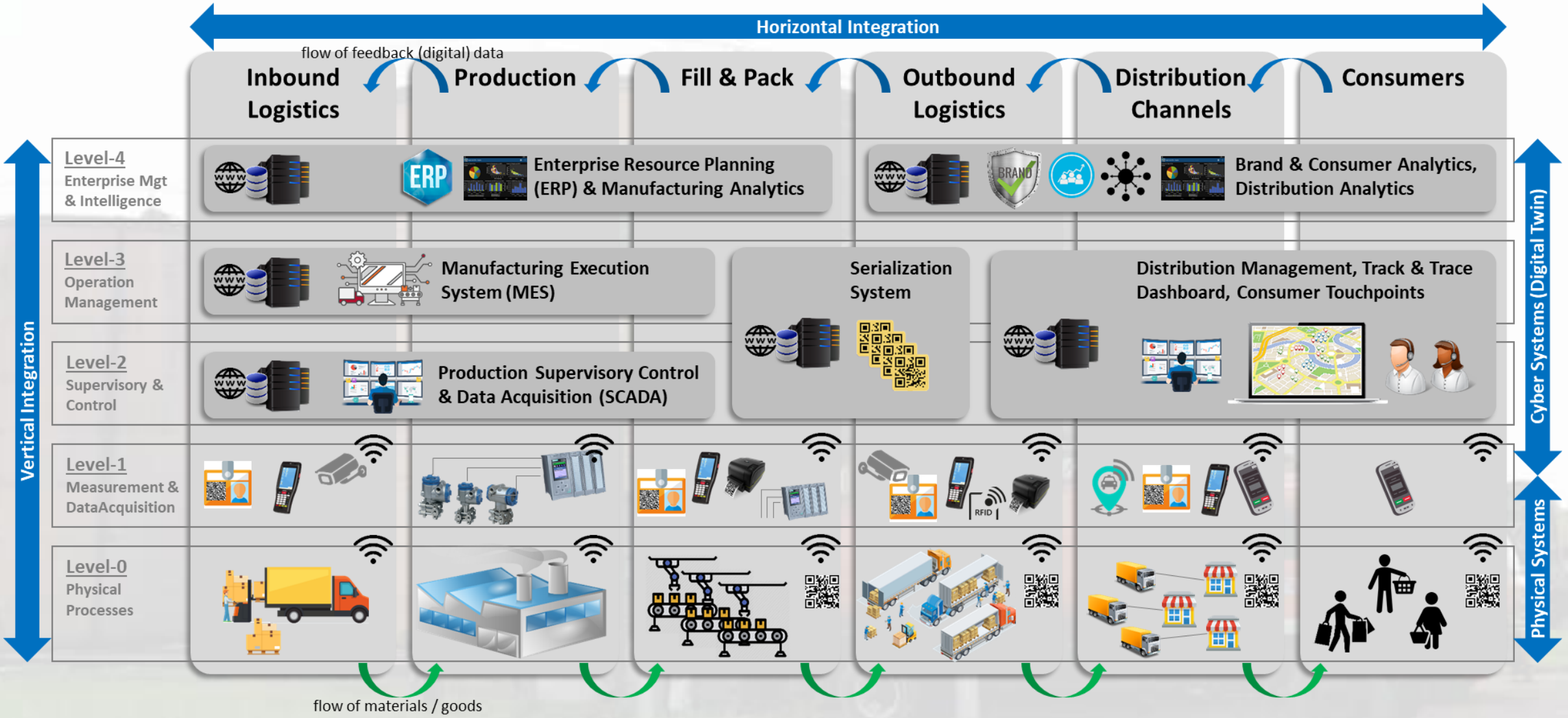
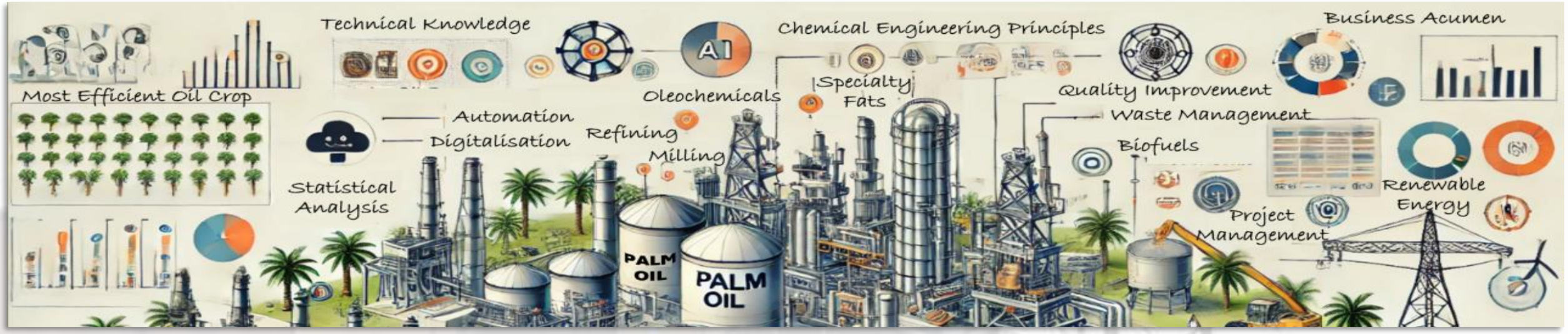
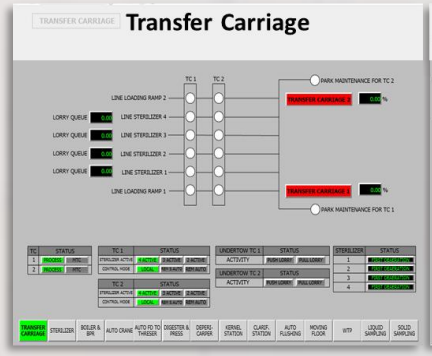
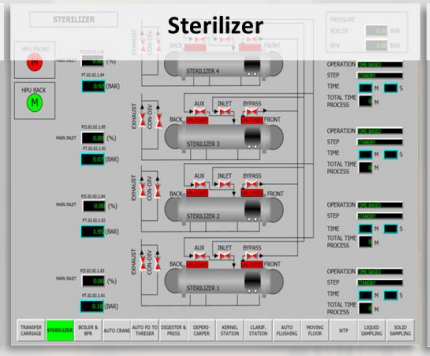
Integrasi Vertikal & Horizontal untuk Otomasi PKS

