Asbestos

• History and uses
• What it is
• The Health risks
Wonderful Asbestos !!!

It’s fantastic stuff !!

• Fire resistant
• Thermal insulation – it’s green !!
• Does not corrode or decay
• Can be used as a structural component
• Can be woven into a flexible material
• Virtually indestructible
BUT

- It’s a killer
- 4 000 + deaths every year (and rising)
- Compare with:
  - 180 workplace deaths
  - 2 538 road deaths
- Asbestos related diseases lead to a horrible long drawn out death
Historical use of asbestos

- **Period:** 1880s - 1999 (1950 – 1980)

- **Millions of tons of Asbestos containing materials (ACMs) in buildings**

- **Some 3000 different products**
Estimated imports

2.7m tons of chrysotile: mainly cement products

½m tons of amosite: mainly AlB, thermal and spray insulation

50,000 tons of crocidolite: mainly thermal and spray insulation
Where is it?

- Various estimates
  - 0.5 - 2m industrial / commercial buildings
  - 2.4 m domestic premises

- 75% of commercial building estimated to contain some asbestos (Llewellyn, BRE, 1997)

Asbestos is omnipresent
Where is it found?

http://www.hse.gov.uk/asbestos/hiddenkiller/where-is-it-found.htm
Uses

- Insulation lagging
  - to keep heat in — boilers, pipework
  - to keep cold out — railway carriages/water tanks
  - to prevent corrosion in wet/humid conditions — paper mills/textile processes/swimming pools
  - for fire protection
  - to protect from acid attack — chemical industry
Uses

- Traditional insulation
  - limpet
  - hand applied pipe lagging
  - monkey muck
  - sectionalised
Uses

- Asbestos insulating board (AIB)
  - Panelling
  - Internal partitions
  - Airing cupboards
  - Soffits
  - Suspended ceilings/tiles
  - Behind heaters
  - Fire resistant separation, Factories Act 1961, OSRP Act 1963

Asbestos content generally 20-35%
Asbestos Insulating Board

AIB – not obvious !!!

N.B. TRADE NAMES CONFUSE !!!!
Asbestos Cement

- Asbestos cement
  - roofing
  - cladding
  - fascias
  - pipes
  - guttering
  - window sills
  - ironing boards

Asbestos content generally >10% <20%
Uses

• Decorative coatings
• Asbestos paper
  • GRP lining
  • roofing felt
• Asbestos rope
• Gaskets
  • chemical industry
  • kilns/ovens
  • switchgear
Uses

• brake linings
• rubberised tiles/floor covering
• filler compounds
• Mastics
• And many more
• Let’s look at some asbestos
Asbestos Types

• Serpentine
  – Chrysotile (white)

• Amphiboles
  – Crocidolite (blue)
  – Amosite (brown)
  – Tremolite
  – Actinolite
  – Anthophyllite
Health

• Small fibrous dust particles easily produced and inhaled

• Respirable

• Fibre characteristics affect toxicity:
  ➢ chrysotile - curved fibres break longitudinally
  ➢ amosite - straight and brittle fibres
  ➢ crocidolite - short, stiff and straight

• Fibres persist in the lungs
Friability
Friability - examples

MOST

• Loose-fill lagging
• Lagging
• Sprayed insulation
• Asbestos insulation board
• Asbestos cement
• Bitumen sheets

LEAST

• Floor tiles
Asbestos related diseases

• Asbestosis (latency 20+ years)
• Lung cancer (latency 20+ years)
• Mesothelioma (latency 15 to 60+ years)

Not diseases of the past – still upward curving graph, many thousands yet to suffer and die. Effective work by us now will impact in the future.

Chris Morgan’s story – one story out of many thousands

Health risks
Hazard, Exposure and Risk

**Hazard** depends on asbestos type:
- Crocidolite (blue)
- Amosite (brown)
- Chrysotile (white)

**Exposure** depends on:
- asbestos type (to some degree)
- the material (ACM) it is in
- the nature of the work/disturbance (energy)

**Risk** depends on:
- Level of exposure
- Duration of exposure
- Time since first exposure

Identified from ‘bulk’ samples by microscopy (MDHS 77)
Mesothelioma Deaths

Figure 2: Predicted mesothelioma deaths in British men and UK asbestos imports
Significant uses of asbestos (1)

Insulation lagging

- to keep heat in — boilers, pipework
- to keep cold out — railway carriages/water tanks
- to prevent corrosion in wet/humid conditions — paper mills/textile processes/swimming pools
- for fire protection
- to protect from acid attack — chemical industry
 Significant uses of asbestos (1 cont.)

