), University College of Lands and Architectural studies (UCLAS), Sokoine University of Agriculture (SUA) and Dar es Salaam Institute of Technology (DIT);
- ❖ Presentation of Structured Engineers' Apprenticeship Program

(SEAP) certificates to beneficiaries who have completed the Program, SEAP Mentors and SEAP Providers;

- ❖ Presentation of awards to Best Technical and Commercial Exhibitors of AED 2005;
- ❖ Learned Discourse on the theme: "Vision 2025: Engineering Contribution in Poverty Reduction".

The Annual Engineers' Day is now a popular event in the almanac of engineers in Tanzania and the public at large. Those who attended the AED 2004, and the one-day Learned Discourse, will agree with me that the event was successfully conducted.

I wish therefore to express the Board's sincere gratitude and appreciation to all individuals and organizations that facilitated the successful holding of the event as well as the Ministry of Works for working closely with the Board in the preparations of the event and all the participants. Specifically, I wish to thank the Minister for Works, Hon. John P. Magufuli (MP), the Deputy Minister for Works, Hon. Hamza A. Mwenegoha (MP) and Eng. John W. Kijazi, the Permanent Secretary, Ministry of Works for the great support they rendered to the Board.

The impacts made by the AED 2003 and AED 2004 is great. The successes made are also key milestones in the engineering profession in the country and should therefore be our new benchmarks for greater achievements. I thus wish to implore engineers and all stakeholders in the engineering sector to cherish and consolidate these gains.

Eng. Prof. Mwamila B.L.M
Board Chairman

ERB Awards Female Engineers

The Engineers Registration Board (ERB) has awarded four female engineers since 2004 with **Distinguished Engineering Accomplishment Awards**. These awards are given to engineers and other technical cadres in engineering in recognition of their outstanding engineering accomplishments that have a bearing on national development.

During the Annual Engineers Day (AED) 2005 sixteen engineers received the **Distinguished Engineering Accomplishment Awards** and three were female engineers namely, Eng. Consolatha Ngimbwa, Eng. Gertrude Lyatuu and Eng. Elisifa Kinasha. Last year (2004), the same type of award was given to Eng. Margaret Munyagi.

These role-model engineers deserve special commendation for they have excelled during the time when females in engineering education in Tanzania are still few. It is worth mentioning here that it is not uncommon to hear some people saying that engineering is for males

only and that females cannot be as successful as males in this profession. Engineers Ngimbwa, Lyatuu, Kinasha, Munyagi and a few others have really proved them wrong.

Eng. Consolata Ngimbwa



She is registered by ERB as a Professional Engineer. The award was presented to Eng. Ngimbwa because of the success of her company. She established an electrical contracting firm in 1984 called Electrics International Co. Ltd (EICL) with a staff of 2.

The firm, which was initially registered in class IV by ERB, has grown and it has now been registered as Class 1. Besides, it has expanded and has been registered as class IV Building Contractor and Class V Civil Contractor. EICL has a permanent staff of 23, which includes 2



engineers. The annual turnover of EICL has increased from Tsh 2,000,000 in 1984 to Tsh 1,150,000,000 in 2004. Major projects undertaken by her firm, include: Expansion of Tanzania Cigarette Company (T.C.C) Sub-station, Electrification of Kibo Breweries, Electrification of PPF Estate (Njiro) and Installation of 5 MVA substation for Moshi Pesticide Co.

Eng. Ngimbwa is a Chairperson of Contractors Association of Tanzania (CATA), NCC Vice Chairperson and CRB Board Member.

Eng. Gertrude Lyatuu

She obtained an Advanced Diploma in Environmental Engineering from the then Ardhi Institute in 1988 and Postgraduate Diploma in Sanitary Engineering, Delft, 1996 and a MSc. in Sanitation Engineering from the International Institute of Infrastructure, Hydraulics and Environmental Engineering, Delft, 1997. Eng. Lyatuu is a registered Environmental engineer. She is currently working with UNDP as an Assistant Resident Representative, heading the Energy and Environmental Unit. As a result of her major contributions in the supervision of various UNDP funded projects pertaining to sanitation, water and the environment, Eng. Lyatuu was awarded the Distinguished Engineering Accomplishment Award. She is a member of the Institution of Engineers Tanzania (IET).



