

The Past, Present and Future of Asbestos Containing Materials

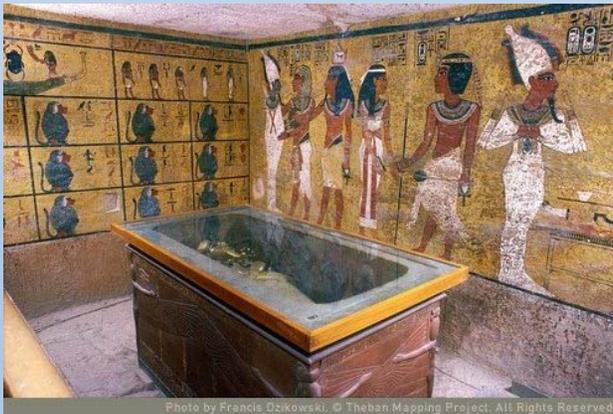


Mining and Mills

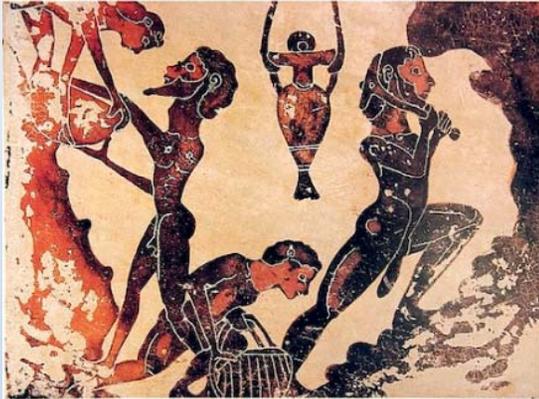


Asbestos has been mined and used in an infinite number of textiles and building materials for millennia due to its tensile strength, fire retardant and acid resistant properties making it essential in the automobile and construction industries, as well as the military.





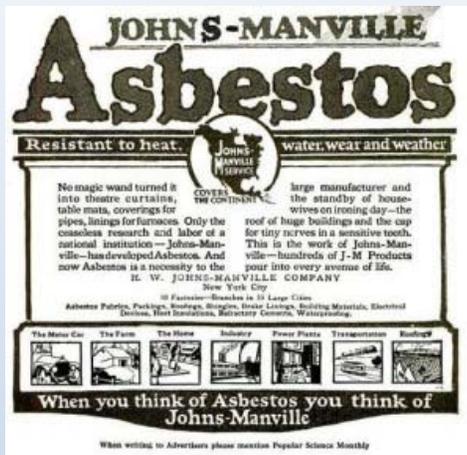
Archeologists uncovered asbestos fibers in debris dating back to the Stone Age, some 750,000 years ago. It is believed that as early as 4000 BC, asbestos' long hair-like fibers were used for wicks in oil lamps and candles. Between 2000-3000 BC, embalmed bodies of Egyptian pharaohs were wrapped in asbestos cloth to protect the bodies from deterioration. In Finland, clay pots dating back to 2500 BC contained asbestos fibers, which are believed to strengthen the pots and make them resistant to fire. Around 456 BC, Herodotus, the classical Greek historian, referred to the use of asbestos shrouds wrapped around the dead before their bodies were tossed onto the funeral pyre to prevent their ashes from being mixed with those of the fire itself. Some scholars claim the word asbestos comes from the ancient Greek term, $\alpha\sigma\beta\epsilon\sigma\tau\omicron\varsigma$ (properly transliterated as “asbestos”), meaning inextinguishable or unquenchable, a characterization of the material's invincibility from the intense heat of the fire pits used by the Greeks for cooking and warmth.



Others believe that the word's origin can be traced back to a Latin idiom, *amiantus*, meaning unsoiled, or unpolluted, since the ancient Romans were said to have woven asbestos fibers into a cloth-like material that was then sewn into table cloths and napkins. These cloths were purportedly cleaned by throwing them into a blistering fire, from which they came out miraculously unharmed and essentially whiter than when they went in. While Greeks and Romans exploited the unique properties of asbestos, they also documented its harmful effects on those who mined the silken material from ancient stone quarries. Greek geographer Strabo noted a "sickness of the lungs" in slaves who wove asbestos into cloth. Roman historian, naturalist and philosopher, Pliny the Elder, wrote of the "disease of slaves," and actually described the use of a thin membrane from the bladder of a goat or lamb used by the slave miners as an early respirator in an attempt to protect them from inhaling the harmful asbestos fibers as they labored.

