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Managing Arsenic and Asbestos

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- Arsenic in taxidermy
- Asbestos



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Arsenic



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Safe handling of museum objects containing arsenic



5000 birds
at
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Harmful effects of arsenic

- Toxic by ingestion, inhalation and skin absorption
- Corrosive
- Short-term inhalation may cause cough, sore throat, breathlessness and wheezing
- Short-term ingestion causes sickness, diarrhoea and abdominal pain
- Inorganic arsenic is irritant to the eye and skin



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Harmful effects of arsenic

- Following long-term ingestion the lungs, nervous system, liver, kidneys or stomach may be affected
- Long-term inhalation may cause inflammation of the eyes and nose
- Inorganic arsenic compounds have mutagenic potential
- Inorganic arsenic is a known human carcinogen



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Project to find out how many had arsenic using portable XRF



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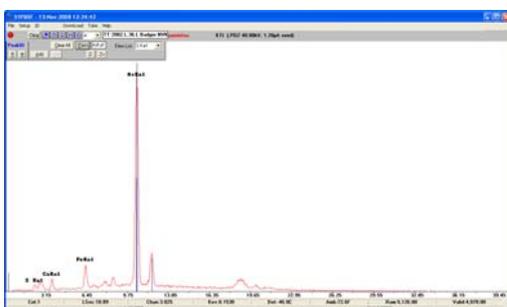
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All 800 birds tested showed positive for arsenic

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Measuring Airborne Particulates containing arsenic



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Measuring Airborne Particulates containing arsenic

HSE UK – safe working levels	BCC Labs Results
0.1mg/m ³	<0.01mg/m ³
8hr TWA time weighted average	

Absorption of arsenic

Defra & environment Agency UK – safe working levels	BCC Labs Results – gloves worn
0.4 – 0.9µg/Kg body weight per day	
0.4 µg x 50Kg = 20µg per day	18.28µg

What we learnt from this project

- When handling taxidermy bird specimens:
 - Historic taxidermy is very likely to contain arsenic
 - It is necessary to wear nitrile gloves and protective clothing to avoid absorbing arsenic
 - The level of exposure to airborne particles containing arsenic is 10 time lower than the HSE recommended safe level, therefore a disposable dust mask is sufficient protection

This study was published

Cane, D. and Gayle, M. 2012 *Safe handling of museum collections containing arsenic.* ICON News Issue 40 pp 18-20.

Asbestos

What is asbestos?



Chrysotile mineral specimen

Harmful effects of exposure to asbestos

- Breathing in fibres
 - Asbestosis – “Industrial disease”
 - Carcinogen
 - Mesothelioma
 - Lung cancer
 - Cancer at other sites e.g. gastrointestinal tract, larynx
- Long latency period

Useful properties of asbestos

- Fire/heat proof
- Thermal insulator
- Electrical insulator
- Hard wearing
- Sound insulator
- Moisture resistant
- Resistant to corrosive chemicals
- Adds bulk and strength
- Cheap, plentiful

Uses for asbestos

- Fire/heat proof → Protective clothing, fire proofing of all kinds, anything assoc. with heat, fire
- Thermal insulator → Thermal insulation, boiler lagging, protective clothing
- Electrical insulator → High voltage electrics, cable sheathing
- Hard wearing → Friction products, brake shoe, clutch plates, drive belts
- Sound insulator → Spray coatings, engine compartments, vehicle body undercoating, aircraft fuselage insulation, exhaust mufflers
- Moisture resistant → Gas masks, acid resistant mats
- Resistant to corrosive → Cement roof tiles, gutter/drain pipes, plastics, *Bakelite*, floor tiles, textured coatings, e.g. Artex
- Adds bulk and strength
- Cheap, plentiful

When was asbestos used?

- Natural History specimens – any period
- Known in ancient Egypt, 1st Century Roman Empire
- Used from 19th Century - first asbestos product 1857
- not completely banned for use in UK until 1999
- Still mined in Russia, China, Brazil, Canada, Kazakhstan today
- Commonly encountered in WWII objects

What does asbestos look like?



Asbestos mineral and raw fibre

What does asbestos look like?



Asbestos yarn

What does asbestos look like?



Asbestos woven tape

What does asbestos look like?



Asbestos board

What does asbestos look like?



Asbestos compressed fibre gasket

The Control of Asbestos Regulations 2012

Approved Code of Practice and guidance

- Duty to manage asbestos
- Identify where it is
- Risk assess any work liable to release fibres
- Written plans of work
- Licensing
- Notification
- Training
- Control measures and working methods
- Air monitoring
- Health records
- disposal

Non licensed Asbestos work

For BMT staff: non licensed work only

- Low intensity
- Not liable to exceed the exposure limit of 0.1 fibres/cm³ of air averaged over 4 hours (Control limit)
- Short duration (less than 1 hour)
- Sporadic

Non licensed Asbestos work



James Watts packet of *asbestos*

Science Museum, London

Managing Asbestos: surveys



Managing Asbestos: surveys



Managing asbestos

- Record asbestos for each object on collections database – asbestos register
- Collections hazard advisors decide if any work on asbestos is non licensed or not
- Licensed asbestos contractors, e.g. ICL, KADEC used for licensed asbestos work

Summary

- Two hazards - Arsenic and Asbestos
 - Different risks
 - Common approach
 - Find out what the hazards are - seek advice
 - Carry out tests to quantify risk
 - Work out safe working method and so avoid exposure
 - You will find these and other hazards in your collections