
Application of Sustainability Management Practices in Newspaper Printing Industry: A Sri Lankan Case

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Abstract

Purpose - The purpose of this study is to examine the current environment management accounting practices and concept of cleaner production relating to one of the major media firms, a news paper printing company, in Sri Lanka.

Design/ Methodology/Approach - The case study method was followed in the study. The primary data were collected mainly by face to face unstructured interviews and telephone interviews with the General Manager and the Operations Manager of the site. In order to get further clarifications, email communications were also made. In addition, the researchers visited the factory and collected data through observations. Secondary data were gathered by browsing web site sources, internal company records, presentations done by the General Manager, etc. Multiple data gathered were analyzed by creating data flowcharts and tabulating the frequency of different events (Quantity wise and monetary wise).

Findings - The study illustrates that the news paper printing company has successfully implemented many environmental management accounting and cleaner production practices as a cost saving strategy. Due to the correct application of the environmental accounting practices, the company was able to become a top ranking company in small and medium sector. Further, this study confirmed some general practices can be further converted in to environmental accounting practices with precise guidance and continuous following.

Research Limitations/implications – The findings of the study would be difficult to generalize since the study is based on one particular company in the media industry in Sri Lanka which applies EMA & CP practices. Further, the study has focused only on EMA & CP strategies relating to material and water in the selected company in order to minimize the complexity of analyzing information.

Originality/Value: This study is useful to understand how a company can use CP strategies and EMA practices to increase the productivity and efficiency in a competitive environment.

Keywords: Cleaner Production; Environmental Management Accounting; News paper printing company; Sri Lanka.

Paper Type: Case Study

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1. Introduction

Accounting profession is now facing the challenge to account for the environment not only through its traditional role of recording and reporting financial information, but also through its role to manage environmental performance. Environmental accounting, which can assist in meeting this challenge, is an inclusive field of accounting, but it represents a broader term that relates to the provision of relevant firm-level environmental performance information to internal and external stakeholders (Bennett and James, 2000). Environmental Management Accounting (EMA) has gained increased recognition as a management tool that assists in improving financial and environmental performance through enhanced environmental accountability. Companies and managers usually believe that environmental costs are not significant to the operation of their businesses. However, current competition in the business world force companies to reanalyze the cost structure since some production costs can be reduced significantly by adopting EMA and cleaner Production (CP) practices. For instance, the purchase price of raw materials- the unused portion that is emitted as waste - is not usually considered as an environmentally related cost. These costs usually tend to be much higher than initial estimates (if estimates are even prepared) and should be controlled and minimised by the introduction of effective cleaner production initiatives whenever possible. By identifying and controlling environmental costs, EMA systems can help environmental managers to justify these cleaner production projects since it helps to minimize waste and emissions and maximize product output, and identify new ways of saving money and improving environmental performance at the same time.

One of the main tools of EMA is material flow cost accounting, a management tool that can assist organizations to better understand the potential environmental and financial consequences of their material and energy practices. Furthermore, it seeks opportunities to achieve both environmental and financial improvements via changes in energy management including planning and operation of energy-related production and consumption units and water and wastewater management. This is achieved through planning, developing, distributing and managing the optimum use of water resources and planning to minimize and treat wastewater. Various industries have been included in these EMA-related researches and studies in the past, and this study examines the experience and effectiveness of implementing EMA practices and concepts of cleaner production related to one of the major media firms in Sri Lanka; a news paper printing company.

The particular news paper printing company was established in 1979 and is now the leading newspaper group in Sri Lanka, recording the highest annual turnover by claiming 70% of market share in the Sri Lankan newspaper industry. The company operates with a vision of "Being the most independent and socially

responsible media group in Sri Lanka, upholding freedom of expression and protecting the right of the individual through journalistic excellence” and with a mission to provide timely and comprehensive information, to everyone, wherever they are and report facts as they are, while providing a forum for the public to discuss issues of importance and interest. Currently, the group publishes six newspapers, five weekly papers and five magazines. The company maintains two main printing plants in two locations, one in a residential area and the other in a highly urbanized area, for which environmental friendliness is extremely important. Out of these two plants the plant located in the residential area produces more than 80% of their demand.

