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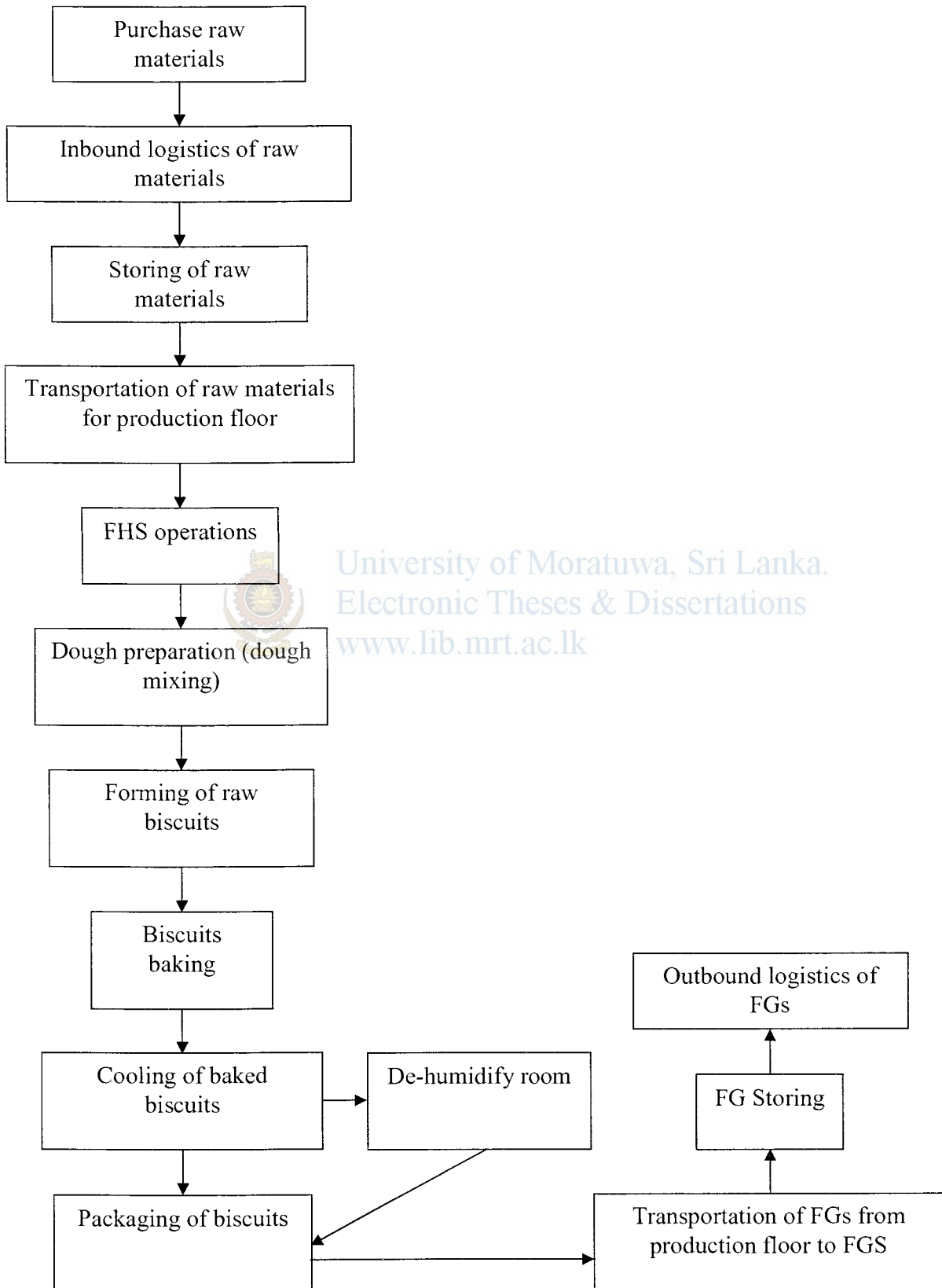
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Appendix 1: CBL Process Map