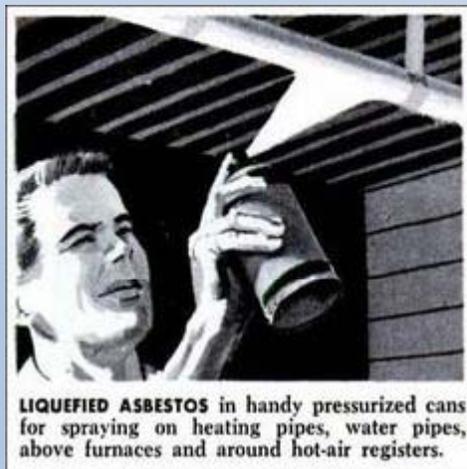


Much later in 1899, Dr. Montague Murray noted the negative health effects of asbestos. In the early 1900s researchers began to notice a large number of early deaths and lung problems in asbestos-mining towns. The first documented death related to asbestos was in 1906. The first such study was conducted by Dr. Murray at the Charing Cross Hospital, London, in 1900, in which a postmortem investigation of a young man who had died from pulmonary fibrosis after having worked for 14 years in an asbestos textile factory, discovered asbestos traces in the victim's lungs. Adelaide Anderson, the Inspector of Factories in Britain, included asbestos in a list of harmful industrial substances in 1902. Similar investigations were conducted in France and Italy, in 1906 and 1908, respectively. You ask, “If they’ve known it was bad for you for thousands of years, why are they still using it?!?”. Well, funny story...depending on which side of the coin you’re on....



Although public health professionals had long been aware of the deaths and illnesses related to asbestos exposure, it wasn't until the early 1970s that asbestos garnered the attention of the Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA).

In 1989, after conducting a ten year study and compiling a 100,000 page administrative record, EPA announced that it would phase out and ban virtually all products containing asbestos. The ban applied to the manufacture, import, processing and distribution of asbestos products. It would affect 94% of all asbestos consumption, including a ban of asbestos-containing products like brake linings, roofing, pipes, tile, and insulation. EPA's stated rationale for the ban was simple: "asbestos is a human carcinogen and is one of the most hazardous substances to which humans are exposed in both occupational and non-occupational settings."



1991 Overturn of Asbestos Ban

In July of 1989, the U.S. Environmental Protection Agency (EPA) created an Asbestos Ban and Phase-out Rule that was intended to ban virtually all manufacture, processing, importation, distribution and use of asbestos in the United States.

Unfortunately, in 1991, the Fifth Circuit Court of Appeals vacated and remanded the Final Rule on the grounds that the EPA failed to supply sufficient evidence to justify the ban.

The court, however, did uphold a portion of the Final Rule that banned the new manufacture of asbestos containing materials as of 1990 and in 1977, the Consumer Product Safety Commission (CPSC) banned the use of asbestos in wallboard patching compounds, gas fireplaces, and artificial fireplace ash. CPSC also influenced manufacturers of hair dryers to ban the use of asbestos insulation in their products.

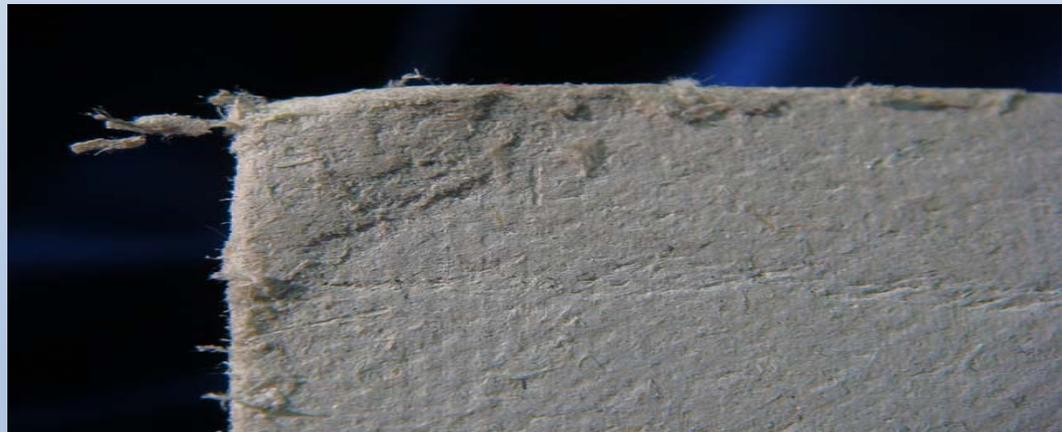
Other bans on certain asbestos containing materials remained intact under the Clean Air Act and the Toxic Substances Control Act. (TSCA)



The Clean Air Act bans the use of sprayed-on surfacing applications containing more than 1% of asbestos unless such materials would be encapsulated with a binder that would prevent the asbestos from becoming friable. Friable is defined by the EPA as any material containing asbestos that, when dry, can be “crumbled, pulverized or reduced to powder by hand pressure”. The CAA also bans any form of wet-applied or pre-formed asbestos pipe, boiler or block insulation.

The Toxic Substances Control Act bans any new use of asbestos as well as any of the following products that may contain asbestos:

**Corrugated paper
Rollboard
Commercial paper
Specialty paper
Flooring felt**



Besides those listed above, the EPA does not have any other existing bans and does not track commercial use, distribution or processing of asbestos containing materials.

