

SHEN'S ART PRINTING CO. LTD. (Taiwan)



ABOUT THE COMPANY

Shen's Art Printing Co. Ltd. is a leading company in the field of cultural, commercial and art printing. Formed in 1977, Shen's has invested heavily in innovative color separation, plate making and electronic publishing system technology. A medium-scale company, it is located in To-Cheng City, Taipei County, has a staff of 180, a floor area of 5,300 m² and an annual turnover of some US\$ 10 million.

The company has an impressive record of environmental improvement programs. Prior to the implementation of its GP program, Shen's had already reduced pollution and improved energy efficiency by installing water recycling, temperature-control, dust filtration and air change systems. These technological innovations have been backed up by a strong environmental management regime. Shen's was awarded the ISO 14001 Environmental Management System Certification in 1996.

WHY GP?

INNOVATION

As a forward-thinking company, Shen's viewed GP as an excellent opportunity to develop new technical and management solutions to its business challenges. The company's GP goals included capitalizing on reductions in raw material and resource consumption to lower production costs, upgrade productivity and improve the work environment.

ENVIRONMENTAL EXCELLENCE

GP provides a company with an opportunity to not only comply with environmental regulations and standards but also to demonstrate that it is committed to continuous improvement and the pursuit of environmental excellence. Because of this, Shen's recognized that GP could help it improve its image and be a leader in its sector while also helping it open up new business opportunities abroad.

To implement GP, the company used the methodology described in the introductory chapter.

MAIN ISSUES

The plant baseline audit looked at all aspects of the company's production process. The audit included assessment, tests and analysis of waste water, material and energy inputs and outputs. It also investigated waste characteristics and efficiency/productivity issues. Shen's operations are divided into pre-press (preparation of art work and plate processing) and press processes. Shen's uses both manual and electronic pre-press systems and employs offset lithography technology. The main stages of Shen's production process are shown in Fig. 1. The following issues were highlighted:



WASTE WATER

Manual pre-press film and plate making and processing operations were found to produce large quantities of waste water. The waste liquor from the platemaking process had a high chemical oxygen demand (COD) and high levels of dissolved silver. The press cleaning procedures also resulted in a major waste water stream containing residual ink.

GASEOUS WASTE

The press process produced volatile organic chemicals (VOCs), dust and acid gas. The major VOC emission came from the solvents used to wash and clean machinery such as the ink feeder and press.

SOLID WASTE

Solid wastes included waste plates, waste film, empty containers, waste ink and ink cans, spent rags and wastepaper.

INEFFICIENCIES

The plant's lighting, air conditioning, energy supply and management systems were found to be inefficient. Moreover, the company's contract with its power supplier was not optimally specified since the basic fee, which was not directly related to the company's daily power consumption, was calculated in such a way that the company might overpay a significant portion of the electricity bill.

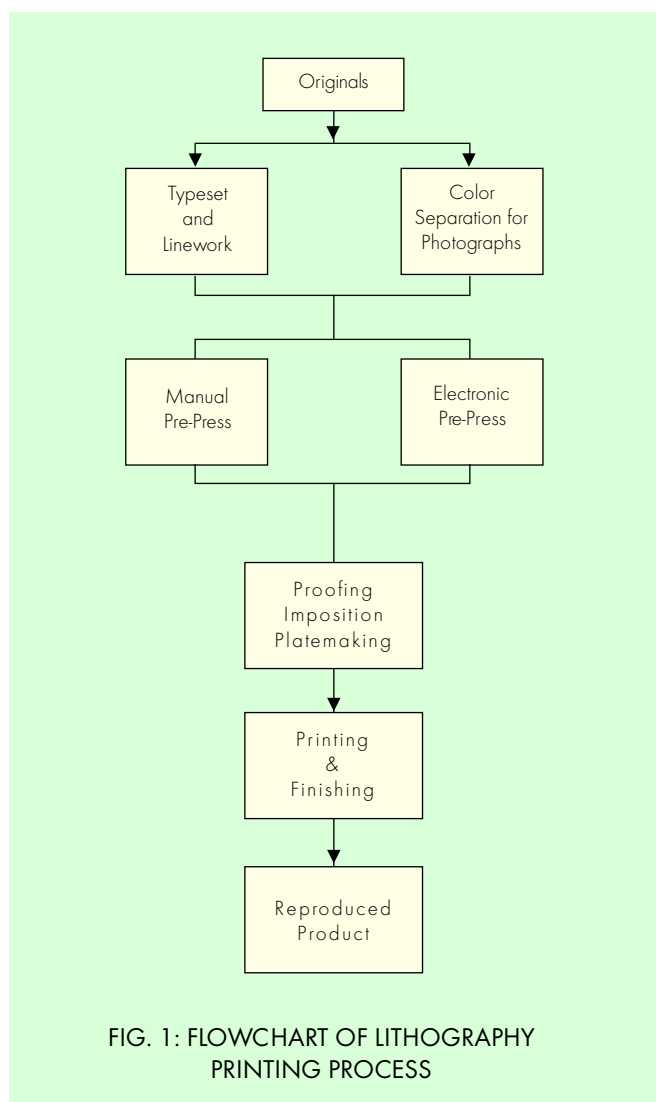


FIG. 1: FLOWCHART OF LITHOGRAPHY PRINTING PROCESS

GP SOLUTIONS

After studying the processes and operations and analyzing all technological and management options the GP team came up with the following main suggestions for improvements:

- Recover fixing silver from waste water.
- Recover residual ink and substitute solvent-based ink.
- Recover spent cleaning rags.
- Recycle packaging materials and containers.
- Implement film recovery, reduction and substitution.
- Improve energy conservation and efficiency.
- Eliminate mechanical noise.
- Phase out manual pre-press in favor of an electronic system.
- Reduce VOC emissions.
- Invest in innovative technology and research/development.
- Establish a unified industrial waste treatment system.

