CLEANER PRODUCTION ASSESSMENT IN SMALL AND MEDIUM INDUSTRIES OF SRI LANKA

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Summary
Cleaner Production assessment is a systematic and planned procedure for identifying, quantifying and finding options to minimise wastes. Implementation of Cleaner Production (CP) options will increase profits and simultaneously reduce the need for end of pipe pollution control.

This paper describes the Project SMED experiences in promoting, planning, organizing and developing implementation plans in several small and medium enterprises (SME) in Sri Lanka. It describes and compares different methods used to convince manager and employees of the organisation of the importance of Cleaner Production. The CP assessment methodology is tailored to the characteristics of the company, which is an important aspect of this exercise. Most SMEs in Sri Lanka start out as family businesses and with little professional capabilities. The resistance to change from pre-conceived ideas and lack of awareness were the challenges in getting the message across to SME’s. Project SMED also experienced varying problems in the formation of CP teams.

The paper also describes an attractive proposition of “cost sharing” for implementation of CP options after the assessment phase. Most companies are motivated to try adopting CP measures on a “pay as you benefit” rather than paying up front costs.

Keywords
Cleaner Production, methodology.

INTRODUCTION
In all developing Asian economies the percentage of SMEs is well over half of industrial production. Although the waste from individual SMEs is small, the environment and health impact of these companies on the community can be quite high. Due to limitations in capabilities; SMEs undergo difficulties of complying with end-of-pipe treatment of effluents.

“Talking of environment to a person who doesn’t have money to buy fuel to cook his dinner, he won’t even address himself to the problem of deforestation, to the problem of green-house gas emissions or into the problem of toxic emission.”[1]

Under this scenario, Cleaner Production (CP) remains the only solution to helping companies become competitive and environmentally friendly simultaneously.
Small & Medium Industries in Sri Lanka

Although a host of definitions are available in Sri Lanka for describing the SMEs, there is no universally applicable definitions for SMEs, and there are also various criteria used to define SMEs, for example;

- no of employees,
- value of turnover, and
- capital investment on fixed assets.

Project SMED (Small & Medium Enterprise Developers of Sri Lanka) uses the following definitions, which are related to the number of employees;

- less than 9 persons - very small scale (VSSE)
- 10 - 19 persons - small scale (SSE)
- 20 - 99 persons - medium scale (MSE 1)
- 100-199 persons - medium scale (MSE 2)

In a recent study done by Project SMED [2], important facts about Sri Lanka’s SMEs were revealed which have been useful for implementing CP. Some important facts are listed below.

- SMEs account for 86% of industries;
- SMEs contribute to 18% of GDP;
- SMEs employ 24% of the industrial workforce;
- 53% of SMEs import their raw materials;
- Value adding is 17% (product sector with largest value adding being Food & Beverages);
- Very few SMEs invest in environment protection, energy saving and packaging;
- Overall capital output ratio is quite low - 1:1.09;
- Export orientation (export turnover as a percentage of total turnover) had dropped from 16%-8% in 1996;
- Turnover per person employed in 1996 is US$4,286.

An important recommendation made by this study has been the need for “improvement of the internal productivity of enterprises, through high calibre leadership, which is able to motivate workers, reduce costs, and exploit this lucrative market segment”. Implementation of CP was a timely action taken by Project SMED to address productivity in general and environmental soundness and competitiveness.

Project SMED of Sri Lanka

Project SMED was established in 1989 as a joint collaboration between the Federation of Chambers of Commerce and Industry of Sri Lanka (FCCISL) and Friedrich-Naumann-Stiftung (FNSSt) of Germany.

The Federation of Chambers of Commerce and Industry of Sri Lanka (FCCISL) is the apex organisation for 36 trade chambers and associations at metropolitan, district and provincial level which have a combined membership of over 30,000 comprising successful sole
proprietorships, partnerships, private limited liability companies, public and quoted companies, countrywide.

Established in 1973, the FCCISL plays a major role in articulating the macro policies necessary for overall private sector development and performance while the affiliated chambers and associations take up the sectorial issues relevant to their specific area of business interest.

With private sector being identified as the engine of economic growth, the role of the FCCISL and its constituent members have been widespread reaching almost every major economic activity.

FCCISL conducts several projects and programmes to achieve its broader objectives and enhance the contribution of the private sector towards rapid socioeconomic development. These are carried out and achieved through separate departments under the FCCISL.

