

ANALYSIS OF ATMOSPHERIC POLLUTION OF A PRODUCTIVE ACTIVITY IN THE GALVANIC COATING SECTOR

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ABSTRACT: *The proposed project has as a goal to highlight environmental problems which are recognized at the level of an enterprise and to highlight corresponding environmental policies in order to achieve a more environmentally friendly and economically more efficient enterprise. A priority for scientists, public body and civil society is to prevent and avoid environmental impacts when carrying out diverse economic activities. If environmental pollution is not avoidable when performing different production activities, appropriate environmental protection technologies have to be designed in order to provide a new economic and environment-friendly behavior of human beings and of the society as a whole. In the present development stage, carrying out environmental impact assessments as well as shaping efficient environmental management systems have to become basic elements in the management strategy of each company. Appropriate company environmental policy can reduce environmental pollution. On the other side a careful environmental impact analysis and assessment of different life-cycle stages of products, can have as a direct consequence improving existing production processes, so that environmental impacts are minimized, finally getting by this a more efficient environmental policy on the company level.*

Keywords: *sustainability strategies; environmental policy; environmental protection; emission reduction; pollution;*

Introductory information

The numerous debates and scientific actions carried out lately have resulted in the recognition of the fact that the sustainability of humanity at the global level is closely linked to the achievement of the sustainability of numerous human economic activities, which can have a greater or lesser impact on the quality of people's lives, not least in turn through their impact on the environment due to environmental pollution [Ardelean, F., 2015]

Environmental pollution is the change in the quality of the environment through various actions caused primarily by the human factor, in various ways, especially through the development of various anthropogenic elements and economic activities more or less necessary for people's lives [Jischa, M., 2005].

The problems related to environmental pollution have become particularly complex in recent years, although already since the 1970s the world organization The Club of Rome has tried to draw the attention of mankind to the complexity of the problems related to this aspect (Meadows, D. and D., 1972). Consequently, at the present time, humanity is faced with the situation that the aspects related to the protection of the environment are not fully understood properly, often requiring a greater involvement of the authorities in educating the population in this regard [Ardelean, F., 2015].

Many businesses and commercial companies recognize that they must give importance to issues related to environmental protection, through their activities negatively impacting the environment, but when the problem arises of

surviving economic crises, as is currently happening, these problems related to the negative impact on the environment become minimal and are often neglected [Jischa, M., 2005].

In this context, a special role can be played by environmental policies and strategies, with the help of which it is aimed to obtain the optimization of technological processes from various industrial economic activities regarding the degree of impact on the environment, as well as concrete environmental protection measures.

Pollution in the galvanizing process. Emissions in the atmosphere

Galvanic workshops are big consumers of chemical products that are particularly toxic for humans and the natural environment. The production conditions of galvanic sections are characterized by working environment with increased humidity (chroming activities consuming a lot of water needed in different stages of the production process resulting in waste water), a significant concentration of vapors and harmful gases. The gaseous emissions shown in fig.1 generated contribute to the illness of

people and the degradation of the environment, acting directly on its balance.

The main polluting effects are: acid rain, formation of photochemical smog, greenhouse effect and the destruction of the ozone layer (fig. 1).

Sources of emissions from the technological process, emissions [vapours] from galvanizing activities are:

- volatile organic compounds (VOCs) emissions from solvents used for washing/degreasing;
- emissions in the form of vapors containing chromic anhydride, hydrochloric acid, sulfuric acid, cyanides, etc.

The quantities of polluting substances emitted in the galvanizing technological process can vary depending on certain factors, the most important role being played by the following factors:

- applied current density (A/m^2);
- the size of the surface to be covered (m^2);
- the thickness of the covering layer (mm);
- coverage time (s);
- the concentration of the solution in the tank (xy).
- temperature of the solution in the tank ($^{\circ}C$)



Fig. 1. Emissions in the form of vapors in the galvanic workshop

Reducing pollutant emissions

The environmental policy represents a coherent set of measures and means by which the preservation of the support capacity of natural systems is pursued. Regarding the economic approach, a revision of the thinking and action schemes is observed, because the natural factor of production mattered far too little from its perspective. Two significant trends characterize the evolution of the modern economy, namely: firstly, the globalization of economic activity, and secondly, it is, especially in highly industrialized countries, the intensification of concerns regarding the protection of the environment [Tulbure, I., 2018].

At the institutional/enterprise level, various specific environmental programs and measures can be established for:

- reduction of pollutant emissions, CO₂, SO₂, NO_x;
- increasing energy efficiency;
- reducing the consumption of resources and materials;
- reduction of transport emissions;
- the use of high energy efficiency equipment;
- promotion of renewable fuels.

In the setting of environmental policies at

the global, national, regional, local level, as well as at the institutional/enterprise level, environmental strategies and measures at these levels have an important role, even environmental strategies related to the optimization of the life cycle of products, as well as related measures [Tulbure I., 2013].

Through Decision 1386/2013/EU of the European Parliament and the Council of Europe (the "action program") it is recognized that the emissions of pollutants into the atmosphere have been significantly reduced in recent decades, but that, at the same time, the levels of atmospheric pollution still represents a problem in many parts of Europe, and the citizens of the European Union continue to be exposed to polluting substances in the atmosphere, which can affect their health and well-being. [<https://eur-lex.europa.eu>]

In order to achieve this and reduce pollutant emissions, it is necessary to upgrade the galvanic workshop by purchasing modern machines that use more "environmentally friendly" technologies or to modernize the existing ones by equipping them with high performance filters like those shown in fig.2, such as those with activated carbon that meet the following requirements:

- ensures high and constant filtration efficiency;



Fig. 2. Installation for capturing, filtering and washing gases, powders and acid vapors [<https://www.electromec.info>]

- works for a long time without maintenance/supervision (reduced operating costs).
Areas of use:
- the choice of an equipment must be decided by the Life Cycle Cost (LCC- life cycle cost) [<http://www.kip.ro>].
Areas of use:
- activated carbon installations can be used in any industrial process where it is necessary to retain and remove VOCs or odors, present in low concentration: at painting lines, in the chemical industry, in the food industry, etc.
- gas treatment in the electronics industry
- capture and retention of noxes released in the form of vapors and toxic smoke from heat treatment baths with acids
- in the metallurgical industry [<https://www.electromec.info>]

Conclusions

Currently, in any industrial field, where one wants to make an innovation, one must also take into account the ecological aspects, related to pollution and environmental protection, in addition to the technical, economic and quality assurance aspects, which implies a systemic approach to the analyzed technology, as highlighted and as proposed in the present project.

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The prevention and reduction of pollution must become a priority issue for the industry, due to the negative consequences, as well as the losses caused by pollution.

The pollution situation must be known and analyzed by each individual enterprise, made public and measures established to reduce pollution, as well as better environmental protection.

Galvanic coating technologies contribute to increasing the durability of parts, increasing wear and friction resistance, as well as improving the aesthetic aspect, which means a reduction in material and energy consumption.

Regarding galvanic coating technologies, they have a major contribution to environmental pollution, but taking into account the positive consequences regarding the reduction of material and energy consumption, in the end they contribute to the reduction of environmental pollution.

The main purpose for which it is used in industry is to obtain new properties of steel such as: increased wear resistance, increased corrosion resistance.

In the long term, by applying certain environmental protection strategies in the electroplating sectors, in the end, important savings in raw materials and energy can be achieved, making it possible to achieve products with a lower price.