Traditional insulation

- limpet
- hand applied pipe lagging
- monkey muck
- sectionalised
Significant uses of asbestos (2)

- Asbestos based boards
  and asbestos insulating board (AIB)
  - Panelling
  - Internal partitions
  - Airing cupboards
  - Soffits
  - Suspended ceilings/tiles
  - Behind heaters
  - Fire resistant separation, Factories Act 1961, OSRP Act 1963

Asbestos content generally 20-35%
Beware – is it AIB?!

‘Some’ AIB trade names

- Supalux
- Turnasbestos
- Caposil
- Asbestolux
- Sindanyo board
- LDR board
- Marinite
- Thetford board
- Masterboard
Significant uses of asbestos (3)

Asbestos cement
  - roofing
  - cladding
  - fascias
  - pipes
  - guttering
  - window sills
  - ironing boards

Asbestos content generally >10% <20%

REMEMBER The main danger with asbestos cement roof sheeting is its fragility!
Significant uses of asbestos (4)

- Decorative coatings (3.9 - 4.2% asbestos?)

- Asbestos paper
  - GRP lining
  - roofing felt

- Asbestos rope

- Gaskets
  - chemical industry
  - kilns/ovens
  - switchgear
Significant uses of asbestos
(4 cont.)

• brake linings

• rubberised tiles/floor covering

• filler compounds

• Mastics

• And many more
Asbestos content

- Sprayed coatings 85% asbestos
- Lagging 50-100%
- Insulating boards 16-40%
- Millboard 100%
- Ropes/yarns 100%
- Cement 10-15%
- Flooring material 1 - 2.5%
- Textured coatings 1 - 4.2%
- Mastics 0.5 - 2%
Asbestos density/fibre scale

Density (Kg/m³)

% Fibre content

- Vinyl tiles asbestos paper
- Asbestos cement
- Asbestos insulating board
- Asbestos lagging and spray
## Quantity of imports of asbestos (tonnes)

<table>
<thead>
<tr>
<th>YEAR</th>
<th>AMOSITE</th>
<th>ANTHOPHYLLITE</th>
<th>CHRYSOTILE</th>
<th>CROCIDOLITE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1946</td>
<td>2673</td>
<td>Not known</td>
<td>50722</td>
<td>967</td>
<td>54362</td>
</tr>
<tr>
<td>1955</td>
<td>12308</td>
<td>Not known</td>
<td>122965</td>
<td>6822</td>
<td>142095</td>
</tr>
<tr>
<td>1965</td>
<td>22582</td>
<td>78</td>
<td>147265</td>
<td>3425</td>
<td>173350</td>
</tr>
<tr>
<td>1975</td>
<td>19219</td>
<td>225</td>
<td>119741</td>
<td>Nil</td>
<td>139185</td>
</tr>
</tbody>
</table>

Source: Asbestos Fibre Importers Committee, private communication
### Asbestos fibre usage in the UK (thousands of tonnes)

