Introducing Environmental Management in a Small Business, Nina Printhouse, Uppsala, Sweden

1 The Printing Business

Nina Printhouse, Uppsala, Sweden

Nina Printhouse is a small printing business in Uppsala, Sweden, with only the two owners and three additional persons employed. The annual turnover is about 3,000,000 SEK (300,000 Euro). The production at Nina Printhouse is basically conventional offset printing with sheet-feed. The products span from business cards, folders, booklets and posters to large books, in black and white or full colour. Orders come from the local market but the printhouse also occupy an important niche as a printhouse for non-european languages. 10% or more of the production are in Arab and Persian languages.

The printhouse has two print machines (two-colour Heidelberg Speedmaster printing 52x72 cm and a four-colour Solna printing 46x64 cm) and machines for ripping, photo-setter, sorting and folding-machine and a machine for glue-binding.

Description of the Production Flow

Jobs are delivered to the printing house as digital layout files, which are printed on film by photo setter, a so-called RIP (Raster Image Processor). The imprints of the films are then transferred to printing plates of aluminium, which are then mounted on the impression cylinder of the printing machines. After that the prints are cut, sorted, folded, and finally wired together to booklets or bound to books by glue-binding.

2 Introducing a Management System

The Environmental Consultant

After a request for environmental certification from customers in early 2005 Nina Printhouse contacted Tomas Hörz and Ove Högman from Euro Quality Consult AB EQC for help with the introduction of an environmental management system. The goal was to receive certification according to ISO 14001:2004.

Developing an environmental management system in a small business is different in many ways from implementation in a large company. One of the problems is that tools and work methods, the routines of the ISO standards, are very much adapted to the big companies. The executive in a small business however is often unfamiliar with the organizational framework for management systems in general, as well as with flowcharts and theoretical tools and other details. The daily work is instead based very much on short-time planning and ad hoc solutions. On the other hand communication is easy, more direct and also more flexible. As a consequence much of the work on certification of a small company is done by the consultant while large corporations can rely more on internal competence. The role of the consultant when working with a small company is quite wide. The consultant is very much like a coach and a guide. The management structure is ”imported” but also adapted together with the staff to the company. Ove Högman says that: *“Many small companies at first*

Figure 7.1 *The management system introduced at Nina Printhouse included ISO 14001:2004 but also addressed work environment and production quality.*

see the certification as something that cost money, but later they often find out that the management system itself can make production more efficient. It can payoff in many ways to work in a more systematic way. Environmental certification is often a good economic investment in the long run."

It is very important that the consultant is able to make the staff committed for the project to be successful. Most of the work is supposed to be carried out by the staff themselves. It is not meant to be only a desktop product with files on a computer.

A Management System of Continuous Improvement

The management system introduced included of course the standards of ISO 14001:2004 but also addressed work environment and production quality. The rules of AFS 2001:1 on working environment and the most important standards of ISO 9000:2000 on quality management were therefore integrated into the management system.

A key task in the process was to produce a *management handbook* for the company. This management handbook was based on a systematic overview of the production process at Nina Printhouse. It included a thorough description of the company, complete with organisational structure, and with instructions in detail for all the work tasks performed in the production process and with clear definitions on areas of responsibility. The handbook describes all the routines within the company, as well as rules for procurement of material such as paper, as well as details of waste management, energy management etc. The handbook was made both as a binder for the office and as a document on one of the computers.

One important aspect of the system is that decisions should be based on facts and collection of data is therefore very important. If the system works as intended the company and the production process will be continuously analysed and improved.

The principles and working methods are of course developed in co-operation with the operative staff and when fully implemented will ensure a higher degree of control over the work flows. The environmental management system developed at Nina Printhouse was based on the Plan-Do-Check-Act Deming model (see Figure 1.3, section 1.4.1). The basic idea is that a systematic way to work, including increased supervision and collection of error reports and other data, will ensure that relevant information becomes available, and increased possibilities of accurate decisions and continuous improvement.

Identifying Environmental Aspects

In the starting phase, the "Plan-phase" all the steps of the printing process are listed and mapped in order to identify and quantify the material flows and to identify processes of the production which may affect the environment. An environmental report is then written to describe the environmental context of the company and list the potential environmental impacts (aspects). For Nina Printhouse the following 20 items were listed:

Material use
- Paper for print
- Other materials for production
- Chemicals & inks
- Purchase of machinery
- Purchase of office material

Resource use
- Energy consumption
- Water consumption
- Heat & ventilation

Transport
- Transports
- Travel to work
- Travel at work
- Customer transports

Waste
- Waste of paper
- Dangerous waste from production
- Dangerous waste from office
- Other waste from production
- Household waste & office
- Outflow to sewer from production
- Outflow to sewer from kitchen

Noise
- Noise

The steps in the production were analysed by a simple comparision-matrix by pairs of different environmental aspects in a so-called difference matrix. Table 7.1 is an example of a implemented matrix.