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Appendix 2:

(a) Liquid Effluent Treatment Plant

CBL has installed two effluent treatment plants for its liquid effluent treatment. These plants are example models for the availability of proper operating conditions in treatment plants as well grown fish are living in the settlement tanks providing the visible proofs for availability of natural fish living water conditions in the tanks. Plants handle 30 m³ of process effluents and 80 m³ of sewage, canteen and incinerator scrubber a day. Daily water quality testing is done in-house while every month testing is done by an external laboratory. Third party auditors ensure the conformance to regulatory levels once in three months. Following shows above average operating conditions of two plants as plant operating conditions are well below the tolerance limits. Information have been extracted from Rubber Research Institute of Sri Lanka test reports.

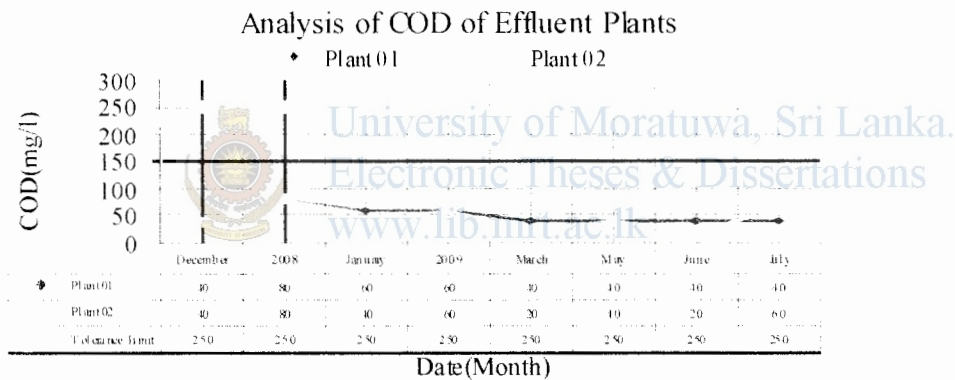


Figure 1: Analysis of COD of effluent plants

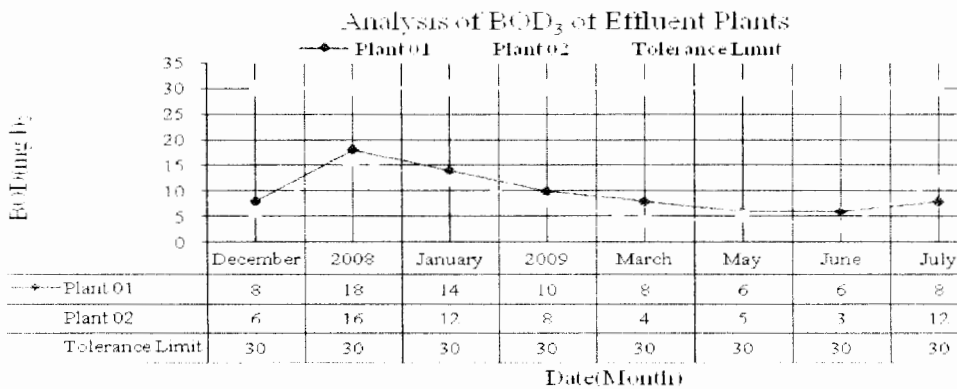


Figure 2: Analysis of BOD of effluent plants

(b) Conversion of PU Conveyors to Stainless Steel Conveyors

In the biscuits production lines Polyurethane (PU) canvases are used to convey biscuits through various machine components while biscuits are being processed. These are made out of especial materials and having especial features (non stick, Oil resistance etc.) so that to suit in Biscuits Manufacturing industry. When these are damaged, new canvases are installed replacing the damaged once. These canvasses are very expensive because of its especial features and since PU is less bio degradable, it is very difficult to manage when disposed. Through new technical improvements some of these PU canvases can be replaced with stainless steel wire mesh conveyors where steel belts are more durable, lesser in long run opportunity cost and Greener product at disposal than PU conveyors. This improvement has been implemented in CBL's De-Oiling Conveyor in the production Plant 6 where annual cost saving is achieved in several millions. Environmental benefit is achieved by avoiding the less Green friendly PU products for about twice per year for a period of 7 years (i.e. about 14 belts). Same improvement is planning to be implemented in production Plant 8 as well where a similar cost saving is expected.



