

CLEANER PRODUCTION IN EGYPT SUCCESS STORY IN INDUSTRIAL DEVELOPMENT WORKS



The Factory: Industrial Development Works an Egyptian joint stock company established in 1952, it is a leading company in manufacturing taps and valves.

Industrial operations take place in two sites one of where the old factory lies, and the other is a new factory built for expansion. Such expansion project is an upgrade for the casting methods currently existing in the factory, and switching from manual casting to automatic one aided by sand withdrawal lines, sand mixer and foundry furnace, which leads to production improvement and factory productive energy decrease.

Residential buildings border the old factory which increases the danger of environmental impacts on the surrounding environment

The results achieved from the CP are summarized. The information serves to demonstrate how CP and Energy Efficiency can be successfully implemented in industries in Egypt.

GENERAL INFORMATION	COMPANY	Industrial Development Works (I.D.W)
	SECTOR	Metallurgical- Energy
	PRODUCTS	Valves used in water and wastewater networks and different types of accessories for pipeline networks from gray and ductile cast iron. It also produces copper and aluminum products.
	MARKET	Local Market
	EMPLOYEES	400 (350 permanent; 50 seasonal)
	WORKING SYSTEMS	One shifts 8hr/dayx 6 days/week

PRODUCTION

PROCESSES

The productive process can be summarized in 3 main stages:

- Producing casted materials
- Operating casted materials
- Assembling and testing different products.

PRODUCTION (CONT.)

RAW MATERIALS

Scrap iron, Cast iron for machines, Raw cast iron for foundries, Scrape copper & Aluminum

ENERGY SOURCES

-Coke 16.74 tons/month in cupola furnaces

- Gas oil 5700 l/month in the copper furnace

-Electricity factory with 79000Kwh/month in induction furnace

WASTES AND EMISSIONS

1- Gaseous emissions

gaseous emissions sources can be categorized as follows:

- a. Melting process emissions (furnaces and crucibles).
- b. Treatment with magnesium process emissions
- c. Casting process emissions as
- d. Shakeout process emissions.
- e. Painting process emissions.

The factory does not contain emissions treatment system, while dust collection system exists in some areas within the old factory but it does not cover all emissions areas.

2-Solid wastes

Solid wastes are generated from the foundry, such as:

- Molding spoilage.
- Sand spoilage (even after the use of recycling system in the new factory, there will be 10% of sand spoilage.)
- Slag (with the percentage of 20-25% out of furnace melted material).
- Firebrick.
- Coal remnants.

Some solid wastes are generated





from operation workshops, such as: Cast iron and copper turnings and spoiled cast iron returns- cast iron, copper and aluminum wastes (metallic wastes) are re-melted in cupola furnace in old factory.

Occupational health and Safety (OHS)

There are some occupational perils against workers' health and safety, such as:

- Dust and emissions in workplace.
- High temperatures around melting furnaces.
- Sometimes, personal protection devices are not used in the factory the matter that may expose workers to accidents, especially, when handling melted metal.
- Visual perils resulting from the process of treating with magnesium in an open area, increasing perils on workers – activities causing hazards are not separated from other activities; consequently, workers are exposed to perils from activities not connected with their work.

CP OPTION



Specifying cleaner production Opportunities

1-Transforming (cupola) furnace working with coke to a (rotary) furnace

- Current state: copula furnace used currently causes many environmental problems such as: coke, SO₂ and NO_x emissions, in addition to exposing workers to perils resulting from melted metal scattering and the fall of some materials out of furnace.
- Needed action: replacing copula furnaces with rotary furnace (with the possibility of increasing furnaces in the future), providing solutions to copula furnaces problems with a lower cost because of its closed design and energy consumption.

2-Developing shakeout and sand blasting processes

- Current state: Separation between sand and product takes place through being shaken manually causing sand to fly apart and leading to productivity slowdown, additionally, product is cleaned in casting workshop.
- Needed action: making shakeout process an automatic one, taking into considering the matter of using filters and a system for collecting flying dust.

3-Developing painting area

- Current state: the process of painting products takes place currently in an open area within the factory with the use of spray compressor, matter which leads to wasting materials and causing emissions in the surrounding area.
- Needed action: developing painting area through using dripping (electro) or powder based process inside closed booths, leading to an increase in productivity and making painting quality better in addition to controlling emissions, as powder based system contains a unit devoted for collecting emissions and re-using them (a closed system) leading to reduced costs. A comparison has been made between the two suggested methods to determine the suitable method, as illustrated in table (4), it is economically and environmentally advisable to use the powder-based method in painting.



RESULTS

During the CP assessment that was conducted by a team of ECO experts, 3 CP options were identified for the company.

The three most feasible and rewarding options are described below:

Option	Environmental Benefits	Economic Aspects		
		Savings [L.E./y]	Investment L.E	Payback [year]
Option 1: Replacement of the Cupola furnaces with a Rotary furnace operating with natural gas	-improving working environment and achieving compliance with EEL law CO ₂ reduction = 647.633 t/y SO ₂ reduction = 24.1056 t/y PM10 reduction = 7.6717 t/y H.M. reduction = 0.218 t/y	614748	1,260,200	2
Option 2: Upgrade shakeout and sand preparation processes	TSP reduction = 0.64 t/y	492885	913600	1.8
Option 3: Upgrade painting process	- Reducing painting residue - Improving work and surrounding environments Reduce the volatile organic compound(VOC)	606500	27500	1.8

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