Application of Cleaner Production in the packaging process of sockets lamps: a case study.

BENVENUTI, T. a*, MAFFESSONI, D. b, TONIN, B. P.b

a. Universidade Federal do Rio Grande do Sul, UFRGS, Porto Alegre-RS
b. Faculdades Ftec, Bento Gonçalves-RS
1. Introduction

Cleaner Production

- Reduce emission
- Reduce energy consumption
- Reduce material consumption

- Save cost
- Enhance competitiveness
- Sharpen corporate image
The aim of this study was to reuse and to optimize the use of packaging in a business outsourcer mounting sockets lamps. It was carrying out as a case study for increase the capacity and reuse of the pack.
Socket cover

Socket box
Open socket  

Assembled socket
3. Methodology

- Step 1: planning and organization;
- Step 2: pre-assessment and diagnosis (global process flowchart);
- Step 3: studies and evaluation (intermediate flowchart);
- Step 4: technical, economic and environmental feasibility studies, and the selection of viable opportunities (prioritization);
- Step 5: implementation, monitoring and continuity plans (case study).
### 4. Results

#### 4.1 Global Process Flow Chart

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Lamp sockets outsourced assembly</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastic parts</td>
<td></td>
<td>Plastic parts waste</td>
</tr>
<tr>
<td>Metal parts</td>
<td></td>
<td>Metal parts waste</td>
</tr>
<tr>
<td>Plastic packaging</td>
<td></td>
<td>Plastic packaging waste</td>
</tr>
<tr>
<td>Paperboard packaging</td>
<td></td>
<td>Paperboard packaging waste</td>
</tr>
</tbody>
</table>
4.2 Intermediate flowchart

Receipt of disassembled parts → Packaging waste

Conference parts → Defective parts

Sockets assembly

Metal and plastic parts

Packaging

Plastic packaging → Packaging waste

Paperboard packaging → Paperboard packaging waste

Return to the supplier
4.3 Prioritization

- Packaging used were large, contained little material and could have a better use.

- Socket cover packaging:
  - 2500 units occupying 48% of capacity.
4.3 Prioritization

Packaging use percentage

- Socket box packaging: 2500 units occupying 65% of capacity.
4.3 Prioritization

Packaging use percentage

- Socket spring packaging:
  - 10000 units occupying 17% of capacity.
4.4 Case Study: Application of cleaner production in the reuse of raffia bags and the reduction of plastic packaging.
### 4.4.1. Case study: indicators and benefits

- Indicators calculated for socket box parts.

<table>
<thead>
<tr>
<th></th>
<th>BEFORE CLEANER PRODUCTION</th>
<th>AFTER CLEANER PRODUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of parts / packaging (units)</td>
<td>2.500</td>
<td>3.000</td>
</tr>
<tr>
<td>Packaging consumption (units/year)</td>
<td>600</td>
<td>75</td>
</tr>
<tr>
<td>Total cost of packaging (R$/year)</td>
<td>330,00</td>
<td>41,25</td>
</tr>
</tbody>
</table>
4.4.1. Case study: indicators and benefits

- Indicators calculated for socket cover parts.

<table>
<thead>
<tr>
<th></th>
<th>BEFORE CLEANER PRODUCTION</th>
<th>AFTER CLEANER PRODUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of parts / packaging (units)</td>
<td>2.500</td>
<td>4.500</td>
</tr>
<tr>
<td>Packaging consumption (units/year)</td>
<td>600</td>
<td>50</td>
</tr>
<tr>
<td>Total cost of packaging (R$/year)</td>
<td>330,00</td>
<td>27,50</td>
</tr>
</tbody>
</table>
4.4.1. Case study: indicators and benefits

![Bar chart showing packaging consumption and total cost of packaging for Box Socket and Cover Socket before and after cleaner production.](chart)

- **Packaging consumption (units/year)**
- **Total cost of packaging (R$/year)**
### 4.4.1. Case study: indicators and benefits

- Indicators calculated for assembled socket packaging.

<table>
<thead>
<tr>
<th></th>
<th>BEFORE CLEANER PRODUCTION</th>
<th>AFTER CLEANER PRODUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of parts / packaging</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>(units)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Packaging consumption</td>
<td>30,000</td>
<td>15,000</td>
</tr>
<tr>
<td>(units/year)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total cost of packaging</td>
<td>7,200.00</td>
<td>3,600.00</td>
</tr>
<tr>
<td>(R$/year)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.4.1. Case study: indicators and benefits

Graph of the reduction of finished product packaging and total cost involved

![Graph showing reduction in packaging and total cost](image_url)

- **Packaging consumption (units/year).**
- **Total cost of packaging (R$/year).**
4.5 Total benefits

- Environmental benefits: reduction of 16,075 units of plastic packaging;
- Economic benefits: R $ 4,191.25 per year, without investment.
5. Conclusion

- It was proved the efficiency of cleaner production even in small and simple projects.

- It was a small reduction action at source, rather simplistic in nature that can significantly reduce the consumption of packaging and its cost of purchase.
References

Acknowledgements

- UFRGS, CAPES and CNPq-Brazil for financial support.

Tatiane Benvenuti
benvenuti.tatiane@gmail.com