Construction Industry Council CDM Guidance for Designers

Designing to make the management of hazardous materials easier

Health Guidance Note

H 10.001

INTRODUCTION

1. Designers can play a major part in making it easier to manage hazardous materials.

2. All construction projects involve the bringing together, transporting and placing of materials of one form or another. These activities are all site related and, as such, may be ignored by designers when they assess risks of ill-health to those constructing the works. While the designer usually specifies the materials used in the works, the Contractor will use these materials in the most cost effective way.

3. Too much ill-health is caused by workers coming into contact with harmful materials in one form or another.

4. While it is a contractor's duty to deal with materials, chemicals or pathogens on site, designers should provide information to the Planning Supervisor to ensure that it is not left to the Contractor to discover the hazards.

5. Designers may influence construction policy on a project either directly through the design and investigation process or indirectly by influencing project specifications, selection of contractors, etc.

6. Frequently workers do not recognise that carrying out tasks in a particular way and exposure to particular materials may result in long-term ill-health. Therefore, they need the extra protection provided by a design, which could challenge current practices.

HAZARDS ASSOCIATED WITH HARMFUL MATERIALS

7. Hazardous materials can cause serious ill-health and their effects can be cumulative [chronic] or immediate [acute].

8. Their potential for harm can take several forms; they can be: poisons, pathogens, explosive, irritants, or asphyxiating. This potential can exist either in their natural form, eg, asbestos, or in their form derived from the application of a construction process, eg, dust from cutting concrete.

WHAT DESIGNERS SHOULD DO

9. Designers who are aware of possible causes of ill-health to site workers are in a good position to eliminate hazardous materials from their designs. At the detailed design stage the effects of the materials specified should be assessed and hazardous materials eliminated, where appropriate, to protect the health of all those involved in the construction processes. Where it is not possible to eliminate the material, contractors should be alerted to their existence.

10. Designers should be aware that hazardous materials can be present from a variety of sources, as follows:

a) *Existing contaminants*, already on site from:
   i) previous use, eg, wastes, oil, chemicals, asbestos, process by-products, etc;
   ii) incorporation into building components, eg, asbestos in insulation – see Health Series **H 10.002 Asbestos**,
   iii) site use as a commercial tip or as a community waste tip;

b) *Previous specifications*, which used hazardous materials [acceptable at the time of specification], eg: asbestos, lead paint;

c) *Biological hazards* present due to the nature of the site, eg: leptosporidium, HIV, Hepatitis, animal/bird droppings etc, ;

d) *Work processes*, which could transform inert materials into a hazardous form, eg: hot work on materials likely to fume, cutting hard concrete;

e) *Materials specified* by the designer (who may also be a contractor) for use in the project, as mentioned earlier in **9**.

11. In addition, designers should be aware that some chemicals used in construction can be:

a) Explosive – avoid use near ignition sources, eg, electrostatic, open flames;
b) Flammable – where possible specify materials with flashpoints > 55^0C and not near ignition sources, eg, hot work;
c) Toxic – check how easily they vaporise and avoid specifying application by spraying;
d) Corrosive – avoid application by spraying and in situations where it is likely to drip;
e) Irritants – in solvents, etc;
f) Agents for causing respiratory and skin conditions, eg: Asthma, Eczema

Much of this information is contained in manufacturers' material data sheets, which should be consulted.

12. Potentially harmful chemicals exist in the following commonly specified materials:

a) Adhesives: floors and wall tiles;
b) Concrete work: cement, accelerators, retarders, air, entraining agents, placticisers, curing membranes, formwork release agents, joint sealants, and resin admixtures;
c) Masonry work: cleaners, joint sealants, cavity insulation;
d) Steelwork: paints, primers, undercoats, rustproofers and grouts;
e) Timber work: preservatives, flame retarders;
f) Weedkillers.

Much of this information is contained in manufacturers' material data sheets, which should be consulted.

13. People can also come into contact with harmful materials while working in excavations. Further information is given in Technical Series **T 10.002 Excavations**.

14. Designers should be careful to ensure that any processes they specify will not have the potential to realise harm, eg: the use of highly flammable materials close to hot work. Remember the maintenance phase.

Controlling the hazard by design

15. At the design stage, designers need to assess what hazards are present [10a) – c)] or created [10d) & e)] and how these could, potentially, place the construction workers at risk. Having done this, they should endeavour to eliminate the hazard or, if this is not possible, reduce its effect, as shown in Table 1.

Table 1: Design hazard control measures

Hazard source [para 10]	**Design control measure**
10 a) 10 b) 10 c)	Identify hazardous materials on the site from whatever source, eg: a) early desk study or SI; b) see also **T 30.001**- table 1. If possible, design around the hazard, so that it is not realised. Inform contractor about the hazard.
10 d) 10 e)	Specify construction details, which reduce the workers exposure to harmful substances during construction, maintenance and demolition by: c) Where possible designing for construction techniques, which eliminate or control exposure to the hazardous materials; d) Specifying materials, which are less hazardous; Not specifying or requiring processes, which generate hazardous by-products.

16. In addition, in certain circumstances, it may be prudent to discuss the design and its assumed construction method with the contractor for the work, in order to identify the preferred construction methods and materials to be employed. Otherwise the designer should determine for himself how he envisages that the works will be constructed.

17. Table 2, in the next column, gives some examples of how designers might achieve elimination or reduction.

Informing about residual risks

18. It is not acceptable for the designer just to carry out his design and then expect the contractor to control all the risks resulting from the design, on site.

19. It is essential that information about residual risks be conveyed to the Contractor, to allow him to manage these risks. Normally this information would be included on drawings, in the Health and Safety Plan and the Health and Safety File.

20. If you specify a hazardous substance, it is always useful to include the COSHH data sheet in the pre-tender health and safety plan.

TABLE 2: Examples of hazard control measures

Operation	**Health risk**	**Possible Control measure**
Developing contaminated Land [dealing with an existing hazard]	**Toxic material & biological hazards**	As far as possible, eliminate excavations or other dusty operations; Design services in sealed trenches to avoid future contact; Specify driven or displacement piles to reduce spoil; Treat land to reduce exposure (remove/treat in situ);
Cutting and chasing for services [problems of specification]	**Dust**	Design to eliminate the need, eg: surface mounted or cast-in ducting.
Scabbling [problem of specification]		Specify other means of joint formation, eg, retarder & washing
Painting [problem of specification]	**Toxins and solvents**	Specify water based or solvent free paints. Do not specify use in confined spaces.
Restoration/ refurbishment [dealing with an existing hazard]`	**Asbestos** **Other** : eg, lead paint, arsenic	Leave untouched or design to minimise exposure. Inform contractor of its **exact** location **–** see **H 10.002** Leave untouched. If not, inform contractor of what & where it is.
Grouts / sealants/ epoxy [problem of specification]	**Toxins, irritants**	Specify alternative materials.

USEFUL REFERENCES

HSG 224 Managing health and safety in construction 0 7176 2139 1
L27 Control of asbestos at work 1999 0 7176 1673 8
HSG 213 Introduction to asbestos essentials 0 7176 1901 X
CIS 24 Chemical cleaners HSE
CIS 27 Solvents HSE
CIS 36 Silica HSE
INDG 315 Stone dust and you HSE
HSG 97 A step by step guide to COSHH assessment 0 7176 1446 8
HSG 110 Seven steps to successful substitution of hazardous substances 0 7176 0695 3
CIRIA A guide to the safe use of chemicals in construction 691.614.8
EH40 (include MELs / OELs)