Litigation related to asbestos is regarded as one of the largest litigation cases in legal history in terms of duration, claim size, and scope. Factors responsible for this include:

***1.Asbestos use was extremely widespread:* It was used across many sectors, countries, industries and uses. It was also widespread in society itself, being used not in limited "niche" areas but within many everyday products, in housing, fire protection, and even decorative material such as Artex, and in numerous other ways. Over 50% of homes in some countries contained asbestos even after its ban there. So it was somewhat ubiquitous;**

***2.Knowledge or suspicion of health issues existed for a long time:* The health issues related to asbestos were known, suspected, or reported, for decades, with modern medical coverage dating back to the 19th century.**

***3.Impact was severe, and included factors that tend to lead to high claims:* serious and fatal disease; also apart from death, the costs include long term care and disability, care costs, lifetime loss of income, and other high value compensations.**

4. *Relatively easy to be at risk:* asbestos-related diseases are caused by inhaling tiny airborne fibers, therefore any activity related to asbestos that led to loose dust or fibers could potentially cause disease (*Secondary asbestosis*).

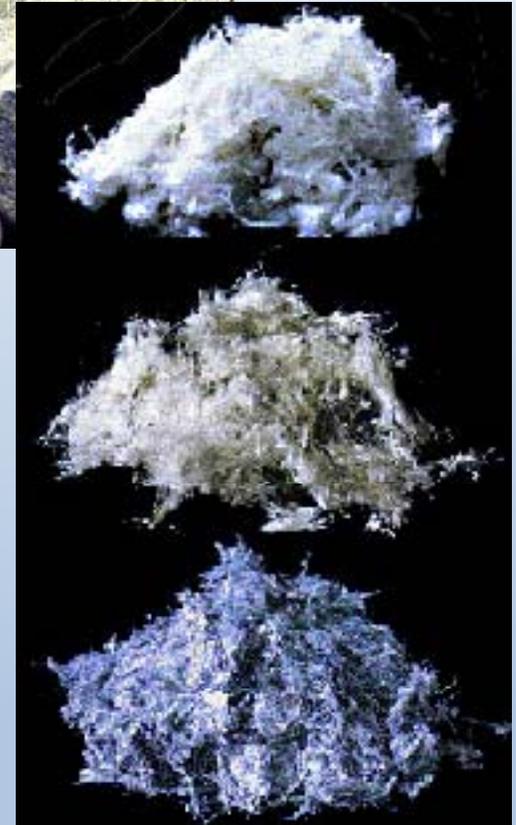
5. *Illnesses arise long after exposure:* asbestos related diseases can arise decades after actual exposure.

6. *Asbestos industry alleged misconduct:* alleged concealing, distorting, and suppressing of risk related information, by asbestos related businesses.

As of 1999, trends indicated that the worldwide rate at which people are diagnosed with asbestos-related diseases will likely increase through the next decade.

