Annual Pathology Asbestos Analysis Report

Bulk material and air filter data for 2020

Ntebogeng Kgokong

Lucia Mhlongo

PO Box 4788
Johannesburg
2000

email: ntebogengk@nioh.ac.za

NIOH Asbestos Surveillance Report 1/2021

NATIONAL INSTITUTE FOR OCCUPATIONAL HEALTH

Division of the National Health Laboratory Service

TABLE OF CONTENTS

List of figures

List of tables

GLOSSARY

Asbestos	A group of fibrous silicate minerals that include chrysotile (white asbestos), crocidolite (blue asbestos) and Amosite (brown asbestos) and others that were not mined in South Africa.
Samples	All materials received and analysed for asbestos.
Type of sample	The sample that was received, be it an air filter, piece of floor tile or roof grouped into either the air filter or bulk sample category.
Bulk samples	All samples that do not include air filters e.g. pieces of floor tiles, roofs, soil, ceiling, cement etc. This information is obtained from the description of the material that was sampled and submitted with the sample.
Air filters	Gold coated filters that were used in pumps to sample the air.
Province	The province where the sample was taken
Industry	The industry where the samples were taken was grouped into categories according the Standard Industrial Classification of all economic activities (7th Edition).
Activity	The activity that resulted in sending the sample to analyse for asbestos e.g. inventory purposes or identifying asbestos prior to demolition work

REPORT SUMMARY

A total of 84 samples were received and analysed in 2020. Of these, 24 (28.6%) contained asbestos.

All of the samples were received from South Africa. Of these, a majority were received from Gauteng (n=57, 67.9%) followed by the Free State (n=13, 15.5%) and Western Cape (n=5, 6%). The least number of samples were received from the Eastern Cape and Kwa-Zulu Natal, both with one sample each (n=1, 1.2%).

The majority of samples received were air filters (n=45, 53.6%). On analysis, only one of the air filters contained asbestos, which was identified as chrysotile asbestos.

The bulk samples made up 44% (n=37) of the total number of samples. The most common types of bulk samples were cement (n=14, 37.8%), followed by floor tiles and other (n=5, 13.5%), then closely followed by fascia boards, ceiling panels and roof sheets all at four (10.8%) samples each. Upon analysis, 23 (62.2%) bulk samples contained asbestos. More than half of these samples contained serpentine asbestos (n=12, 52.2%) followed by serpentine amphibole mixtures (n=8, 34.8%).

Two soil (2.4%) samples were received and upon analysis, none of the soil samples contained asbestos.

The most common industries from which samples were received were Water supply, sewerage, waste management and remediation activities (n=37, 44.0%) followed by Professional, scientific and technical activities (n=16, 19%). The industry the samples were sent from could not be ascertained for two samples (2.4%).

BACKGROUND

In terms of the 2002 Asbestos Regulations, the first step when working with asbestos should be its identification. The regulations specify all precautions that need to be considered when conducting any work on any structure containing asbestos. Draft Asbestos Abatement Regulations have been gazetted by the Department of Labour and will replace the Asbestos Regulations of 2002. However, the draft suggests that the identification of asbestos in materials and air will continue to remain an integral part of the regulations.

Regulations to prohibit the use, manufacture, import and export of asbestos and asbestos containing materials were promulgated in 2008. Despite this prohibition, the legacy of asbestos remains and this legacy include environmental contamination due to activities such as mining, milling and transportation of asbestos as well as the presence of a large number of asbestos containing materials in the environment. Environmental contamination poses potential health risks to surrounding communities. These risks include the potential development of asbestos related diseases namely pleural plaques, asbestosis, lung cancer and malignant pleural mesothelioma. While occupational exposure through the mining and milling and manufacturing of asbestos has ceased, workers in other industries may be exposed. The incorrect removal of asbestos containing materials can result in the liberation of fibres, exposing workers in the construction and demolition industries as well as to the community.

The National Institute for Occupational Health (NIOH) analyses samples for the presence of asbestos using scanning electron microscopy combined with electron dispersive spectrometry (SEM/EDS). This technique enables the identification of the type(s) and size of asbestos fibres present in the sample. All samples received are analysed and reported. The Electron Microscopy Unit participates in the Asbestos in Materials Schemes from Health and Safety Laboratories in the United Kingdom. This external quality assurance scheme ensures that the unit produces reliable results.

