

# AN INNOVATIVE TECHNIQUE FOR WASTAGE MINIMIZATION IN PRINTING INDUSTRY

**Ms. Kanchan Sharma**

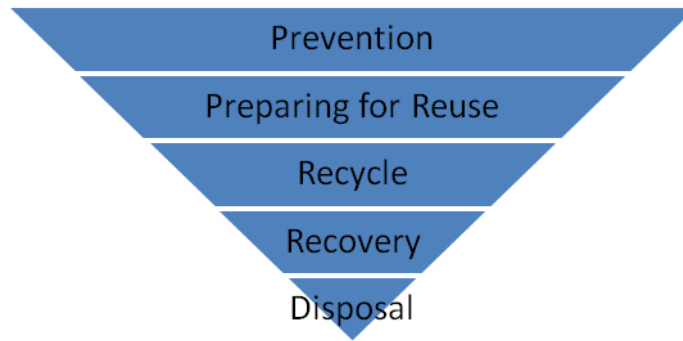
Department of Printing, Graphics and Packaging  
[naughtykanchibtech@gmail.com](mailto:naughtykanchibtech@gmail.com)

**Abstract:** The printing industry faces pressures to increase efficiency and reduce cost due to global overcapacity and rising costs of raw material. At the same time increased legislative and customer demands to lower the environmental impact of industry activities has created a need for printers to better their sustainable practices. Increasing resource efficiency and reducing waste has therefore become an important aspect to consider for printers wanting to maintain their market position in an increasingly competitive environment. In the printing industry discarded paper is one of the largest sources of waste and is associated with substantial costs and environmental impact. Finding ways to reduce paper waste can therefore present opportunities for printers wanting to become more efficient, engage in more sustainable production and lower costs. Based on this, the purpose of this work is to map the current paper waste situation at a printing and packaging company, investigate its causes and suggest an approach for how paper waste can be reduced at the company. The research strategy of this thesis combines both qualitative and quantitative methods including observations, interviews, production data analysis, and production measurements. The findings reveal that a majority of the paper waste at the company originates from the cutting and offset printing departments. Approximately 42 % of the total generated paper waste originated from the cutting department, and at least 24 % originated from the offset printing department. It was however also found that the potential to reduce paper waste exists in all investigated production steps. Causes of paper waste differ between departments and waste types but main factors influencing paper waste include: a lacking focus on waste reduction, missing accountability for waste generation, a mindset where waste is seen as a necessary and integral part of production, and a difficulty of accurately assessing the paper needed throughout production due to lack of process measurements and accurate production data. It was also found that current imposition practices in combination with using mainly two sheet sizes, inefficient inventory control practices, and lacking housekeeping practices affects the generation of paper waste largely. From the findings it is concluded that reducing paper waste is a complex and cross-functional endeavor which requires continuous efforts if real improvements are to be realized and sustained. Reducing paper waste must become prioritized within the organization and the view of paper waste as necessary altered. Accountability for waste generation should be established, and the environmental strategy and goals anchored in daily shop-floor operations. Accurate production data needs to be made available so that the production process can be monitored and controlled, and continuous improvements enabled. Common reduction techniques such as reusing wasted paper and improving inventory control practices should also be explored

**Keywords:** Printing, packaging, Printing Industry, competitive environment

## 1.0 Introduction

The Waste Management in the Printing Industries project undertaken by the Printing Industries Association. This was allocated to assist the printing industry to improve its waste management performance and cut waste going to landfill. Spin off benefits such as saving money and cutting of resource usage are considered other key drivers for increased printing industry uptake of improved waste management performance[1]. There is a plethora of waste minimization and cleaner production published information available for printers. However, there is little that has been done to look at the implementation of published information and the impact this has had on waste production.



**Figure 1: Waste Management Hierarchy.**

Printing Industries wished to investigate the management drivers of printers, which take waste avoidance and minimization more seriously than others. These management drivers and practices were shared across the industry through a series of seminars and workshops to encourage increased uptake of effective environmental practices and its spin-off effects which as improved productivity and saving from reduced waste. To investigate these drivers and the types of waste management activities and their spread across the industry a survey backed by on-site investigations of a selection of a range of printers varying in size and printing processor was considered the best approach. Use of benchmarking based on the type of printing process was widely used overseas. Its use for waste reduction was seen a one advantage. It also became apparent that its use should be expanded as means to compare and incite some rivalry between printers on a range of efficiency measures. There is anecdotal evidence that there has been reasonable uptake of good waste management practices in the printing industry, especially cutting paper wastage. However, other types of wastes, especially hazardous wastes could be better managed.

