

<p style="text-align: center;">KLM Technology Group</p> <p style="text-align: center;">Practical Engineering Guidelines for Processing Plant Solutions</p>	<table border="1" style="margin: auto;"> <tr> <td style="text-align: center; vertical-align: middle;">KLM</td> <td style="text-align: center; vertical-align: middle;">Technology Group</td> </tr> </table> <p style="text-align: center;">Engineering Solutions Consulting, Guidelines, and Training</p> <p style="text-align: center;">www.klmtechgroup.com</p>	KLM	Technology Group	<p style="text-align: center;">Page 1 of 9</p> <p style="text-align: center;">Rev 1.1</p>
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Palm Oil Plantation Management Training Course

Importance of Palm Oil

Palm oil is an incredibly efficient crop, producing more oil per land area than any other equivalent vegetable oil crop. Globally, palm oil supplies 40% of the world's vegetable oil demand on just under 6% of the land used to produce all vegetable oils. To get the same amount of alternative oils like soybean, coconut, or sunflower oil you would need anything between 4 and 10 times more land. Furthermore, there are millions of smallholder farmers who depend on producing palm oil for their livelihoods.

Course Introduction

The success of every company depends on each employee's understanding of the key business components. Employee training and development will unlock the companies' profitability and reliability. When people, processes, and technology work together as a team developing practical solutions, companies can maximize profitability and assets in a sustainable manner. Training and development are an investment in future success - give yourself and your employees the keys to success.

It is strategically important that your team understands the fundamentals of palm oil plantation management concepts. This is the difference between being in the best quartile of operational ability and being in the last quartile. There is vast difference in the operational ability of operating companies and most benchmarking studies have confirmed this gap in operational abilities.

Whether you have a team of new or seasoned employees, an introduction or review of these concepts are very beneficial in closing the gap if you are not in the best quartile or maintaining a leadership position. Most studies show that a continuous reinforcement of best practices in operational principles is the most effective way to obtain the desired results. Training and learning should be an ongoing continuous lifelong goal.

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Course Objective

This course will guide the participants to develop key concepts and techniques for Palm Oil Plantation Management. These key concepts can be utilized to make operating decisions that can improve your unit's performance and profitability.

Many aspects of Palm Oil Plantation Management can be improved including product recoveries, better fruit and energy utilization, and safety. This cannot be achieved without first an understanding of basic fundamental principles of crops management and operation.

This seminar focuses on the core building blocks of Palm Oil Plantation Management. This program will emphasize management fundamentals, safe utilization of these fundamentals by operations, engineering, maintenance, and support personnel.

Course Duration and Delivery

A typical course duration is 3 to 5 days based on the background of the participants. One of our Senior Technical Professional with over 25 years of experience would lead the class. Instruction can be in a regional seminar, in house or in an online webinar.

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Syllabus

Introduction

- The Global Oils and Fats Markets

Review of Process Incidents

- Safety for the Processing Industry

Fundamentals of Oils and Fats Chemistry

- Description of Oil and Fats Molecules
- Composition and Structure
- Minor Constituents of Oils and Fats
- Typical Specifications

Sustainability

- Role of Oil and Fats in Sustainability
- Net Zero Green House Gas Emissions
- Pillars of Sustainability
- Palm Oil Sustainability
 - Growing the crop in plantations (oil palm or any farming) cannot be completely environmentally friendly; still, its negative cultivation effects can be minimized.
 - Palm Oil Industry sustainability can be achieved through governmental guidance and the joint efforts of palm oil growers, manufactures, and end consumers.

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Palm Oil Productivity

- Tree Species
 - The oil palm tree (*Elaeis guineensis*)
 - dura – with a thick shell (2-8 mm);
 - pisifera – with no shell;
 - tenera – a hybrid of the above two.
- Soil Type
 - The best soil types for the crop's cultivation are loamy or alluvial well-drained earths:
 - at least one meter deep for root development;
 - rich in organic matter;
 - with pH 4.0 to 6-8.0;
 - having sufficient soil moisture.
- Climate Conditions
 - The plant is tropical, so it grows best in stable-warm areas with sufficient soil moisture all year round.

