

Designing for health - Guidance for designers

| Demolition | | | | Ref No. DfH007_18 |
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| Potential health impacts to be considered by the designer: | | Concept Stage <input type="checkbox"/> | Scheme Design Stage <input type="checkbox"/> | Detailed design Stage <input type="checkbox"/> |
| Design Element | Health Hazard | Considerations | Possible Solutions | Linked to Ref No. |
| General Design Considerations | Examples include; Dust Lead Fume Biohazards Asbestos | Demolition brings its own unique set of health hazards, since in case there will be years, if not centuries of activities (some relatively unknown) carried out on the site. Particular caution is needed and competent and detailed pre-demolition inspections need to be conducted with extreme vigilance. | Consider material disposal options in respect of health issues e.g. encapsulation on site, treatment Consider enabling machine demolition by creating adequate working space to limit the duration that workers need to work in the open air to reduce exposure to UV and extremes or temperature | |

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| | | <p>Remember: The demolition needs to be rigorously planned and a written record of all the demolition arrangements has to be in place before demolition starts.</p> | <p>Consider whether remote demolition and mechanical handling e.g. conveyors should be encouraged</p> | |
| General disturbance | <p>Examples include;</p> <p>Dust</p> <p>Lead</p> <p>Fume</p> <p>Biohazards</p> <p>Asbestos</p> | <p>Dust or other residues from previous industrial activities may contain many different hazardous substances.</p> <p>Hazardous materials that should to be considered include dust, asbestos and respirable crystalline silica (RCS). There may also be material or contamination on site that has not been cleared, for example:</p> <p>acids from industrial processes</p> <p>paints</p> <p>flammable liquids</p> <p>unidentified drums</p> <p>microbiological hazards (especially in old hospital buildings)</p> | <p>May be located on all surfaces and in ducts, flues and chimneys.</p> <p>Organise pre demolition surveys if no are data available</p> <p>Establish a strategy for dealing with hazard during the demolition and outline in tender documents.</p> | |

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| Inspection | Biological hazards (such as <i>C. psittaci</i> , <i>aspergillus</i> , <i>e-coli</i> and meningitis) | <p>Hazards resulting from the presence of bird droppings present a range of potential health effects. Check out HSE guidance on biological hazards.</p> <p>But remember also that nature needs to be worked with not forcibly eliminated.</p> <p>Hazard(s) may be present in horizontal exposed surfaces externally and possibly internally, depending upon the state of the building/ structure.</p> | Identify locations and alert tenderers | |
| | Ground contaminated by current or former industrial processes, fuel storage, for example. | Exposure to carcinogens, mutagens etc. through exposure to volatile organic compounds, polyaromatic hydrocarbons, total petroleum hydrocarbons, organic solvents, polychlorinated biphenyls, heavy metals etc. | Investigate previous use and whether it was of an industrial or similar nature. This will indicate whether dust, duct residues, encrustations etc. are likely to be particularly hazardous. | |
| | Ground contaminated by biological contaminants such as sewage, biological waste, for example. | Biological infection including leptospirosis, Lyme disease and water borne diseases. | Ensure that any ground investigation establishes the nature, concentration and spacial extent of contaminants in the soil and groundwater in terms of likely occupational exposure to the hazard. | |
| Site set-up and design stage visits to site | - | - | - | DfH002_18 |

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| Disturbing asbestos products | <p>Asbestos exposure can lead to fatal outcomes or life altering health conditions such as:</p> <p>Mesothelioma, Asbestos-related lung cancer, Asbestosis (Pneumoconiosis) Pleural Thickening</p> | <p>Ban on use of blue and brown asbestos in structures came into force in 1993 while use of white asbestos was not banned until 2000.</p> <p>Accordingly, asbestos can be found in any industrial or residential building built or refurbished before the year 2000. It is in many of the common materials used in the building trade that you may come across; such as:</p> <ul style="list-style-type: none"> • Loose asbestos in ceiling or floor cavity; • Lagging; • Sprayed coatings on ceilings, walls and beams/columns; • Asbestos insulating board; • Floor tiles, textiles and composites; • Textured coatings; • Asbestos cement products; • Roofing felt; • Rope seals and gaskets | <p>Asbestos may occur in a large number of locations and uses. Refer to the HSE Asbestos Essentials.</p> <p>Establish a pre-demolition survey to establish presence, condition and type in line with the requirements of the Control of Asbestos Regulations 2012.</p> <p>Ensure contract contains details of the data and sufficient time for specialist removal.</p> <p>Consider material disposal options, within the design process, such as encapsulation on site, treatment, mechanical movement around site to avoid manual handling, for example.</p> | |
| Groundworks | - | - | - | DfH003_18 |
| Removing drainage | Chemical properties of substances or contaminants/ pathogens in existing drains. | Exposure is likely when inspecting existing drains (surveys, measurements etc.), in particular in old industrial sites, hospitals etc. where there is likely to be a range of various contaminants. | Investigate previous use of site and whether it was of an industrial or similar nature. This will indicate whether any substances present are likely to be particularly hazardous. | |

