

MEASURES TO PREVENT EXPOSURE TO ASBESTOS

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Abstract: *Asbestos is a hazardous material, widely used in construction and industries until it was banned, having devastating effects on health, such as the development of lung cancer, mesothelioma and other serious respiratory diseases. This article explores essential measures to prevent exposure to asbestos, with the aim of protecting workers and the general population. The importance of identifying and eliminating sources of asbestos, the implementation of strict regulations on its handling and removal, as well as the need for proper training of exposed personnel are discussed. The article highlights the importance of collaboration between competent authorities, employers and workers for the effective implementation of preventive measures and reducing the negative impact of asbestos on public health.*

Keywords: Exposure to asbestos, pulmonary cancer, prevention measures

1. INTRODUCTION

Asbestos is a fibrous mineral material widely used in construction, in industrial processes, due to its exceptional properties. The highlighting of the serious health risks that this product has, due to the inhalation of very fine fibers, has led the public authorities to take increasingly strict measures, going so far as to ban its use. Although certain asbestos-containing products have disappeared from the market in recent years, a significant number of products are still present, especially in construction, installations or enterprises, and due to inhalation of asbestos fibers, a large number of people can be affected by various diseases, with cancer being the most common.

In this context, measures to prevent exposure to asbestos become essential to protect the health of workers, but also of the general population. Here are some ways people can be exposed to asbestos:

–Old buildings: When these old structures are renovated, demolished, or degraded, asbestos fibers can be released into the air and inhaled by those nearby.

–Domestic environment: Asbestos exposure can also occur in homes where asbestos-containing products have been used, such as asbestos floor boards, mineral wool, or pipe insulation.

–Jobs: Certain industries, such as construction, demolition, insulation installations, manufacturing of building materials, or the production of automotive brakes and clutches, can expose workers to significant risks. [1]

–Consumer products: Some of these include vehicle braking equipment, roof tiles, and even household products such as toasters or hair dryers, which can pose a risk of exposure.

For this reason, it is essential that protective measures are implemented, both for workers and for the general population, to prevent exposure to this hazardous material.

2. EFFECTS OF ASBESTOS FIBERS ON HEALTH

Asbestos fibers are, in turn, made up of bundles of small fibrils attached to each other. They have the particularity of being able to separate very easily along the length under the effect of processing, shocks, vibrations, friction (or air currents in the case of a friable material) to constitute a cloud of very fine dusts, often invisible to the naked eye, being able to be deposited everywhere and penetrate deep into the lungs. [2]

Penetrating the respiratory tract, asbestos fibers can generate various diseases, among which, the most common is cancer. The main diseases caused by inhaling asbestos fibers are:

- asbestosis, a type of pulmonary fibrosis, which occurs after several years of exposure, when the dose retained in the lungs is high enough; It is manifested by a reduction in respiratory capacity, and may worsen over time, even after exposure has stopped. Asbestosis may be accompanied by some complications (inflammatory pleurisy or fibrosis of the pleura, lung lining, for example);

- broncho-pulmonary cancer, which occurs after a latency period after exposure, sometimes going up to 15 and 20 years or more, respectively; – pleural plaques, conditions that are manifested by localized thickening of the pleura, accompanied or not by an alteration of respiratory function;

- mesothelioma, primary cancer of the pleura, which can occur very late after exposure.

Asbestos causes serious diseases with very low survival rates, in 2019 alone, it took almost 72,000 lives in the EU. Reducing contact with asbestos is essential to protect workers' health and save lives. The new rules will reduce workers' exposure to asbestos, thus significantly reducing the risk of developing asbestos-related diseases. This is all the more important given the EU's objective to boost energy renovation in the EU, which could lead to the renovation of 35 million buildings by 2030. [3]

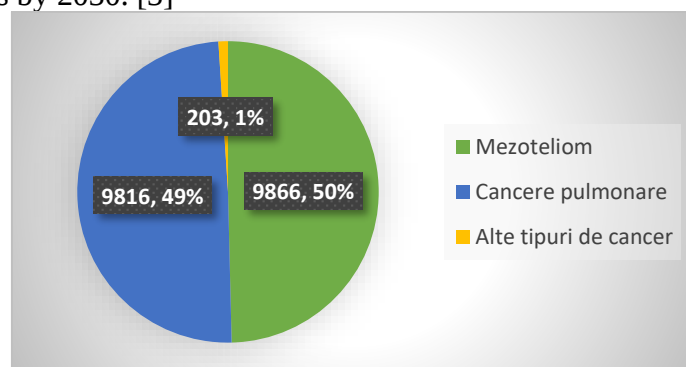


Figure 1. Number of asbestos-related occupational cancer cases.

Therefore, workers who come into contact with asbestos are particularly at risk. It can take up to 30 years for the first symptoms of an asbestos-related disease to appear. According to EU statistics on occupational diseases collected by Eurostat, 78% of recognized cases of occupational cancer in the EU are related to asbestos, the graph shows the number of asbestos-related occupational cancer cases by type for the period 2013-2019.

The number of exposed workers, currently 4.1-7.3 million, is expected to grow by 4% per year by 2030, according to Figure 2 below.

