

## *Supplementary Materials for*

# Mortality in an Italian cohort of former asbestos cement workers

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This PDF file includes the detailed description of the production cycle of the Eternit Company and Table S1. Cause of death, and ICD8, ICD9, ICD10 codes, investigated

## ETERNIT COMPANY: THE PRODUCTION CYCLE

From a historical point of view, professional exposure to asbestos at the Eternit Company in Syracuse changed reasonably during the time, as the company adopted some major changes in technology and work procedures in the years 1974-1975.

### *Before 1974-1975*

The phases of the production cycle in which the greatest dispersion of asbestos fibers occurred were:

a) Raw material

The raw material arrived once a month by rail or truck. Unloading was carried out by a cooperative (about 20 employees), with the occasional participation of Eternit workers. It is reported that jute bags containing asbestos sometimes arrived broken. Unloading was done manually throughout the 1960s. The bags, loaded onto pallets with the use of forklifts, after being shaken in a vacuum machine, were unstitched and reused. Crocidolite was used until 1974, when the production of tubes was discontinued. The leftover crocidolite was used to make slabs for some time after the renovation.

b) Production

From the warehouse the requirements for 8-10 hours were carried on pallets that were raised with a trolley up to a height of 5.50 m.

From 1953-54 to the end of the 1960s, the jute sacks were unstitched and emptied on the ground floor into a long channel equipped with a feeding screw, then taken to another screw which raised the asbestos and loaded the disintegrator. The fiber was sucked by an "armored" fan and sent to storage rooms. The transport was pneumatic, and a bag of jute was placed as a filter on the tube for air outlet from the chamber. The sacks were emptied by two workers. The asbestos was taken from the storage rooms with a shovel and pitchfork and placed in a cart loaded also by hand, and then poured into a hole on the floor inside the mixer. If the pipes got flooded, they were cleaned manually. At the end of the

1960s the disintegrator was replaced with a carding machine, adapted by the textile sector. This change caused an increase in dustiness as the process of "opening" of the fibers was more intense.

c) Finishing and storage

Until 1962 the slabs were trimmed manually with a cutter, then with a dry diamond disc, equipped with an aspirator, about 12 hours after forming; the operation was done manually until 1962, then by machine (suction cup corrugator). The tubes were stored in a warehouse resting on shavings coming from the turning of the same, with consequent exposure to crocidolite fibers.

### *After 1974-75 renovation*

The main changes were as follows: discontinuation of the use of crocidolite, adoption of weighing and automated compounding in the raw materials department, suction cabin on the asbestos hopper where polyethylene bags were cut and unloaded, suction systems in correspondence with the cut with disc saws. In 1977 the injection system was built for the production of the tanks, and in 1979 the injection system for the production of the ventilation ducts.

After the restructuring, some sources of dust were still present, for example the cleaning of the dough department, carried out with a broom, the presence of a silos for the scraps that were ground in a hammer mill. The residual finishing activities, reduced compared to the previous period, were carried out manually with sandpaper and a dry pad. The sleeves were cut both with a wet diamond blade and with a dry-working machine. An aspirator with a 60-meter hose was always clogged, with the shavings on the ground removed with a shovel. Wet cleaning was carried out with high pressure water lances, but the use of scrapers, hammers and hand chisels remained in the hardest places. Until the introduction of a bag to collect the dust directly from the vacuum cleaner, on an unspecified date, the dust was discharged outdoors. The overalls were washed at home until 1991.

**Table S1**  
Cause of death, and ICD8, ICD9, ICD10 codes, investigated

Cause of death	ICD8 codes	ICD9 codes	ICD10 codes
<b>All causes</b>	0000-9999	0001-9999	A00-T98
<b>Malignant neoplasms (MN)</b>	1400-2079	1400-2089	C00-C97
MN of the lip, oral cavity, and pharynx	1400-1499	1400-1499	C00-C14
MN digestive organs (peritoneum included)	1500-1599, 1978	1500-1599	C15-C26, C45.1, C48
MN of the stomach	1510-1519	1510-1519	C16
MN of the small intestine	1520-1529	1520-1529	C17
MN of the colon	1530-1539	1530-1539	C18
MN of the rectum	1540-1549	1540-1549	C19-C21
MN of the liver and intrahepatic bile ducts	1550-1559, 1978	1550-1552	C22
MN of the retroperitoneum and peritoneum	1580-1589	1580-1589	C45.1, C48
MN of the respiratory organs	1600-1639, 1942	1600-1659	C30-C39, C45.0, C45.2, C45.9
MN of the larynx	1610-1619	1610-1619	C32
MN of the lungs	1620-1629	1620-1629	C33-C34
MN of the pleura	1630-1630	1630-1639	C38.4, C45.0, C45.9
MN of the uterus	1800-1809, 1820-1829	1790-1809, 1820-1829	C53-C55
MN of the ovaries	1830-1839	1830-1839	C56-C57
MN of the prostate	1850-1859	1850-1859	C61
MN of the bladder	1880-1889	1880-1889	C67
MN of the kidney, ureter, and other unspecified urinary organs	1890-1899	1890-1899	C64-C66, C68
MN unspecified sites	1990-1999	1990-1999	C80
Laeukaemias and lymphomas	2000-2079	2000-2089	C81-C96
Psychiatric diseases	2900-3199	2900-3199	F00-F99
Neurological diseases	3200-3589, 0660-0669	3200-3599	G00-G99
Cardiovascular diseases	3900-4589	3900-4599	I00-I99
Respiratory diseases	4600-5199	4600-5199	J00-J99
Chronic and obstructive respiratory diseases	4900-4939	4900-4939	J40-J46
Pneumoconiosis	5150-5169	5000-5059	J60-J65
Asbestosis	5152-5152	5010-5019	J61
Digestive diseases	5200-5799	5200-5799	K00-K93
Genitourinary diseases	5800-6299	5800-6299	N00-N99
Poorly specified causes	7800-7963	7800-7999	R00-R99
Accident and violence	8000-9999	8000-9999	S00-T98

ICD: International Classification of Diseases.