Eng. Elisifa Kinasha



She obtained her first degree from the University of Dar es Salaam, Tanzania in 1983 and MSc. in Engineering Management from the University of Southwest Louisiana, USA in 1994. She is registered by ERB as a Civil engineer and a Professional Engineer. Eng. Kinasha is the Acting Director of

Operations and Systems – a directorate responsible for all operations related to implementation of community subprojects in Tanzania Social Action Fund (TASAF). Before holding this position, she served as the Director of Public Works Programme, and was responsible for all building works undertaken by the Fund. She has made great contributions in various TASAF Poverty Reduction programmes in several regions notably in earthdam construction, roadworks and construction of markets.

Prior to joining TASAF, she worked with the National Housing Corporation as research engineer and later as Project engineer at Kisarawe Burnt Bricks Factory, after which she joined the National Construction Council (NCC) as Chief Consultant and Head of Civil Works Department. While with the NCC, her prominent contributions included: Training of local contractors and consultants, development of Contract documents, development of Construction Management documents and the development of Contractual Claims document.

All these documents are still in use to date.

Eng. Kinasha has various professional memberships, which include: Corporate Member of the Institution of Engineers Tanzania, Founder member of the Tanzania Institute of Arbitrators, member of the American Society of Civil Engineers, Founder Member of the Tanzania Women Scientists and Technologists, member of the International Council for Building Research Studies and Documentation on Working Commission for Procurement Systems, member of Tanzania Roads Association (TARA).

Eng. Kinasha has also served in the Council of the Institution of Engineers Tanzania from 1996 to 2004. She was the Institution Vice President between 2002 and 2004.

Eng. Margaret T. Munyagi

Eng. Munyagi is among the most prominent women engineers in Tanzania. She graduated from the University of Science and Technology, Kumasi, Ghana, where she received a B.Sc. (Eng) degree in Electrical Engineering in 1976.



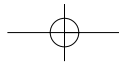
She obtained her MBA degree from Graduate School of Management, Simons College, Bolton (USA) in 1991. Eng. Munyagi with her 28 years experience as an engineer has served in various positions that include: General Manager (Airport Commandant), Project Manager and currently she is the Director General of Tanzania Civil Aviation Authority.

Eng. Munyagi is registered with the Board as a Professional Engineer and she is a Board Member of the Engineers Registration Board since 1997. She is also a Member of the Institution of Engineers Tanzania (IET). She currently sits in the Boards of the Dar es Salaam Institute of Technology (DIT), Tour and Travel Agents Licensing Authority (TALA) and Tanzania Airports Authority (TAA).

She was the first female to receive the ERB Distinguished Engineering Accomplishment Award in 2004. She qualified for the Award nomination because of her outstanding contributions to the aviation industry and overall engineering management abilities. As Airport Manager, she effectively coordinated the expansion of the Dar es Salaam International Airport.

These selected successful female engineers may be regarded as inspirational role models.

A special message and challenge to all females in the engineering field from these outstanding role models is that, if they have made it to the top, why not you? The sky is the limit.



The 3rd Annual Engineers Day in Perspective

The engineering community in Tanzania once again marked the Third Annual Engineers' Day (AED2005) on March 18-19, 2005. It was held at the Karimjee Hall, Dar es Salaam. The event started by a learned discourse on Friday, March 18, 2005, which was attended by 450 participants from all over the country and from neighboring countries of Uganda, Kenya and Zambia. The climax of the event was Saturday, March 19, 2005 and was attended by 509 participants. The Chief Guest to the event was H.E. Dr. Ali Mohamed Shein, the Vice President of the United Republic of Tanzania.

The Board Chairman, Eng. Prof. Mwamila B.L.M, delivered a welcoming address before requesting the Minister for Works to invite the Vice President to address the participants and the invited guests.