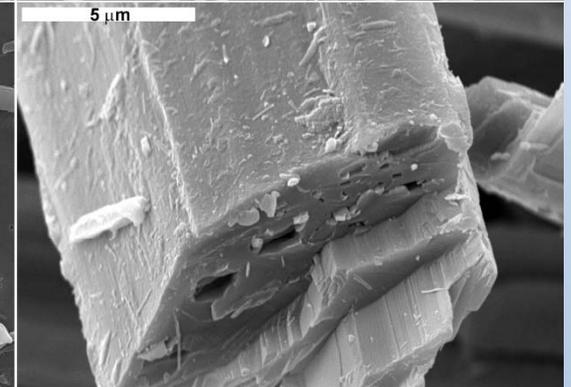
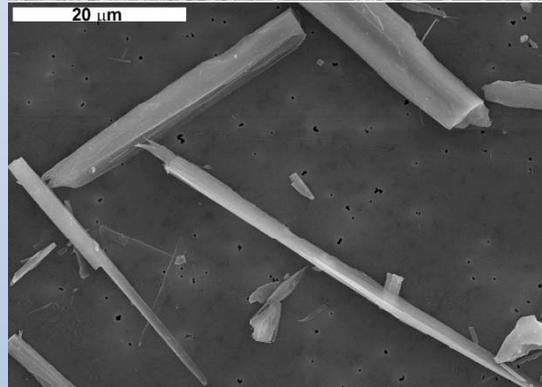
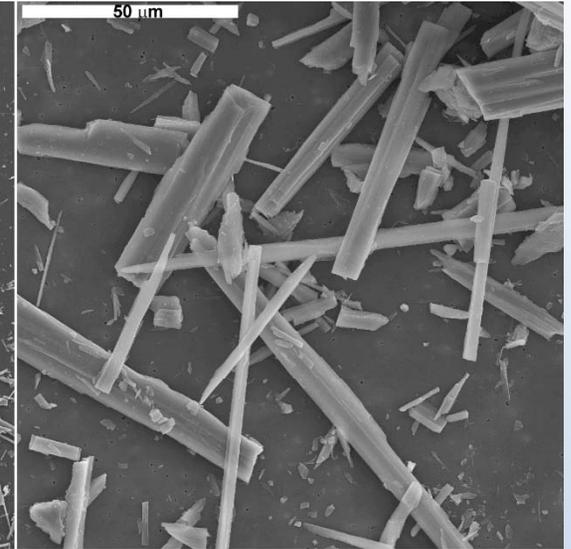
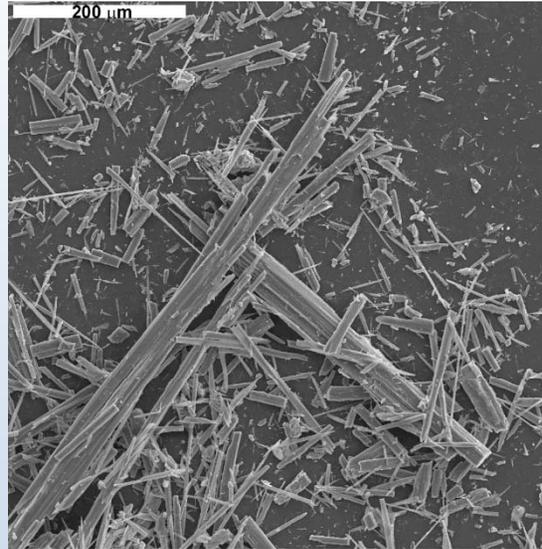
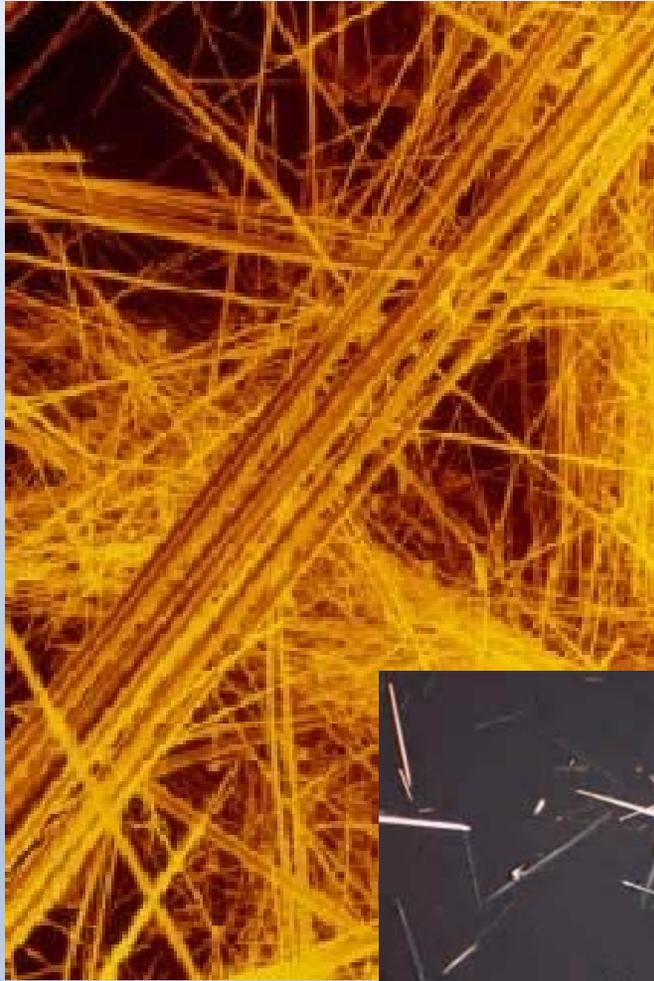
Analysts have estimated that the total cost of asbestos litigation in the USA alone is over \$250 billion.

In the UK, more people died in 2011 from asbestos-related causes (4721) than in all types of traffic and transport accidents combined, and new reported cases were estimated at 2126.



**What appears soft and fluffy
in it's natural state...**

**...appears to be
needles and shards
under a microscope.**



ASBESTOS ATTRIBUTES

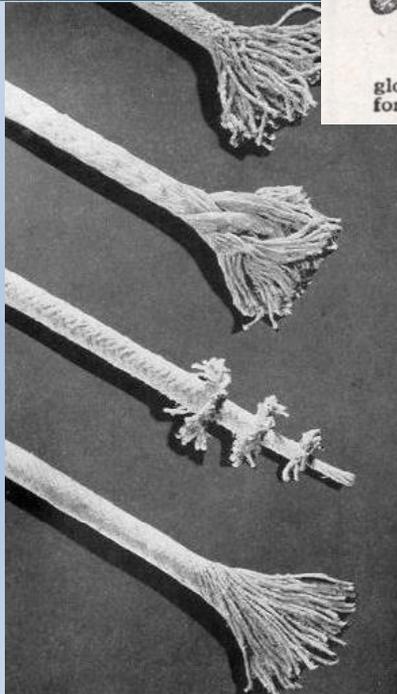


Asbestos is fireproof,
acid and corrosion
resistant....