**2.0 Literature review**

The companies is diverse and includes printers, desktop publishers, graphic designers, prepress houses, publishers, software and hardware manufacturers and distributors, paper and paper board manufacturers, paper merchants, ink manufacturers, manufacturers and suppliers of printing equipment and consumables, packaging and flexible packaging, paper converting, binding and finishing, communication and media services. Printing Industries provides a comprehensive range of business assistance services as well as industry representation to all levels of government. The industry, which Printing Industries represents, is very significant economically with a geographical presence in all regions[2]. To investigate innovative approaches to waste minimization using a range of technologies and management processes. The printing industry is a diverse industry printing on a wide range of substrates, such as paper, polymers, metals, etc., using a broad range of printing technologies. Large variations exist between printers in their waste management practices and amounts of waste they send to landfill. For example, printers using silicones papers for non-stick backings for labels find there is no recycling option for the silicones paper off cuts. This is also the case for printers using carbon paper. Due to this diversity the printing industry is difficult to manage on an overall basis. The industry down in to its main printing processes is typically where most generic waste management and cleaner production publications follow. The flow of materials and work through a printer is remarkably similar, the main difference being the type of printing operation being undertaken.

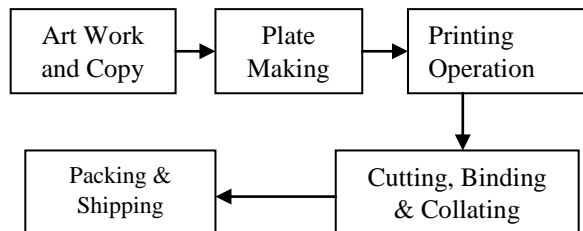


Figure 2: Flow Chart of Printer

So the main printing processes listed above can be substituted in the printing operations box with the other issues remaining virtually unchanged. A printer has the following process flow chart as shown in Figure 2. Each of these processes use raw materials and produces wastes. So each section holds a potential for waste minimization[2].

Commercial Pressures Printers are faced with considerable commercial pressure from each other, as there is a large amount of printing equipment turnover, accelerated by the technology improvement brought about by computer and IT technologies. As a consequence starts up printers are able to purchase second hand equipment at relatively low prices. In addition, with the ease of transmission of electronic files overseas printers offer their services at considerably lower prices than do local printers.

### **3.0 Problem Analysis**

To keep track of paper waste, the company has established a performance indicator that puts the amount of paper retrieved by their recycling partner in relation to the amount of purchased paper on a month-by-month basis. The paper waste performance indicator paints a general picture of the current situation but misses to convey more specific information about where and how much paper waste is generated in different steps of production. The lack of detailed information about waste quantities and waste streams makes paper waste a difficult issue to handle, and has given rise to an internally divided view of the importance of the topic. To be able to better work with decreasing paper waste and build consensus in the matter, there is a need to determine where paper waste originates in the production system, and to identify which paper waste types that contribute largely to the total waste stream, in order to know where efforts should be focused.

### **4.0 Reusing Paper Waste**

Other source reduction techniques involve reusing waste paper, such as printing on both sides of a make-ready sheet (WMRC, 1997). Therefore reusing paper should be employed whenever feasible throughout the production process. At the company alternatives for reusing paper waste include:

- Reusing make-ready sheets in offset production for jobs that require going through the presses twice.
- Using offset make-ready sheets during folding setups instead of high quality printings.

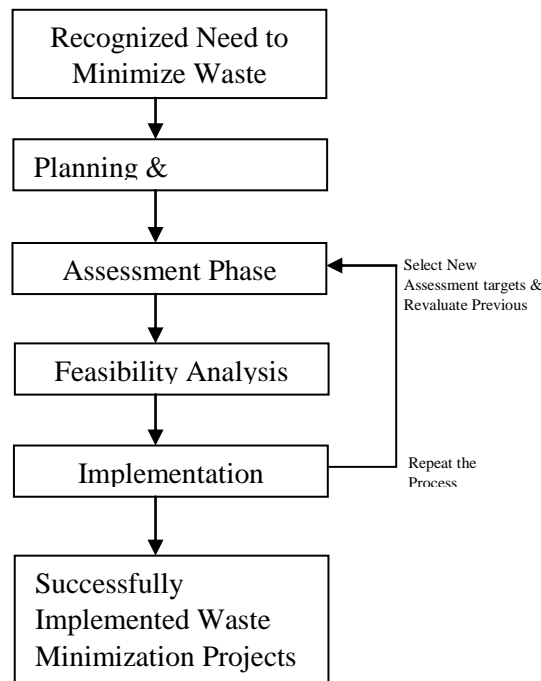
If wasted paper is reused the overall quantity of paper waste and paper consumption can be reduced. The potential effects of using offset make-ready sheets during folding setups could also lead to more over's being sold or fewer instances of under production occurring. The output from folding operations can increase if high quality printings are not used for setup, and thereby the output from binding operations can increase as well. Furthermore, long-term potential effects could even be a decrease in the amount of net sheets required in post-press operations, as offset make-ready sheets can replace buffers included in the net amount of sheet. Reusing waste paper in folding operations entails preparatory steps in offset printing and cutting to enable the change, which can create resistance. It therefore becomes paramount to communicate the benefits of the change, and how it affects the production in later stages of the process. Furthermore, a detailed instruction of new additional practices within the production process is needed in order to assure that make-ready sheets are not mistaken for sheets of high quality in subsequent process steps. Moreover, before implementing the change it can be beneficial to pilot test procedures until the most effective way has been identified, and to be able to create detailed instructions in order for misunderstandings to be limited. It might also be beneficial to discuss the change in a group setting where operators from offset, cutting and folding are present in order to create motivation and a willingness to change.

