

Designing for health - Guidance for designers

Steelwork				Ref No. DfH005_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.
Painting	NIHL HAVS	Using high-powered hand-held tools for surface preparation	Maximise shop preparation and painting. Do not over-specify surface standard (although these decisions need to be balanced against a reduced maintenance cycle) Specify lifting points to protect the painted areas.	
	Irritant, inhalation	Exposure to harmful chemicals in the on site application of paint and thinners	Discuss with specialist sub-contractor; select less-harmful paint formulations subject to whole-life risk assessment (isocyanates in particular should be	

			<p>avoided)</p> <p>Consider health risks associated with removal of the paint in the future, for maintenance reasons (See Sheet 08 Refurbishment)</p> <p>Consider handling points to minimise likelihood of damage during erection, and thus need for small areas of painting touch-up</p>	
	Various	Exposure to other chemicals in the on site use of degreasing agents	Ensure specification allows less harmful options where available	
Tooling operations	NIHL, HAVs	Using high-powered hand-held tools to grind welds, tighten bolts and/or shot-blast to clean	<p>Avoid where possible</p> <p>Avoid over-specifying weld treatment</p> <p>Avoid operations, which require power-tools particularly in confined spaces e.g. inside box-girders</p>	
Component handling and fixing	Musculo-skeletal disorder	Manual handling assemblies with small components	<p>Detail fixing and lifting points on significant items, and provide component weights</p> <p>Mark on the centre of gravity if it is not at the visual centre of the component</p>	

			<p>Consider space and access needs especially for mechanical aids</p> <p>Design to allow for partial assembly at the works and on the ground</p> <p>Where crane use is not possible e.g. in some refurbishments, design to allow erection in sections</p>	
	HAVs, WRULD, NIHL	Using high-powered hand-held tools for bolting	Minimise where possible. Consider space and repetitive actions required as a consequence of the design	
		Using high-powered hand-held tools for site drilling	<p>Avoid by designing for shop drilling with sufficient tolerances</p> <p>Avoid noisy operations in spaces enclosed by hard construction e.g. in concrete basements, inside box-girders</p> <p>Design connections to concrete/masonry by using cast-in connections</p>	
	Blindness, burns, poisoning	Site welding including for the attachment of small or secondary	Minimise site welding. Generally, look to use bolts as first option. Design to allow weld studs to be attached in the	

	Welding fume	components	workshop	
Work in confined spaces	Inhalation of fume	Activities where the by-product is fume e.g. use of epoxies, welding, painting	Discuss with specialist at design stage and try to design out or minimise risk. See CIRIA 'Safe access for maintenance and repair' C686 p36 for guidance on space required for typical postures Alert tenderers to residual risks.	
	WRULD	Where access is needed to bearings, internal areas of boxes	Ergonomic considerations	
Piling	NIHL	Excessive noise caused by the use of driven piles	Consider alternatives to avoid this risk. This will be a balance however against other health and geotechnical issues (See sheet 02 Groundworks-Piling)	
Grouting	Dermatitis Alkali burns	Grouting base plates		DfH003_17
Drilling for holding-down bolts	HAVs, NIHL, silicosis	Using high-powered hand-held tools to create post-drilled fixings for steelwork into concrete foundations	The choice between cast-in/post drilled fixings will be project related and be influenced by design considerations, accuracy of positioning, desirability of avoiding 2/3 bolt fixings (stability issues) and performance of hand-held tools. Tool/Fixing suppliers have determined performance and options in respect of HAVs	

Information to go to contractor:

Information to go to H&S File:

Use

Maintenance

Demolition

Further Information:

Research - None known at this stage