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Presence of Asbestos in Albania, an Approach

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Abstract: Asbestos fibers have been widely used in the world but also in Albania. Being in contact with it is a daily risk to human life. Asbestos is also known as the silent killer. There are 2300 Asbestos based products worldwide. In our country the most widespread product is Eternite which has a content of 30% asbestos and 70% cement. Cement mixes very well with Asbestos fibers isolating them. During time cement collapse and losses, its physical properties by many factors including atmospheric ones causing the Asbestos fibers to expose themselves in the surrounding area. As a consequence of being microscopic, they penetrate to the human body endangering our lives. In the 60s and 80s in US, anti-Asbesto campaigns started for the first time, while in the EU it started very late in 1992 and unfortunately also during that period in developing countries this dangerous material was still being used endangering the lives of people. Every year over 100,000 people around the world die from incurable diseases caused by asbestos. In 2012, the use of Asbestos was strictly banned in European Union countries, including Israel.

Keywords: asbestos, disease, isolation, displacement, chrysotile ,carcinogen etj.

I. INTRODUCTION

One of the natural fibers with excellent thermal insulation, electrical insulation and waterproofing properties is Asbestos. **[1]** Some 2000 years ago the Romans were aware of the potential health hazards of asbestos and recognized that slaves mining this material were at a serious health risk. The modern era of asbestos being appreciated as being hazardous to health started in the late 1800s with an official report from the government of the United Kingdom. Asbestos as it is otherwise known, is a group of 6 different fibrous minerals with crystalline structure. As a consequence, the group belong to the chemical class of silicates and the mineralogical series of serpentine and amphibolite. Asbestos has a fibrous structure originating from silicic acid salts that can't be seen with the naked eye but only with a microscope. Asbestos has a very wide usage even today. The lack of information regarding this material, for the society from the relevant institutions does not give the proper information to the community.**[2-3]** The institutions must be engaged to the awareness campaigns anti Asbestos. The risk of leaving with this material is very high. In fact, the whole purpose is related to the awareness regarding this material creating campaigns by blocking the production and the use of it worldwide. In the other hand, this material has extremely good properties for thermal insulation of other buildings. it's structure which makes it extremely thermal resistant. Above all, it is very easy to extract and work with these fibers, but these fibers are carcinogenic to humans. Asbestos has very good physical properties which are ductility, high resistance to acids, durability and is a very good acoustic, thermal and electrical thermal insulator.**[4]**Asbestos fibers are very dense and very thin, soft, flexible and have a very low conductivity both thermal and electrical. The main characteristic of Asbestos is the length of the fibers and based on this property its value is determined. The name Asbestos has its root from the Greek: Asbestos (inalienable, indivisible, immutable and indestructible).Environmental exposure to the pathogenic effect of Asbestos and its fibers, affects people living conditions near asbestos mines and asbestos manufacturing processing plants.

II. CHEMICAL AND PHYSICAL PROPERTIES OF ASBESTOS

Asbestos is divided into two major groups: The first group includes Serpentine, also known as magnesium silicate, and chrysotile, otherwise known as white asbestos. While in the second group is a larger group of minerals that are: Anphibolites which are silicates of magnesium and calcium. This group is also subdivided into: Actinol, Termol, Antophil, Amos and Crocidophiles.

(a) (b)

Figure 1. Asbestos Minerals (a) and how its look Asbestos in microscope (b)

2.1 Asbestos Risk and Limit Value

The risk that asbestos has as a building material is very high and this risk depends on the degree of connection that the fibers have with each other. So, the more compact the fiber connection, the risk will belower to the human health and vice versa. **[5]** It is estimated that 125 million people in the world are exposed to asbestos fibers with reference to occupational and environmental aspect. Occupational exposure is mainly related to work on the extraction of asbestos in mines or with the production of asbestos-containing products, as well as during the dismantling, the repairs and the maintenance of the products used . Environmental exposure to the pathogenic effect of asbestos and asbestiform fibers mainly affects people living near asbestos mines, asbestos manufacturing and processing plants, people living in highly urbanized areas, where asbestos can be a factor initiating cancer. Asbestos is very fibrous and invisible and at the moment itentersat the human airways they concentrate in the bronchi or pleura causing irreversible tissue damage. The disease caused by asbestos is called Mesothelioma. **[6]** According to a survey conducted by the WHO from 53 member states of the organization, 30 countries in Europe have banned all types of asbestos since 2011. In Albania according to ANEP, the amount of asbestos is about 188 thousand tons but it is not something official yet.