### **5.0 Proposed Work**

The purpose of the work was to obtain information on current waste management and environmental activities. It also enquired as to the primary drivers for adopting waste and environmentally friendly printing practices. Information gathered was then used to structure the seminar and workshop training packages. It was also used to sharpen the issues and data to be sought from the analysis of the individual companies undertaken in the next stage of the project. A number of modifications were made to simplify and shorten the survey form following advice from

the steering group. Virtually all spoilage, regardless of who pays for it, is measured by the number of sheets, which do not count as final product. Spoilage can also be confused with make ready waste; the waste generated to align the colors and paper.

Key issues identified by the detailed on-site analysis of chosen companies includes: Large variation between printers in their attention to waste management issues, which reflects the survey's results. Weighting of wastes is an uncommon practice. Visual breakdowns and volume measurements are the most common measurement practice by printers that undertake measurement activities. While not as accurate as weighing it is an easy starting point and has lead to major savings. Use of spoilage by printers to measure wastes only gives part of the overall waste generation of a site. Packaging from supplies is a key waste source. Recycling is extensively used for printed medium and some other waste types, but better segregation of waste to landfill and recyclable wastes is an area for improvement. Major costs savings have been achieved by focusing on waste minimization at source, especially with the larger printers. Team efforts, which have focused on efficiency and cutting waste, achieved some of the best results. Three of the sites visited were good performers, even leaders in waste management and have provided good case studies for the workshop. Overall what separated the best performance leaders were good management practices [5]. Without senior management support and commitment down the management chain waste management becomes a token issue, rather than one, which demands appropriate resources and attention.



**Figure 3: Waste Minimization Assessment**

The proposal for the project involved developing two training modules. The first to be developed was the seminar titled Profiting & Efficiency from Waste Management for Printers[6]. In order to provide a set of quick solutions and possible actions that many printers can undertake the seminar focused on tips from other printers on how to cut waste, save money and improve productivity. For example, ask your waste contractor to supply weighbridge results of you waste bins (assuming you have your own bin). Environmental Image Discusses the advantages of improving waste management at a printer is site and how this can be marketed to clients as an additional service to clients who are looking for more environmentally friendly suppliers. It also advantages the entire printing industry as it promotes a greener image.

## 6.0 Conclusion

A major outcome of the undertaking of this work is the recognition that the main obstacle to printers improving their environmentally friendly practices is one of change. Change in attitude towards becoming more efficient and productive through waste reduction strategies can lead to savings and improvements. A set of drivers for printers to adopt waste minimization management techniques will continue to be used to impart a need to change on the management of printing companies. A substantial amount of useful information has been collated into these training packages; it is just a case of getting printers to allocate appropriate time to learn of the advantages they offer. Outcomes of the training packages have been well received; however, their real impact on the behavior of printers will be determined through future surveys, such as the annual benchmarking survey. Printers and educational providers can use many of the lessons and case studies identified well into the future. As a consequence the usefulness of the information gained in this project will continue to aid the printing industry.

## 7.0 References

- [1] Smith, L., & Ball, P. (2012). Steps towards sustainable manufacturing through modelling material, energy and waste flows. *International Journal of Production Economics*, 140(1), 227-238.
- [2] Desa, A., Kadir, N. B. y. A., & Yusoooff, F. (2011). A Study on the Knowledge, Attitudes, Awareness Status and Behaviour Concerning Solid Waste Management. *Procedia-Social and Behavioral Sciences*, 18, 643-648. doi: 10.1016/j.sbspro.2011.05.095
- [3] Ansari, P.M. 2006. Key note address on corporate responsibility for environment protection (CREP) in pulp and paper industries. *IPPTA J.* 18 : 41-45.
- [4] Chakrabarti S.K. 2006. Environment management in pulp and paper industry beyond current legislations and CREP commitments. *IPPTA J.* 18 : 143-149.
- [5] Poonprasit, M., Phillips, P. S., Smith, A., Wirojanagud, W., & Naseby, D. (2005). The application of waste minimisation to business management to improve environmental performance in the food and drink industry. Paper presented at the In: *Procs of the 7th Finnish Conf on Environmental Science, Jyvaskyla 2005.*
- [6] Vigneswaran S., Visvanathan C., and Jegatheesan V. (1998). *Industrial waste minimization.* ENSEARCH. Environmental Management and Research Association of Malaysia. Petalyng Jaya, Malaysia.
- [7] Ghosh, A. 1997. *Technology trends in the pulp and paper industry, Green Business Opportunity.*