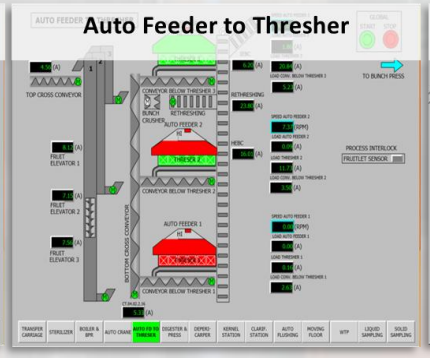


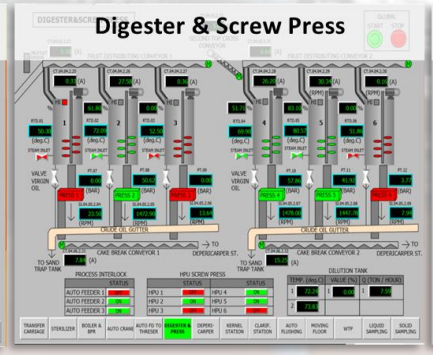
Arsitektur Supervisory Control & Data Acquisition (SCADA), Visualisasi & Kendali Otomatis Proses

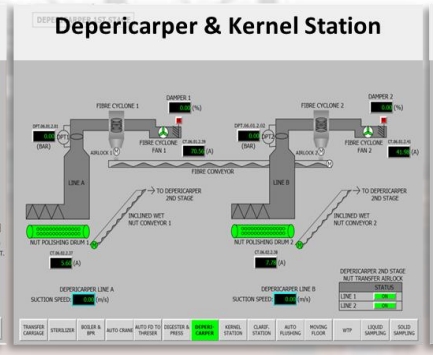


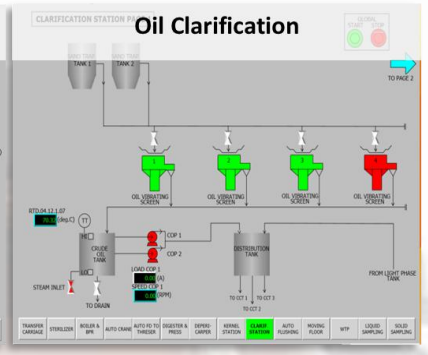




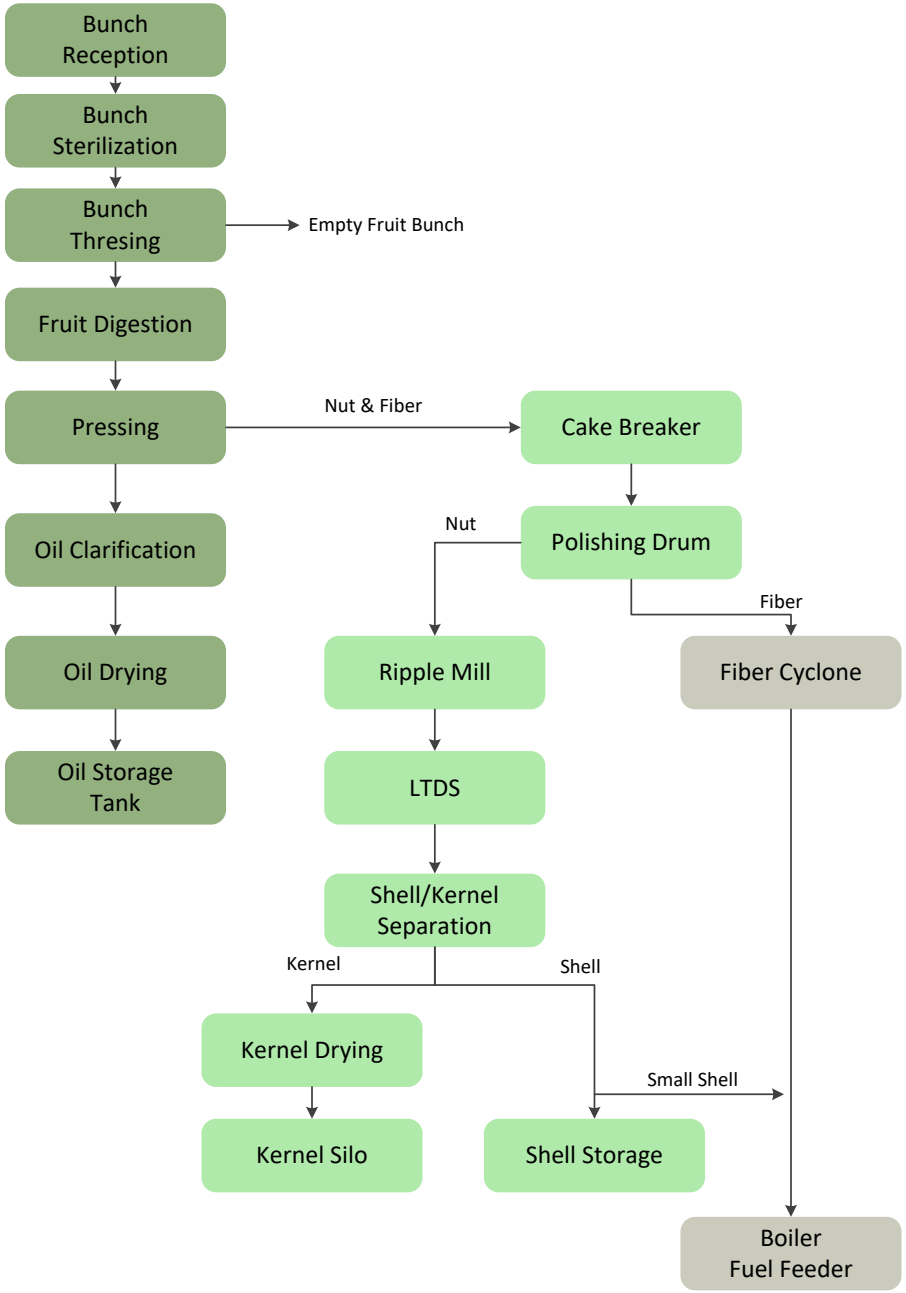




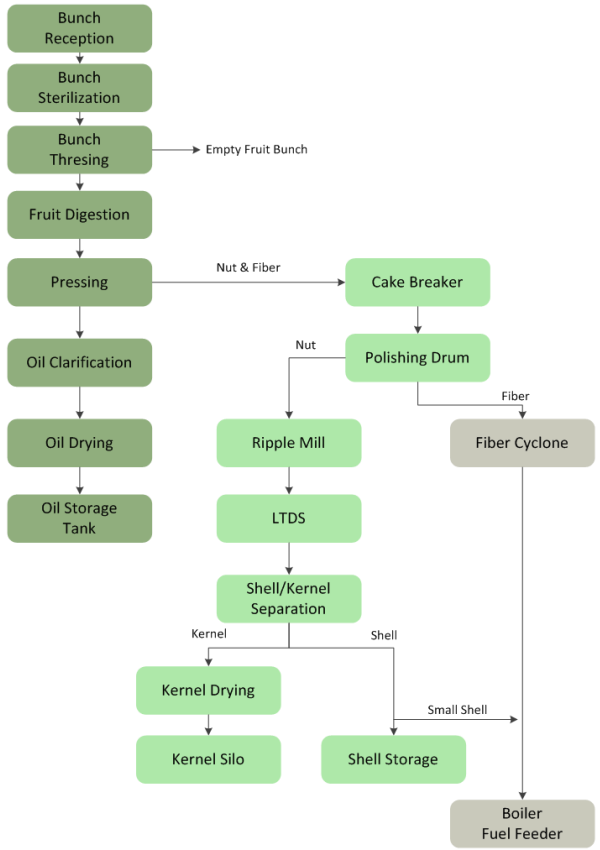




Palm Oil Milling Process



Palm Oil Milling Process



A. Indexer dan Transfer carriage

Tipical Transfer Carriage using Hydraulic Indexer, complete with sensor, control system and actuator. Fully-automatic operation is depend on mechanical instalation.

- Mechanical installation shall be precise/aligned and reliable to transfer FFB cage safely
- **Diagnosis & interlock system** shall be implemented in control system to detect any mechanical problem (not aligned, high load, etc)

B. Sterilizer Station

1. Tipical Palm Oil has 2 (two) or more Sterilizer and using *Triple peak method to process FFB*. Automation System shall control high demand steam for any combination steam cycle.
   - Control steam BPV (make-up valve) shall responsive for steam demand. Valve sizing is important to calculate steam flow.
   - Automatic timer shall be programmed in control system based on steam-demand cycle.