The company has won several newspaper industry awards such as Editorial Guild Awards and Collets Awards and also SLIM Nelson Peoples Award for the most famous newspaper in the island. Apart from winning these industry awards, the printing plant in the residential area has won several awards for maintaining a high quality production while keeping the efficiency and effectiveness of the operations. These awards are; National Cleaner Production Awards-2009 (2009) given by National Cleaner Production Centre – Sri Lanka, Silver Award in recognition of excellence in cleaner production practices in manufacturing – Small & Medium Organization Category, Special award in recognition of achievements in material efficiency in manufacturing, Special award in recognition of achievements in water efficiency in manufacturing – small & medium organization category, Global Chemical Leasing Award 2010 – Certificate for applying and Promoting Chemical Leasing, National Productivity Awards 2009 -3rd Place in the Western Province, and National Quality Circle Awards – 2009 – Certificate.

The rest of the paper is organized as follows. Section Two presents the literature review of the study which is then followed by the research methodology in Section Three. Section Four provides the findings and discussion. The last section provides the conclusions.

2. Literature Review

Despite the various actions of organizations to be good citizens, the concept of “sustainable” businesses is relatively new. There are different methods to operationalize sustainability within organizations (Linnenluecke and Griffiths, 2010). Mirvis and Manga (2010) have identified two models used to integrate citizenship into sustainability of organizations; the top down approach and the catalytic approach.

Beyond doubt, management accounting practices are affected by these sustainability issues. Sustainability, specifically sustainable development, is defined as meeting the needs of the present without compromising the ability of

future generations to meet their own needs (World Commission on Environment and Development, 1987). Sustainable management has been defined as the application of sustainable practices in the categories of businesses, agriculture, society, environment, and personal life by managing them in a way that will benefit current generations and future generations. It is clear that accounting is now facing the challenge to account for the environment not only through its traditional role of recording and reporting financial information, but also through its role to manage environmental performance (Hopwood, 2009; Schaltegger and Wagner, 2006). However, prominence has been placed on environmental aspects when compared to social aspects in sustainability. EMA has attracted increasing attention and interest as a support mechanism to manage environmental performance, which in turn helps to improve financial performance (Bouma and Van deer Veen, 2002; Gray and Bebbington, 2000). There is no universally accepted formal definition for EMA. However, various bodies and individuals have defined EMA based on different perspectives. According to Bennett and James (1998) EMA is the generation, analysis and use of financial and non-financial information in order to optimize corporate environmental and economic performance and to achieve sustainable business. EMA ensures business organizations are concerned about the impact of corporate activities on the environment and the costs of such environmental impacts (Burrill, *et al.*, 2002). Environmental related cost concepts such as conventional costs, potentially hidden costs, contingent costs, image and relationship costs etc. have emerged as inputs to conventional management accounting. The studies have shown that particularly the developed countries have focused on incorporating EMA into conventional accounting as a sustainability approach. For instance, many Australian local governments practice EMA due to social structural influences and organizational contextual influences reflecting situational needs such as complex waste operations, uncertainties in waste and recycling management. (Qian, *et al.*, 2011).

EMA practices are mostly observable in the manufacturing sector. Newspaper printing industry is one such sector where EMA practices are applied all around the world due to the fact that more waste is generated throughout the process of printing. It is important to ascertain whether there are, any potential health or environmental implications associated with the industry (Tucker, *et al.*, 1996). In the past, concern was expressed about the levels of heavy metals used in the process, though nowadays both the industry and environmental organizations agree that these may no longer be a problem (Anon, 1991). There have been significant increases in the amount of colored inks used in newspaper publishing, and the environmental and health implications of this change have not yet been addressed. It is important, if only for reassurance, to consider any possible issues that may be raised. Concentrations of all detectable metals, notably copper and zinc, varies widely amongst individual newspaper titles and even more so amongst

individual magazine titles, possibly because of the variability in ink loadings, fillers and coatings (Tucker *et al.*, 1996). Primary sources of the heavy metal wastes of printing are from additives to paper making (Hamm, *et al.*, 1986; Simon, *et al.*, 1997), impurities in pigments from some manufacturers or from corrosion in the paper mill.