The Chairman informed the Chief Guest that the participants of the AED 2005 were representing a rich diversity of orientations and experiences from the Private Sector, Government Ministries and Authorities, Professional and Training Institutions, the engineering community and stakeholders in the engineering sector, and foreign delegates. The Chairman further informed the Chief Guest and the participants the purpose of holding the Annual Engineers' Day and that the theme for the AED2005 Learned Discourse was "Vision 2025: Engineering Contribution in Poverty Reduction" in which 10 papers were presented on the following sub-themes:

- ❖ Sustainable Agriculture and Food Security, covering Post Harvest and Food Security, Agricultural Mechanization, and Irrigation
- ❖ Infrastructure and Utilities as Stimulants of Economic Development, addressing mainly Rural Roads, Energy as a Utility, Water Supply and Stimulation of SME development through technology incubation.
- ❖ Information and Communication Technology (ICT), and
- ❖ Environment as a Crosscutting Issue in Engineering Undertakings.

The Chairman's welcoming address also covered the following:

- ❑ Reiteration of the objectives of the Annual Engineers' Day;
- ❑ Activities to be undertaken during AED 2005;
- ❑ Achievements made in the implementation of the Board's 2000-03 Strategic Action Plan;
- ❑ Implementation of the Structured Engineers Apprenticeship Program (SEAP)
- ❑ Unemployment of Engineers;
- ❑ Registration of engineers; and
- ❑ Monitoring of engineering activities and conduct of engineers and engineering consulting firms in the country.

Finally the Chairman thanked the Government for its unflinching support to the Board. The Chief Guest was invited to grace the climax of the celebrations by the Minister for Works, Hon. John P. Magufuli (MP). Welcoming the Vice President, the Minister thanked the Chief Guest for accepting his Ministry's invitation to grace the climax of the AED 2005. He underscored the important roles played by engineers in socio-economic development of the country and the need to regulate engineering practice.

He also used the occasion to congratulate the Board for the good work it has been doing. In his opening address, the Vice President reiterated the importance of engineers' roles in achieving the objectives of "Vision 2025" - the vision that aims at achieving a high quality livelihood for its people.

The Vice president further reiterated the engineers' roles in the socio-economic development of the country in general and poverty reduction in particular. The Chief Guest reiterated that, the government was in the final stages of adopting the National Strategy for Growth and Reduction of Poverty (NSGRP), the program commonly known in Swahili as Mkakati wa Kukuza Uchumi na Kupunguza Umaskini(MKUKUTA).

The new Strategy is expected to cover the period 2005/2006 to 2009/2010. That is why he considered the theme selected for AED 2005 was very appropriate and timely. He emphasized that, "it is important to note that the National Strategy for Growth and Reduction of Poverty (MKUKUTA) keeps in focus the aspirations of Tanzania Development Vision 2025 for high and shared growth, high quality livelihood, peace, stability and unity, good governance, good education and international competitiveness".

He further emphasized that, "MKUKUTA seeks to widen the space for country ownership, effective participation of civil society, facilitate private sector development and build fruitful local and external partnerships. The new Strategy counts on the contribution of all sectors towards growth and poverty reduction and stresses cross-sector collaboration".

The Chief Guest emphasized that the government was committed to make sure that SEAP program is sustained. He promised to make a follow-up to other technical ministries so that they contribute to SEAP program because the program was very important to increase the number of professional engineers, who are important for the realization of the Vision 2025.

After the Vice President's speech, the Minister for Works, Hon. John P. Magufuli (MP) presented him with the *Engineering Promotion Award*.



This is an honorary award given to national leaders and individuals who are in the forefront in the promotion of the engineering profession in the country. The grounds for presenting the *Engineering Promotion Award* to H. E. Dr. Ali Mohamed Shein emanated from the following:

- ❑ That he is responsible for poverty alleviation and the office of the Vice President coordinates government endeavors geared towards poverty alleviation. Dr. Shein has been promoting the need to use properly qualified engineers.
- ❑ He has been in the forefront in advocating for the protection of the environment.

On the same occasion, Eng. Prof. Mawenya was named the "Engineer of the Year" and was presented with the 2004 Engineering Excellence Award. He is the second recipient of the award. These awards are given to engineers and/or engineering organizations that have made outstanding contributions in the field of engineering towards socio-economic development of the country.

