THE IMPACT OF THE INDUSTRIAL TECHNOLOGIES ON LIFE QUALITY

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Abstract: *The largest part of the environment pollution is made by the human activities. The intensified development of the industry from the last decades demonstrated the close correlation between economic growth and transformations, which take place in environment. The artificial pollution source of the environment, as industrial processes contributes at diffusion in air of various pollutants eliminated from industrial activities. The atmosphere composition changed, emissions of gaseous noxes, powders and aerosols carrying on at serious environmental problems as: urban pollution, acid rains, climate change.*

In this paper are presented the main industrial pollution sources and the most important measures for prevention of huge pollution of the atmosphere due to the anthropic activities. Various technological solutions have a different significant impact on the environment. Therefore, advantages and disadvantages of each solution must be well conceived and the decision to concretize one or other among these must be seriously argued.

1. Introduction

The environment pollution appeared in the same time with people, but developed and diversified in proportion to evolution of the human society. The pollution represents the modification of natural components by presence of some foreign bodies, called pollutants, as a result of human activity, and which have harmful effects upon the health, creates discomfort or obstruct the utilization of some environment components essential for life.

The intensified development of industry from the last decades demonstrated the closed relation between economic growth and modifications that take place in environment. At the beginning of the human development, the environment was naturally protected due on the one hand to reduced possibilities of people to transform the nature, and the other hand to environment capacity to autocorrect. In proportion to industrialization of the human society, activities, which produce pollution, exceeded the self-cleaning and self-regulation capacity of the environmental factors, thus the life existence on Earth is in danger.

The technical-scientific progress affected the human-nature balancing by emphasis of the real risk for working-out of the natural resources, the modification of air quality, soil, water, increasing of the wastes volume and theirs diversity, achievement of some technologies, which generate residual and toxic materials that constituted the origin of most frequently accidents, creating new risks for human and environment health [1].

The main types of environment pollution

The environment pollution especially in terms of harmful effects on health is of many types as:

I. **Biological pollution** is produced by disposal and dispersion in environment of microbial embryos that produce diseases, which constitute a danger in epidemic releases.

II. **Chemical pollution** consists of disposal and dispersion in environment of different chemical substances, which can lead to increasing of high toxic potential of these substances.

III. **Physical pollution** is the most actually and firstly, consists of radioactive pollution in consequence of increasing for radioactive isotopes utilization in various domains (science,

industry, agriculture, zooculture, medicine). Beside the radioactive pollution is the sound pollution, as a component of physical pollution. The noise, also the vibrations and ultrasounds are frequently in working place and life of the modern people, and intensities of the sound pollution are in continuous increasing.

But, the most known types of pollution are: water pollution, soil pollution, air pollution.

Are presented and analyzed the main industrial pollution sources and the most important measures for prevention of huge pollution of the atmosphere due to the anthropic activities.

The atmosphere composition changed in consequence of human activity, emissions of gaseous noxes, powders and aerosols leading to acute environmental problems as: urban pollution, acid rains, climate change. In this context is necessary that the problems regarding the atmospheric pollution should be treated in global way. **The air pollution** consists of modification of its normal composition (78% N, 21% O_2, 0.03 CO_2, 0.01 ozone and other gases, water vapours, powders) especially by entrancing in atmosphere of some foreign elements and with harmful effects.

The sources of air pollution are:

Natural sources, represented by various processes, which take place in nature, are:

- *soil*, which suffers phenomena of erosion and granulation with release of very fine particles;
- *plants and animals*, which can eliminate in air various elements (flakes, pollen, hair);
- *volcanic eruption*, which eliminate in air large quantities of gases, solid particles;

Artificial sources, represented by the human activities:

- *combustion processes*, from houses warming to combustible used for energy generation in industrial purposes;
- industrial processes, constituted from dispersion in air of different pollutants eliminated by the industrial enterprises;
- transports, consisting of railroad, naval and aerial transports and especially road transport.

As main pollutant elements are:

- suspensions, represented by solid or liquid particles dispersed in atmosphere;
- gases as pollutants in gaseous state, dispersed in atmosphere.

Concrete there are three main natural sources, which generate dust, ash and/or smoke in atmosphere:

1. Volcanic eruptions;
2. Dust storms;
3. natural arson of forests.

The effects of the atmosphere pollution are: acid rain and greenhouse effect.