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(c) Conversion of Fluorescent Light Bulbs to LED Light Bulbs

Conventional fluorescent light bulbs having magnetic ballasts are replaced with especial light bulb made out of several Light Emitting Diode (LED) bulbs having electronic ballasts. LED type is capable of providing same Lux level with an Electrical power saving of 50 watts per single LED unit. Annual saving by 600 nos of LED units on power consumption is approximately 216,000 kwh (for 6 or more 24 hour operational days per week). Expected cost benefit per annum is above 2 million (According to tariff category 'Industrial 2' Cost of 1 kWh is Rs. 9.60 as at November 2009).

(d) Process Flow Rearrangement Project for Marie Biscuits

Recently a major process improvement has been achieved in Marie biscuits by rearranging the usual manufacturing process flow sequence by bypassing a main section of machine components

(Bypassing the Laminator) which facilitated, minimizing of unnecessary wastage of equipments, less power consumption (Operation of several geared motor units were stopped) and improvement in Marie biscuits product quality (Avoided unnecessary over processing) as well.

(e) Compost Generation by In-House Solid Waste

CBL's Solid waste treatment Compost project which started sometimes back now in decline stage need further improvements, because of the reason that reduction of garbage and generation of compost end products, both are benefitted to the environment. Food waste generated through CBL Canteen, plants and leaves collected through garden sweeping and effluent plant sludge collection is used for compost production. This daily collection averages about 100 kg consists highly and easy bio degradable ingredients results high quality compost fertilizer output once mixed with soil.



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(f) Solid Waste Incineration

The solid waste which is not possible to recycle mainly incinerated so as to achieve a clean environmental condition. Biscuit wrappers are very poor in bio degradable features and incinerated by the in-house operated incinerator. Incinerator was manually controlled monitoring the gas emissions and minimizing the dusty burnt particles by flue emission gases sending through water spraying scrubber unit. Scrubber water was subsequently treated by the effluent plant before disposing to environment.

(g) Diesel to LPG, Fuel Conversion in Biscuit Baking Oven of Manufacturing Plant 7

CBL's Biscuits Manufacturing Plant 7, baking oven is modified very recently from Diesel fuel to LPG. Following are the benefits achieved through this improvement.

- No black or white smoke in LPG as it undergoes complete and better stoichiometric combustion. Black smoke means un-burnt carbon and white smoke means heat loss due to excess air. Both these conditions are unfavorable in Green perspective as waste of fossil resources occurred in both cases
- Initial oven heat up time reduced from 1½ hours to 15 minutes minimizing the non productive time
- Dramatic improvement in product quality which minimized the waste production (Color variation eliminated)
- Precise temperature controlling could achieve which facilitated uniform heating. As a result of that uniform moisture levels throughout the products in the oven chamber could achieve and that make possible minimizing of overweight products due to uncertainty of weight variation of packets (The gap between weight control limits of Biscuits packets or the band of weight tolerance was minimized)
- When operating with LPG, no burner down time like in the case of Diesel burners. 8-10% grinding Biscuit waste reduction could achieve by eliminating burner down times
- Cost benefit through the use of lower cost LPG than Diesel. This amount varies depending on the market price difference of LPG and Diesel

Both Plant 6 and 8 are newly purchased plants which are already designed for the use of LPG fuel. CBL's manufacturing Plant 5 is planned to be converted from its original fuel the Diesel to LPG as well.