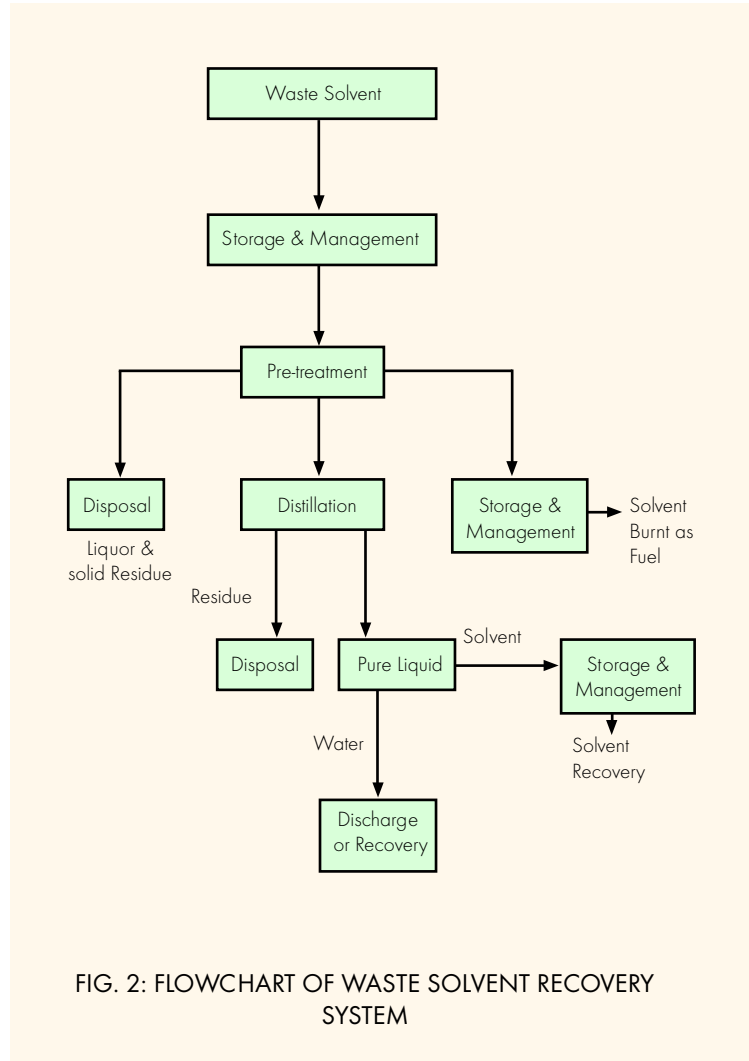


FIG. 2: FLOWCHART OF WASTE SOLVENT RECOVERY SYSTEM

GP IMPLEMENTATION

The options identified by the GP team were evaluated in terms of their environmental impact and technical and economic feasibility. Four were selected for immediate implementation and the rest were scheduled as long-term objectives. The following key improvements were implemented:

CHEMICAL RECOVERY

A system to recover silver from waste liquor by electrolysis was installed. This allows the silver to be re-used. The capital investment for this system totalled NT\$ 170,000 (US\$ 5,457), however it gives annual benefits (after running costs) of NT\$ 114,328 (US\$ 3,669). Savings include silver recovery of about 56 kg/year worth over NT\$ 124,000 (US\$ 3,980). This translates into a 18 month payback period.



A distillation system to recover waste solvent from the printing blanket and wiping rags was installed (see Fig. 2). The capital investment for this system was NT\$ 395,000 (US\$ 12,679), however it gives savings of NT\$ 306,000 (US\$ 9,822) per year due to a 75% solvent recovery rate. It also generates a NT\$ 3,056 (US\$ 98) annual reduction in wastewater treatment costs.

Given running costs of NT\$ 6,009 (US\$ 192), this translates into a total annual benefit of NT\$ 303,047 (US\$ 9,727) and a payback period of 16 months.



ENERGY EFFICIENCY

Plans to rationalize the use of energy were drawn up after a site evaluation by technical consultants from the Energy Technical Service Center of China. Implementation of the plans were estimated to give annual benefits of NT\$ 300,000 (US\$ 9,630).

PROCESS CHANGE

The phase out of the manual pre-press process was initiated. This involved the promotion of electronic working with all clients and is estimated to have reduced the company's film and chemical usage by two thirds (as compared with old manual methods). This translates into economic savings of about NT\$ 7.44 million (US\$ 238,824) per year. The transition to electronic publication systems has also brought improvements in working conditions and process management.

GP BENEFITS

The implementation of the four major GP options improved the environmental performance of Shen's factory in terms of its water and air pollution and its consumption of resources and energy.

ECONOMIC SAVINGS

The company has also enjoyed substantial economic benefits with annual benefits estimated to be NT\$ 8,150,000 (US\$ 261,615) in total.

CONCLUSIONS

The implementation of GP at Shen's showed how wide-ranging the environmental improvement possibilities are even in a progressive and technologically innovative company. It also demonstrated that the economic benefits of such improvement can be large and that payback periods need not be long-term.

Shen's plant represents a successful case study which demonstrates unequivocally to the printing sector that environmental protection and economic productivity can go hand in hand.



“Obtaining ISO certification and our research in minimization of waste are the results of the joint effort of our company and our customers in seeking excellence in the market.

By forming a team with our customers, Shen's Art will succeed in pioneering an approach which promises endless opportunities.”

Mr Hsi Chen
General Manager
Shen's Art Printing Co. Ltd.

Video available for this case study from:

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