Quilted
ASBESTOS MITTS
... they last twice as long

These asbestos mitts for handling hot metal molds and shapes are reversible to fit either hand. Both sides quilted, won't shred or fray on rough, jagged material. Double wear, double life. Wool lined. All seams double stitched. The answer to troublesome problems. \$2.20 a pair. Discounts for quantities. One of 4300 production-speeding, time-saving safety gloves, aprons, sleeves, spats, etc. Write for Free catalog.



...and
possesses a
tensile
strength
greater than
that of steel.

TABLE 2.6. COMPARISON OF AVERAGE TENSILE STRENGTHS OF VARIOUS MATERIALS *

Type of Material	Tensile Strength, Lb per Sq In
Ingot iron	45,000
Wrought iron	48,000
Carbon steel	155,000
"Nichrome" steel	243,000
Piano steel wire	300,000
Cotton fiber	73,000 to 89,000
Rock wool	60,000
Glass fiber	100,000 to 200,000
Chrysotile asbestos	80,000 to 200,000
Crocidolite asbestos	100,000 to 300,000
Amosite asbestos	16,000 to 90,000
Tremolite asbestos	1,000 to 8,000

* Can. Mining and Met. Bull. (1951)

Beneath the asbestos shingles or corrugated cement panel roof ; beneath the asbestos flashing tar, behind the asbestos cement fiber board siding a product known as “Zonolite™” was commonly used for attic and wall insulation and it was commonly used for insulation in CMU block cavities.

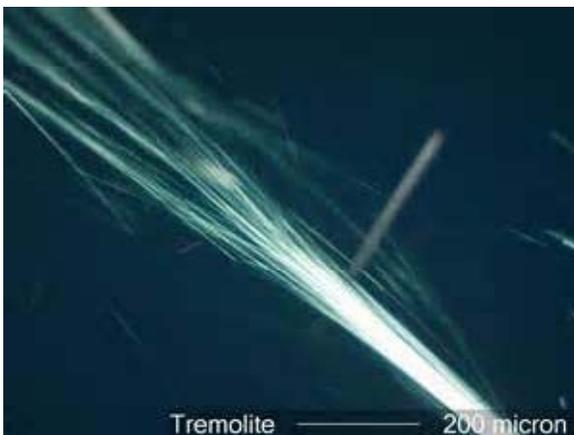




Zonolite™ was sold as attic insulation between the 1940s and 1990s. It is a Vermiculite ore that is a naturally occurring mineral used widely in various consumer products, such as attic insulation, lawn and garden products, and fireproofing material.



Most vermiculite ore and products do not pose a health hazard however vermiculite from Libby, Montana is of special concern because it is contaminated with asbestos.



The asbestos found in Libby appears to be unique in terms of its molecular composition of Tremolite-Actinolite and the disease progression from what is called Libby amphibole asbestos. There have been hundreds of illnesses and deaths in the Libby community over the past 70 years resulting from occupational and non-occupational environmental exposures to asbestos associated with Libby's vermiculite mining and milling operations.



A building may have decorative asbestos containing texture or “popcorn” ceilings.

**It may have asbestos containing concealed spline tiles....
...or the tiles may be adhered with asbestos containing button mastic.**



Or it may have vinyl sheet flooring with an asbestos backing that contains up to 65% Chrysotile asbestos or vinyl asbestos floor tile adhered with asbestos containing mastic.



The walls may have asbestos containing joint compound and textures in a countless variety of patterns!



A Heating Ventilation and Air Conditioning system (HVAC) could be blowing more than air



There may be a vibration dampener separating the air handler from the duct work woven from almost pure Chrysotile asbestos...

...or paper duct tape on duct work and air registers...



...or the entire air duct may be wrapped in asbestos containing paper insulation.



The roof top cooling tower may be made with asbestos containing walls and louvres.





There may be asbestos containing glaze around windows....

...or asbestos containing caulk around window and door frames

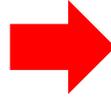


...and it is commonly found in plaster walls and ceilings.



Although it is still a legal commodity that appears in many building materials and common household products, asbestos use has declined considerably in the U.S., but by no means has production completely stopped.

Asbestos may still be found in roofing materials, caulks and mastics such as those used to adhere mirrors.



