
THE RUINATION OF HK KRUŠIK PERFORMED BY NATO ALLIANCE IS A TYPICAL DESTRUCTION OF ALL FORMS, ESPECIALLY OF THE ENVIRONMENT

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Introduction

During NATO attack on FR Yugoslavia which lasted from March to June 1999, Krušik holding company was completely demolished.

To destroy the company 176 different projectiles were fired in 12 raids. It caused total annihilation of the environmental conditions in the area the factory covers and a considerable damage to the environment of the wide Valjevo area. It is possible that the soil, water (both underground and other) and air were polluted with chemical substances. The supposition is grounded on the quantity of the explosives and rocket fuels used in bombing of the factory (around 50 tonnes) as well as the fact that technological processes applied in the production comprise use of different dangerous materials.

Nowadays, when everywhere in the world great efforts are made to improve the environmental conditions, this kind of destruction could, by no means, be a step toward the progress, but rather a contribution to a degradation that cannot be measured precisely.

A healthy material and cultural development of a society has always depended on the creativity, knowledge and respect for the knowledge.

The destruction of Krušik is an example of annihilation of the creativity which degraded the concept of applying knowledge to get a better life and improved environment.

1. Krušik holding company before the bombing

The company was started in 1939 in Valjevo and is principally engaged in production of the products for special use, chemical sources of current, sanitary fittings, textile machines, electric detonators for mines, anti-hail rockets etc.

It covers the area of 1.2 km² and is located in the centre of Valjevo, a town of around 70,000 citizens. The production was organized in the area of 170,000 m² in about 200 different buildings equipped with modern infrastructure.

The production processes in Krušik were complex comprising almost all known technologies for metal processing, some special chemical technologies and technologies from the field of electronics.

Different materials were used, especially the materials used in chemical processes.

At the beginning of bombing, there were considerable quantities of the materials both in storage and in then current production processes. Those that could greatly affect the environmental conditions are given in the table 1.

Table 1. Some of the materials stored or used in production at the beginning of the bombing

Material	quantity (in tonnes)
Oil derivatives (Masut)	350.00
Oils for metal processing	6.00
Oil emulsions for metal processing	8.00
Trichlorethylene	5.00
Paints and varnishes (alkyd, bitumen, epoxy, polyurethanes, shellac etc)	6.00
Paint and varnish diluents	0.800
Graphite emulsion used to lubricate tools for deep forging	8.00
White phosphorus	2.00
Sodium hydroxide	2.00
Sulphur acid	3.00
Nitrogen acid	1.00
Chlorohydric acid	0.50
Phosphorus acid	1.50
Cadmium oxide	0.80
Nickel sulphate	1.50
Sodium cyanide	1.00
Potassium chloride	1.00
Copper sulphate	1.00
Chromium trioxide	1.50
Sodium dichromate	1.00
Sodium carbonate	2.00
Trinatrium phosphate	1.50
Salts for heat treatment	5.00
Ferri-oxide – powder	2.00
Special materials of inorganic/organic origin	2.00
Other materials (glues, sealers, pastes, plastic materials, laboratory chemicals, etc)	3.00

Before the bombing the company had solved the problem of unfavourable technological influences on the environment. There had been a number of devices for recycling waste waters, contaminated air, solid waste materials, etc.

The company set a good example in Yugoslavia on how to successfully solve the problem of environmental protection.

2. Holding company Krušik during and after the bombing

Due to the types of technology, types and quantities of the materials stored and used in the processes during the bombing, the quantity of the explosive matters and rocket fuels used, a huge ecological damage was made not only in the factory itself but also in the city area and its environment. The material damage made to the factory has been estimated to 600,000,000 US dollars. As for the ecological damage caused to the city and its surroundings, it cannot be estimated well. The bombing brought the conditions necessary for interaction of different materials (great energy and high temperatures) which produced extremely dangerous products scattered over the factory area and its environment .

It is supposed that the air was considerably polluted with gaseous and fluid matters. The air pollution was limited in duration and it lasted for as long as the products stayed in the air.

Chemical pollution of the soil and waters in the factory and the environment is significant and long-lasting as the production lines were fully functioning at the beginning of the bombing and due to the materials stored.