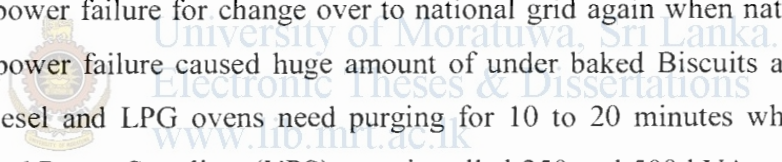
(h) Lime Drying Project

Dried lime Powder is an exporting product of CBL Natural Foods Pvt. Ltd. that is one of subsidiary company of CBL group. This was usually done in Kerosene fired dryers and consumption was approximately 1 Kerosene liter per 1 ton of lime. Instead of Kerosene, exhaust heat of Biscuits ovens were directed to lime dryers using in-house designed heat exchangers and

project was so successful by installing six lime dryer and processing 20 metric tons of dried lime in last year. Product quality was improved having a better appearance closer to natural green color instead of Black color in the Kerosene usage and process temperature controlling was easier and smoothed in the new method as well. Kerosene saving was 20,000 liters and air pollution by un-burnt gases were also avoided. Environmental saving by avoiding the CO₂ generation was calculated to be above 40 metric tons of CO₂ and benefit is for the environment. (CO₂ generation by burning of 1 kg of Kerosene is approximately 3.2 kg CO₂ and mass of 1 liter of Kerosene is approximately 0.7 kg). Direct cost benefit by stopping the usage of Kerosene fuel is approximately 1 million (Price of 1 liter of Kerosene is on average 50 rupees) last year.

(i) Installation of UPS

In the case of a power failure in the national grid, Diesel and LPG fired burners also failed and Biscuits in the oven get under baked. When generators take up the electric load needed another fraction of a second of power failure for change over to national grid again when national grid sets back. This double power failure caused huge amount of under baked Biscuits adding the waste quantity high (Diesel and LPG ovens need purging for 10 to 20 minutes when power failed). Two Uninterrupted Power Suppliers (UPS) were installed 250 and 500 kVA and product wastage of about 2 to 3% out of total production which was directly due to this phenomenon, was avoided by this project.



(j) Wrapper Waste Minimization

Wrapper was the main non green component in the Biscuit products which is having very poor bio degradable features as well. Wrappers are very expensive and usually imported to Sri Lanka incurring a great cost for company. Wrapper waste can be generated due to many reasons mainly due to worker; product as well as the machine caused reasons. This waste generating was given high priority and monitored in order to minimize the root causes. With operator training the worker caused factors and improving the product dimensions etc., the product caused factors were minimized. Packaging machines were especially observed and continuously improved to

find solutions for the machine caused wastage factors. A greater support was given by the ISO 14001 EMS system from the beginning as EMS could identify the importance of seeking solutions for this problem. Especially with the great contribution of EMS; and other factors, successful results could achieve as wrapper waste was reduced from 14.8% in year 2002 when EMS start; to 3.6% presently.

(k) Maximum Permissible Levels – Ambient Air Quality

Parameter / Unit	Method of Analysis *	Maximum Permissible Level *
Suspended Particulate Matter (3 hours average) (mg/m ³)	High volume Sampling and Gravimetry	0.45
Sulfur dioxide (as SO ₂) (1 hour average) (mg/m ³)	ASTM D 2914 - 1978 Re-approval 1981	0.2
Nitrogen dioxide (as NO ₂) (1 hour average) (mg/m ³)	ASTM D 1607 - 1976	0.25

* As specified in the National Environmental (Ambient Air Quality) regulations 1994 under the National Environmental act No. 47 of 1980

Table 1: Maximum Permissible Levels – Ambient Air Quality

(l) Allowable Sound Levels

Day time – 63 B (A)

Night – 50 B (A)

(m) Allowable Water Quality Levels

Parameter	Unit	Tolerance Limits
pH	-	6.0 - 8.5
Chemical Oxygen Demand (COD)	mg/l	250
Biochemical Oxygen Demand (BOD ₅)	mg/l	30
Total Suspended Solids (TSS)	mg/l	50
Total Ammonical Nitrogen (TAN)	mg/l	50
Oil & Grease	mg/l	10
Temperature	^o C	40

Table 2: Allowable Water Quality Levels