The composition of pollutants in waste water of paper industries, depend on the kind of raw material used. Well-functioning water and waste water services are basic requirements for all human activities (Shafqat, 2010). Therefore, wastewater must be treated and disposed of or discharged into a naturally occurring water source. The waste water from industries requires collection, treatment and disposal in accordance with local, state and federal standards (Theodore and Theodore, 2009).

Commitment to sustainability is a relatively new phenomenon in organizations (Stoughton and Ludema, 2012). Therefore, it is highly important for the organizations to adopt sustainability practices and maintain systematic measurement and monitoring mechanisms for such practices. This fact is particularly important for the industries like newspaper printing in order to enhance the value adding services they provide to the communities at large by minimizing the negative impacts towards environment and community.

3. Methodology

The case study method was followed since the research question is of qualitative nature (Stake, 2006). The company consists of two main printing plants, one in a trade zone and another in a residential area. The plant located in the residential area practices EMA to a greater extent. Thus, it was selected for the study. The printing plant uses mainly four types of material i.e., newsprint, ink, plates and fountain. Newsprint is the major cost driver for the company, while the fountain at the end of the printing process will be a key risk factor to the environment if not taken care of. Therefore, more attention has been paid to these two inputs in the study.

Prior to visiting the site, the web site of the organization and other documents available online (EMA reports published, newspaper articles, other related blogs, etc.) were studied in order to understand the milestones and recognitions received by the organization in relation to EMA practices. For the purpose of collecting further data, the particular printing plant of the company was visited. Initially, data regarding the plant and its printing process were collected from the presentations done by the General Manager of the plant. Further, the full printing process from the point of material arrival till treatment of wastage as outputs was observed during the site visit.

During the next site visit, face to face unstructured interviews were conducted with the General Manager of the printing plant, the Operations Manager of the site of the particular shift and two more core staff members (machine operators). These interviews covered mainly the newsprint and fountain treatment from the beginning to the end of the process including types of material flows, how and where wastage occurs, monetary and physical terms of wastage, wastage management practices, potential risk factors and planned initiations for the future. Thereafter, findings of the interviews were triangulated with observation (by two more site visits) to ensure consistency and credibility. More attention was paid towards Paper Print, Reel Butts and Fountains during the final two visits. Further, snapshots were taken as evidence with approval from the company management.

The organization uses quality control circles and management programs in order to address each strategic issue specially related to the management of material wastage, water wastage, energy, etc. These teams are made responsible to meet the waste management targets whilst keeping proper records. A document analysis was conducted by reviewing the contemporary records and historical records kept by such teams relating to material and water wastage. Using emails and telephone conversations with the General Manager of the plant further clarifications were obtained.

Multiple data gathered was analyzed descriptively by creating data displays (flowcharts and other graphics), and tabulating the frequency of different events (quantity wise and monetary wise) separately for Newsprint and Fountains. The descriptive analysis was then incorporated into thematic analysis of data. The next section provides the findings and discussion of the data analysis.

4. Findings and Discussion

This section presents the findings and discussion under two themes i.e., organizational transformation and success of the sustainability practices and current sustainability and accounting practices.

Organizational transformation and success of sustainability strategies

The following section identifies why the news paper printing establishment was inspired to follow EMA practices, how the change actually took place in the company, and the measures the company take to sustain and continuously upgrade its practices. The section finally identifies the challenges the company encounters or encountered in this process.

Inspiration to adopt the EMA practices

The printing plant, currently considered to be the main plant of the company, started its operations in the year 2007. The stepping stone towards EMA was initiated by the General Manager of the Printing Plant. As he had studied the importance of using the natural resources without harming the future generations' needs, the EMA practices were initiated at the printing plant under his guidance. Through proper leadership, the company was able to achieve major cost savings while being sustainable towards the environment. Prior to the present General Manager's appointment, the company was carrying out its operations similar to other companies in the country, without paying much attention towards EMA aspects such as the usage of energy, material, water and generation of various types of waste. However after receiving proper leadership under the new General Manager, the company was going through a drastic change in terms of EMA adoptions. The company was able to obtain enormous cost savings while being environmentally friendly at the same time. The printing plant was able to set up an example to the whole group of companies of the importance of conducting operations in an environmentally friendly manner, thereby attaining cost savings leading to an improvement to the bottom line.