In 2003 the NIOH was able to offer a service to meet the demand by contractors to identify asbestos in materials and to enumerate asbestos fibres in air. In addition to recording the results for samples that are submitted for analysis, the NIOH also captures the information that accompanies the samples in a database. The database was created using Epi Info and contains various fields including the origin of the sample, the industry as well as the activity taking place before, at or after sample collection e.g. demolition/renovation etc. The NIOH, being a national research institute, undertakes to study various aspects of occupational and environmental health in terms of asbestos exposure. Data from these studies are also captured in the database and are included in the results presented in this report.

While the legacy of asbestos is recognised as a national problem, detail of its extent and magnitude remain largely unknown. This database provides information about the location and type of asbestos that remains in the environment.

This report summarises the asbestos database. Data from the asbestos database are exported into, and analysed, using SAS enterprise guide v7.1.

SECTION 1 – SAMPLES RECEIVED AND TYPE OF ASBESTOS IDENTIFIED

The number of samples received in the period 2003 to 2020 is displayed in Figure 1.1. The total number of samples analysed in 2020 was 84 due to the nationwide lockdown constituted by the government as a result of the coronavirus pandemic. Of these, the types of samples received were bulk samples (n=37, 44.0%), air filters (n=45, 53.6%) and soil (n=2, 2.4%). The types of bulk samples are displayed in Table 1.1.