The soluble materials listed in table 1 must have reached deep layers of the soil and underground waters during the rains. Insoluble and not easily soluble materials have probably formed layers on the outer surface of the ground. Bombing made it possible for the materials to mix and spread freely and to form other equally dangerous compounds.

The destruction of the environment in this factory is barely comprehensible in the world where everybody strive for better quality of life.

The damage made to the installations for protection of the working environment in the factory has been estimated to 36.000.000 US dollars. The buildings that were completely destroyed were used for recycling of the waste waters coming from: galvanizing centre, special lines for phosphate coating, central varnishing workshop, special lines for nickel coating, workshops where active masses for batteries were produced. Also, the installations for recycling waste graphite emulsion for hot forging, regeneration and recycling of the oils used in mechanical treatment, recycling of oil emulsions for metal processing, cleansing of waste air coming from production lines for battery electrodes, cleansing of the waste air coming from workshop for grinding and polishing, cleansing of the waste air from workshops for sand-bathing, etc.

The surveillance and monitoring of the conditions have not been done, therefore, it is not possible to give a professional or scientific presentation.

The company has started some kind of reconstruction of the production. Building new installations for recycling of waste materials is an expensive investment for a ruined factory. The renewed production pollutes already infected environment. In such cases, there are simply no solutions to the problem. Favourable investments could only help the company start reconstruction and solving the problem of waste materials, all in order to obtain better conditions for life in the town and its environment.

3. Recovery of the environment in the company and management of its protection

The area of the company has been seriously damaged in terms of ecology. A great number of separate micro-locations has been badly contaminated with chemical and other materials. In order to save the market and the production programmes, the recovery of the production and employment of the new workers is a priority. Due to lack of the material resources the

identification, surveillance and ecological recovery of the area had not been done. Currently, several separate reconstruction processes are being done but they do not include different influences to the environment.

However, we expect better conditions in the following period which would make a more systematic reconstruction possible. This being done, the recovery of the environment and reconstruction of the company would be carried out in accordance with the relevant laws and regulations. Therefore, the inspection of the current state in the company as well as of the emission impact on the surroundings is required. There would also be necessary certain experts of different profiles who are well acquainted with the impact the products, processes and equipment of the company can make on the environment. Permanent, integrated monitoring, identification of the emitters and the analysis of the emission would also be required.

Formation of the design projects and realization of the technologies is of great importance which requires the appropriate education of company's board team. The following parameters are necessary for a successful management of the different influences on the environment:

- Production planning
- Market planning
- Financial planning
- Production processes
- Raw materials and fluids
- Power and energy
- Waste materials
- Noise during the processes
- Accidents and casualties
- Inter-communication
- Monitoring software.

The main goals of the managing over environmental conditions are better standard of living for workers, increase in work and, generally, improvement of the life quality.

The recovery and reconstruction of the company is expected to provide healthy conditions to work in and to contribute to the wider protection of the environment. In order to fulfil these aims the following measures should be taken:

- Implementation of the laws and rules regarding the environment.
- Development of ecologically friendly technologies and adopting production processes that are safe for both workers engaged in it and the surroundings.
- Working on improvement of the organization of the processes in order to use the production materials, power, water and gas fluids in an economic way and to decrease the emission of the waste materials in the air, water and soil.
- Striving for decrease of the technological and other waste within the company.
- Establishment a continual, incessant process of education/training of the employed regarding the protection of the environment forming in this way the awareness on the significance of the healthy environment.
- Establishment of a good communication system with all interested parties in order to exchange information crucial for the environmental protection in a more efficient way.

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- Make the reports on the steps taken towards the environmental protection in the company public.

The recovery and re-establishment of the appropriate system for protection of the environment in the company after NATO bombing must be systematic and compact. However, the consequences of the bombing are great and considerable help in expert knowledge and material sources are needed and will last for a long period.

The case of KRU[IK Holding Company indicates that, apart from other factors, the ecological circumstances were terribly damaged. The word 'genocide' that used to denote systematic devastation of people could now be applied to systematic and thorough devastation of the human environment.