The printing plant, with proper direction from the General Manager, commenced various programmes to achieve its objective of carrying out its operations in a manner that do not deprive future generations of satisfying their needs (Brundtland Report, 1987). The below section discusses how it manages its material and water consumed in an environmentally friendly manner. It specifically describes how the "Newsprint" material is being managed by the company together with water management, thereby leading it to be successful in its EMA adoptions.

Process of implementing EMA practices, and the organizational transformation

The company initiated an environmental policy with regards to its operations with the aim of achieving major cost savings by managing the material and water utilized in the production. In order to achieve the reduction in material wastage and the waste water generation, this particular printing plant focused on carrying out a root cause analysis, enabling it to identify the cause to waste. This root cause analysis was done with the aid of quality circles inclusive of well trained personnel in managing wastage, who were able to address the issue properly and manage the waste accordingly. The people involved were well trained through providing a series of regular proper trainings in managing wastage. In the newspaper industry, the benchmark standard for waste is considered to be within the range of 4.5% to 5%. However at the particular printing plant this target is further tightened to 3% of the total production. With the help of quality circles, various types of waste in the production such as "Scum", an uncontrollable waste relating to water and ink,

newsprint waste have been identified. To confirm the General Manager of the Printing Plant says:

“All of these were implemented as part of achieving the ISO 14000 accreditation. Furthermore as part of housekeeping development, the company has also implemented the Japanese concept of 5S, which has resulted in many benefits to the organization and to its employees.”

With this type of environmentally friendly initiatives the employees also realize the importance of conserving the resources for the benefit of future generations, thereby taking the sustainability message to their families and relatives; hence, leading to a major social service.

With the implementation of the cleaner production concepts the company emphasizes on the importance of being environmentally friendly, and this message is further pressed on to the factory staff as well, by disclosing to them of the fact that in order to create one ton of paper, 14 well grown trees need to be cut down, thereby making them very much cautious when handling material during production. The Printing Plant started its CP initiatives with 3R concept, which stands for “Reduce, Reuse and Recycle”.

Moreover, the company has taken great measures in conserving water and treating waste water for reuse, which has eventually resulted in a saving of 296,400 liters of water annually. Similar to material waste, even for water, with the use of quality circles, a root cause analysis has been carried out in order to find the major factors that cause the generation of waste water. The Operations Manager during an interview says:

“We have taken various initiatives in order to manage the waste water generation such as using a water treatment plant in order to treat waste water so that it can be reused.”

His statement highlights level of concern they have towards the waste water management. During this process, various chemicals are added for the purification of water, which then generates water that can be even used for drinking. However, this treated water is only used for gardening in the premises and other cleaning activities as the company greatly considers the good health of its employees.

One of the most important aspects of energy saving relates to the electricity usage and at the plant, a large amount of energy is being saved as it uses natural lights during day time. Moreover, the printing facility also uses natural ventilation within the premises. All of these are part of EMA practices and result in valuable cost savings for the company while being environmentally friendly.

Sustainability Management Practices in Newspaper Printing Industry

Efforts taken to sustain the improvements

The plant has taken various initiatives to sustain these practices. The General Manager in an interview says:

“The concept of Kaizen, which means continuous improvement, is one that is greatly appreciated at the printing plant. In order to achieve continuous improvement and sustain the developments achieved this far, the company carries out various management programs covering many fields.”

The statement of the General Manager emphasized the attention they have devoted to sustain and improve these practices. Regarding the main material utilized in the process, which is the “Newsprint” the company firstly analyzed how much “News print reel butts” are required in the production and the amount of wastage generated through the process. Significant importance is given for the material “Newsprint” as it is the main cost driver of the printing plant. Thereafter the company decided on an objective to reduce the Newsprint material wastage by 10% of its total usage. In order to achieve this target, the management of the company set up a particular team with a leader who is the Operations Manager and rest of the members from various backgrounds, such as supervisors and factory staff. This team’s activities were monitored and authorized by the General Manager of the company, who initiated this management program.