The acid rains, result of dispersion in atmosphere of the industrial noxes, appeared for the first time in Scandinavia. Naturally, rain water has a weak acid character due its reaction with CO_2. The acid rains are the result of reaction of sulphuric and nitric oxides with water. These oxides form in various industrial processes as burning of combustibles in power stations, in motors with intern combustion. Contribution of sulphuric acid to acid rains is of 2/3, while the contribution of nitric acids is below 1/3.

Greenhouse effect produces in consequence of capture by carbon dioxide or other substances from atmosphere of ultraviolet radiations.

The impact of terrestrial globe warming will be difficult especially for the poor countries. Economic development requires increased energetic consumption, large quantities of consumed resources, investments. It is incorrectly and practically impossible to stop the industrialization of those poor countries on ecological reasons. International collaborations,

also the choice of technological methods which integrate the ecological measures, are actually, the only one solution of the development.

For choice of the control measures for atmospheric pollution with industrial harmful gases (table 1), must be known the main processes for pollutants appearance [1].

Table 1. Processes from which are generated pollutants

No.	Harmful agent	Technological processes
1	Sulphuric acid	Burning of combustibles, retteries, casthouses, chemical industry
2	Carbon oxide	Incomplete burning, explosion motors
3	Ammonia	Cooling systems, explosives, lacquer finish, paints, fertilizers
4	Nitric oxides	Explosives, fertilizers, metals cleaning, combustions at high temperatures
5	Hydrofluoric acid	Etching on glass, fertilizers manufacture
6	Carbon dioxide	Burning of combustibles, decomposition processes, volcanic activity
7	Phosgene	Thermal decomposition of the perchlorocarbons, pharmaceutical products
8	Hydrocyanic acid	Smoke screens, pigments
9	Hydrocarbons	Exhaust gases, combustibles processing
10	Aldehydes	Thermal decomposition of the greases and glycerin

The main sources of industrial pollution are:

- *Ironwork and metal-working industry*

Industry for raw metals processing for extraction of ferrous or non-ferrous components based on melting and amelioration at high temperatures from which result huge quantities of harmful gases and powders.

- *Petrochemical industry*

In refineries from petrochemical industry appear hydrocarbons emissions, sulphuric dioxide, hydrogen sulphide, carbon oxides also other harmful components less important. On period of products storage, especially those refined, due to the high vapours tension are possible emissions, most frequency of propane and butane.

- *Industry of buildings materials*

The industry of buildings materials which is based on processing of some natural rocks (silicates, clay, calcite, magnesite, gessoes) discharges large quantities of dust and less harmful gases.

- *Chemical industry*

Technological processes that develop in chemical industry carry on to atmosphere pollution with various substances: sulphuric oxides, hydrogen sulphide, nitric oxides, chlorine, etc.

- *Mining industry*

The high exploitation rhythm to the opened mines means dislocation of some large quantities of soil and disposal of solid powders.

- *Energetic industry and transports*

The energetic industry and transports, quantitatively, are on the first place of sources for harmful gases emissions because all industries require huge quantities of energy, and its obtaining by combustion is related to the generation of huge quantities of residual gases (sulphuric dioxide, nitric oxides, and carbon oxides), dust and smoke.

The smoke is the invisible part of substances, which is eliminate by chimneys of industrial enterprises and consists of water vapours, gases, incomplete burned products (coal, hydrocarbons and pitch) and other impurities integrated and exempt with combustion.

The ash is resulted exclusively from solid combustibles. Its rate ranges between 5-15% to anthracite (superior coal, so with more complete burning) and between 40-50% to inferior coals (lignite, peat).

The ash consists of:

- mineral compounds strong integrated in the coal mass. In this category are silicates compounds, alumina, calcium, magnesium and/or sulphur;
- impurities (mechanical ash) from the rock in which is the deposit;

The most part of ash remains in fireplace and is removed by mechanical and hydraulic methods. The other part is carrying off to chimney by strong air current formed in the burning room, in big thermo-electrical stations; at crossing by chimney, the ash is captured almost in the mass.

Other important source, which generates smoke and ash, is the burning of solid, liquid and gaseous combustibles in domestic purpose. Today, in many countries in course of development, the fire wood is very important like foods, and as price, in some places, records an increasing rhythm much bigger than the foods. The cause of price increasing is decreasing of wood areas. The smoke exhaled by the stoves with woods has a smoked blue color and contains an important quantity of organic materials, which are toxic and can induce cancer. Also, for domestic purpose are burning today, huge quantities of coals, oil and natural gases.