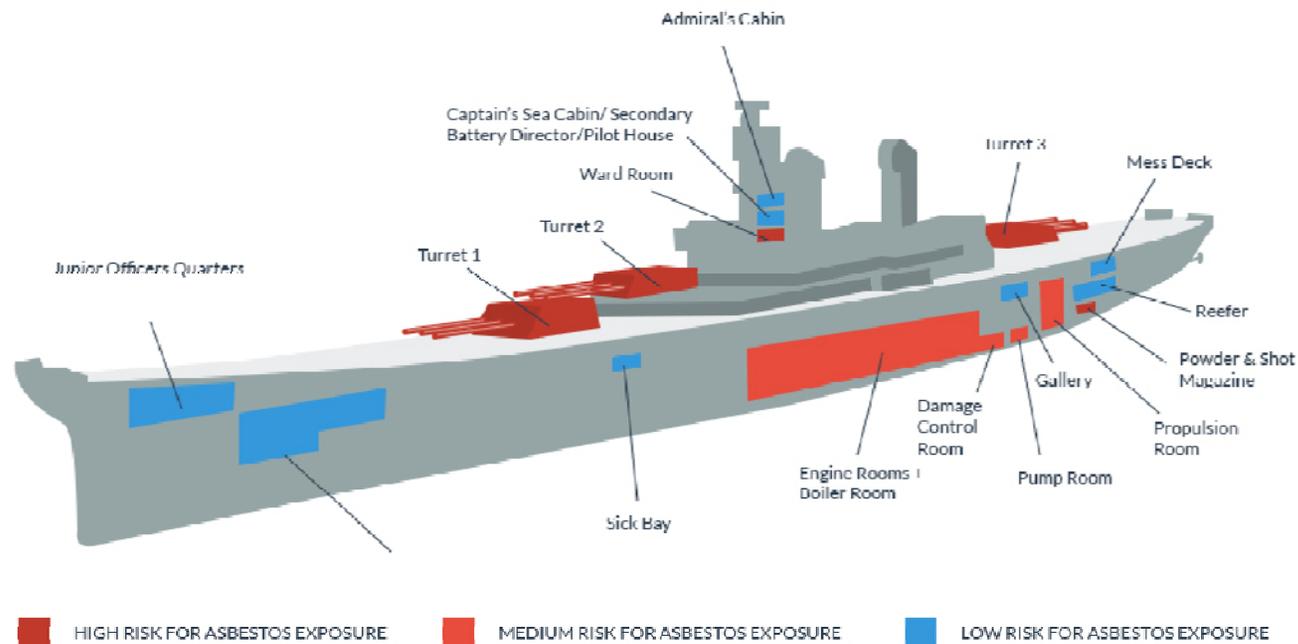
The last U.S. asbestos mine closed in 2002, ending more than a century of the country's asbestos production. And although the United States has always been a major importer of asbestos, historically providing only a small percentage of the world's supply, it was always the world's largest consumer and it can still be found in products that are imported under the North American Free Trade Act. Another leading sector that continues to use asbestos materials is the automotive industry. Many car parts that withstand high temperatures and friction, such as gaskets and brake pads, contained some percentage of asbestos.



ASBESTOS RELATED DISEASE

- The peak of asbestos use occurred from the late 1930s through the end of the 1970s.
- Though anyone who was exposed to asbestos can develop asbestos-related diseases, US Navy veterans who served during World War II and the Korean Conflict have the highest incidence of these diseases.
- Some 30 million pounds of asbestos are still used each year in the United States.

AREAS OF ASBESTOS EXPOSURE RISK ON UNITED STATES NAVAL SHIP





The number one cause of occupational cancer in the United States is asbestos, even more than 30 years after its use was essentially halted. Asbestos accounts for 54 percent of all occupational cancers, according to the Asbestos Disease Awareness Organization.

← Shipyard workers carding pipe insulation for steam lines.

Most non-Western developing countries continue to use asbestos. The largest markets include China and India. It has been reported that Indian government officials support the asbestos industry because many of them state publicly that the mineral is not toxic, or at least not toxic under certain levels of exposure. The construction industry in India continues to use asbestos products in housing, and in industrial and commercial buildings – guaranteeing a health crisis in years to come.

