KeSEBAE NEWS

Newsletter of the Kenya Society of Environmental, Biological and Agricultural Engineers

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Dairy Engineering

By: Luke Oremo

Eng. Prof. Lawrence Gumbe, Eng. Richard Kanui, Eng. Shiribwa Mwamzali and Eng. Kennedy Makudiuh in a Photo with Graduate Engineers who attended the Workshop Training Professional Registration Training for Graduate Engineers. Held at Burch's Resort, Naivasha from 5-9 June 2023.

Dairy engineering is a branch of engineering that focuses on the design, manufacturing and operation of dairy processing plants and equipment. It involves the application of engineering principles and techniques to various aspects of the dairy industry, including milk production, processing, storage and distribution. Dairy engineering encompasses several key branches that address different aspects of dairy processing and its relevance to the modern world. Here are some of the significant branches of dairy engineering and their importance:

Processing Engineering: Processing engineering focusses on designing, optimizing and controlling the various stages of dairy processing.

DEAR READER

Welcome to KeSEBAE Newsletter.

A fortnightly Newsletter touching on topical issues affecting our environment.

KeSEBAE NEWS is a Newsletter of the Kenya Society of Environmental, Biological and Agricultural Engineers (KeSEBAE)

Inside this Issue!

It involves developing efficient processes, selecting appropriate equipment and implementing automation and control systems. Processing engineering is crucial in the modern world as it enables the production of high-quality dairy products with enhanced efficiency, reduced waste and improved resource utilization.

Food Safety and Quality Assurance: Ensuring food safety and maintaining product quality are crucial in the dairy industry. This branch of dairy engineering involves implementing and monitoring quality control systems, conducting risk assessments and developing strategies to comply with food safety regulations. In the modern world, with increased consumer awareness and stricter regulations, the expertise of dairy engineers in food safety and quality assurance is essential for maintaining consumer trust and meeting regulatory standards.

Dairy Product Development: Dairy product development focuses on creating new dairy products, improving existing products and incorporating innovative ingredients and formulations. Dairy engineers work closely with food scientists and technologists to develop products that meet consumer preferences, nutritional requirements and market demands. This branch of dairy engineering is relevant in the modern world as it addresses the need for product diversification, catering to changing consumer trends and expanding the range of dairy alternatives.

Dairy Plant Design and Layout: Dairy plant design involves planning and designing the layout of dairy processing facilities. It considers factors such as workflow optimization, equipment selection, energy efficiency and compliance with hygiene and safety standards. In the modern world, dairy plant design is important for creating sustainable and efficient processing facilities that minimize environmental impact, improve productivity and ensure worker safety.

Automation and Robotics: Automation and robotics have revolutionized the dairy industry, improving efficiency, product consistency and worker safety. Dairy engineers play a key role in integrating automation technologies and robotic systems into dairy processing plants. This branch of dairy engineering is highly relevant in the modern world as it addresses the need for increased productivity, reduced labour dependency and improved precision in dairy processing operations.

Sustainability and Environmental Engineering: Environmental sustainability is a growing concern in the dairy industry. Dairy engineers specializing in sustainability and environmental engineering focus on developing eco-friendly practices, reducing energy and water consumption, managing waste effectively and exploring renewable energy sources. This branch of dairy engineering is crucial in the modern world as it addresses the need for sustainable and environmentally conscious dairy production to mitigate the industry's impact on the environment.

Research and Innovation: Research and innovation are integral to the advancement of dairy engineering. Dairy engineers collaborate with scientists, researchers and industry experts to explore new technologies, develop novel processing methods and address emerging challenges. This branch of dairy engineering is relevant in the modern world as it drives continuous improvement, fosters

technological advancements and encourages sustainable practices in the dairy industry.

These branches of dairy engineering collectively contribute to the modernization and progress of the dairy industry. They enable the development of safe, high-quality products, while also addressing the evolving needs of consumers, sustainability concerns and the technological advancements shaping the world today. The study of dairy engineering covers the following: Sanitary pipes, fittings and milk handling equipment; Bottle and cans washing and CIP (Cleaning in Place) cleaning equipment; Separation equipment; homogenizers; Pasteurizers; Sterilizing and packing equipment; Filling equipment and Mixing and agitation equipment.

The dairy engineering sector has undergone significant advancements over the years, driven by technological innovations, scientific research and the need for increased efficiency and productivity in dairy processing. Some of the major advances made in the dairy engineering sector include:

Milk Processing and Pasteurization: The development of sufficient milk processing techniques, such as pasteurization, has greatly enhanced the safety and shelf life of dairy products. Pasteurization involves heating milk to kill harmful bacteria while preserving its nutritional quality. Continuous pasteurization systems, high-temperature short-time (HTST) pasteurization, and ultra-high-temperature (UHT) processing are some advancements in this area.