In table 2 are presented some industrial sources of pollution with dust, smoke and ash, and in table 3 the specific production for smoke and dust on industries.

Table 2. Industrial sources of pollution with dust, smoke and ash

Industry	Pollution source	Pollutant
Steel works	Smoke screens, synthesizers	Iron oxides, iron, smoke
Ironworks	Smoke screens, installation of knock-out	Iron oxide, dust, smoke, oil smokes
Non-ferrous metallurgy	Smoke screens and retteries	Smoke, oil and metals smoke
Oil refineries	Catalyzers regenerators, slimes incinerators	Catalyzer dust, slime ash
Paper factories	Ovens for recovery of chemicals and calcite	Chemical dust
Glass and glass fibers	Manipulation of raw materials, glass ovens, wires drawing	Dust of raw materials, smog of sulphuric acid, alkaline oxide, resin aerosols

Table 3. Production of smoke and dust in industries

Industry	Emission of smoke and dust
Metallurgy of iron	10 kg/metal tone
Ironworks	15-25 kg/metal tone
Alumina processing	450 kg/metal tone
Rettery of bronze and brass	12 kg/metal tone

The most important measures for restraint of huge pollution of the atmosphere are: building of enterprises outside of living area, preliminary treatment of combustible used or some raw materials for reduction of pollutant concentration, assuring of some complete

burnings of the combustible used in industry, endowment of the industrial enterprises with installation for pollutants retention, proper regulation of the burnings at cars for pollutants reduction, replacement of inferior combustible with that superior, less pollutant, settlement of much more green spaces etc [2].

Anthropic activity can be characterized as:

(1) Natural resources are not regenerative.

(2) In anthropic activity process, pollutant substances and wastes result, belong the base products. These return in a more concentrated form, so more harmful, in the people system.

(3) Pollutant substances and wastes resulted from human activity determine global changes of the natural systems.

Decreasing action of the industrial pollution base on the following hypotheses transformed in measures:

(a) The control and modeling of industrial processes can be made only on the product trajectory, because the pollution of anthropic ecosystems has source in the technologic flow of product;

(b) Complete disposal of the direct emissions in air and water is a necessary condition, but no sufficient, for reduction of industrial pollution, because the purification processes of water and air produce wastes which include all pollutant quantity, which contrary, should be emitted directly;

(c) Processes for wastes treatment resulted from industrial activity not represent a solution for minimizing of industrial pollution; these processes are very expensive and generate a high level of pollution, which can be higher than that resulted from technological flow, by direct pollution;

(d) Maximum decreasing of pollution can be obtained using a technology based on coupled cycles, analogous to those from natural systems.

The ecosanogenetic analysis, [3] is the first step of pollution reduction in industrial areas. This analysis has the following objectives:

(1) Geoecological configuration of industrial areas;

(2) Identification and assessment of pollution sources of area;

(3) Assessment of dispersal effects;

(4) Analysis of thermodynamic stability and evolution trends;

(5) Establishment of solutions for pollution reduction in area;

(6) Achievement of ecosanogenetic feasibility study for each industrial unity and overall area.

The algorithm of ecosanogenetic analysis is presented in fig. 1.

In A chart is presented the sequential algorithm, underlining in A5 sequence the interdisciplinary dimension of the specialists group. In B chart, the usual consumption balance is complete, because it includes the pollutant substances and residues (quantities and final destination). The C chart includes the usual impact studies. The D chart refers to global stability of area affected by pollution. The stability type that will be determined will impose the reorganization type of each entity. In E chart, the E1, E2 and E3 sequence presents the computation mode of benefits on short term of the pollution decreasing. The next sequences present the benefits of pollution decreasing on long term (including the costs for health improvement).

The main identified pollution sources are inobservance of technological rules and using of some ancient equipment.

Generally, the practical level of the action for pollution reduction in an industrial area has the following stages:

(1) Continuous measuring in real time of the pollution to each technological source;

(2) Reduction until complete elimination of emissions in water and air, using ventilation, filtration of air and water;
(3) Reduction of pollutant emissions and solid wastes, by optimization of primary resources, materials and energy on product unit, in a real time process;
(4) Increasing of the recondition and reintegration degree of the solid wastes resulted in phases (1) and (2).

Sequences (1) – (3) are obligatorily, because is obtaining, simultaneously, pollution decreasing and benefit increasing.

Sequence (4) is today a research problem, implying a physical-chemical model and technological process, also an economic model, of financial resources and costs.