Eng. Prof. Awadhi Sadiki Mawenya obtained his B.Sc. and M.Sc degrees in engineering from the then University of East Africa in 1967 and 1970 respectively. His PhD degree was obtained from the University of Wales (UK) in 1973. Eng. Prof. Mawenya is a Registered Consulting Engineer. He is also Member of the Association of Consulting Engineers Tanzania (ACET), Fellow, Institution of Engineers Tanzania (FIET), Fellow, Institution of Civil Engineers, UK (FICE), Chartered Engineer (Ceng), UK and Founding Fellow, African Academy of Sciences.

Implementation of the Structured Engineers Apprenticeship Programme (SEAP)

The Structured Engineers Apprenticeship Programme (SEAP) is a Government funded programme and the Engineers Registration Board (ERB) is the implementing agency. The SEAP programme is intended to give fresh graduate engineers a three years structured professional training under the supervision and mentorship of qualified and experienced professional engineers. Implementation of the SEAP will enable Tanzanian graduate engineers to gain professional knowledge and engineering skills, to qualify for registration as professional engineers within shortest time possible and thereafter to be able to practice the profession with confidence and effectiveness.

SEAP Mentors' Workshops

One of the major observations made by the Board during monitoring visits to SEAP Providers and Beneficiaries in all zones in February and

His outstanding engineering contributions that merit him for the award of the *ERB Engineering Excellence Award* are:

- ❑ As first President of IET he laid a good foundation for the conduct of the activities of the Institution,
- ❑ As Dean of the then Faculty of Engineering of the University of Dar es Salaam he played a key role in the establishment of IPI and Department of Chemical and Process Engineering.
- ❑ As a consultant since 1984, he has effectively directed 120 engineering projects through various stages of project life cycles.
- ❑ For having ably managed NIGP
- ❑ Being instrumental in the establishment of the National Construction Council (NCC).
- ❑ Being instrumental in the transformation of UTAFITI to Commission for Science and Technology (COSTECH)
- ❑ As Chairman of the "Ministerial Committee to Review the Registration of Consulting Firms and Construction companies in the Construction Industry in Tanzania" conducted in 1992, he played a key role that led to the enactment of Acts Nos. 15, 16 and 17 and the subsequent establishment of the current ERB, AQRB and CRB in 1997.
- ❑ His research papers have had significant impact on the body of knowledge in engineering.
- ❑ Being an engineer of distinguished intellectual and professional integrity.

The Board congratulates Eng. Prof. Mawenya for the achievements and the contributions made for the people and the engineering community.

May 2004, was that Mentors had differing understanding of their roles in the implementation of the programme. The Board decided to organize workshops for all SEAP Mentors in order to raise awareness, forge uniform/common understanding of the SEAP programme and mode of conducting professional training of graduate engineers. Between March and May, 2005 the Board conducted Mentors Workshop in Dar es Salaam, Arusha and Mwanza.

The objectives of the SEAP Mentors' Workshops:

- ❑ To raise awareness on the programme and to impress upon the mentors on the importance of the SEAP programme to the nation,
- ❑ To ensure mentors understand the benefits of the SEAP programme to trainees, Mentors, the providers and the nation,
- ❑ To enable SEAP Mentors know their roles in the programme and the Board's expectations on them,
- ❑ To ensure uniformity in the mentoring of the Trainees,
- ❑ To establish close working relationships between the Board and the Mentors, and
- ❑ Obtain Mentors' views on how best to conduct the SEAP programme.



SEAP Mentors Workshop attendants posing for a group picture

SEAP Trainees Statistics

As of June 30, 2005, a total of 565 graduate engineers had joined SEAP programme, out of these, 77 were from Local Government Authority, Government Ministries and its Institutions.

The rest were unemployed fresh graduates from the open market. Among those from Local Government Authority, 15 have completed the programme (Eng. Barozi of ERB is the sixteenth) and 16 have already been registered by the Board as Professional Engineers. A total of 126 SEAP Trainees from the open market secured employment after showing high diligence that impressed their SEAP Providers even before completing their training programme.