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Management

- Preparation of Seeds
 - Oil palms for plantations are typically propagated with seeds taken from fruits. Seed treatment is a responsible stage in oil palm cultivation and management because improperly prepared seeds will germinate after a couple of years due to long dormancy time.
- Field Preparation, Spacing, And Planting
 - Oil palm cultivation needs soil preparation before planting. The plantation soil should be fertilized with well-decomposed organic matter and cleaned from weeds. Plantation tilling improves the soil structure.
 - To get a good yield from cultivation, oil palm trees must be planted at the right density. The plant sprouts are spaced in a triangular pattern with enough spacing for growing (9x9x9 m) in pits about 60 cm³. This planting method allows placing around 145 plants per hectare.
- Benefits Of Intercropping and Cover Cropping in Plantations
 - During the first three years after planting, the land use can be intensified with intercropping or cover cropping. Thus, plantation owners can get additional yields and cattle forage prior to the cash crop will fruit. However, operations and movement of oil palm plantation machinery for intercropping must not disturb the cash crop's roots.

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Cultivation Practices

- Water Needs and Irrigation
 - The plant can resist several-month droughts, yet the yields will significantly drop. For this reason, oil palms grow under natural rainfalls, with compensating irrigation when rain-fed soil moisture in plantations is not enough.
- Mulching In Oil Palm Cultivation
 - Base mulching helps retain soil moisture and creates a favorable microclimate for plant growing. Additionally, it suppresses weeds in oil palm plantations. Male flowers, coconut husk, empty bunches, straw, leaves can serve as natural mulch material in cultivation.
- Pollination In Oil Palm Plantations
 - The plant's pollination occurs with the help of *Elaeidobius kamerunicus* and wind. However, mere wind pollination is not enough; this is why the insects are released on plantations after 2.5-3 years of tree growing
- Flowering and the Necessity of Ablation
 - The palm oil tree bursts into bloom at the age of 14-18 months. Yet, for better growing and strong vegetation, it is necessary to cut or pull both male and female flowers off the trees during the first 2-3 years of plant cultivation.

Weed Management

- Weed species in oil palm groves are quite diverse: a topic study counted 136 varieties.

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Protection Against Pests or Infestations In The Development Of Oil Palm

- The plant typically suffers from rhinoceros beetles, bagworms, red palm weevils, mealybugs.
- Widespread oil palm tree diseases are rots and wilts:
- Efficient pest and disease control in plantations strongly depends on early problem identification and timely response

Oil Palm Plantation Fertilizer Guidelines

- Efficient plant cultivation is secured with a sufficient supply of macro and micronutrients, including nitrogen, potassium, phosphorus, magnesium, etc. With a lack of nutrients, adequate growing is impossible.
- The crop doesn't typically suffer from deficiency of Fe, Zn, Mn, or Cu in acid soils. However, a lack of boron may cause foliage malformations, including small, "fish-bone", stiff, and hooked leaves.

Yielding And Harvesting In The Cultivation Method For Oil Palm

- Oil palm growers can expect yields after three years of growing.
- Harvesting machines are a more productive and less labor-consuming option to manual picking in plantations.
- Harvesting rounds in plantations are repeated about every 10 to 14 days,

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Who Should Attend:

- People who are making day to day decisions regarding operation, design, and economics of Palm Oil Plantations.
 1. 1st Line Operations personnel,
 2. Operation Supervisors,
 3. 1st Line Maintenance personnel,
 4. Maintenance Supervisors,
 5. Senior Plant Supervisors,
 6. Operations Engineers
 7. Process Support Engineers,
 8. Design Engineers,
 9. Cost Engineers
 10. Environmental Professionals
 11. Chemist
 12. Sales and Marketing Specialist

- Ideal for veterans and those with only a few years of experience who want to review or broaden their understanding in Palm Oil Plantations Operations.

- This is an opportunity for new plant personnel and for those who are experienced to meet and discuss current problems and learn how to enhance their operations.

- The course material will also serve as a useful reference for processors, product formulators, chemists and technicians as well as business managers familiar with oils and fats processing, and the production of finished products.

- Other professionals who desire a better understanding of subject matter

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What you can expect to gain:

- A detailed overview of Palm Oil Plantation operations, and processes
- Gain an understanding of the Issues and Problems in Palm Oil Plantations
- Gain and understanding of Fertilizer needs and optimization
- Gain an insight to optimization strategies