Membrane Filtration Technologies: Membrane filtration techniques, including microfiltration, nanofiltration and reverse osmosis, have become indispensable in the dairy industry. These technologies enable the separation of milk components based on size or molecular weight, leading to the production of products like skim milk, whey protein concentrates and lactose-free milk.

Dairy Product Innovation: The development of mew dairy products and formulations has expanded consumer choices and increased market competitiveness. Advances in dairy product formulation have led to the creation of functional foods, such as probiotic yoghurts, lactose-free products and low-fat dairy alternatives. These developments have catered to evolving consumer preferences and dietary requirements.

Energy Efficiency and Sustainability: The dairy industry has made significant strides in improving energy efficiency and reducing environmental impact. Energy-efficient equipment, heat recovery systems and renewable energy sources, such as solar panels and biogas are being adopted to reduce energy consumption and greenhouse gas emissions. Waste management and water conservation practices have also been implemented for sustainable dairy production.

Milk Quality and Safety Assurance: Ensuring milk quality and safety is of paramount importance in the dairy industry. Advances in dairy engineering have contributed to the development of advanced milk testing and quality assurance methods. Rapid microbial testing, automated milking systems with built-in quality monitoring and stringent hygiene practices have enhanced milk safety and reduced the risk of contamination.

Data Analytics and Digitalization: The application of data analytics, machine learning and digitalization has gained traction in the dairy industry. Dairy farms

and processing plants are implementing sensor technologies, real-time monitoring systems, and data-driven decision-making processes. These advancements help optimize milk production, track product quality and improve overall operational efficiency.

These are just a few examples of the major advances made in the dairy engineering sector. The ongoing technological developments in automation, process optimization, sustainability and product innovation continue to shape and enhance the dairy industry, improving product quality, efficiency and consumer satisfaction.

Workshop Training Professional Registration Training for Graduate Engineers

The Ministry of Agriculture and Livestock Development's State Department for Crop Development is actively involved in providing capacity-building mentorship and platforms for graduate engineers to gain practical experience in preparation for transitioning to professional engineers, as well as supporting growth in the engineering sector.

In recognition of the Board's efforts to accelerate the transition of Graduate Engineers (GEs) to Professional Engineers (PEs), KeSEBAE, in collaboration with the Ministry of Agriculture and Livestock Development, organized a training workshop for 31 GEs from June 4-9, 2023, at Burch's Resort in Naivasha. The workshop aimed to provide exposure on how to apply practical engineering work through case studies and put it in the right report format, help graduate engineers understand professional ethics and standards of professional registration in engineering, provide specialized knowledge according to the projects they have chosen for registration, meet the requirement for continuous professional development by providing the trainees with certificates of attendance, provide a mock presentation that would give the graduate engineers confidence and knowledge of how the Engineers Board of Kenya (EBK) interview is conducted, and inform the graduate engineers of the tools they need for professional registration, including project reports, training and experience reports, drawings, among others.

The training was conducted through training sessions where relevant subjects related to the registration of professional engineers were presented by trainers, including the necessary requirements, ethics, and standards as outlined in the Engineers Act of 2011. Trainees were given ample time to work on their pending projects using the format and lessons provided during the training process. To enhance their skills, trainees participated in mock presentations of their Training and Experience reports and Project reports in the presence of other trainees and senior engineers. Throughout the training sessions, the trainers encouraged trainees to participate in questions and answers, creating an interactive approach to learning that helped to clarify any doubts or queries they had about the training subjects, ensuring that the trainees were fully engaged and actively involved in the training process.

The workshop covered various modules of discussion, including Engineering, Professionalism and Licensing, The Scheme of Service and Role of Engineers in the Ministry of Agriculture, Purpose, History and Registration of Engineers, Formal Content Structure, Competence Standards for Professional Assessment, Professional Registration Process, Preparation of Engineering Drawings and Bills of Quantities, Case Study: Design Aspects in Process Engineering, Preparation for Professional Interview and Professional Ethics and Professionalism for Engineers.

Small Scale Irrigation and Value Addition Project (SIVAP)

Ministy Of Agriculture And Livestock Development
State Department Of Crops Development
Small Scale Irrigation And Value Addition Project (SIVAP)
At Lake Naivasha Burch's Resort, 4th-9th June 2023

Eng. Prof. Lawrence Gumbe, Eng. Richard Kanui, Eng. Shiribwa Mwamzali and Eng. Kennedy Makudiuh in a Photo with Graduate Engineers who attended the Workshop Training Professional Registration Training for Graduate Engineers. Held at Burch's Resort, Naivasha from 5-9 June 2023.

Women Engineering Chapter of KeSEBAE was Well Represented at the Workshop Training Professional Registration Training for Graduate Engineers. Held at Burch's Resort, Naivasha from 5-9 June 2023.

