

Designing for health - Guidance for designers

Internal drainage and building services				Ref No. DfH011_18
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.
Installation of external drainage	-	-	Be aware that a trench could be a confined space and present specific health hazards (see below)	DfH003_18
Installation of internal drainage	Fumes Burns	Jointing		
	Chemical properties of substances or contaminants/ pathogens in existing	Exposure is likely when connecting to existing drains, in particular in old industrial sites, hospitals etc. where there is likely to be a range of various	Provide wet and dry-weather running levels for the existing sewer network.	

	<p>drains.</p> <p>Toxic gases</p> <p>Oxygen deficiency</p> <p>Leptospirosis or Weils Disease from contact with infected rats urine or contaminated water.</p>	<p>contaminants.</p> <p>Note that exposure to these hazards is also likely when dealing with new drainage pipework.</p>	<p>Connect to the crown of the sewer.</p> <p>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.</p> <p>Design around an assumed construction sequence if nature of effluent is likely to create a significant health constraint.</p>	
	<p>Weight, shape and manoeuvrability of pipework and fittings.</p>	<p>Handling heavy and/ or awkward pipework and pipework fittings exposes workers to poor posture for prolonged periods, such as the need to manually handle drainage items leading to musculoskeletal injury.</p>	<p>Consider space and access for installation and maintenance e.g. secondary items such as pipework to toilets and sinks.</p>	
Services	<p>Weight, shape and manoeuvrability of ductwork and related components</p>	<p>Handling heavy but more likely awkward ducting and related components exposes workers to poor posture for prolonged periods leading to musculoskeletal injury.</p>	<p>Endeavour to specify lengths of ductwork that will allow ready decommissioning within the constraints that will be present. Wherever possible opt for designing for pre-fabrication.</p>	

			<p>Consider the likely access to service for installation and during operational phase of facility.</p> <p>Maximise remote control facilities.</p> <p>Position to give ergonomically adequate space.</p> <p>Consider module sizes of access equipment, to allow its safe use, for example: working platform is to be at the correct height for comfortable working (and remember that appropriate guard-rails should be in place)</p> <p>Design for pre-fabrication.</p> <p>Consider impact of other obstacles upon required access e.g. partitions, fire breaks, cable trays.</p>	
	<p>Low temperatures</p> <p>Wind chill</p>	<p>Hypothermia and/ or aggravation of rheumatic conditions are likely in cold conditions. Workers with HAVS also are more distressed in colder temperatures.</p>	<p>Minimise need to visit plant etc. in exposed areas e.g. roofs, by using remote monitoring systems or locating within protected areas.</p>	

		NOTE: However, an individuals' ability to withstand cold stress is different from person to person and advice on working in minimum temperatures (below 13°C) is given in British and European Standards (see Cold Stress advice link below)	Be aware of HSE's thermal comfort and their Cold Stress guidance websites.	
	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.	Ensure ducts and/ or pipes are labelled if carrying substances/fluids harmful to health	
Soldering electrical connections	Rosin-based fume	Solder fume rise vertically and, for manual operations, is likely to enter the breathing zone of the worker, leading to possible occupational asthma and/ or dermatitis.	Where soldering is deemed necessary consider how to avoid carrying out the soldering activity in an enclosed space or at an awkward posture.	
Confined Spaces working	Asphyxiation (Oxygen deficiency) Heat exhaustion, Poisoning (toxic fume)	Working spaces in, for example, basements, plant spaces, service voids, roofs, undercrofts can become 'confined spaces' and that reflects the nature of the hazards workers are exposed to. NOTE: Confined spaces are not to be confused with restricted spaces, since many confined spaces are extremely large.	Work activities that may be low risk in normal circumstances may become hazardous in confined spaces. Design to allow access to services from above. Consider module sizes of access equipment, to allow its safe use: Ensure working platform is at the	

			correct height for comfortable working (and remember that appropriate guard-rails should be in place).	
Installation or removal of large or awkward items	Weight, shape and manoeuvrability of components.	Handling heavy and/ or awkward components exposes workers to poor posture for prolonged periods, presenting the need to manually handle large or awkward items, such as plant, pumps, furniture where there is insufficient or inappropriate access leading to musculoskeletal injury.	<p>Consider the erection sequence in relation to delivery and installation of significant items. Alert tenderers and give suggested methodology.</p> <p>Some items will also need to be replaced during the lifetime of the facility e.g. M&E plant.</p> <p>Locate in uninterrupted corridors and make corridors at least 1.2m wide;</p> <p>Check that the weights to be removed and/ or installed can be carried by the number of people that can fit into the space available;</p> <p>Specify marking of the centre of gravity on awkward shapes so that the weight can be shared equally.</p>	
Cutting or drilling holes/ openings	Noise Vibration		<p>Design in the holes/ openings to avoid need for drilling</p> <p>Consider grouping of services to</p>	

	Dust		minimise number of holes. Water suppression useful when drilling is needed.	
<p>Information to go to contractor:</p> <p>Alert tenderers (including those carrying out advance survey or exploration works) to significant, specific, residual site-wide hazards, identified in competent site investigations, e.g. provide a list of any known contaminants in any existing drainage pipework, highlighting those that are above action levels.</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>Cold Stress (HSE Guidance): http://www.hse.gov.uk/temperature/coldstress.htm</p> <p>Controlling Health Risks from rosin (colophony)-based solder flux fume (HSE Guidance): http://www.hse.gov.uk/pubns/indg249.pdf</p> <p>Electronics (Soldering) (HSE Guidance): http://www.hse.gov.uk/lung-disease/electronics-soldering.htm</p> <p>Thermal Comfort (HSE Guidance): http://www.hse.gov.uk/temperature/thermal/factors.htm</p> <p>Research - None known at this time</p>				