This management program to reduce the “Newsprint” material waste had begun with a specific vision of being sustainable in operations for the goodwill of the future generations. The team initially carried out a brainstorming activity in order to identify what measures could be taken in order to achieve the set target of reducing waste by 10%. Through the brainstorm activity various suggestions were proposed, namely notifying the factory staff to be mindful when handling the material in the process, (such as advising on the maximum use of material reel butt that is used in the news printing, which will reduce the amount of material wastage), reducing the amount of operator faults in machine handling, providing training to the staff to improve their skills and capabilities and so on. After obtaining the suggestions, by specifying weights, the management, together with the team, decided on what can be implemented from the listed suggestions.

After determining the activities to be conducted in terms of achieving the target of reducing 10% of material news print wastage, the management carried out various training programs to the factory staff of different departments of the Printing Plant, such as the stores staff, printing division’s staff, etc. Thereafter, as part of this material reduction initiative the company also devised plans of displaying various notices to the staff to keep them informed about being cautious when handing material and also to be alert on the reduction of material waste. All of these

proposals enabled the company to achieve a saving with regards to material news print reel butts amounting to Rs.6,578,628. Therefore, encouraged by this management program relating to newsprint material, various other management programs were initiated to save materials such as water (fountain), ink, plates used in printing, etc.

Similar to news print material management, many measures were taken to manage the water used in the production as well other activities within the factory. Some of the suggestions that were proposed during the brainstorming activity carried out relative to the water management program includes, determining the possibility of reusing the water consumed for plate washing during printing cycle, controlling tap water consumption, usage of sensor controlled taps, reducing the water leaks as far as possible, taking the maximum usage of the treated water and encouraging employees to use a glass water bottles for drinking water, which will further reduce the waste of water. Upon these suggestions, tap water control, foot control taps, water control in toilets have been successfully implemented, resulting in a saving of Rs.116,842 annually as per the latest data obtained. In order to sustain the EMA adoptions company's management encourages carrying out such management programs in the future as well, as they do not focus on incurring high capital expenditure, but on simple improvements towards sustainable operations.

Challenges encountered in the process of establishing EMA practices

The implementation of these practices has not been without hurdles. The Operations Manager says:

"When carrying out these environmentally friendly initiatives we had to undergo many challenge... especially the General Manager who took the proactive approach of being environmentally friendly in the production had to go through many challenges posed by the management and the staff."

His statement highlights the challenges have come from management and staff. Concerns from higher management, in particular, regarding whether the green initiatives would provide the expected cost savings had to be addressed. However, most of these challenges were well managed by proving results obtained via the EMA adoptions, particularly by presenting in terms of monetary value terms. It was even more challenging to manage the factory staff with regard to these initiatives due to their low levels of education.

Nevertheless, continuous training and awareness programs aimed at the staff persuaded them to understand the importance of proper material management, water conservation and environmental friendly operations for the ultimate benefit

of future generations. Both the General Manager and the Operations Manager make a similar statement regarding their approach for continuous improvement:

“The most important aspect of being successful is the strong commitment for the various EMA adoptions from all employees of the organization, from the General Manager to the factory workers.”

Furthermore, in order to retain the commitment especially from the factory staff, the company continues to encourage them by rewarding their efforts monthly.

Current sustainability practices and accounting aspects

The printing plant has won the National Cleaner Production Award, Silver Medal for three consecutive years in Small and Medium company sector. This was achieved as a result of continuous implementation of EMA and CP practices. In the year 2012, company was able to save Rs.38.5 million to the company, of which 76.2% was saved by following CP practices in the areas of material and water. The company has followed several strategies to save material which was their main input to the production process and water which is one of the most valuable resources to the entire world population. These strategies are explained below.

Material

The Printing Plant has followed several technical strategies to curtail the material wastage including; reducing Computer to Plate (CTP) Dimension, introducing CTP baking machine, reducing the Diameter of the reel butt, introducing printing machines which have ink injectors.

Computer to Plate (CTP) Dimension

According to the global standards, dimension of a CTP was 750 x 576mm. Under this global standard company used 62,208 cubic meters of CTPs in the production for the year. Therefore, the General Manager and his team performed a careful study on the CTP and found out the current CTP dimension can be reduced by 30mm to 720 x 576mm. After implementing this strategy the Printing Plant was able to generate 11% total material saving from the CTP in the year 2012. As Burritt *et al.* (2002) suggest this is the physical EMA information.