Strategy to attract more females into the Engineering Profession

The current status of registration statistics indicates that the number of registered female engineers have been increasing especially after the new legislation i.e. Act No. 15 of 1997, but the table and the figure below raises concern on the low number of females in engineering and technological fields.

The Board hereby calls upon all female individuals who have graduated in engineering to consult the ERB Secretariat for guidance prior to their application for registration as Engineers in various registration categories.

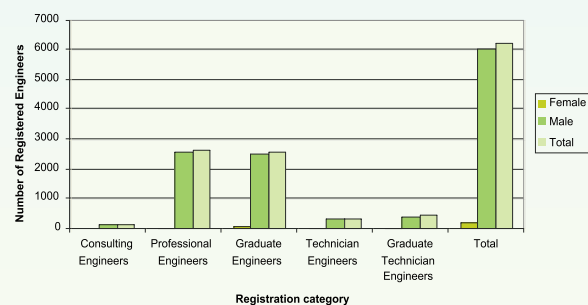
It is important to note here that registration with the Board not only gives the engineer a license to practice engineering in the country but also adds self-confidence to the engineer, establishes a forum for the engineer to share immense and vast experiences from fellow registered engineers through workshops, seminars, professional lectures, annual engineering events etc.

The Engineers Registration Board joins hands with the call by the Government of the United Republic of Tanzania to encourage females to accept taking subjects that make the foundations of engineering profession such as Physics, Chemistry, Mathematics and Geography.

The Board has also put in place a mechanism to accommodate all fresh female graduate engineers into a Structured Engineers Apprenticeship Programme (SEAP) so that they acquire engineering competency and qualify for registration by ERB within three years.

Registration status of Engineers by Gender up to September 2005

Engineering Category	Number of Registered Engineers		
	Females	Males	Total
Consulting Engineers	2	162	164
Professional Engineers	42	2607	2649
Graduate Engineers	78	2528	2606
Technician Engineers	30	337	367
Graduate Technician Engineers	34	424	458
TOTAL	186	6058	6244



FEATURES

Technology Innovation, Development and Transfer : Where are we?

By Eng. Dr. Raphael, L. Matheo (COSTECH) Email: rmatheo@costech.org.tz

Every institution /enterprise /company, small /medium /large uses some process to choose the products it is going to develop or invest in the future. In smaller firms, where resources are scarce, this selection process is usually less formal. Larger firms often have the resources to formalize this process, but easily get bogged down by bureaucracy and uncertainties. Despite these hurdles, all technology firms understand the role of being innovative and staying ahead in developing new products for their survival.

The process by which these ideas are generated and then selected for development can be revealing. Even if these new ideas cannot be pursued now because of limited resources, it is better to have them prepared for the future when resources and opportunities do become available. Lack of technology development, innovation, low level of awareness and applications visibly manifests itself in terms of limited access to cleaner energy, safe water, efficient transport and communication, adequate shelter, food and medicines. One-way to bridge this divide is to "adapt and adopt" technologies to work in environments with limited support services. It is from idea development to market assessment, intellectual property protection to dissemination of that technology.

Technology Innovation Index and Innovation System

The technology index (TI) measures the capacity to innovate, acquire and disseminate technologies and penetration of information and communication technologies (ICTs). Countries are divided into two main groups: those that are core innovators and the non-core innovators. Core innovators are countries whose firms register at least 15 utility patents per million populations in the year under review while non-core innovators are countries whose firms register less than this minimum. Innovation plays a dominant role in the economic growth of core innovators while technology acquisition plays a dominant role for non-core innovators. Tanzanians are in a group of non-core innovators, our technology related patent register is almost zero and our score in technology acquisition is also low. This score reflects our low levels of technology acquisition and penetration. Therefore, there is a need to enhance mechanisms to promote technology innovation and transfer through coordination, facilitation and capacity building.

The "innovation system" - the amalgamation of organizations, laws and policies that pertain to innovation plays a key role. Intellectual property (IP) is a key component of any innovation system, because it grants an innovator or inventor an opportunity to be compensated for investment of time and resources that went into the creation of a new product or services.