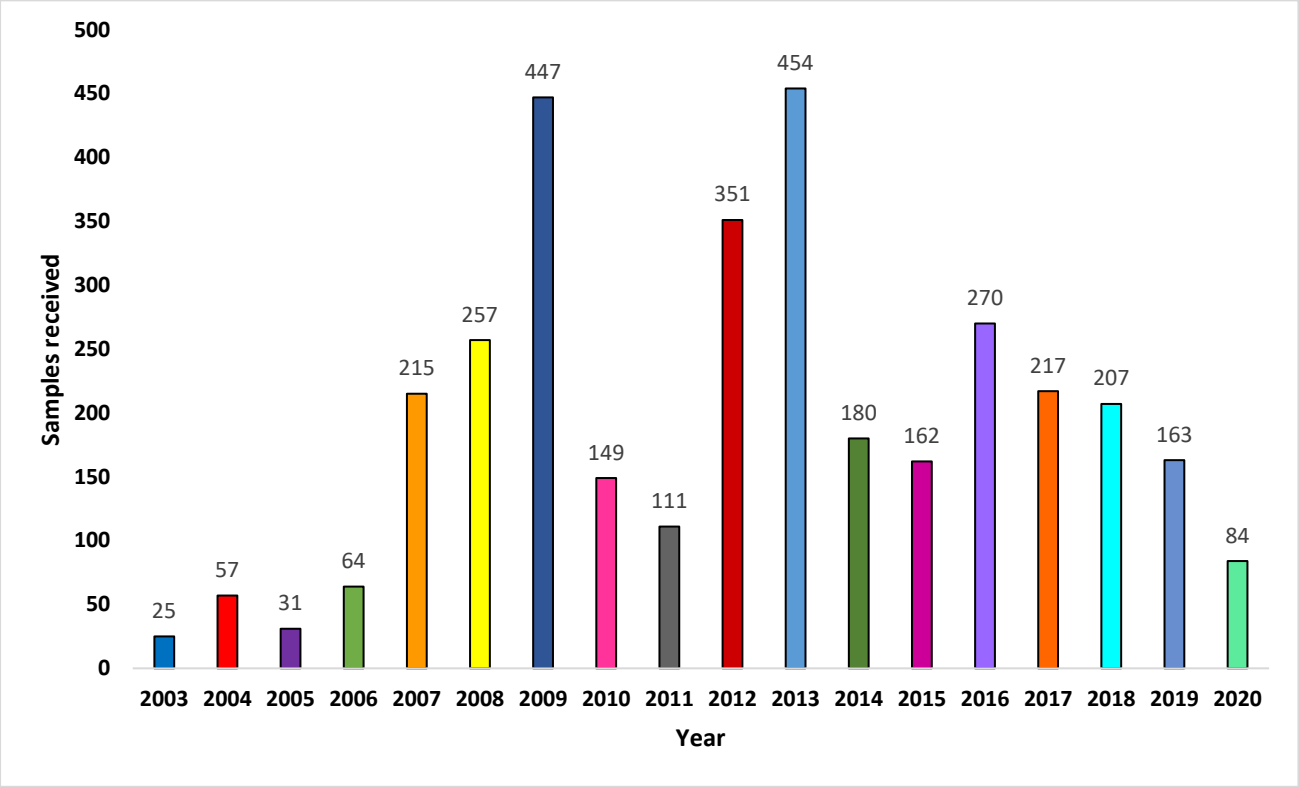

FIGURE 1.1: TOTAL NUMBER OF SAMPLES RECEIVED (2003-2020)

TABLE 1.1: THE TYPES OF BULK SAMPLES RECEIVED 2020

Bulk type	N	%
Floor tile	5	13.5
Ceiling panel	4	10.8
Cement	14	37.8
Cement pipe	1	2.7
Cement roof/ sheet	4	10.8
Fascia board	4	10.8
*Other	5	13.5
Total	37	

*Other includes: Marley tile, wall section, artificial coal, bird proofing, board, brake lining, brick, cladding, clay material, flower pot, foam, gasket, gutter, heater, jewellers sheet, lagging, manhole cover, millboard, ore, panel, pedestals, pipe, plaster, powder, pressure cleaning, rock, rope, seal, ship gear, ship wall panel, sludge, sponge material, string, sweepings, textile, vermiculite, water, waterproofing material, window putty, windowsill, woven material

The number of samples that contained asbestos is displayed in Figure 1.2. Asbestos was identified in the majority of the bulk samples (n=23, 62.2%), only one (2.2%) of the air filters received contained asbestos and none of the soil samples contained asbestos. The type(s) of asbestos identified per sample type are displayed in Table 1.2.