The Friedrich-Naumann-Stiftung (FNSt) is a German Foundation devoted to the principles of freedom and liberty. All over the world, the principles of free market and the rule of law are the basis of individual liberty in a civic society. With political education and consultation, the Friedrich Naumann Foundation meet the freedom’s promise and challenge. The FNSt help to solve the pressing problems of today’s world by creating an awareness among the average citizen, helping them to understand politics, and encouraging their active participation.

At a time the country changed from a closed economy to an open economy, local industries were highly worried about dumping and competition problems. Project SMED strategically come into being at this particular time and it was a great challenge to win over the SME sector who were not in favour of the open economic policies. Not only has SMED been successful in helping the SMEs to upgrade their production technology and thereby improve productivity, but SMED has also created a great awareness among the SMEs about the value of the consultancies.

**CLEANER PRODUCTION ASSESSMENT METHODOLOGY**

Consultants working on Project SMED received extensive training under the Industrial Pollution Reduction Programme (IPRP) of the Central Environment Authority (CEA) sponsored by UNDP & UNIDO. With the knowledge and training they received, they adopted the following methodology for the CP assessment of Industries.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1</td>
<td>- Getting Management Commitment</td>
</tr>
<tr>
<td>Phase 2</td>
<td>- Formation of CP teams and training them on CP</td>
</tr>
<tr>
<td>Phase 3</td>
<td>- Preparation of flow charts and identification of waste stream</td>
</tr>
<tr>
<td>Phase 4</td>
<td>- Data collection &amp; quantifying waste</td>
</tr>
<tr>
<td>Phase 5</td>
<td>- Cause analysis and option generation</td>
</tr>
<tr>
<td>Phase 6</td>
<td>- Selection of priorities</td>
</tr>
</tbody>
</table>

During the actual assessments which was a learning process for the SMED consultants, a number of problems and constraints were experienced, which were useful for future improvements. Some of the barriers faced at the assessment phase were:

- Systemic barriers
  - Lack of professional management skills
Low quality of record keeping and in most cases no record keeping

- Organisational barriers
  - Concentration of decision making powers
  - Over emphasis on production
  - Non involvement of workers

- Technical barriers
  - Limited technical capabilities
  - Limited access to technical information
  - Limited or lack of skilled man power
  - Lack of in-house monitoring
  - Deficiencies in maintenance

- Economic Barriers
  - Financial soundness of the company
  - High cost and low availability of capital for CP implementation

**Experience of the CP Assessments Carried out by Project SMED**

Project SMED has carried out CP assessments in the following industries to date:

- Food & Beverages 1
- Hospitality Industry 5
- Steel Industry 1

The following are now in progress

- Tea Industry 1
- Printing Industry 1

After the Cleaner Production Assessments were completed the Enterprises were able to reduce waste which invariably polluted the environment. Further, it resulted in considerable financial savings for the Enterprises.

**Summary of a CP Assessment carried out by SMED**

One of the pioneering companies in the south of Sri Lanka, established in 1953, started on very small scale and has now matured providing direct, indirect and contract employment opportunities to a large number of people. Blended with a southern tradition, the company is popular among every class of Sri Lankans and manufactures edible products, dairy products, soaps, oil, and animal food.

The Managing Director of the company was keen to implement CP. The noodle and soap manufacturing sections, the grinding mill and the steam generation and supply sections were the focus of the main audit. After the initial discussions the main CP team and five sub-teams were formed. The main CP team consisted of the Departmental Managers and sub teams had a blend of Managers and operators.
The main success of the CP assessment and the subsequent implementation was the effective management and the involvement of the teams. The teams had a free hand and were allowed to meet during working hours. The composition of the team is given in Table 1.

<table>
<thead>
<tr>
<th>Category / Department</th>
<th>Team Leader</th>
<th>Team make-up in number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Management</td>
</tr>
<tr>
<td>Main Team</td>
<td>Quality Assurance Manager</td>
<td>7</td>
</tr>
<tr>
<td>Soap</td>
<td>Department Manager</td>
<td>1</td>
</tr>
<tr>
<td>Grinding Mill</td>
<td>Department Manager</td>
<td>1</td>
</tr>
<tr>
<td>Noodles Department</td>
<td>Department Manager</td>
<td>1</td>
</tr>
<tr>
<td>Pappadam Section</td>
<td>Department Manager</td>
<td>1</td>
</tr>
<tr>
<td>Grain Mill</td>
<td>Department Manager</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 1: Composition of CP team at Harischandra Mills

The consultants conducted several rounds of awareness programmes to introduce CP as well as several brainstorming sessions, after which the team members generated a number of CP options to reduce, recycle or reuse waste.

