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POSITIVE ENVIRONMENTAL MANAGEMENT VIA WASTE MINIMISATION IN A TEXTILE WASHING FACILITY

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Summary

Textile and garment Industry is an important industry sector in the Sri Lankan economy. The finishing part comprises the final step in textile processing and it is known as a sector with high polluting potential. In the textile washing sector considerable quantities of water is used only once usually and is discharged without any recovery. To stay competitive this industry needs to be modernised and definitely needs better performance in the environmental management sector.

This project was limited to looking at the environmental management aspects and that too with only a single pollutant stream -water. The sector of the textile industry considered is the textile washing industry.

A garment washing plant is analysed with the objective of promoting water recycling and waste minimization practices. Initially typical practices were reported, followed by a water balance for the system . Results of the water audit presented here forms the first essential element of the waste minimization process.

Water stream is considered from the inlet to the exit, and the consideration is given to methods of conservation possible of this valuable natural resource while obtaining the optimal use in the process. The time that water was assumed to be a limitless low-cost resource has already passed. Today there is an increasing awareness of the danger to the environment caused by over-extraction and use of water. There is now considerable incentive to reduce both consumption and wastewater production. The selection of the washing industry was selected for this study under that consideration. This industry sector today uses significant quantities of water and most of the factories neither utilize waste minimization nor water recycling techniques. The waste treatment methods are also not adequate. Thus there is a tremendous potential on savings on one hand and a need on the other hand.

It was shown that it is feasible to utilise groundwater after treatment. Manganese is not appearing to be a major problem. The problem chemical appears to be the presence of iron. Iron can be removed from groundwater using several operations. This eliminates the transport of water from outside and serves many environmental needs such as reduced traffic, removing reliance on outside sources and events etc. A pilot plant was constructed in the laboratory and four methods of iron removal were analysed.

Ozonation was studied as a method of reducing this wastage. In this manner there would be a reduced demand on the freshwater resource as well as reduced discharge of effluents. Thus the situation would lead to a facility whereby the waste minimisation has taken place and a facility with positive environmental management. It has been shown that this technology offers many advantages to the industry including the recycling option. Ozonation in addition provided abilities to provide the required input quality as well in addition to being able to reduce COD, BOD and the most importantly Colour of effluents.

It was seen that processes are carried out with less attention being paid to the overall efficiencies but only towards meeting production targets and/or meeting deadlines. The feasibility of recycling wastewater was shown. The practice of this would be a major improvement on the current environmental performance.

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List of Abbreviations

$	United States Currency (US Dollars)
(g)	Gas
μS	Micro Seconds
AATCC	American Association of Textile Chemists and Colourists
AIT	American Institute of Textiles
AOX	Adsorbable organic halides
aq	aqueous
AT	Advance Technology
BDL	Below Detection limits
BOD	Bio Chemical Oxygen Demand
C	Fluid concentration at a point in a bed.
c_b	Break point concentration
c_d	Concentration at which the bed is ineffective
CD	Chorona Discharge
CEA	Central Environmental Authority
CFM	Chloro Fluoro Methane
C_o	Feed concentration
COD	Chemical Oxygen Demand
C_{pf}	Specific Heat Capacity of Fabrics
C_{pl}	Specific Heat Capacity of Water
dH	German Hardness
E / S	Enzyme / Bleach Wash
EIU	Economic intelligence unit
EOP	Electro Chemical Potential of Ozone
g	grams
GPF	Garment factory programme
gpm	grams per minute
H_B	Length of bed used up to the break point
H_T	Total Height
H_{UNB}	The length of unused bed
ISO	International Standard Organisation
J	Joule
K	Kelvin
kg	kilogram
kJ	kilo joule
Kwh	kilo watt hour
L	Litre
M	Metre
M.L.R.	Material to Liquor ratio
M_F	Fabric Weight
MID	Ministry of Industrial Development
Min	Minutes
M_L	Liquid Weight
M_l	Liquid Weight
NAFTA	North American Free Trade Agreement
NWS & DB	National Water Supply and Drainage Board
O_3	Ozone
^{O}C	Centigrade

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NAFTA	North American Free Trade Agreement
NWS & DB	National Water Supply and Drainage Board
O_3	Ozone
^{o}C	Centigrade
OZAT	Ozone Advance Technology
P&I	Piping and Instrumentation
PC	Proprietary Chemical
pH	Unit used to describe acidity or alkalinity.
ppm	Parts per Million
QA / QC	Quality assurance and Quality control
RUS	Rainwater Utilization System
S	Seconds
SAPTA	South Asian Preferential Trade Agreement
SLS	Sri Lanka Standards
SS	Suspended Solids
t_4	Time equivalent to tower out put
t_b	Breakpoint Time
t_d	Time at which the bed is ineffective
t_s	Time for $c/c_o = 0.5$
t_t	Time equivalent to the total or stoichiometric capacity
t_u	Time equivalent to usable capacity
THM	Trihalomethane
TKN	Total Kjeldhal Nitrogen
TL	Textiles and Leather
TL	Textile & Leather
TP	Total Phosphate
TSS	Total Suspended Solids
USA	United States of America
UV	Ultra Violet
WWTP	Wastewater Treatment Plant

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