Steve Matiti (left) and Audrey Magina (right) doing a Mock Presentation Workshop Training Professional Registration Training for Graduate Engineers. Held at Burch's Resort, Naivasha from 5-9 June 2023.

AfroAgEng

Kenya Society of Environmental Biological and Agricultural Engineers

JOINT INTERNATIONAL ANNUAL CONFERENCE 2023

THEME: Engineering Agenda 2063: The Africa We Want

AGENDA 2063 is Africa's blueprint and master plan for transforming Africa into the global powerhouse of the future.

Wed 6 – Fri 8 Dec 2023

Nairobi

EARN 20 CPD POINTS

SUB-THEMES

1. Seamless connections (Roads, Railways, Air Transport and Water Transport)
2. Energy for Africa
3. Industrialized Agriculture
4. Housing
5. Free Trade in Services
6. Security
7. Sustainable Environment
8. Engineering Education and Practice

KEY DATES:

Abstract Submission: 11 Oct 2023
Paper Submission: 10 Nov 2023
Payment Deadline: 25 Oct 2023

CHARGES

Members: KES 15,000 ($150)
Non Members: KES 20,000 ($200)
Undergrad Students: KES 2,000 ($20)
Field Visit: KES 5,000 ($50)
Virtual: KES 5,000 ($50)

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Call for Papers

To the Next Editions of the JEAE

JEAE

Journal of Engineering in Agriculture and the Environment

The Journal of Engineering in Agriculture and the Environment (JEAE) is a Publication of the Kenya Society of Environmental, Biological and Agricultural Engineers (KeSEBAE) through which researchers in the fields of Environment, Agriculture and related fields share research information and findings with their peers from around the globe.

The JEAE Editorial Board wishes to invite interested researchers with complete work in any relevant topic, to submit their papers for publication in the next editions of the Journal.

Manuscripts may be submitted online or via email to:

Prof. Lawrence Gumbe, Chairperson, JEAE Editorial Board
Via Email: info@kesebae.or.ke or online via: https://www.kesebae.or.ke/journal/manuscript_submit.php

Criteria for Article Selection

Priority in the selection of articles for publication is that the articles:

a. Are written in the English language
b. Are relevant to the application of engineering and technology in agriculture, the environment and biological systems
c. Have not been previously published elsewhere, or, if previously published are supported by a copyright permission
d. Deals with theoretical, practical and adoptable innovations applicable to engineering and technology in agriculture, the environment and biological systems
e. Have a 150 to250 words abstract, preceding the main body of the article
f. The abstract should be followed by the list of 4 to 8 "Key Words"
g. Manuscript should be single-spaced, under 4,000 words (approximately equivalent to 5-6 pages of A4-size paper)
h. Should be submitted in both MS word (2010 or later versions) and pdf formats (i.e., authors submit the abstract and key words in MS Word and pdf after which author uploads the entire manuscript in MS word and pdf)
i. Are supported by authentic sources, references or bibliography

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CALL FOR ARTICLES TO KeSEBAE NEWS

KeSEBAE NEWS Editorial wishes to call for topical articles for publication in future editions of KeSEBAE NEWS.

Please transmit the same to the **Editor: Ezekiel Oranga** via Email: info@kesebae.or.ke

NOTE: A payment will be made to the author of each selected article

CALL FOR MEMBERSHIP

Be a KeSEBAE Member:

The annual subscription fees, admission fees and reinstatement fees for members of all grades (except Honorary and Life Members who shall pay no dues or fees) are indicated below: The annual dues are as follows:

Membership Category	Annual Subscription (KES)	Admission Fees (KES)	Reinstatement Fees (KES)
Fellow	5,000	1,000	2,000
Member	2,000	1,000	2,000
Ass.Member	1,000	1,000	2,000
Aff.Member	500	1,000	2,000
Student	300	100	-

Membership Renewal

Members of all grades are requested to renew their **2022 membership as follows.**

Membership Category	*Annual Subscription Fee (KES)*
Fellow	**5,000**
Member	**2,000**
Ass. Member	**1,000**
Aff. Member	**500**
Student Member	**300**

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Currency	**Kenya Shillings**

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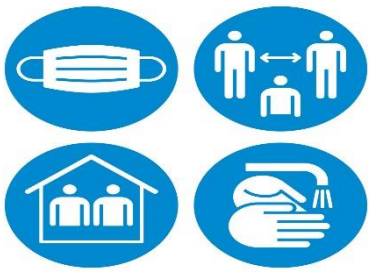

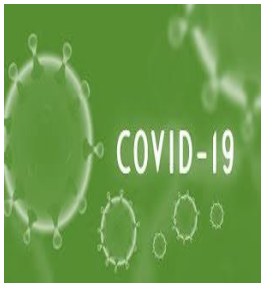

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