It is important that the public in general, our institutions, researchers and innovators are made aware of this and where possible the institutions should establish the Institutional IP Policy and a technology transfer office to oversee IP related issues. In order to promote IP, the Tanzania Commission for Science and Technology (COSTECH) has been partially facilitating the establishment of the Institutional IP policy and of recent in collaboration with BRELA, has established the so-called IP-Forum, where stakeholders meet once a year to discuss IP related issues. Furthermore, COSTECH in collaboration with the Ministry of Science and Technology and Higher Education (MSTHE) is working on the revival of the Tanzania Association of Inventors (TAI) where innovators and inventors will have a platform to interact with stakeholders and discuss their developments and commercialization of their inventions.

Another key factor in an innovation system is the commitment by the public and private sector to avail funds for research and development activities. With the central Government pulling out of the productive activities and opting for the liberalized market economy, the private sector is ultimately responsible for the commercialization of technologies and bringing advances to the market place. Their participation at every stage in research and development (R&D) is crucial. Unlike developed countries, public research takes on a supporting role in the overall research framework while our research capacity is in public research organizations such as universities and government R&D institutions. Thus, it is essential to strengthen public-to-private technology development and transfer in order to boost national innovation.

Technology Transfer

In a simple language, technology transfer is a partnership between the researcher or the technology owner and the entrepreneur to commercialize research results or technology. Technology transfer process involves: Identification of technologies (endogenous or indigenous or imported) and preparation of technology dossiers; technology audit, which includes technology brokerage, technology test and customer needs assessment (audit).

An entrepreneur plays a critical role in the process, working in multi-disciplinary teams alongside a researcher asking questions of feasibility analysis for potential products: like, can products or services be created from the research results or technology? Are there customers for the products? Is there a market of sufficient size? Can products be distributed? Do calculations of sales, expenses and capital requirements make it a viable investment?

In Tanzania, among other constraints, we are lacking such entrepreneurs (risk takers) and our financial institutions have always shied away in technology related investments or have made capital returns very difficult because of high interest rates. Also, low level of awareness of available technologies has been a hindrance in promoting demand for technologies. There is a need for deliberate efforts to avail credits to technology investors by establishing special funding schemes and creation of public awareness through rigorous promotions, exhibitions, workshops, and establishment of science parks and incubator systems.

Tanzania Situation in Technology Development and Transfer

The role of technology development and transfer in Tanzania is mandated to COSTECH in terms of promotion, coordination and facilitation. The COSTECH has an established Centre for the development and the transfer of technology, which is mandated by The Act. No. 7 of 1986, to coordinate all technologies developed or imported into the country including choice and assessment of technologies and advice the Government accordingly. In coordinating technology development, COSTECH has established a network (MoU) of technology developers called 'Institutions Collaboration in Research and Technology Development' -ICRTD, formerly known as 'Sister Institutions Collaboration'. The founding members of this collaboration are: CARMATEC, TDTC T2 Centre (MoW), TEMDO, SIDO, TATC, TaTEDO, NHBRA, TIRDO and COSTECH. The membership is open to all interested parties through application and payment of membership fee. All these institutions are staffed with well experienced Consulting Engineers and Professional Engineers, who are potential technology developers. Coordination of technology development is very crucial

to avoid duplication of efforts and to share the meager resources available in the country. Through this kind of networking each institution does what it can do best and leaves other technologies to others. For example, among other technologies CARMATEC is at the top in rural energy technologies—biogas, windmill and institutional stoves; TDTC in new and novel technologies emanating from researchers; TEMDO in oilseed and post harvest processing technologies; SIDO in technology training using her extensive country-wide network and food processing; TATC in industrial and automotive machinery; TaTEDO in energy and environmental friendly technologies; NHBRA in building technologies and TIRDO in applied research and development in manufacturing and processing technologies. The Commission for Science and Technology is the coordinator and facilitator of activities related to technology development, innovation and dissemination by providing resources and training to the stakeholders.