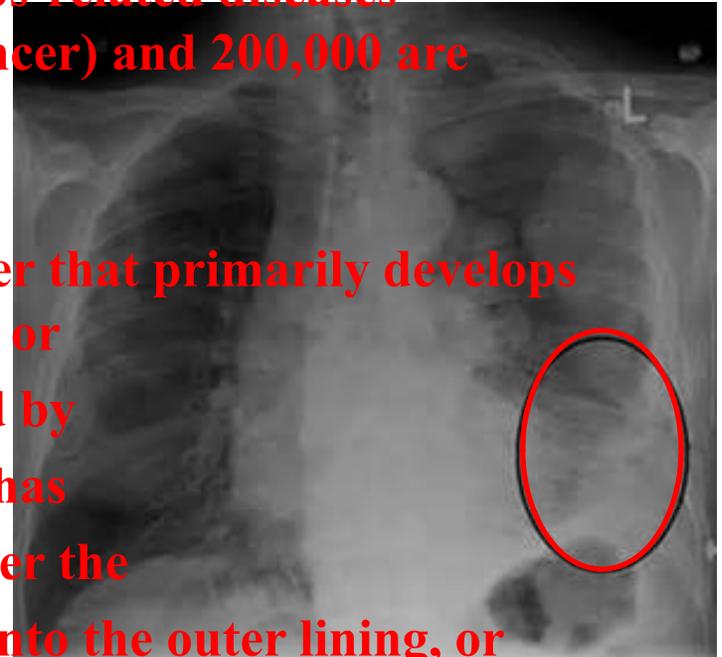


↑ Asbestos factory, Ahmedabad, India

MESOTHELIOMA CANCER

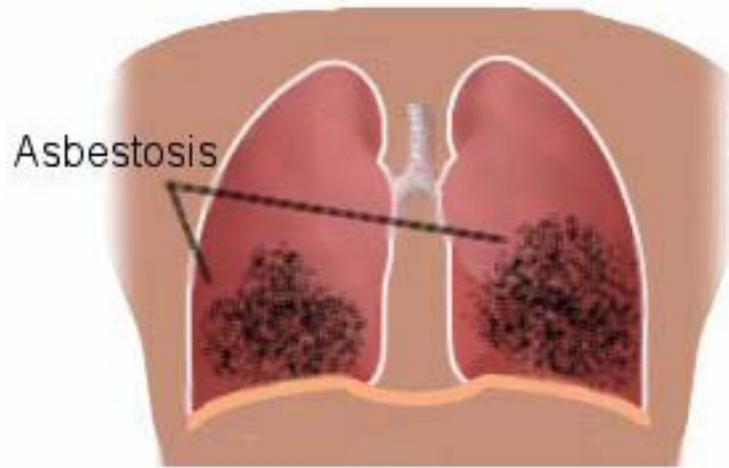
- Since asbestos guidelines were issued in 1979, approximately 45,000 Americans have died of asbestos-related diseases, including asbestosis and mesothelioma.
- 10,000 Americans will die this year of asbestos-related diseases (including lung cancer and mesothelioma cancer) and 200,000 are currently living with asbestosis.

Mesothelioma is a rare, aggressive form of cancer that primarily develops in the lining of the lungs (pleural mesothelioma) or the abdomen (peritoneal mesothelioma). Caused by asbestos, mesothelioma has no known cure and has a very poor prognosis. With mesothelioma cancer the fibers have worked their way through the lung into the outer lining, or mesothelium. The latency period after initial exposure is estimated to be as much as 40 years!



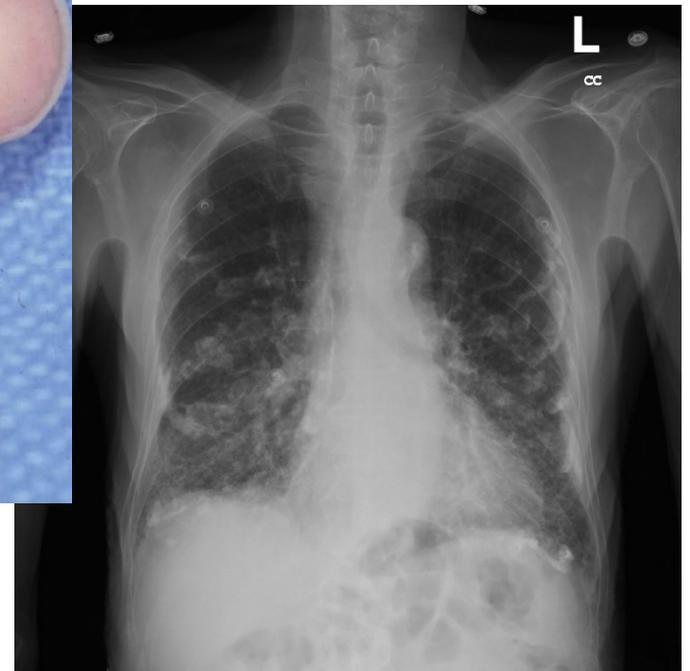
ASBESTOSIS

In the case of asbestosis, the fibers embed themselves in the inner lung tissue and cause scarring. Over time that scarring leads to fibrosis, which hardens areas of the lung tissue and reduces, or eliminates, the ability of that tissue to absorb oxygen.



The effects of long-term exposure to asbestos typically don't show up for 10 to 25 years after initial exposure. Asbestosis signs and symptoms can include:

- Shortness of breath
- A persistent, dry cough
- Loss of appetite with weight loss
- Fingertips and toes that appear wider and rounder than normal (clubbing)
- Chest tightness or pain



Texas Asbestos Health Protection Act (TAHPA)

An asbestos survey is required prior to *any* renovation, demolition or repair in a public building that would impact *any* suspect material.



“Before performing any demolition or renovation activity in a public facility or commercial building, building owners or operators shall ensure that all friable asbestos-containing material (ACM) or asbestos-containing materials which may become friable are inspected and abated in accordance with 40 CFR Part 61, Subpart M. The asbestos survey and abatement for the demolition and/or renovation shall be conducted by persons licensed in accordance with these rules, and according to the standards for removal specified in §§295.58 - 295.60 of the Texas Asbestos Health Protection Act (TAHPA).”

A 10-day notification must be submitted prior to the disturbance of *any* amount of asbestos or before the demolition of *any* public building regardless of whether it contains asbestos



“The building owner retains the primary responsibility for compliance with these rules for the presence, condition, disturbance, renovation, demolition, and disposal of any asbestos encountered in the construction, operations, maintenance, or furnishing of that building or facility, including the responsibility for the periods of vacancy, and for all preparations prior to actual demolition; all regulated asbestos-containing material (RACM) must be removed prior to demolition in accordance with the National Emission Standards for Hazardous Air Pollutants (NESHAP), and in a public building, comply with §295.60 in the TAHPA relating to Operations: Abatement Practices and Procedures.”