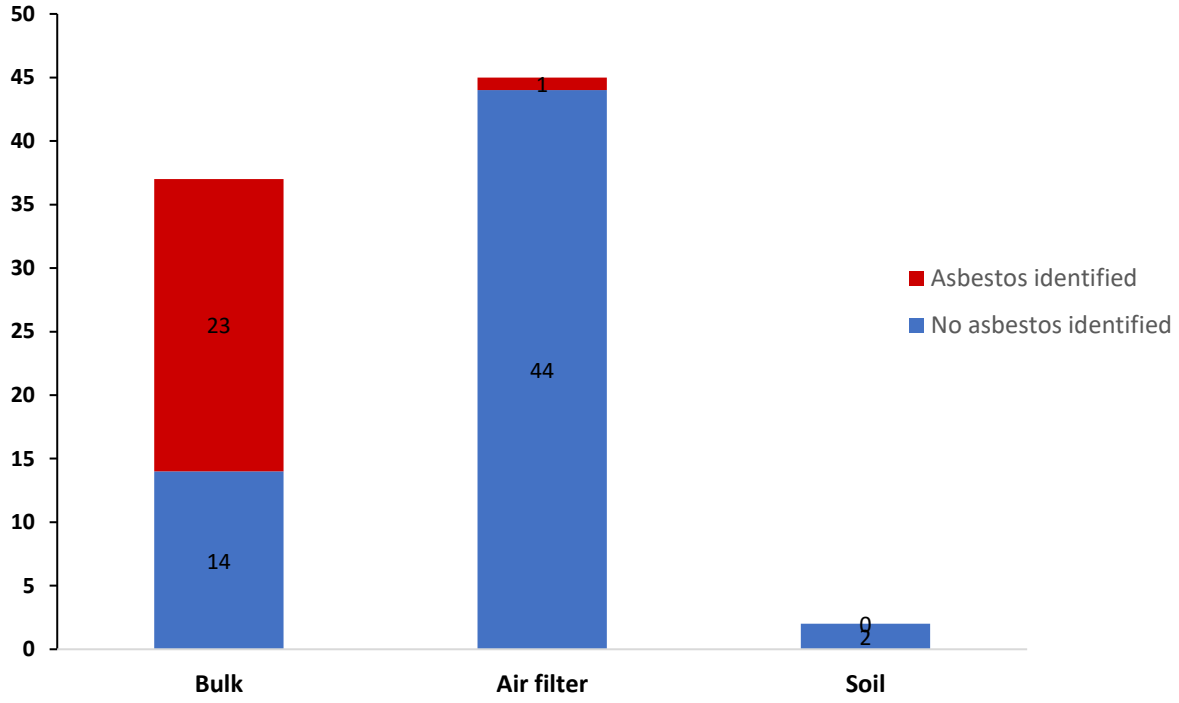

FIGURE 1.2: THE NUMBER OF SAMPLES THAT CONTAINED ASBESTOS PER SAMPLE TYPE 2020

TABLE 1.2: THE TYPES OF ASBESTOS IDENTIFIED PER SAMPLE TYPE 2020

Asbestos type	Bulk	Air filters
Chrysotile only	12	1
Chrysotile, crocidolite mixture	6	0
Chrysotile,amosite mixture	2	0
Amosite only	2	0
Crocidolite, Amosite mixture	1	0
Total	23	1

SECTION 2 – SAMPLE ORIGIN

Each sample is received with accompanying information including the country or provincial origin of the sample. Information regarding the sample's country of origin was available for all samples received. All samples were received from South Africa in 2020. The origins for the samples received in 2020 are displayed in Figure 2.1 below.

TABLE 2.1: THE COUNTRY OF ORIGIN FOR SAMPLES RECEIVED IN 2020

Country of origin	Number of samples	%
RSA	84	100
Total	84	

A majority of the samples were received from Gauteng (n=57, 67.9%) followed by the Free State (n=13, 15.5%) and Western Cape (n=5, 6%). The least number of samples were received from the Eastern Cape and Kwa-Zulu Natal, both with one sample each (n=1, 1.2%).

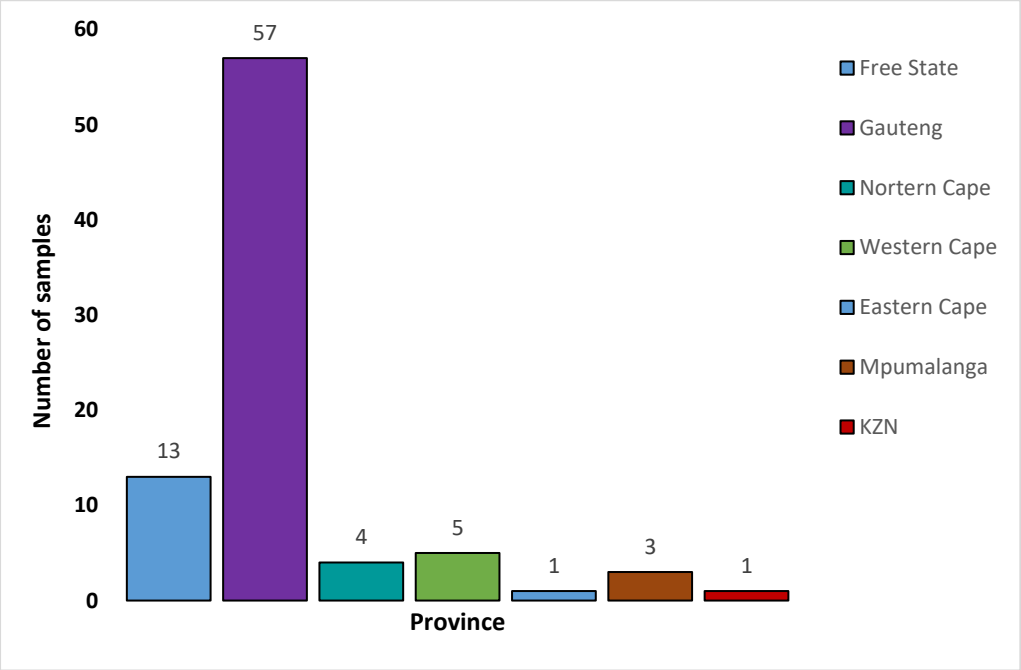

FIGURE 2.1: THE SOUTH AFRICAN PROVINCE FROM WHICH THE SAMPLES WERE RECEIVED 2020

SECTION 3 – INDUSTRY CLASSIFICATION OF SAMPLES

The industrial sector was assigned to each sample according to the Standard Industrial Classification of all Economic Activities. Where no information regarding the sample's industry was received, the sample was classified as unknown (n=2, 2.4%). The various industries are displayed in Table 3.1.

