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OCCASION

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RECP Experiences at Suprema Aços Indústria e Comércio Ltda.

The efficient and environmentally sound use of materials, energy and water - coupled with the minimization of waste and emissions - makes good business sense. Resource Efficient and Cleaner Production (RECP) is a way to achieve this in a holistic and systematic manner. RECP covers the application of preventive management strategies that increase the productive use of natural resources, minimize generation of waste and emissions, and foster safe and responsible production. Benefits are eminent in many enterprises, regardless of sector, location or size, as demonstrated by the experiences of Suprema Aços Indústria e Comércio Ltda. in Brazil.

Achievements at a Glance

The implementation of RECP at Suprema Aços Indústria e Comércio Ltda. generates four case studies covering: changing the type of solder nozzle used; replacing the gas supply cylinder by implementing integrated station to the gas distribution network; substitution of disposable textile rags by using reusable towels used in the cleaning of operators and parts contaminated with oil and grease; changing the type of oil used in the plasma cutting table. These actions provided an annual economic benefit of US\$ 102,355.16, where only action regarding the implementation of the gas station demanded investment by US\$ 26,927.87 with payback of 3.3 months. The environmental benefits provided by the RECP total annual reduction in the generation of 1,223.76 kg of solid waste, annual emission reduction of 90.00 kg of CO₂ and reduce the annual discharge of 300 liters of waste oil.

Overview

The Suprema Aços Indústria e Comércio Ltda., located in Belo Horizonte/Minas Gerais, develops and carries out projects for various industries such as steel, mining, cement, pulp and paper, oil and gas, power, petrochemical, among others. The company has 150 employees and generates a monthly output of 170 tons. Its main field of activity are engineering projects involving machining processes, boiler shop and welding in the manufacture of parts, equipment and metal constructions. Productive activities that combine to form the process have a varied configuration being dependent on the type of product to be developed within the company.

Benefits

The welding process of the Suprema Aços Indústria e Comércio Ltda. was one of the focal points of RECP during its evaluation were checked that the low durability of welding nozzles used generates a large number exchanges causing a low productivity of operators. To solve this problem many studies have been performed considering the following characteristics of welding nozzles: utility, physical characteristics and workability. The company chose to conduct the welding process with increased productivity and less waste. For this was held several daily measurements, simulations with various types of welding nozzle, during 22 days. Comparisons were made between the various types of nozzles and their respective constitutions and it was decided to replacement of Copper welding nozzle for a Copper-Chromium-Zirconium welding nozzle. The comparative analysis shows that the use of 2,112 units / year of copper welding nozzle will reduce to 528 units / year of Copper-Chromium-zirconia welding nozzle. Although Copper-Chromium-Zirconium welding nozzle has a unit cost of US \$ 4.15 and the copper nozzle costs \$ 2.24, reducing the amount consumed and reducing nozzle exchange operation provide economic gain annual by US\$ 2,919.62. Along with economic gain, less waste will be generated by avoiding the generation of 23.76 kg / year of copper waste.



Figure 1: Before Cleaner Production:
Copper welding nozzle



Figure 2: After Cleaner Production:
Copper-Chromium-Zirconium welding nozzle

Before RECP the supply of gases (Argon, CO₂, LPG and oxygen) was conducted through cylinders and bottles, as demand. It has been found the high cost of these inputs and noted that the value offered by the supplier is greatly change depending on the form of packaging, as well as other factors that influence the final price, such as: logistics, administrative costs and cost of packaging. For improvement was studied the possibility of constructing a gas station, eliminating the supply through cylinders and bottles. This measure required an initial investment of US\$ 26,927.87 and provided an annual reduction of costs by US\$ 97,875.99 and eliminates the transport of gases in cylinders, avoiding the annual emission of 90 kg of CO₂ into the atmosphere.



Figure 3: Before Cleaner Production:
Gas supply by cylinders and bottles



Figure 4: After Cleaner Production:
Gas Station

Throughout the manufacturing process of the Suprema Aços Indústria e Comércio Ltda. There manipulating parts, machinery and equipment which employ various types of oil and grease. Aimed at cleaning of operators and improved operating processes every day they are distributed to workers rags for this purpose. This material after use results in waste contaminated with oils and greases and thus require a specific management, since it is a residue class I - dangerous according to NBR 10.004. Monthly are purchased 100 kg of rags generating a cost of US\$ 147.63 per month. After the rags are destined for landfills monthly cost allocation of US \$ 89.07 in addition to generating environmental liabilities.

The associated costs and the environmental liability issue led to the change of rags for returnable industrial towels. The team set a trial period, where for a month of work contracted to supply 700 units of industrial towels, with the cost of US \$ 177.16. With this procedure has eliminated the cost of acquisition of rags and disposal of waste used rags, since the industrial towels are returned to the providing company. This measure provided an annual economic benefit of US\$ 714.51 and prevented the annual shipment of 1,200 kg of hazardous waste to landfill.