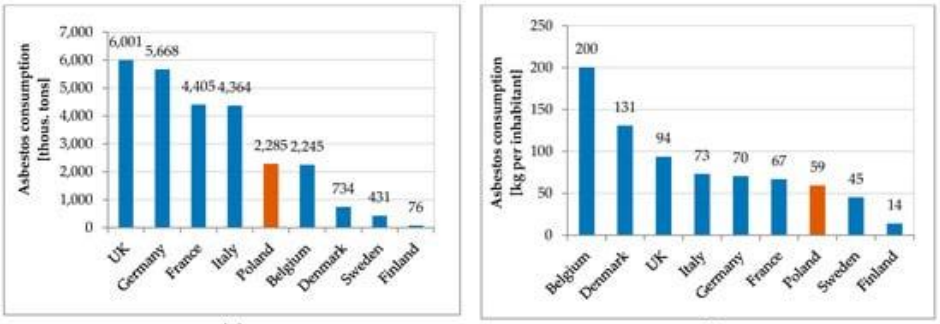
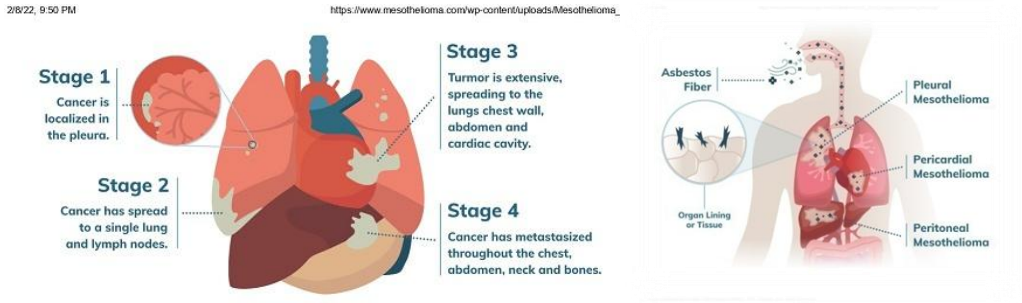


Figure 2. Asbestos consumption in selected European countries. Total consumption (thousand tons) **a**) and total consumption per capita (kg per person) (**b**)

According to the norms of European countries, not all types of fibrous silicates are called asbestos but only one category of them which are: Actinolite, Amosite, Chrysotile, Crocidolite, Tremolite and Antophilite. The limit value of risk for these materials is 0.6 fiber / cm^3 for Chrysotile and for all other types of Asbestos is 0.2 fiber / cm^3.



(a) (b)

Figure 3. Mesothelioma Stages At stage 1 or 2, patients have the most treatment options. By stages 3 and 4, treatment options are generally more limited, as the cancer has spread (a) and the way how Asbestos enter in our body (b)

The main sources of asbestos are usually applied in all industrial areas, in schools covered with asbestos etc.[7] The areas that have problems are those where asbestos is collected. In Albania and not only, the industries which pose greatest risk of asbestos exposure are: cement production, lime production companies, paper factories, ceramics factories and all abandoned industrial areas where the main element of construction and insulation is asbestos.

III. MATERIALS AND METHODS

The usage of asbestos is quite a wide field. In fact, the country with the highest amount of Asbestos as a mineral is Canada where the largest mine pits in the world are located. The 20s and 30s brought a very large development of asbestos around the world. The materials were used in textiles, construction, industry, shipbuilding, etc. Asbestos worldwide has almost 2300 products which are classified as:

a) More than 69% cement-asbestos or otherwise known in the vernacular as Eternit.
b) 10% which are materials for insulation and coating
c) 7% on paper and cardboard
d) 3% for car brakes and friction
e) 2% in textile products

(a) (b)

Figure 4. Proctor Electric Company made a toaster containing asbestos insulation (a) and rope asbestos sold online

3.1 Areas Where Asbestos is Used

[8] According to some calculation looking at customs asbestos imports from other countries, the ratio between the surface of the amount of asbestos in Albania is greater than the surface of Albania itself. In Albania exists two groups of Asbestos usage: The first group includes all those products that have a strong and compact structure such as pipes and plates. While the second group includes all those materials with crumbly structures like as plastering, textile products, brakes, asbestos ropes… etc. But even compact materials are dangerous to human life because over time they are damaged by atmospheric factors, humidity and many other factors causing asbestos to spread in the air.