Introducing CTP baking machine

As a second strategy they introduced the CTP baking machine to the production. The reason was, at present the company has more than 70% of the market share in the newspaper industry. Due to this reason, ability to print large volume of printing copies from one CTP is highly important. Under the normal condition of CTP without baking it can print 100,000 to 125,000 newspaper copies only. After reaching this level the colors in the plate will begin to weaken and cannot be used

to print further. This number of copies was not enough to cater to the current demand of the company. In order to meet current market demand, company has to create another CTP of same print to continue the production and this caused high wastage of both material and time. After some studies carried out by the General Manager of the Plant together with his team, they discovered that one baked CTP can create 300,000 to 500,000 copies. Therefore, the Printing Plant introduced the CTP Baking Machine to their production to meet the current demand more effectively and efficiently with the consumption of less resource and energy. The company was able to gain 29% of gross saving from material before reducing the energy consumption of CTP Baking Machine, and the net saving of the material from the CTP Baking Machine after removing the energy cost was 28%.

Reducing the diameter of the reel butt

The General Manager and his team in the Printing Plant discovered another remarkable solution to reduce the white paper waste used in printing. Before finding this solution, the company removed the Reel Butt from the printing machine when it had a diameter of 140mm which was the global standard and this was sold at low price for salvage. After some studies carried out by one of the operations managers of the Plant, under supervision of the General Manager, he found that this global standard can be reduced up to 130mm with proper attention of the machine operator when the reel butt continued to print after the 140mm. Before implementing this strategy company made a loss of 30 to 35 copies of good news paper from each one of the paper reel used. After implementation of the solution together with some staff training and displaying visuals in factory premises, company was able to gain 35% of saving from the total material saving.

Introducing printing machines which have ink injectors

The printing plant earlier used ink spray guns in their printing process which caused high level of ink waste. Further, this caused damages to the nearby machines. As a solution, the company purchased new machines that have ink injectors which generated negligible ink waste throughout the printing process and this could be further adjusted by computer as for the printing requirement.

Apart from above mentioned strategies which have high technical expertise, the company had implemented few more low cost strategies to minimize the material wastage within the company.

Other strategies followed to reduce material wastage

The Management of the Printing Plant has instructed the operators to remove the damage paper from the paper reel manually without using the damage removal machine and limit it to the one or two rounds maximum from one reel. Management conducted training programs to introduce minor strategies to

improve the effectiveness and efficiency, such as training fork lift drivers to eliminate the damages caused to the paper reel during unloading from the container and refilling the container with newspapers. Further, visuals were being displayed in the factory premises to enhance awareness of the staff and also a competition was conducted between two shifts of the staff to make continuous improvement in efficiency in material usage. These strategies too resulted in a significant quantity of material savings with less technical and financial investments.

Water

Understanding the social responsibility and importance of saving water the printing plant has taken several actions to minimize the water wastage in the premises. Saving water from national water supply and tube well not merely saves water, but also helps reduce energy usage and the carbon footprint at a national level.

At present the printing facility has two major sources of water supply to fulfill the water requirements of human consumption and production requirement. These two sources are tube well and national water supply. Currently, 43% of the water requirement is taken from tube wells and the balance 57% is taken from the national water supply. The company uses this water for eighteen different activities. Before introducing CP practices the company did not have a clear idea about how much of water was consumed from the tube well and how much of water was consumed by the different activities in the factory.

To introduce CP strategies to water consumption, management had to identify the activities which consumed water and the amount of water that was consumed in each activity independently. To measure this, the management introduced a sub meter system to the factory and measured the water consumption of each activity separately. With the improved understanding of the water consumption, the company introduced some CP strategies such as introducing water control system for toilets and urinals, air conditioned condensing water reuse system, treated water reuse from waste water treatment plant and water saving project in rest rooms. By implementing these CP practices, the company was able to save 3% of the total saving of the year 2012.

Water control system introduced to toilets and urinals

Major contribution to the 3% reduction was rendered by the water control system introduced to toilets and urinals. Before introducing the new system, urinals had continuous water supply during the 24 hours in the entire year. The estimated water consumption in toilets urinals was 1,682 cubic meters per year. As a solution, the company installed a new system which releases one liter of water in

one manual flush. With the newly installed lavatory system, the company was able to reduce the water consumption in lavatories by 1,616 cubic meters for the year of 2012. The cost saving from this amounted to Rs.121, 217. It is clear that the organization is identifying the physical as well as monetary EMA (Burrirt, *et al.*, 2002).

