AUTOMATIC CRUDE PALM OIL DILUTION PROCESS CONTROL SYSTEM

FATAH YAH ABD MANAF; ANDREW YAP KIAN CHUNG; N RAVI MENON and ZAID YASIR

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Basic milling technology related to crude oil dilution control has not made significant advances in the last 25 years. Currently, there are no reliable methods of maintaining the oil to crude palm oil ratio and in actual practice most mills do not alter dilution control with widely fluctuating mill throughputs. Crude palm oil that is discharged from the presses is highly viscous. Thus, separation of the oil from the solid and water is difficult without the addition of dilution water. Hot water is therefore added to the press liquor to dilute it. The dilution provides a barrier causing the heavy solid to settle to the bottom of the container while the lighter oil droplets rise through the sludge phase to the top when heat is applied. In practice it has been found that 38% to 40% of the crude oil will be the best for good separation in the settling tank (Mongana Report, 1955). It has also been found that excessive use of water in the process will result in poor settling rate and can cause higher oil losses in the waste water.

OPERATING PRINCIPLE

The NIR-Online Analyser

Near Infra Red (NIR) detects the oil ratio of the crude palm oil ex-press in real time.

The Controller

The detected values are compared against a pre-set value and the error values are used to generate continuous signals. These signals actuate a control valve located in the water dilution line for injecting the appropriate dilution water.

Human Machine Interface

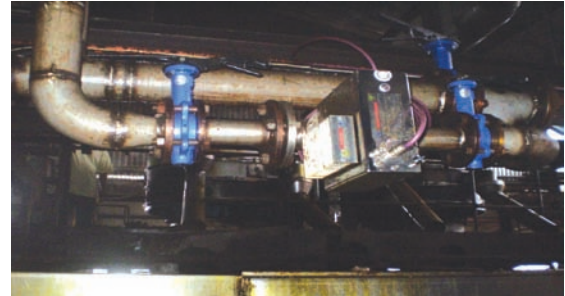The generated signals are linked up to a computer to maintain oil content in press liquor.

Figure 1. NIR online system.

Figure 2. Control valve.

Figure 3. Inline mixer.
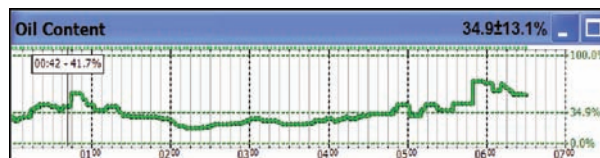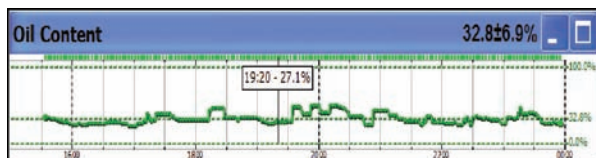

Figure 4. Human machine interface.

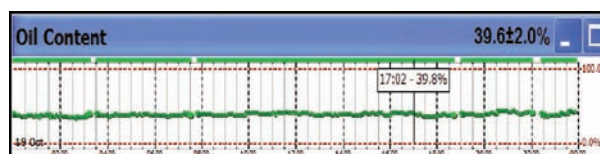*Figure 5. NIR spectrum before the system is activated.*

Figure 6. NIR spectrum after the system is activated.

CONCLUSION

- The automatic crude palm oil dilution control system was successful in controlling water dilution to maintain oil in the crude palm oil at 39% to 41%.
- Creation of a stable system at the clarification station for efficient oil separation.
- A reduction in oil losses is one of the expected outputs.

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