3.1.1 Asbestos in Industry

As Asbestos has a great use in the field of industry because it is used to produce electrical cables, textiles, fireproof clothing for firefighters of the production of fire blankets which are used in the oil industry. Also are

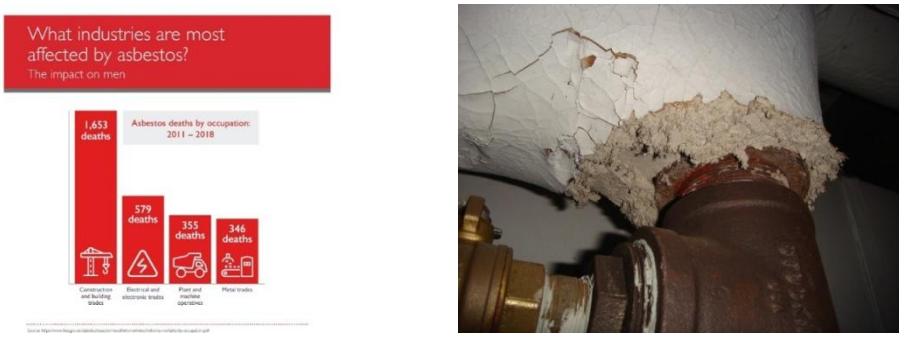
produced fireproof cartons which are used for security doors or safes. In mixture with other materials, Amianti is also widely used in car ferrules, brakes and frictions but also as filters in the food and chemical industry.

3.1.2 Asbestos in Construction

Regarding the field of construction, Asbestos has one of the biggest role in insulation. It has a very good insulating property in any aspect, noise, humidity, electricity, etc. Asbestos has a very high tensile strength and it is used to make corrugated tiles for cover and tiles for clothing because it has very good thermal insulation properties. The material is used also in the production of the pipes which were used to transport various liquids. In fact, it was most widely used in the product known as Eternite, which was a mixture of cement and Asbestos. Through Eternity, many elements were produced, starting from the corrugated sheets that were used to cover buildings, the flat sheets that were used to insulate buildings, pipes, canisters and many other elements.

3.1.3 Asbestos in Transport and Domestic Use

In household use, Asbesto is present in stoves, appliances, refrigerators, hair dryers, kitchen utensils and in some types of gloves. As far as transport is concerned, it has been used verywidely, being applied to brakes, frictions, thermal insulation of trains, ships, buses and refrigeration equipment.



(a) (b)

Figure 5. Industries most affected by asbestos, based on the number of mesothelioma deaths by profession between 2011 and 2018 (a) and partially damaged asbestos insulation on pipe fitting

3.2 Application Methods

[9] In fact, from the recent study it turns out that there are three best techniques for interfering with asbestos-containing materials: **1. Asbestos** relocation consists of dismantling facilities that are still in use. This method eliminates any potential source of Asbestos. It is very important that the relocation of Amianti is done by experts and with special equipment and of course it is very important to follow the technical rules.

2. Capsulation or encapsulation is a procedure which treats Asbestos with products that are penetrating or covering depending on the product usage by wrapping the asbestos fibers and creating a protective film on the exposed surface.**3. Insulation** creates a permanent protective barrier which is indescribable from air and humidity which has a very low cost. Isolation must always be accompanied by the encapsulation method to be as efficient as possible.

(a) (b) (c)

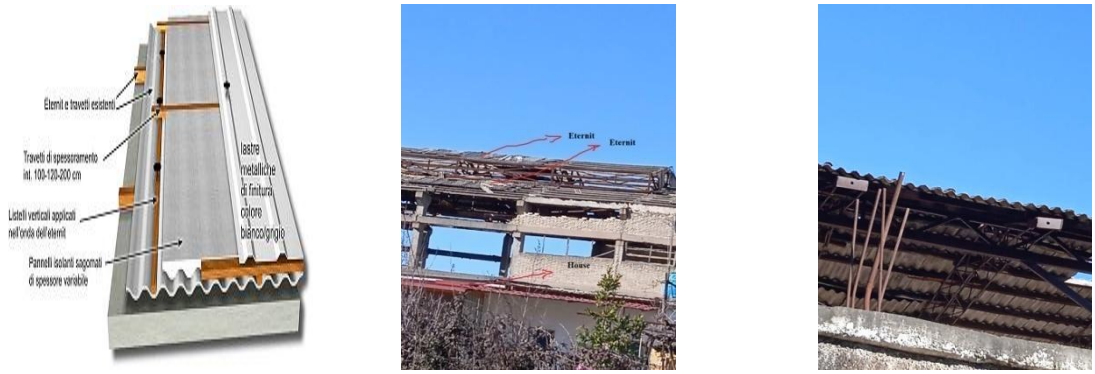
Figure 6. Methods for eliminating Asbestos. Abatement of Asbestos (a), Capsulation of Asbestos (b) and Insulation of Asbestos (c)