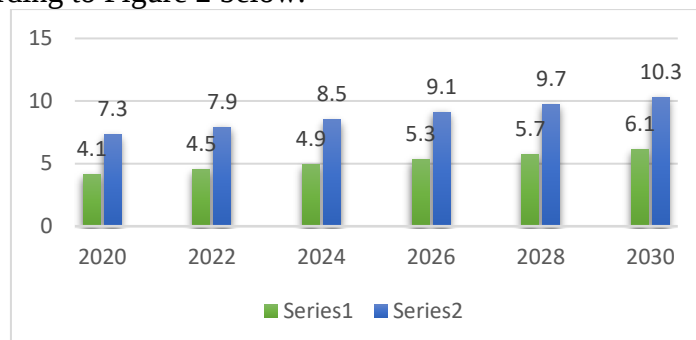


Figure 2. Evolution of the number of workers exposed to asbestos.

Starting with January 2007, the production, marketing and use of asbestos have been prohibited in Romania, but the works (repairs, maintenance) with products containing asbestos are still allowed. According to reports, the number of economic agents in Romania, by counties, that perform works with asbestos-containing materials is presented in Figure 3.

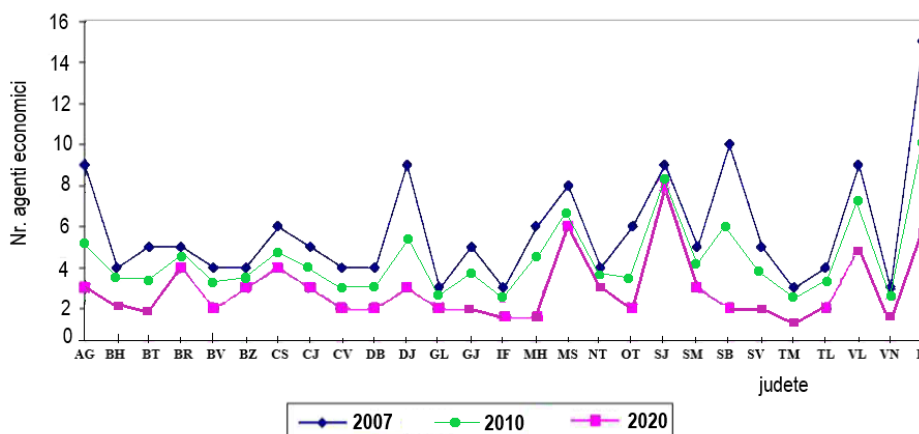


Figure 3. Economic agents who carry out works with asbestos-containing materials.

3. EXPOSURE ASSESSMENT AND LIMIT VALUES

According to art. 5 item 4 of HG no. 1.218/2006 regarding the establishment of the minimum occupational safety and health requirements to ensure the protection of workers against the risks related to the presence of chemical agents, the occupational exposure limit value is the limit of the time-weighted average of the concentration of a chemical agent in the air of the area where a worker breathes, for a specified reference period, for 8 hours or for a short period of maximum 15 minutes. [4]

According to Art. 5 of HG1875/2005, a worker must not be exposed to a suspended concentration of asbestos in air greater than 0.1 fibers/cm^3 , measured in relation to an 8-hour time-weighted average (TWA). This is a minimum objective and, therefore, it is important that the practices and equipment chosen aim to reduce the level of exposure to values as low as possible.

The limit value derives from the current knowledge of specialists regarding the toxicity of asbestos; aims to limit dust in the work environment. It is important to note that, at the current state of knowledge, we can see that repeated short-term exposures to high concentrations can

also pose a risk. Precisely for this reason, the regulations require the wearing of respiratory protective equipment in these work situations.

In the case of any activity involving the risk of exposure to dust from asbestos or asbestos-containing materials, the employer must order a risk assessment to be carried out in order to determine the nature and degree of exposure of the worker to dust from asbestos or asbestos-containing materials.

The employer must ensure the asbestos concentration determinations at the workplace, according to the provisions of HG no. 1875/2005 on the protection of workers' health and safety against the risks due to exposure to asbestos, with subsequent amendments and HG no. 124/2003 on the prevention, reduction and control of environmental pollution with asbestos. The determinations will be carried out by laboratories authorized by the Ministry of Health and the Ministry of Labor, Family, Social Protection and the Elderly, which will use methods approved by the Ministry of Health, according to Annex 1 of Directive 83/477/EEC as amended (HG no. 1875/2005). [5]

When the limit values are exceeded, the causes of these exceedances must be identified and the employer must take appropriate measures to remedy the situation, as soon as possible. It is forbidden to continue working in the affected areas until appropriate measures have been taken for the protection of workers. In order to verify the effectiveness of these measures, a new determination of the asbestos concentration in the work environment will be carried out immediately. When exposure to asbestos cannot be reduced by other means and it is necessary to wear personal respiratory protective equipment, its use must not be permanent, the duration of wearing it being limited for each employee strictly to the minimum necessary.