TABLE 3.1: THE INDUSTRY CLASSIFICATION FOR SAMPLES RECEIVED 2020

Industry classification	**N**	**%**
Agriculture, forestry and fishery	1	1.2
Mining and quarrying	5	6.0
Unknown	2	2.4
Professional, scientific and technical activities	16	19.0
Water supply; sewerage, waste management and remediation activities	37	44.0
Construction	8	9.5
Financial and insurance activities	1	1.2
Manufacturing	3	3.6
Real estate activities	9	10.7
Human health and social work activities	1	1.2
Public administration and defence; compulsory social security	1	1.2
Total	84	

SECTION 4 – ACTIVITIES BEFORE, AT OR AFTER SAMPLE COLLECTION

The activities taking place before, at or after sample collection were categorised and displayed in Table 4.1. A majority of the air filter samples were sent for monitoring (n=43, 95.6%) and the reaming two were sent for inventory purposes. Most of the bulk samples were sent for inventory purposes (n=23, 62.2%).

TABLE 4.1: ACTIVITIES BEFORE, AT OR AFTER SAMPLE COLLECTION 2020

Activity	Sample type					
	Air filters	%	Bulk	%	Soil	%
*Air monitoring	43	95.6	-	-	-	-
Demolition	-	-	1	2.7	-	-
Inventory	2	4.4	23	62.2	2	100
Renovation	-	-	13	35.1	-	-
Unknown	-	-	-	-	-	-
Total	45	100	37	100	2	

*Air monitoring includes, but is not limited to, the monitoring of asbestos landfill/waste sites, communities and clean ups.

ACKNOWLEDGEMENTS

We thank the following for their contributions to this report:

The NIOH Department of Occupational Hygiene

APPENDIX 1: PUBLICATIONS, PRESENTATIONS AND POSTERS UTILISING THE ASBESTOS DATABASE

Publications:

Vorster T, Kgokong N, Phillips JI. Exploring the South African legacy of asbestos using routinely collected data. *Occupational Health Southern Africa,* 2018 pp 5-9.

Rees D, Phillips JI. The legacy of in situ asbestos cement roofs in South Africa, *Occupational and Environmental Medicine*, 2017;74 (Suppl 1):A76-A77.

Phillips JI, Norman G, and Renton K. Asbestos in soil around dwellings in Soweto. *Occupational Health Southern Africa*, 2009;15(2):24–27.

Phillips JI, Rent K, Murray J, Garton E, Tylee BE, and Rees D. Asbestos in and around Soweto dwellings with asbestos cement roofs. *Occupational Health Southern Africa*, 2007;13(6):3–7.

Milne SJ, Garton E, Nelson G, Murray J, Davies JCA, Phillips JI. A South African database of samples analysed for the presence of asbestos. *Occupational Health Southern Africa*, 2003;19(6):14–21.

Oral presentations:

Kgokong N, McCabe M, Mhlongo LN. The NIOH asbestos database (an update). Asbestos Land and Remediation workshop; 12 March 2020. Sierra Burgers Hotel, Pretoria

Rees D, Phillips JI. *In situ* asbestos and the risk of exposure for workers. An International challenge. EPICOH conference; 28 – 31 August 2017. Edinburgh Scotland

Kgokong N, Vorster T, Kereeditse KR, Phillips JI. The NIOH asbestos database – What can it tell us? World day for Safety and Health at Work; 30 May 2017. NIOH Braamfontein

Vorster T, Kgokong N, Kereeditse KR, Phillips JI. The NIOH asbestos database – What can it tell us? Research Forum; 19 April 2017. NIOH Braamfontein

Poster presentations:

Vorster T, Kgokong N, Phillips JI. The possible health implications of the legacy of asbestos cement roofs in South Africa. Pathology Research and Development Congress; 23-24 June 2017. Emperor's Palace, Johannesburg, South Africa