IV. ASBESTOS IN ALBANIA

Asbestos continues to be a product with a very high risk of health damage. The amount of Asbestos is indescribable and indestructible and the whole amount brought to Albania from abroad is a high danger to the citizens lives. The south-western area, including the cities of Tirana and Elbasan, are the most affected areas by this phenomenon, leaving other cities behind. Since rural areas are the poorest areas, they are still in a state of inactivity and decay.

(a) (b) (c)

Figure 7. Those photos we have taken in the Misto Mane(Tirana) area where they show currently the presence of Asbestos. In photos (a) and (b) we want to show how close is the asbestos with the houses and in the (c) is currently present in a business



(a) (b) (c)

Figure 8. The way how Asbestos is placed in the building (a) and in the photos (b) and (c) show the currently presence of Asbestos in buildings in the Kombinat area a Tirana

The population living in those areas is very poor so the materials have remained there for decades in untouched form. In fact, until now, the problem of Asbestos in Albania has been considered like not very important problem, and something transient. **[10-11]**Asbestos is founded not only in the outdoor environments but also in the indoor environments. Albania, has benefit till now for Asbestos as a finished industrial product but also as a raw material. The period with the largest inflows and with the largest use of Asbestos in Albania was between the years 1930-1990 where the use of approximately 190,000 tons was estimated. But the biggest problem lies in the fact that Asbestos is still imported to Albania. The western industrialized countries export the remaining products not only to Albania but also to the under-development countries. Albania is a country under development and the main concerns for the residence is the air quality they breathe. Everywhere there is a possibility that we inhale Asbestos since every day industrial buildings are destroyed or even private buildings and also different category of pipes, which make our life even more insecure.

V. CONCLUSIONS

In developed countries it has been scientifically proven that in the presence of asbestos during 10-30 years of exposure appear indisputably diseases. All European countries have created their own Anti-Asbestos legislation during the period 1992-2005, meanwhile in Albania is missing. Albania must have legislation and anti-asbestos policies. In European countries there is a directive 1999/77 / ce which strictly prohibits the use of Asbestos. Only in the case of anti-asbestos legislation with very strong regulations for the prevention and proper management of the anti-asbestos situation will improve the existing situation. Of course, the three methods mentioned above are very good for preventing Asbestos, such as isolation, displacement and encapsulation, but without an international policy to apply these methods, the inhabitance are still at risk. Many books and articles have been written relaying on the danger of asbestos and the diseases that the material provokes (lung cancer etc.). The lack of Albanian national anti-asbestos strategy as well as the lack of a local action plan for this" war" is very evident. This is a very complex problem because the socio-economic and health situation of the whole territory are intertwined. Therefore, the application of the most accurate, applicable and direct methods which suits with the need of the government is crucial. Especially in Tirana, there are many Asbestos buildings and gatherings which sleep silently, in the dust of oblivion, endangering our lives. The strict ban on asbestos on the usage of Asbestos should be implemented by the government. Such kind of material is not a simple building material, is a high-risky material. The safeness of the future generations must be guaranteed avoiding it.

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Figure and Tabels

Figure 1
(a) https://www.geologyin.com/2015/01/killer-minerals-worlds-10-most-deadly.html
(b) https://twu.edu/health-safety/safety-programs/asbestos-safety/

Figure 2
(https://www.mdpi.com/1660-4601/15/8/1741/htm

Figure 3
https://www.mesothelioma.com/mesothelioma/

Figure 4
(a) https://www.asbestos.com/products/consumer/
(b) https://www.indiamart.com/proddetail/20-mm-asbestos-rope-19166486962.html

Figure 5
(a) https://www.thompsons.law/support/legal-guides-and-resources/the-most-common-industries-affected-by-asbestos
(b) https://www.flickr.com/photos/asbestos_pix/4341733481

Figure 6
https://alloygroup.com/hazardous-material-abatement/

Figure 8
https://www.sostetti.com/sos.php/eternit/