In the difference-matrix the environmental aspects in the production process are listed both horizontally and vertically. Each one is then compared to each of the others. Thus, A is compared to B, C, D and so on. If A is considered more important than B "+" is entered and if not "- " is entered. The "+" are then added up. The judgments relied mainly on the experiences of the consultants. In future audits they may be based on more objective measures.

In the example matrix (see Table 7.1) the aspects with the most serious environmental consequences are identified as A and D. In the case of Nina Printhouse, 20 items were listed and then compared according to the matrix. The highest number of pluses was attributed to *Paper for print* (see Table 7.2). Some other important aspects were *Chemicals & inks*, *Energy consumption*, and *Transports*.

Identifying Environmental Goals

For two of these environmental aspects, *Paper for print* and *Waste of paper*, action plans were developed. In the future the intention is that when an action goal is met a new one is set up so that new environmental aspects always are addressed.

The analysis of the report should result in an environmental policy and in defining environmental goals and plans of action.

Table 7.2 *Nina Printhouse's 20 aspects listed according to the seriousness of their potentional environmental impact as judged by the difference matrix method.*

Paper for print	19
Chemicals & inks	18
Energy consumtion	15
Transports	15
Customer transports	15
Travels to work	14
Dangerous waste from production	13
Travel at work	12
Heat & ventilation	11
Waste of paper	10
Other materials for production	7
Dangerous waste from office	6
Other waste from production	6
Water consumtion	6
Household waste & office	6
Outflow to sewer from production	4
Outflow to sewer from kitchen	3
Purchase of machinery	2
Purchase of office material	1
Noise	0

Table 7.1 The difference matrix. *In the example below different environmental aspects in the production process are listed both horizontally and vertically. Each one is compared to each of the others. For example A (in the row to the left) is compared to B, C, D and so on. If A is considered more important than B, for example, "+" is entered and if not, "- " is entered. The "+" are then added up. In the matrix below the steps with the highest impacts are identified as A and D.*

	Alternative								
Alternative	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**Number "+"**
A		+	+	-	+	+	-	+	5
B			-	+	-	-	+	-	2
C				+	-	+	-	+	3
D					+	+	+	+	4
E						-	-	-	0
F							+	-	1
G								-	0
H									0
Number "-"	0	0	1	1	2	2	3	4	

An important element in the action plan is to define routines and instructions and also of course to train and inform the staff so that the plans are fully implemented in the daily work.

A very important routine to be implemented is the so called *error reports*. Every time an error occurs (failure to deliver on time, quality error, machine trouble etc.) the incident must be reported. Every now and then these reports will be analysed by the staff and possible preventive actions should be taken to avoid the problem in the future.

The Environmental Management System

With much help from the consultants a basic environmental management system was developed for Nina Printhouse. The system included improvements also in the general management of the company in order to increase the control of the production.

The discussions on the regular planning of the production of the printhouse was thus the main component of the work on certification. However, in addition a basic full-day general environmental education was held for the staff. This day was based on material from the Natural Step foundation.

Figure 7.2 *Printing inks are an important environmental aspect, and are 2nd on Nina Printhouse's list as "Chemicals & inks" but also occur as "Dangerous waste from production". Empty cans of ink are collected by an environmental service company for destruction.*

The certification process is a considerable investment in both time and money for a small company. The cost of certification is about 10,000 Euro. In the long run Nina Printhouse hope that certification will improve competitiveness and that environmental management, apart from being valuable in itself, eventually also will pay off in economic terms.

Certification and Continuous Improvement

One year after the process started a basic environmental management system exists at Nina Printhouse. In mid autumn 2005 in a third-party pre-audit for certification was performed by Mattias Widmark from BVQI. A recommendation for certification was issued and then sent to BVQI, a world-leading certifying authority for quality and environmental management systems. Within a month Nina Printhouse received a certificate with identification number by ordinary mail.

Nina Printhouse is now certified according to the standards of ISO 14001:2004. It will continue to be so in the future provided that environmental goals are set and met at the audits that will be performed annually as evidence of a continuous process of environmental improvement of the company.

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