Amid limited financial resources availed to our technology development institutions, the Commission believes that if these resources are coordinated and focused into few specific objectives they will make a big impact to our society and change the mind set of our people. We should also not forget to incorporate and modernize our indigenous technologies, which were developed by our forefathers and passed on to generation after generation. All in all, there is need to involve a private sector into technology development and dissemination for effective socio-economic development of our country. The ICRTD is inviting all interested parties in technology development from all sectors of the economy to join the collaboration and work as a team with a focused goal on 'Development, Dissemination and Application of Sustainable Technologies for Poverty Reduction'.

ENGINEERS' FORUM

Enjoy a good, comfortable and safe ride on the Wheel

By Eng. Tunzo T. Mnzava

Wheels and tires have been one of the greatest inventions the man ever did that have facilitated the communication and made it comfortable. The history goes back to 3500 B.C when man invented the Wheel! It is a history of success mixed with fates of prominent engineers. As you read, you will never fail to read of Charles Goodyear and Robert W. Thomson. Novice engineers will surely appreciate the role of evaluation of constraints in any engineering endeavor as is seen in this exegesis. The wheel has come a long way. For one thing it is no longer made of wood and it is guaranteed that the ride is much smoother. What hasn't changed is the fact that it is still one of man's greatest inventions. Could you imagine where we would be today without the wheel? The early engineers made a wheel that was very simple: a solid curved piece of wood. Later, leather was added to soften the ride.

As time progressed it became solid rubber, which led to today's tire—the pneumatic, or air inflated, radial tire. The first wheels made of metal or wood were very durable but did not provide a very comfortable ride. Early rubber did not hold shape; it would be sticky in hot weather and become inflexible in the cold. There were many individuals that made contributions in creating the tire as we think of it today for example Charles Goodyear on vulcanization. In 1839 Charles Goodyear was credited with the discovery of the vulcanization process. Vulcanization is the process of heating rubber with sulfur. This transforms sticky raw rubber to firm pliable material, which makes rubber a perfect material for tires. The story of Charles Goodyear is a sad one. Although he dedicated his entire life to making rubber a better form, he never profited from all his work and he died bankrupt. Forty years later, a rubber company honoured his hard work by using his name for their new tire company. Solid Rubber Tires soon after the discovery of vulcanization were made out of solid rubber.

These tires were strong, absorbed shocks and resisted cuts and abrasions. Although they were a vast improvement, these tires were very heavy and did not provide a smooth ride. Today there are still types of tires made of solid rubber, examples are:

Pneumatic Tires:

The pneumatic tire uses rubber and enclosed air to reduce vibration and improve traction. Robert W. Thomson, a Scottish engineer, first patented the air-filled tire. Unfortunately the idea was too early for its time and was not a commercial success. In 1888 John Boyd Dunlop of Belfast, Ireland, became the second inventor of the pneumatic tire. Dunlop claimed to have no knowledge of Thomson's earlier invention. The second time around, the pneumatic tire caught the public's attention. The timing was perfect because bicycles were becoming extremely popular and the lighter tire provided a much better ride.

Bias Ply Tires:

For the next fifty years, vehicle tires were made up of an inner tube that contained compressed air and an outer casing. This casing protected the inner tube and provided the tire with traction. Layers called plies reinforced the casing. The plies were made of rubberized fabric cords that were embedded in the rubber. These tires were known as bias ply tires. They were named bias ply because the cords in a single ply run diagonally from the beads on one inner rim to the beads on the other. However, the orientation of the cords is reversed from ply to ply so that the cords crisscross each other. Today one can still find bias-ply tires as authentic equipment for antique and collector cars, as well as for certain types of off-the-road tractor tires.

Radial Tires:

The first introduced steel-belted radial tires appeared in Europe in 1948. Radial tires are so named because the ply cords radiate at a 90-degree angle from the wheel rim, and the casing is strengthened by a belt of steel fabric that runs around the circumference of the tire. Radial tire ply cords are made of nylon, rayon, or polyester. The advantages of radial tires include longer tread life, better steering and less rolling resistance, which increase gas mileage. On the other hand, radials have a harder riding quality, and are about twice as expensive to

make. In order to have good mileage, safety and comfort in your vehicle, the following must be observed:

❖ Proper inflation:

Under inflation can cause:

- ❑ Reduction in treads life due to excessive heat.
- ❑ Heat build up can cause the tire body to deteriorate and result in separation of the tread from the body or belt ply. Heat is generated in tires due to flexing.
- ❑ A soft tire over-deflects which can cause fatigue breaks in the body cords.
- ❑ Cracks in the body construction.
- ❑ Can cause its mate (for duals) to be overloaded and so fail.