<table>
<thead>
<tr>
<th></th>
<th>1970</th>
<th>1973</th>
<th>1976</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Asbestos cement products for building (inc (5))</td>
<td>52.5</td>
<td>55.6</td>
<td>42.9</td>
</tr>
<tr>
<td>2 Fire-resistant insulation boards</td>
<td>18.5</td>
<td>22.5</td>
<td>14.5</td>
</tr>
<tr>
<td>3 Other insulation products (inc spray)</td>
<td>4.0</td>
<td>4.0</td>
<td>0.4</td>
</tr>
<tr>
<td>4 Floor tiles and coverings</td>
<td>20.5</td>
<td>16.2</td>
<td>15.8</td>
</tr>
<tr>
<td>5 Asbestos cement pipes (inc under (1))</td>
<td>9.0</td>
<td>8.1</td>
<td></td>
</tr>
<tr>
<td>6 Friction materials</td>
<td>15.0</td>
<td>17.0</td>
<td>15.7</td>
</tr>
<tr>
<td>7 Jointings and packings</td>
<td>9.0</td>
<td>11.4</td>
<td>10.0</td>
</tr>
<tr>
<td>8 Textiles products not included in (6) and (7)</td>
<td>9.0</td>
<td>8.3</td>
<td>6.3</td>
</tr>
<tr>
<td>9 Fillers and reinforcements (felts, millboard paper, underseals, mastics, adhesives etc)</td>
<td>21.5</td>
<td>25.7</td>
<td>28.4</td>
</tr>
<tr>
<td>10 Moulded plastics and battery cases</td>
<td>4.5</td>
<td>2.8</td>
<td>1.2</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>154.5</td>
<td>172.5</td>
<td>143.3</td>
</tr>
</tbody>
</table>
Most vulnerable populations

HISTORICALLY

- textile manufacturing operations
- laggers
- gas mask manufacturers
- railway workers
- shipyard workers/ naval dockyards
- boilermen
- pipework contractors.
Most vulnerable populations

CURRENTLY

- Asbestos removal contractors
- Demolition workers
- Services installers
- Plumbers
- Joiners
- Electricians
- Insulation workers
Asbestos disease caused by conditions in the past?

How much better are we now?
How much better will we be?
Asbestos Surveys in Buildings & New Guidance

Phil Dickinson

May 2010
Agenda

• Introduction
• New research findings
• Quantifying the problem
• Surveys
  – Duty-to-Manage
  – Current issues
  – The Future
ASBESTOS: ‘The Greatest Single Cause of Work Related Deaths in the UK’
Mesothelioma: projected deaths
Mesothelioma spread
J. Peto: Lifetime risks

For people born in the 1940s . . .

- **Carpenters (joiners)** Worked for >10yrs; first exposure at <30yrs old: 6%
- **Lifetime risk including lung cancer**: ~10%
- **Plumbers, electricians, painters**: 2% (~4%)
- **Other construction workers**: 0.8% (~1.5%)
- **No occupational exposure**: 0.1% (~0.2%)
- **Exposed workers relatives**: 0.2% (~0.4%)
J. Peto: Prognosis

- Predicted 90,000 mesothelioma deaths in UK by 2050
  - 40,000 construction
  - 15,000 carpenters/joiners

- Exposure due to:
  - Widespread use of amosite in AIB in 60s & 70s
  - Power tools

"the epidemic will not peak until 2025, ten years longer than feared" J. Peto

- Chemical engineers and scientists
- Managers in construction
- Electrical and electronic production fitters
- Boiler operators
- Electrical engineers
- Construction workers nec
- Production fitters
- Electrical plant operators
- Sheet metal workers
- Electricians
- Carpenters
- Plumbers and gas fitters
- Vehicle body builders
- Metal plate workers

Death Rate / annum

0 100 200 300 400 500 600
### Domestic Housing Stock

<table>
<thead>
<tr>
<th>Year Built</th>
<th>Total Stock</th>
<th>Houses % asbestos</th>
<th>Flats % asbestos</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1945</td>
<td>38</td>
<td>&lt;1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>1945 - 64</td>
<td>22</td>
<td>~5</td>
<td>~30</td>
</tr>
<tr>
<td>1965 - 84</td>
<td>26</td>
<td>~30</td>
<td>~60</td>
</tr>
<tr>
<td>1985 - 94</td>
<td>8</td>
<td>~5</td>
<td>~5</td>
</tr>
<tr>
<td>&gt; 1994</td>
<td>6</td>
<td>&lt;1</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>

Estimated Figures for England & Wales
Adrian K Watson, BOHS Conference, Asbestos Forum, 2007
Assessment of plumbers’ exposure to ACMs (Bard & Burdett, 2007)

How well do you think you can recognise ACMs?
• Plumbers issued with passive samplers and activity logs

• Results:
  – TEM analysis revealed that ~60% of workers exposed to ACMs
  – Only ~20% recorded as working with ACMs
  – Estimated exposures up to 2 f/ml
The Challenge

• Huge amounts of asbestos still in buildings
• Very large number of buildings and Duty Holders
• Large potentially exposed population:
  – Building occupants (20m ??) . . . low risk group
  – Maintenance trades (2m ??) . . . high risk group

• Workers don’t know . . .
  – What it looks like
  – Where it is
  – Complacent

How do we get effective management of asbestos?
Surveys
Duty to Manage

- Survey is a **key** component in managing asbestos

- If asbestos location is unknown ......
  "exposure incidents waiting to happen"
Where does Survey fit into Managing Asbestos?