4. DESCRIPTION OF POSSIBLE PREVENTION MEASURES

4.1. Risk analysis.

The repair or maintenance situations that can put a specialist in contact with a material containing asbestos can be very varied; The level of risk, and therefore the choice of prevention and protection measures, will depend on the nature of the material, the nature of the operation, the equipment used and the general environment of the workplace. However, three levels of exposure can be distinguished, depending on the potential increasing hazard, determined by the situations for which the amount of dust may lead to an exceeding of the exposure limit value, which depends both on the nature of the material encountered and on the type of operation performed. [6]

The first level of exposure includes:

- handling of non-friable materials containing asbestos;
- direct works on a compact material (asbestos cement, plasters, gaskets, slabs)
- local displacement of the elements of a rigid false ceiling containing asbestos cardboard;
- operations to take a sample of material to be analyzed in a laboratory;
- all interventions that will not lead to an exposure higher than 10 times the exposure limit value.

The second level of exposure includes:

- various works in a building insulated with asbestos that can cause vibrations
- works that require handling and cutting of asbestos cardboard or asbestos woven or woven materials,
- short-term operations (less than one hour) of drilling asbestos insulation, thermal insulation or cardboard;

- all interventions which, taking into account their nature or duration, will not result in an exposure greater than 30 times the exposure limit value.

The third level of exposure includes:

- repeated work in a closed area for cutting and processing materials, even non-friable, with high-speed rotary tools;
- direct work on a friable material even in a good state of preservation (insulation), such as scraping a part of an insulation or intervening on a thermal insulation in bulk or flakes up to the support, passing cables or sewers through an insulation, etc.;
- all interventions which, taking into account their nature or duration, will not result in an exposure greater than 30 times the exposure limit value.

4.2. Prevention measures.

Whenever technically possible, work that can be carried out in a fixed place, such as: dismantling asbestos components from parts, equipment or mobile appliances, processing or cutting gaskets, friction products, asbestos cement or asbestos cardboard or other elements containing asbestos, they must be carried out in specially designed workplaces, equipped with adequate ventilation and dust capture devices.

Whatever the level of risk determined, it is always necessary to have recourse to a set of combined organizational, collective protection measures for risk reduction and for the individual protection of workers. The minimum measures for jobs in the first exposure level to be put in place will always be of the type:

- respiratory protection by means of a disposable FFP3 filtering half-mask;
- spraying whenever technically possible;
- garbage bag in the immediate vicinity, sponge or damp cloth to clean, if necessary.

Employees will be equipped with filtering, anti-dust, P3 class respiratory protection devices and disposable clothing throughout the cleaning period. Wearing clothes during the actual maintenance operation is justified if cleaning has not been carried out or if there is a risk of accidental contact with asbestos. The protection of the respiratory tract will be maintained throughout the operation.

The minimum measures for jobs in the second exposure level to be put into practice will always be of the type:

- marking the area;
- P3 anti-dust filtering respiratory protection device with full mask, disposable protective clothing;
- soil protection through plastic film;
- spraying whenever technically possible;
- cleaning with an absolute filter vacuum cleaner at the end of the work, supplemented, if necessary, by cleaning with a wet sponge.

In addition, in some work situations there may be risks of asbestos dust emission that will require special techniques or dust isolation or capture devices. If the operation is accompanied by shocks or vibrations on structural elements that can cause an emission of asbestos fibers, the risk of fiber emission is real and a complete isolation of the area is necessary before the works. For fixed elements in buildings or installations, the operation will be carried out with the help of manual or mechanical tools with low rotational speed, equipped with a dust capture and recovery device with absolute filtration. [7]

The measures to be taken for workplaces in the third exposure level will consist of avoiding the propagation of dust emitted outside the work area:

- locally impregnating the insulation or material with water or a wetting solution before the intervention (taking into account in particular the electrical risk);
- the surface of the treated part is sufficiently small, isolating the area if it is more extensive or if the use of the trouser bag is impossible (insulation, interior walls, etc.) and protecting employees with disposable clothing and at least with a complete mask with ventilation assisted with TMP3 filters, respectively a mask with compressed air supply.

If cutting tools with high rotational speed are to be used, including on materials containing strongly bound asbestos, such as asbestos-cement elements, these tools shall be equipped with pollutant capture devices linked to an absolute filter suction unit. A protection of the area will be created. Employees will have to be equipped with disposable waterproof protective clothing and insulating respiratory protection devices with full mask or balaclava with compressed air supply or assisted ventilation filters with a full mask and a TMP3 filter. [8]

For the activities of extraction, manufacture, transformation and removal of asbestos, the employer must ensure that employees have access to information and recommendations regarding the assessment of their health status and the risks to which they may be subjected at the end of exposure to asbestos and/or asbestos-containing materials.

5. CONCLUSIONS

Preventing exposure to asbestos is a key priority for the protection of public health, given the serious risks associated with this hazardous material. Effective prevention measures, such as the correct identification of asbestos-containing materials, their safe disposal and continuous training of workers, are fundamental to reducing the negative impact on health. Also, the implementation of strict regulations and the use of modern monitoring technologies can significantly contribute to minimizing risks. Collaboration between competent authorities, employers and workers is crucial to ensure a safe working environment and to protect the community from the long-term effects of asbestos exposure.

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