The individual CP teams took the initiative to implement low cost CP measures almost immediately. During subsequent visits the consultants observed that the teams took pride in explaining the low cost measures which are mainly good house-keeping practices.

The Managing Director himself was involved in some of the lengthy brain storming sessions, acting as a facilitator and listening to some of the innovative ideas brought out by “people who always resisted change”. According to the Managing Director this was the greatest achievement by CP. Table 2 compares some of the CP results of those companies that have been assisted by SMED.
<table>
<thead>
<tr>
<th>Company</th>
<th>Management Commitment Rating</th>
<th>Employer / Employee Relationships</th>
<th>Prevalence of a Company Culture</th>
<th>Number of CP Teams</th>
<th>Composition of CP Team</th>
<th>Type of Options</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Supervisors</td>
<td>Operators</td>
<td>L</td>
</tr>
<tr>
<td>F</td>
<td>100 Very Good</td>
<td>Yes</td>
<td>6</td>
<td>12</td>
<td>19</td>
<td>92</td>
</tr>
<tr>
<td>H1</td>
<td>90 Good</td>
<td>Yes</td>
<td>1</td>
<td>6</td>
<td>1</td>
<td>40</td>
</tr>
<tr>
<td>H2</td>
<td>60 Satisfactory</td>
<td>No</td>
<td>1</td>
<td>3</td>
<td>-</td>
<td>28</td>
</tr>
<tr>
<td>H3</td>
<td>70 Satisfactory</td>
<td>Yes</td>
<td>1</td>
<td>5</td>
<td>-</td>
<td>25</td>
</tr>
<tr>
<td>S</td>
<td>80 Very Low</td>
<td>No</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>24</td>
</tr>
<tr>
<td>H4</td>
<td>90 Good</td>
<td>Yes</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>22</td>
</tr>
<tr>
<td>H5</td>
<td>60 Low</td>
<td>Yes</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>18</td>
</tr>
</tbody>
</table>

F - Food related Industry; H - Hospitality Industry; S - Steel Mill
LC - Low cost; MC - Medium Cost; HC - High Cost

Table 2: Comparison of CP results

CONCLUSIONS

Experience gathered from the few assessments SMED has carried out shows that the following are the most important motivators for the adoption of CP principles by SMEs.

Pro-active and Committed Top Management

The top management should appreciate the importance of employees’ involvement and participation and should be willing to accommodate and implement feasible options and ideas generated by them.

Effective CP Team

This seems to be the most important factor for a successful CP assessment and implementation. Therefore, the consultant should attach a high priority to the selection of the team which will at large depend on the characteristics of the company. The team should be trained in CP as well as on team working.

Cost Sharing

As in many countries SMEs in Sri Lanka are slow in responding to CP, however financial barriers are the most significant impediment for implementing CP. As a solution to induce companies to attract towards Cleaner Production, Project SMED is currently trying a “Pay as you benefit” approach. The objective of this approach is to realise the benefit and then induce the company to pay. Careful analysis of tangible benefits should be done and a lasting tract has to be built between the SMED consultant, and the company.
The consultancy cost will be borne by SMED, up front whilst this proposal remains attractive, the implementation is slow due to the present limitation of absorbing it to the company’s accounting structure. A proper documentation system and a legal framework is worked out.

**Capacity Building**

One of the barriers faced almost in all the companies assessed, is the lack of records. In the process of assessing, proper record keeping had to be introduced. While performing material and energy balances, serious lapses in the company records and thereby short-comings in the accounting system was detected. Therefore, it is necessary to launch an awareness programme to introduce a proper system of record keeping and maintenance. Government and non-governmental organisations must have concentrated data on SMEs. Wide scale dissemination of information on CP and related issues must be available.

**Final Remarks**

Success of a CP implementation in most SMEs in Sri Lanka depends on the workforce. CP requires voluntary participation. Therefore the workforce should have high moral value and be contented. Their quality of life should be improved. The company should look at ways and means to improve the quality of life. Supportive programmes such as productivity improvement through application of ‘5S’, has shown sufficient results if it is implemented with the involvement of the employee family units.

**REFERENCES**