Management Survey

Asbestos Register
plan/drawing

Risk Assessment

Management plan

Refurbishment or Demolition Survey
Managing maintenance work

Before ANY work starts contact work coordinator

Check Register/plan

Are ACMs involved?

No further action

Plan Work

• Inform early
  • Check asbestos trained
  • Check clean up

External contractor

YES

Licensed Contractor?

• Trained staff
  • Control of work
  • Clean up

Work done in-house

NO
• Employer responsible for training of all staff who may disturb fabric of building

• Asbestos awareness

• Work methods
What happens if . . . ?

- No Survey
- Poor Survey
- Wrong Survey Type
- Good Survey but not used

Worker Exposure
Contamination
Spread
Exposure to others

Public anxiety
Building closure
Clean-up costs
Enforcement action
Disease
Civil action
New Survey Guidance

- Will address the issues
- Will be an HSG series publication
- More than a “method”
- Guidance for others
- Published spring 2010
Aims and Objectives of New Guidance

- Reduce worker exposure
  - Surveyor:
    - Better informed
    - More aware of client’s needs
    - Better quality surveys
    - Better reports
Aims and Objectives of New Guidance

- Client:
  - Better informed
  - Greater understanding of surveyor’s needs
  - Recognition of need for various surveys of lifespan of buildings
  - Better management of asbestos
Survey Types

• New terms: to assist in the understanding of the purpose of the survey

• **Management Survey**: continued use of the building:
  – normal occupancy/activities and
  – associated maintenance/installation etc
  – involve minor intrusive work

• **Refurbishment/demolition Survey**:
  – includes “minor” refurbishment
  – purpose to identify ACMs for **REMOVAL**

• Surveys can involve combination of sampling and presuming ACMs present
Refurbishment/Demolition Survey

• Purpose is to identify to remove before Refurbishment/Demolition

• Used to locate ALL ACMs in ALL areas afarp
  – Structural locations
  – Break thro walls, ceilings, cladding, partitions etc
  – Inside cavity walls, ducts and tunnels, under floor tiles

• Refurbishment surveys can be small scale/localised
  – Needed for home improvement programmes
  – eg new kitchens, bathrooms, electrics, plumbing, windows, roofs etc

• Must? involve destructive/aggressive inspection
Refurbishment Survey: where does it apply?

• Required for *all work* which disturbs fabric of building in areas where Management Survey has not been intrusive

• Duty holder will need to decide
Clarity of Report

• Bulk analysis results:
  – in Appendix
• Asbestos results and register: room by room
• Material assessment: highest scores=priority for action
  – summarise immediate actions
• Areas not accessed:
  – separate list and mark on plan
• Clear note on actions
Clear identification of rooms
Asbestos Building Plan

Key: Red labels = Asbestos in Room
(see Survey Report for details)
• Clearly identify ACMs in poor condition (ie high score rating) which need remedial action

• Areas not accessed must be presumed to contain ACMs

• ACMs will need regular monitoring

• Clarity on the type of Survey carried out eg Management Survey
New Guidance: Caveats

• Specific section
• Outlines impact and potential problems can create for managing
• Explains can be avoided by proper planning and discussion
• Where necessary:
  – Fully justified
  – Agreed between client and surveyor
  – Documented in report
Final Messages

• Surveyors:
  – Need to raise “game”
  – Become familiar with new guidance
  – Understand client’s needs
  – Provide appropriate survey type

• Clients:
  – Be more informed
  – Check competency of surveyor
  – Check quality of reports
  – Use report to form management plan
and finally ... any questions?