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| | Leptospirosis or Weils Disease from contact with infected rats urine or contaminated water. | | Ensure that any ground investigation establishes the nature, concentration and spacial extent of contaminants in the soil and groundwater in terms of likely occupational exposure to the hazard. See HSE guidance on Leptospirosis. | |
| Removing concrete and other obstructions | NIHL WRULD Silicosis | Use of high-powered tools for breaking up components expose workers to a range of hazards. | Organise pre-construction survey if no data available. (e.g. reinforcement position and quantities) Can obstruction be left in place? Consider and identify sequence and method of demolition (breakers, hydro-dem, chemicals, use of conveyors) that on balance minimises health hazards. | |
| Removing Steelwork | Lead Toxic fume | Breathing or ingesting lead dust or fume can cause serious problems like kidney, nerve and brain damage or infertility. Paint systems when stripping old structures, painted prior to mid 1980s. | Organise competent pre-construction survey if no data available Exposure to lead becomes a problem for the worker when it has to be cut. Consider and identify sequence of demolition that minimises need to | DfH010_18 |

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| | | On all painted structures | disturb paint on site | |
| | Weight, shape and manoeuvrability of materials. | Handling heavy and/ or awkward shapes exposes workers to poor posture for prolonged periods, such as the need to manually handle steel sections into position where, for example, cranes cannot be used, leading to musculoskeletal disorder. | Carefully consider weights and position of any components that need to be salvaged/recovered as opposed to just allowing the contractor to scrap items Consider benefits of partial removal of part of a structure rather than just complete replacement | |
| Removing other components, which may contain hazardous materials | Lead | Poisoning from contact with, for example lead pipes, flashings and fittings. Note; Lead ceased to be used in pipes around 1980s but continues in other situations e.g. flashings. | Exposure to lead becomes a problem for the worker when it has to be cut Endeavour to design demolition in order to eliminate or significantly reduce the need for cutting lead pipes or fittings. | DfH010_18 |
| | Anthrax (from horse hair) | Plaster dust caused by removing plaster and demolishing walls. Note: Horse hair ceased to be used in plaster around 1920s. | Organise pre-demolition survey, if no data are available and highlight in tender documents if there is presence of horse hair. | DfH010_18 |
| | Skin irritants Toxic Gases Oxygen Deficiency | Some hazardous material can cause skin irritation, leading to dermatitis. Chemical properties of substances or contaminants/ pathogens in existing drains. Exposure is likely when | When having an advance competent site investigation conducted, relating to connecting to existing drainage pipework, ask for confirmation of nature of effluent and its constituent make-up if it is not standard domestic effluent. | DfH011_18 |

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| | Leptospirosis or Weils Disease from contact with infected rats urine or contaminated water | dismantling existing drains, in particular in old industrial sites, hospitals etc. where there is likely to be a range of various contaminants. | Design around an assumed demolition sequence if nature of effluent is likely to create a significant health constraint. | |
| Removal of service ducts, flues, chimneys | Chemical properties of substances or contaminants in ducts/ pipes. | Workers need to know what they are likely to be exposed to when working on service ducts and pipes. | Organise pre-demolition surveys if no are data available. Establish type and concentration of contaminants. Establish a strategy for dealing with hazard during the demolition and outline in tender documents. Ensure ducts are labelled if known to be carrying substances/fluids harmful to health. | |
| Removal of sub stations, electrical equipment* (see comment column) and cables | PCB Lead | PCBs can cause a skin condition called chloracne. Known to cause liver damage in animals but not known to have affected humans' health in the same way. Note: Assume that PCBs exist if item | Organise pre demolition surveys if no are data available Establish a strategy for dealing with hazard during the demolition and outline in tender documents. | |

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| | | is manufactured prior to 1986 | Capacitors in fluorescent tubing may also contain PCBs. | |
| <p>Information to go to contractor: Results of and pre-demolition surveys, for example, identification of type and location of asbestos, lead or horse-hair containing plaster.</p> | | | | |
| <p>Information to go to H&S File: Use <input type="checkbox"/> Maintenance <input type="checkbox"/> Demolition <input type="checkbox"/></p> | | | | |
| <p>Further Information:</p> <p>Demolition (HSE Guidance): http://www.hse.gov.uk/construction/safetytopics/demolition.htm</p> <p>Do you know how to work safely with PCBs? (HSE Guidance) http://www.hse.gov.uk/pubns/msa19.htm</p> <p>Research - None known at his time</p> | | | | |