National Emissions Standards for Hazardous Air Pollutants (NESHAP)

While a single family residence, duplex, triplex or quadraplex is not regulated under TAHPA or EPA; OSHA regulations still apply to any contractor performing renovation or demolition. If more than one single family residence is to be renovated or demolished on the same site, the NESHAP regulations apply. The NESHAP also applies to Federal, Commercial and Industrial sites.

“Renovation means altering a facility or one or more facility components in any way, including the stripping or removal of RACM from a facility component.”

“Demolition means the wrecking or taking out of any load-supporting structural member of a facility”

A renovation is only regulated if the combined amount of RACM to be stripped, removed, dislodged, cut, drilled, or similarly disturbed is no more than 260 linear feet on pipes or 160 square feet on other facility components, or 35 cubic feet) off facility components where the length or area could not be measured previously.

If a single family residence has ever been used as a public facility i.e. daycare, real estate office, hair salon, etc.; or if the intent of the renovation is to convert a single family residence into a public facility, the activities are regulated under the Texas Asbestos Health Protection Act (TAHPA).

“Facility means any institutional, commercial, public, industrial, or residential structure, installation, or building (including any structure, installation, or building containing condominiums or individual dwelling units operated as a residential cooperative, but excluding residential buildings having four or fewer dwelling units); any ship; and any active or inactive waste disposal site. For purposes of this definition, any building, structure, or installation that contains a loft used as a dwelling is not considered a residential structure, installation, or building. Any structure, installation or building that was previously subject to this subpart is not excluded, regardless of its current use or function.”

A NESHAP regulated structure must be thoroughly inspected prior to demolition or renovation that would impact 160sf, 260lf or 35cf thresholds and a 10-day notification must be submitted.

AND NOW TO THE FUTURE



In June of 2018, Russian mining company Uralasbest placed a seal with the face of President Donald Trump on their product with the note "Approved by Donald Trump, 45th President of the United States."

EPA is proposing a “Significant New Use Rule” (SNUR) for certain uses of asbestos (including asbestos-containing goods) that would require manufacturers and importers to receive EPA approval before starting or resuming manufacturing, and importing or processing of asbestos. This review process would provide EPA with the opportunity to evaluate the intended use of asbestos and, when necessary, take action to prohibit or limit the use.

The SNUR came about after modifications in 2016 to the Toxic Substances Control Act—the nation’s primary legislation regulating chemical safety. Under those updates, the EPA is mandated to regularly reevaluate chemicals and asbestos was chosen as one of the first 10 substances to receive new scrutiny.

In the case of asbestos, legacy uses, associated disposals, and legacy disposals *will be excluded* from the problem formulation and risk evaluation ... These include asbestos containing materials that remain in older buildings or are part of older products but for which manufacture, processing and distribution in commerce are not currently intended, known or reasonably foreseen.

EPA is excluding these activities because EPA generally interprets the mandates under section TSCA § 6(a)-(b) to conduct risk evaluations and any corresponding risk management to focus on uses for which manufacture, processing or distribution is intended, known to be occurring, or reasonably foreseen, rather than reaching back to evaluate the risks associated with legacy uses, associated disposal, and legacy disposal, and interprets the definition of conditions of use in that context.

Public health advocates believe EPA is inappropriately limiting its health reviews of chemicals to avoid considering the impacts of those already in the environment. But the agency hasn't been swayed by their pushback ... That means the agency won't consider the dangers posed by, for example, asbestos-containing tiles, adhesives and piping in millions of homes and commercial buildings nationwide.

Other changes identified in the E.P.A. documents narrow the definitions of certain chemicals, including asbestos. Some asbestos-like fibers will not be included in the risk assessments, nor will the 8.8 million pounds a year of asbestos deposited in hazardous landfills or the 13.1 million pounds discarded in routine dump sites.

Three former agency officials, including a former supervisor of the toxic chemical program, said that the E.P.A.'s approach would result in a flawed analysis of the threat presented by chemicals.

“It is ridiculous,” said Wendy Cleland-Hamnett, who retired last year after nearly four decades at the E.P.A., where she ran the toxic chemical unit during her last year. *“You can’t determine if there is an unreasonable risk without doing a comprehensive risk evaluation” ...*

The most likely outcome of the changes will be that the agency finds lower levels of risks associated with many chemicals, and as a result, imposes fewer new restrictions or prohibitions, several current and former agency officials said.

While it is true that the uses of asbestos discussed in the 2018 SNUR are currently legal, their health and litigation risks have rendered them effectively dead. The current administration has established a process for some of those uses to be granted formal approval by the EPA if they pass a safety review many scientists find flawed.

While this new approach allows asbestos-containing products that are not currently used, to be used in the future, compared to the status quo, the SNUR is an improvement because without it, any of those prior uses could come back without any notification to EPA and the SNUR at least requires that notification.

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