

## THE IMPACT OF CHEMICAL MANUFACTURING WASTE ON THE HUMAN BODY AND THE ENVIRONMENT AS A SOURCE OF POLLUTION

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The impact of waste on the human body and the environment. Harmful emissions of petrochemistry and oil refinery. The classification of chemically hazardous substances according to their influence on human health will be given below, as well as separation of harmful substances into hazard classes together with the substances examples that belong to each class.

Large quantities of different gaseous, liquid and solid substances of industrial waste enter into our environment. Waste contains chemicals that enter our soil, air and water, go through environmental links from one chain to another eventually reaching the human body.

Chemical pollution is the chemical increase of certain components of the environment, as well as the introduction of these chemicals in concentrations that exceed the norm or is alien to the environment.

According to their impact on nature and human body the chemically dangerous and harmful production factors (substances) are subdivided into the following subgroups:

- Toxic
- Irritating substances
- Sensitized
- Carcinogenic
- Mutagenic
- Affecting reproductive function

Toxic substances are waste capacity that causes serious and chronic diseases including cancer illnesses, when these substances enter human organism through respiratory system, digestion or skin.

The main part of this toxic waste is formed as a result of the industrial waste. Here we can relate different chemical components such as: lead, phosphorus, mercury, potassium and others. This toxic waste emerges from laboratories, hospitals and research centres. It can also be found at people's homes, contained in medical mercury thermometers. These thermometers, energy saving and fluorescent lamps, electric and car batteries must not be thrown out into the waste bins outside.

Irritating substances cause physical (impact on the skin) and chemical impact on sensitive sensory cells or other organs of nervous system.

Sensitized substances cause hypersensitivity in the organism to them. After a relatively short period of time this organism is exposed to them. Subsequent exposure of these substances on the hypersensitive organism even in small quantities lead to turbulent and fast developing reactions that cause skin changes (dermatitis, eczema), asthmatic syndromes and blood diseases.

Carcinogenic substances can cause tumour growth. They enter the body with food, water and air consumption, through skin and can be contained in the air of human habitation or industrial premises, as well as in household chemicals and perfume.

Carcinogenic substances can be related to the following substances: benzpyrene, polycyclic aromatic charcoal, nitrosamines, aromatic amines and amides, asbestos, vinyl chloride, benzene and its derivatives, arsenic, nickel, chromium, cadmium and aflatoxin compounds.

Mutagenic substances cause hereditary impairment and impact on the future generations.

The active substances that effect reproductive function are having harmful impact on the embryo inside the mother's body.

The mentioned substances are rarely found in the petro chemical industry and oil refineries, but cause a huge impact on the human body [7].

In Belarus harmful substances are classified into 4 Hazard Classes and are set out in the Government Standard of Belarus 12.1.007-76 The Standard Safety System.

Harmful Substances:

- 1<sup>st</sup> class: extremely dangerous;
- 2<sup>nd</sup> class: highly dangerous;
- 3<sup>rd</sup> class: moderately dangerous;
- 4<sup>th</sup> class: little dangerous [8].

The effect of harmful chemical substances on the human body is due to their physiochemical properties.

#### **Little dangerous substances**

Little dangerous substances are: emulsions and emulsion mixtures for metal grinding, spent that contain oils and oil products in the quantity of less than 15%, bleaching clay, water residues from waste oil cleaning, industrial sludge of succinimide and alkyl phenol additives, commodity bitumen waste [9].

Little dangerous substances contain such substances as magnesium sulphate, phosphate, and zinc compound. Magnesium contributes to the metabolism alternation and impairment, causes problems with the nasal cavity and hair loss.

In contact with the skin magnesium sulphate leads to dermatological diseases [10].

#### **Moderately dangerous substances**

Oil refining waste products contain such products as: used motor oils and used oil products mixture, brake fluid and others. It is a small part of substances that oil refinery can produce.

If we look at the chemical compounds of moderately dangerous substances we can find lead oxides, nickel chloride, carbon tetrachloride. Nickel chloride causes acute poisoning that leads to agitation and depression, mucosal redness and diarrhea.

#### **Highly dangerous substances**

The 2<sup>nd</sup> class consists of such refined (processed) products as: transformer and heat bearing oils, containing halogens, also transformer oil refuse that contains halogens and has lost its consumer properties etc. [9].

Highly dangerous substances contain copper chloride, copper sulphate, copper oxalate, trioxide antimony, lead compounds.

Lead affects the human body by damaging the central nervous, circulatory, endocrine, and digestive systems. The lead excess in the human body causes anaemia, stomach ulcer and liver alteration, what often causes death. The chronic lead excess and its salts lead to nervous system disorder, kidneys and liver impairment [10].

#### **Extremely dangerous substances**

The 1<sup>st</sup> class of harmful substances consists of such processed products as: transformer oil leftovers containing polychlorinated biphenyls and terphenyls and lost its consumer properties. The other oil leftovers that have lost its consumer properties and that contain polychlorinated biphenyls and terphenyls. Transformer, heat bearing and other oils, flushing fluids polluted with polychlorinated byphenyls and others [9].

The 1<sup>st</sup> class contains such waste products that have mercury and its compounds, including mercury chloride, hydrochloric acid, potassium cyanide and antimony compounds.

Mercury is a highly dangerous chemical that affects the human body. Mercury compounds cause different transformations that can lead to chronic poisoning of the human body. The caused symptoms are endocrine gland function impairment, damaged airways, weight loss, potency disorder, anaemia, hearing and sight impairment and chronic eczema [10].

All the classes of harmful substances are bad for humans and the environment. In some cases the damage can be in a small amount, in others its affect can have adverse consequences. Differentiation of dangerous substances into classes is done according to the calculation of various hygienic parameters, as well as experimentally.

There are several fundamental approaches that warn about unfavourable chemical affects that are emphasized by V.S. Rybkin:

- Total ban on production and practice
- Ban on the admission to the environment and any impact on the human
- Toxic substance replacement for less toxic and less dangerous
- Harmful content restriction in the environment and its impact level on the working population and population in general [11].

At the moment there is on going development and modernisation of new production at many enterprises that deal with petro chemistry and oil refining, the purpose of which is to minimise the emission of harmful substances into the environment.

The government has several problems to solve that require risk development analysis of close and distant harmful substances affects on people, their generation and environment as well as possible social, economic, and medicobiological subsequent ban on the production and the use of chemical compounds [12].

Defining criteria for the strategic choice prevention is the warning about harmful affects. Oil refineries must develop and introduce programs with the aim of the response to the leaks of crude oil, chemical compounds and final products.

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