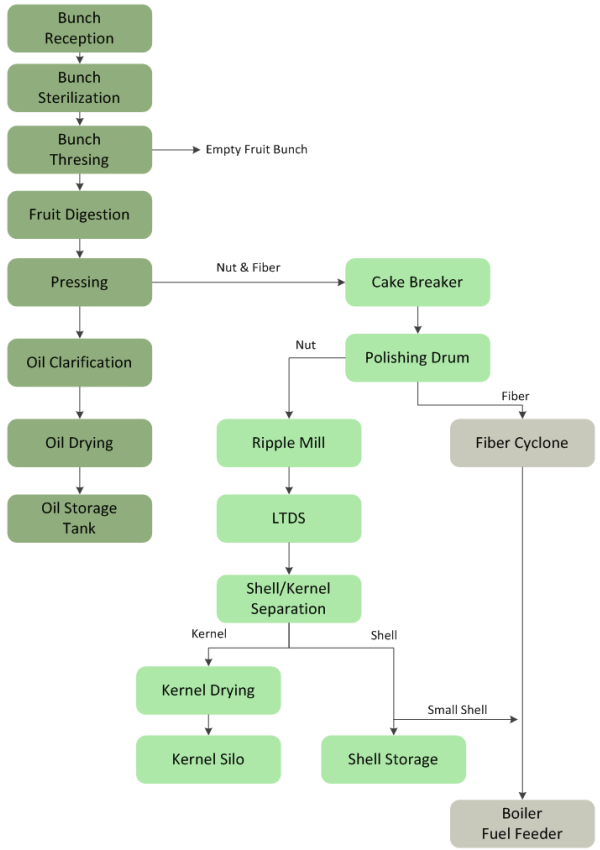
C. Treshing Station

1. Recommended using Variable Speed Drive (VSD)/Inverter to control motor speed for Autofeeder to achieve load balance between Threser and Digester.

D. Screw Press & Digester

1. Recommended to control sliding Gate inlet digester, Motor screw complete with VSD, Self-regulated valve for steam inlet and regulated cone press to achieve full-auto operation.
   - Proper design and Mechanical installation for instrument is important to achieve accurate measurement (limited space & restricted by digester blade)
   - Cascade Control mode shall be implemented to control screw press (cone press & speed motor) and shall be tuned properly to achieve optimal oil extraction (losses oil vs kernel)
   - Level and temperature control also shall be implemented to digest palm fruit properly.

Palm Oil Milling Process (continued)



E. Clarification Station

1. Recommended to control Skimmer motor, level interface (oil-water), to achieve full-auto operation.
   - Proper design and Mechanical installation for instrument is important to achieve accurate measurement (limited space & restricted by agitator blade)
   - Level control shall be implemented based on level interface in the Clarifier tank, to control fluid level in certain level ration (oil-water/mixture)

F. Liquid sampling

1. Challenge: heavy phase/slurry/solidify (sampling line length & intermittent sampling operation), will block sampling tube/pipe.
2. Proper design and mechanical installation is important, recommendation:
   - Sampling pipe/tube using large diameter and shall be flushed after sampling
   - Add heating element (electric heater/steam trace)

G. Fiber Cyclone & LTDS

1. Recommended to control vacuum pressure and speed of fiber cyclone
   - Proper design and implementation of control system will achieve optimum separation of nut/kernel, fiber and other impurities.

Automation Objectives (continued)

More Samples of Automation Objectives (in Palm Oil Milling) …

- **Increase Productivity / Efficiency for Transfer**, automated and interconnected process, minimize waiting time due to human interaction
- **Product Optimization**, monitor and control mill operation, enable to analyze and tuning process parameter

  For example, pressure control for Screw Press to achieve optimum oil extraction
  - *Less pressure, less output yield*
  - *More pressure, kernel will crack/damaged*
- **Help Plant Maintenance**, records running hours and trip/breakdown/alarm to help design and implement Preventive Maintenance operation
- **Plant Operation Safety** (*zero accident*), minimize human interaction and occupancy in the production floor
- **Effective incident management / Alarm Management** , designed to have interlock / safety functions (alarm) to eliminate or reduce hazards