

Occupational Medicine in War and Peace: How an Aluminum Factory Can Protect People and Environment

Žilavka is full of laughter, Blatina is full of sin.

Croatian folk proverb

A harmonious relationship between technology with high pollution risk practices and environment protection in the aluminum factory *Aluminum Mostar* is an example of the successful and modern production and business management, striving to enforce the imperative: high production rates, but not at the cost of risking the health of the employees.

Aluminum Mostar is a factory situated in the Neretva Valley in Bosnia and Herzegovina. Today, *Aluminum Mostar* is the most prosperous company in the whole Bosnia and Herzegovina and one of the economic giants of the Southeastern Europe. It is the frontier of industrial recovery in Bosnia and Herzegovina and provider of the existence for the entire region (1). Due to the advanced technology, modern base and control equipment, the factory has been included among 45 international aluminum systems that use top-level technology. It produces 104,000 tons of 99.9% pure aluminum and its alloys, which makes it one of the top manufactures in the world (2).

The history of *Aluminum Mostar* enterprise in Mostar began in the early twentieth century, when bauxite ore was found in the region of Herzegovina. Up to this date, the development of aluminum industry in this region has been marked by turbulent historical events faced by no similar industry in the world (1).

Immediately after World War II, a special enterprise was established for bauxite exploitation, mining, and transportation. In co-operation with

the French Pechiney Company, the production of aluminum started in 1981. At that time, *Aluminum Mostar* was one of the leading industrial backbones of the region, employing about 2,200 people (3).

During 1992, the first year of the war in Bosnia and Herzegovina, the whole Mostar area, including *Aluminum Mostar*, suffered severe destruction. Many years of excellent production results were destroyed. On April 23, 1992, direct shelling of the electrical substation cut off the electrical power supply and brought the aluminum electrolysis plant to a standstill. The war damages exceeded €130 million (4).

During the five years of terrible war destruction in the whole country, *Aluminum Mostar* management kept on trying to find the best way to save the company from further destruction. At the same time, they planned to restart some parts of *Aluminum Mostar*. Meanwhile, a small number of *Aluminum Mostar* workers actively worked on maintaining the most vital parts.

After the war, in 1996, the *Aluminum Mostar* management made a decision to restart the production. Relying on its own resources, they started with technical and technological preparations: repair of the machinery and terminals for raw materials in the port of Ploče, completion of the laboratory, warehouses, and support services. The production officially restarted on March 15, 1997, which is the historical date for *Aluminum Mostar*. The total costs of restarting *Aluminum Mostar* exceeded €110 million (1,3).

The next step in the development of *Aluminum Mostar* was the modernization of the

production and supporting plants. The modernization of the electrolysis plant has been made in a unique way (1,3). A new information system has been introduced and human and environmental protection has been raised to the highest level. It is an example of a successful and modern production and business management. It is made in accordance with strict international rules on human and environmental protection, which improves and humanizes the work. The quality of the water discharged into the Neretva River is constantly controlled and recorded by the automatic measuring station. All technologically related areas within the plant are made of concrete in order to protect the land and the underground water flows.

In the southern part of the factory, the place of the most severe war destruction, there is a green oasis now. This green area is maintained by the employees with reduced work ability. These are the employees who damaged their health while working in unfavorable conditions in which aluminum was produced in the past. On an area of over 400,000 square meters, they maintained lawns and planted over 100,000 pieces of different fruits, trees, and flowers (Fig. 1). At the moment, there are about 180 species of plants grown with the minimum of agro-technical maintenance. Garden products are mostly given away free of charge to hospitals and kindergartens. The factory has a garden with a variety of plants and animal species. In the middle of this, so-called "Paradise Garden," there are fish-ponds and a wine-cellar.



Figure 1. Green area complex of the *Aluminum Mostar* factory.

On the large area near the factory and in Brotnjo, a region which is famous for the autochthonous sorts of grape, the employees with reduced work ability grow grapes and produce wine (Fig. 2) (3).



Figure 2. Wine made from autochthonous grapes grown in Herzegovina is produced and bottled by the *Aluminum Mostar*.

The fertile region of Herzegovina has been famous for its continuous wine production since Roman times. Among all sorts of wine, the white Žilavka and red Blatina, which are produced from the autochthonous sorts of grapes (see cover page), are among the most famous for their high-quality. The ancient Bosnian king Tvrtko enjoyed the excellent quality of Žilavka, which he mentions in his 1353 charter (5). This year is now a part of the wine's emblem. The Herzegovinian wines were introduced to Western Europe at the Trieste Fair in 1892. Various international acknowledgments followed: at the Vienna fairs in 1898 and 1900, Paris in 1901, London in 1903; as well as European monarchs such as the Austrian emperor Franz Joseph I, Belgian king Leopold I, and the British queen Victoria. These wines could be found even on the Royal dining table of Japan. Žilavka is not only the most famous Herzegovinian white wine, but certainly the best and most famous white wine of the Southeastern Europe (5).

Blatina has a ruby red color, so that it almost looks black. This wine, so fragrant and dark, would not dream of exchanging Herzegovina for any other wine-growing slopes. This is why it is so unique and impossible to grow and produce anywhere else in the world. About 27,000 vines have been planted in the vineyards of the *Aluminum Mostar*. The wine cellar house, opened in 2001, has the capacity of 40,000 liters (Fig. 3).



Figure 3. Wine-cellar in the green complex of the *Aluminum Mostar* factory.

Aluminum Mostar opened its own Art Gallery in 2000, which was constructed in the devastated area of the city, with the intention to give it the urban look and enrich the cultural life of Mostar (Fig. 4). Many famous painters, such as Miroslav Šutej, Stipe Sikirica, Zlatko Prica, Vasko Lipovac, Vasilije Jordan, Dubravka Babić, and other exhibited in the Gallery.



Figure 4. Interior of the *Aluminum Mostar* Gallery in the centre of Mostar.

Today, *Aluminum Mostar* employs about 810 workers, but about 30,000 people in this area are directly or indirectly dependent on the factory. They offer an example of how to conduct business, manage it to earn the money, improve the production on a daily basis, care for the dignity of each employee, protect the environment, live and appreciate life, work, and progress.

Aluminum Mostar is not only the production of pure aluminum; it has become the synonym for care for the employees, environment, and culture. The impact of modernization on hazards to the health and safety of the employees is analyzed in a special article in this issue (6). As Žilavka and Blatina are the symbols of the origins of this area, *Aluminum Mostar* is the symbol of its survival.

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