Figure 5: Before Cleaner Production: Disposable rags



Figure 6: Before Cleaner Production: Industrial

The plasma cut in the Suprema Aços Indústria e Comércio Ltda. takes place at a table where there is an oil mirror for better operation of the equipment and for the absorption of sludge and smoke. The opportunity to exchange oil used for other with greater durability has been identified, reducing the number of annual annual changes and therefore the generation of the oil residue (class I). Currently is used in the plasma table an oil of the poor quality (PLAC 3020), which generates, as well as sludge, excessive smoke and dirt in the machine components. This oil should be changed every six months performed. This oil was replaced by higher quality oil (Houghto GRIND 22). This oil has longer life, becoming necessary to change each year as well as producing fewer grounds, reducing smoke and dirt components. With this action we obtained an economic benefit of US\$ 845.04 and has avoided the annual discharge of 300 liters of waste oil.

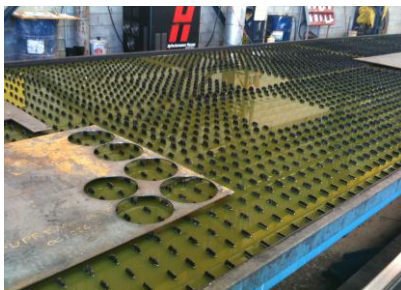


Figure 7: Before Cleaner Production: Low-quality oil in the plasma cutting table

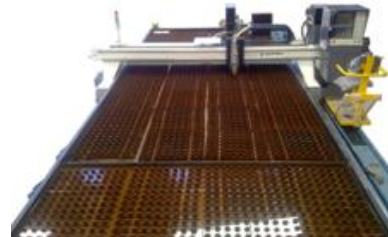
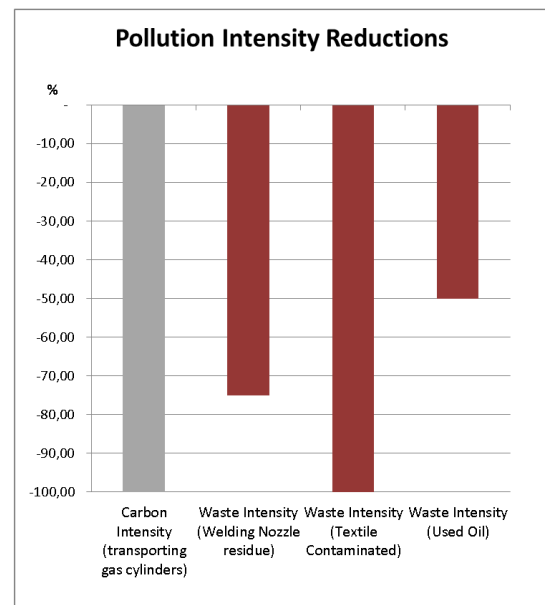
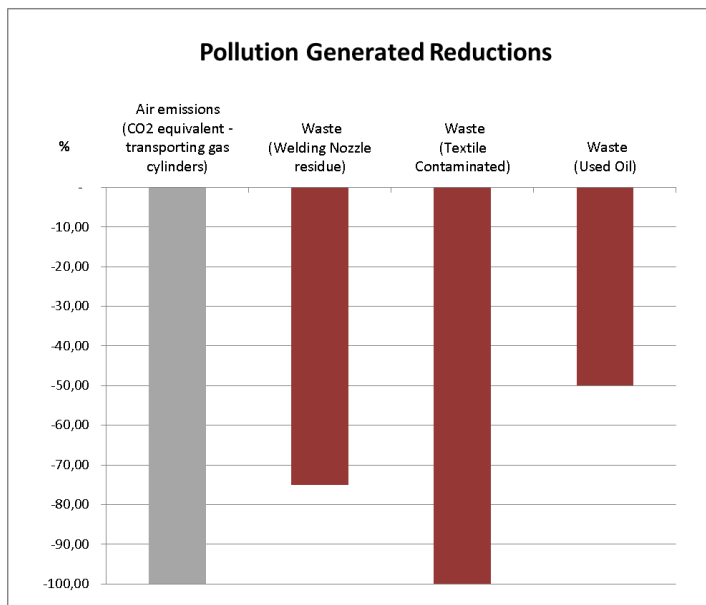
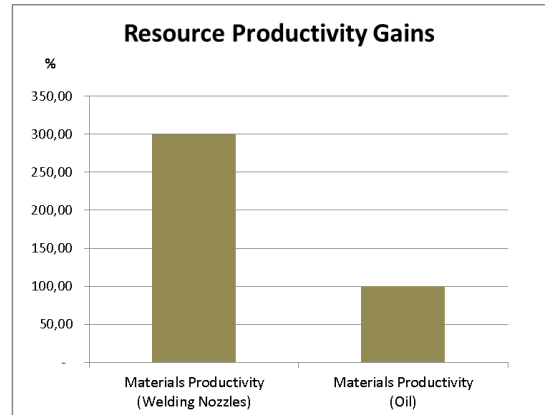
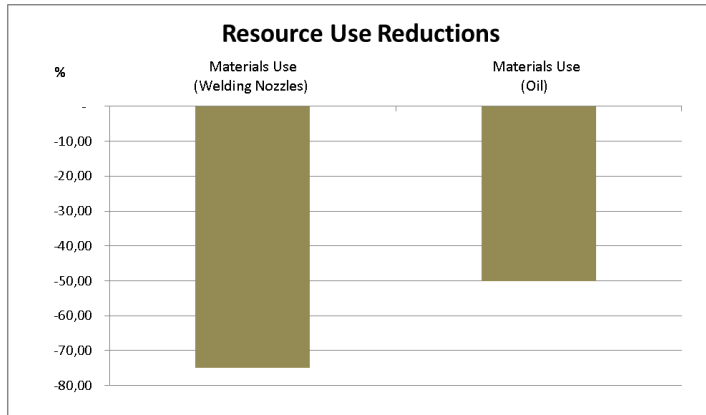