Air Condition condensing water reuse system

The company had also recognized another area where water can be saved, and that is drain water generation from the air conditioning (AC) machines installed in the premises. The management was able to quantify the amount of drain water flowing from all AC plants installed in the printing plant and this amounted to 60 liters per hour. The factory uses the AC machines 85 hours in a week on average, and this generates 265 cubic meters of waste water per year. Due to the magnitude of the waste water generated, the company installed a pipe line to collect this waste water from all AC plants in the premises to a tank and use this water in gardening, other washing and cleaning activities such as washing of vehicles, cleaning of bathrooms and lavatory areas.

Waste water treatment plant

In the printing process, the company uses water as an input with chemicals to maintain the PH level of water. At the end of the printing process, some amount of water will come out as contaminated water due to the chemicals used in the process. As per regulatory requirements, the company cannot release the polluted water generated from the production directly to the environment without reducing its PH value since company operates in a residential area. Therefore, as a solution the printing plant established a water treatment plant to purify the contaminated water of the printing process. With this plant, the company was able to purify 120 cubic meters of water, which is valued at Rs.88,800 in 2012. This water is reused in gardens, washing and cleaning activities.

Water saving project in rest rooms

The company had identified rest rooms as another potential place where CP can be implemented. Earlier, the rest rooms had showers with ball valves by which the operator could not regulate the water flow as per the requirement. As a result, the person who used the shower received a superfluous water flow. Due to the waste occurred from this outdated technology, the company had to endure an unnecessary cost. As a solution, the management replaced the ball valve with conceal valves where the operator can regulate the water outflow as per the requirement. This strategy enabled the company to save 127 cubic meters of water, which had a value of Rs.9,112 during the year of 2012.

5. Conclusion

This case study demonstrates how a newspaper printing company progressed towards becoming an environmentally friendly organization in a developing South Asian country where concerns towards environmental issues are still emerging. The developments achieved in terms of EMA adoption in this particular printing plant can be highly commended, for taking a proactive approach and setting the example for many other companies. However, it is not possible to claim that the company has achieved the status of a complete green company, as it has many more aspects to improve on. These actions include, but are not limited to; better planning of transport, maximizing the use of materials, shifting from 3R towards 7R (i.e., Reject, Reduce, Reuse, Reclaim, Repair, Replace, and Recycle), improving focus on energy management and green water harvesting.

The company has the opportunity to reduce the emissions to the environment by taking measures to print the first page of certain tabloid magazines in the printing plant itself, rather than printing in the other plant and transporting as currently practiced, which causes a great deal of transportation costs as well as air emissions. Further, the company still has scope towards utilizing material reel butts to a greater extent than the current usage where the printing is stopped when it gets to 130mm and hence the remaining material reel butt is sold as salvage at a lower cost. In addition, the company can implement the 7R concept, which means Reject, Reduce, Reuse, Reclaim, Repair, Replace and Recycle. With regards to energy management where electricity is greatly considered, it is recommended the company to move towards LED bulb usage during the night shifts and when the natural lighting is insufficient, as it could save more energy than the present use of CFL bulbs as well and generate more cost savings. This initiative will thereby enable the company to work towards achieving the energy management system standard, which is ISO 50001. In order to identify the environmental impact of its activities, the company can move towards calculating carbon foot print of its production. This will enable them to identify the amount of carbon emitted to the environment via its operations. The company could prioritize and select from the options above and implement these activities to be more cost effective together with being an environmentally friendly company. Although the company has ISO 14000 accreditation, it has still not gained any energy management standards, and through implementing some of the above recommendations the company could progress to obtain energy efficiency as well.

The study focused on a printing plant of a news paper printing company with some context specific features. Moreover, the most of these findings will be confined to news paper printing industry. More research is needed in the future to gain a better understanding of the EMA practices in the printing industry due to the diversity of the industry. These studies could cover different types of printing

operations, organizations of different scales, organizations that use different printing technologies, etc.

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