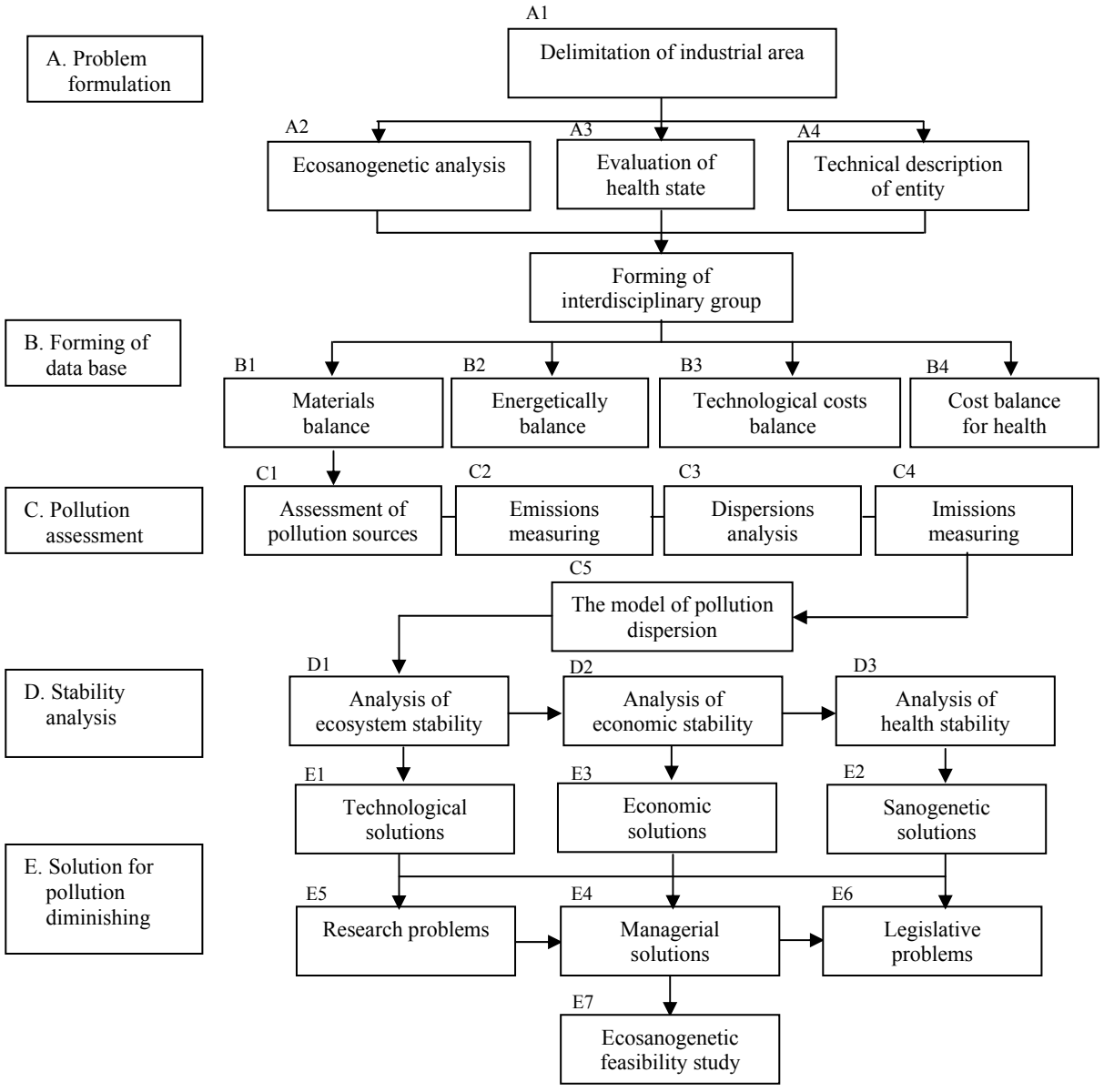

Fig.1. The algorithm of ecosanogenetic analysis for an industrial area

2. Conclusions

The intensified development of industry from the last decades demonstrated the closed relation between economic growth and modifications that take place in environment. In this paper are presented the main industrial pollution sources and the most important measures for prevention of huge pollution of the atmosphere due to the anthropic activities. Various technological solutions have a different significant impact on the environment. Therefore, advantages and disadvantages of each solution must be well conceived and the decision to concretize one or other among these must be seriously argued. Also, is presented and analyzed the algorithm of ecosanogenetic analysis.

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