Over inflation can:

- ❑ Cause tires to run hard and make them more vulnerable to impact and other road hazard damage. Since the tire is hard, it does not absorb road shocks as well which can cause body breaks, cuts snags or punctures.
- ❑ Increase stresses on the rim and hence risks of rim failure.
- ❑ Cause irregular wear.

❖ Maintaining a good condition of the vehicle.

It is advisable to occasionally check your car's suspension and other parts of the vehicle especially if you are driving on bad roads. Correct wheel alignment of your vehicle will ensure that it drives straight down the road and will also ensure that the tires on your vehicle wear evenly and are not removed prematurely as a result of irregular wear. This will also increase fuel economy.

❖ Proper loading of the vehicle.

Breakdown of tire casing can also arise from overloading so never overload your tires. The maximum load and inflation pressure of the tires are molded into the sidewall. Also remember that a tire is capable of carrying the maximum load only if it is inflated to its maximum air pressure.

❖ Inspection.

Tires should be inspected for any visible defects like stones in the grooves, nails in the treads regularly especially before long trips.

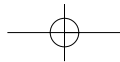
FACTS ABOUT AIDS

"Campaigns against HIV/AIDS should go beyond 'Abstinence, Being faithful and Condom (ABCs)' strategy because it was proving ineffective". Dr. J. Temba, the Director of Policy and Planning TACAIDS, recently highlighted this during the conference for the Regional and District Aids Coordinators. He said that, for the past 20 years the number of HIV/AIDS patients, deaths and orphans had been increasing daily. He pointed out that according to available data, 50% of HIV/AIDS victims were among married couples. In the same workshop, it was also revealed by the official from the Ministry of Health that HIV virus tends to change and develop resistance to drugs. Therefore creativity is needed to ensure that HIV/AIDS messages reach every person at the grassroots level. Let us try another ABC technique that is Adult Behaviour Change !

Reminder: **"DO YOUR PART, TOGETHER WE SHALL WIN"** - TACAIDS

More details: www.thebody.com, www.unaids.org, www.aids.org





MASUMIN PRINTWAYS AND STATIONERS



ARCHITECTURAL STATIONERS

Drawing pen, drawing ink, drawing stencils, french curves, templates, drawing tables A2, A4, A3, A0, A1, plotter sheets A2, A1, plotter rolls A1/A0 and Plotter cartridges.

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Use of Stickers and Standard Site Instruction Books at Construction Sites

Bulk Rate
 Tanzania Postage Paid
 Dar es Salaam

The Engineers Registration Board has introduced ERB Stickers and Standard Site Instructions Books for use at all Construction Sites to be designed and/or supervised by Registered Engineering Consulting Firms as one of the strategies of strengthening the monitoring of engineering activities in the construction industry.

In this regard all registered Consulting Engineers are therefore urged to make sure that all the Signboards for all Project Sites they supervise bear the stickers and that all engineering instructions are issued in the standard site instruction books. These tools are available from the offices of the ERB Secretariat at a fee of Tsh 50,000/= and 10,000/= for sticker and site instruction book respectively. The buying of the sticker is subject to approval of the Consulting Engineer and Firm by the Board that will be done after assessing the details filled in the Application Form Number M-01. The Application form is obtained at a processing fee of Tsh 5,000/=. The engineering community is hereby notified that this move is intended at placing the roles and responsibilities of engineers in the

construction industry into the hands of engineers. In view of this, there is need for all engineers to support it by doing what the law requires and play the role of advocacy to other parties in the projects and the general public. Engineers themselves should again understand the separation of their duties and the separation of responsibilities amongst the engineering registration categories. Engineers should abide to the contents of the ERB Regulations 1999 and the Code of Conduct and Ethics for Engineers.

The general public is reminded that it is illegal to use the services of unregistered engineers.