Figure 8: After Cleaner Production: Top quality oil in the plasma cutting table

Absolute Indicator	Change (%) Year 1	Relative Indicator	Change (%) Year 1
Resource Use		Resource Productivity	
Energy Use	-	Energy Productivity	-
Materials Use (Welding Nozzles)	- 75,00	Materials Productivity (Welding Nozzles)	300,00
Materials Use (Oil)	- 50,00	Materials Productivity (Oil)	100,00
Water Use	-	Water Productivity	-
Pollution Generated		Pollution Intensity	
Air emissions (CO ₂ equivalent - transporting gas cylinders)	- 100,00	Carbon Intensity (transporting gas cylinders)	- 100,00
Waste-water	-	Waste-water Intensity	-
Waste (Welding Nozzle residue)	- 75,00	Waste Intensity (Welding Nozzle residue)	- 75,00
Waste (Textile Contaminated)	- 100,00	Waste Intensity (Textile Contaminated)	- 100,00
Waste (Used Oil)	- 50,00	Waste Intensity (Used Oil)	- 50,00

RECP Profile



Resource Efficient and Cleaner Production (RECP)

Resource Efficient and Cleaner Production (RECP) entails the continuous application of preventive environmental strategies to processes, products and services to increase efficiency and reduce risks to humans and the environment.

RECP addresses three sustainability dimensions individually and synergistically:

- *Production efficiency*

- > Through improved productive use of natural resources by enterprises

- *Environmental management*

- > Through minimization of the impact on nature by enterprises

- *Human development*

- > Through reduction of risks to people and communities from enterprises and supporting their development



Testimony Box

National Cleaner Production Centre (NCPC)

The SENAI National Cleaner Technologies Centre was created in July 1995, upon the accepted candidature of SENAI Rio Grande do Sul to nest the National Cleaner Production Centre of Brazil, through a UNIDO/UNEP call for candidate institutions to establish a NCPC in developing countries. CNTL was the 10th NCPC implanted in the world and the 1st in Latin America. Since 2002, we are the national focal point for Cleaner Production matters by appointment of the Brazilian Government to UNIDO/UNEP.

SENAI CNTL integrates the network of Units of SENAI-RS, a branch of SENAI (National Service of Industrial Education), a nationwide institution with a tradition of 62 years of professional education and services for industries. CNTL responds for the technical coordination of the Cleaner Production Network of CNI (the National Confederation of the Industry).

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RECP Experiences



ABOUT RECP EXPERIENCES

Through the joint Resource Efficient and Cleaner Production (RECP) Programme, the United Nations Industrial Development Organization (UNIDO) and the United Nations Environment Programme (UNEP) cooperate to improve the resource productivity and environmental performance of businesses and other organizations in developing and transition countries. The Programme is implemented in partnership with the Global Network for Resource Efficient and Cleaner Production (RECPnet). This series of enterprise success stories documents the resource productivity, environmental and other benefits achieved by enterprises in developing and transition countries through the implementation of RECP methods and practices.

These successes were achieved with the assistance of the National Cleaner Production Centres, which are part of RECPnet established with support of the UNIDO and UNEP. The success stories employ the indicator set described in *Enterprise Level Indicators for Resource Productivity and Pollution Intensity*, UNIDO/UNEP, 2010. The primer with accompanying calculator tool and further case studies are available at www.recenet.org, as well as on www.unido.org/cp and www.unep.fr/scp/cp.