

Safety in Design (SiD) Learning Aims



Safety in Design Learning Aims

These Learning Aims are intended for designers from disciplines operating across the built environment. The Aims have been developed by practising design professionals and with reference to relevant professional institutions and employer bodies. The work has been funded through, and endorsed by, ConstructionSkills Sector Skills Council as part of a development programme led by the Construction Industry Council.

The Construction (Design and Management) Regulations 1994 (“CDM Regulations”) came into effect in April 1995. The heart of these Regulations (Regulation 13) is a requirement on designers in the UK construction industry to design out hazards in order to make buildings safer to construct, clean, maintain and demolish. Construction industry clients are required to ensure that any designer they use is competent in this regard.

There have been no detailed learning aims for construction industry designers in relation to CDM Regulation 13, nor are there any standards or benchmarked methods by which a designer can demonstrate competence in this regard.

The Learning Aims have been cross-related to the corresponding industry ‘Manage health and safety in design’ Competence Standards (CS). The Learning Aims can be used to form new learning programmes or integrate with existing ones. There will be individuals who need to widen their existing knowledge and understanding in this area. The benefits of such challenges are that these outcomes will stretch and develop built environment designers, and enhance their design health and safety capabilities.

Please note that these Aims are not intended to cover the entirety of knowledge that an individual designer should have. The Learning Aims have been written to provide a benchmark level of generic knowledge that all involved in construction design should have to design for safety. This should improve health and safety and also bring economic benefits. Many roles will require additional specialist health and safety related knowledge and these Aims are not concerned with risk management on site, but with the decisions in the design process that impact on health and safety of others...

For the purposes of these Learning Aims:

- A ‘hazard’ is something with the potential to cause harm.
- A ‘risk’ is the likelihood of harm being caused by a hazard, and the degree of its severity.

These Learning Aims specifications are in four streams designed to allow maximum integration with existing education, training and accreditation processes required by industry. They deal with the following: - Stream 1 legal and process tools; stream 2 construction for Health and Safety; stream 3 design for Health and Safety; stream 4 sector specific design issues (including special construction aspects). At stream 4 SiD Ltd will respond to requests for peer review of proposed courses and testing in sectors according to need and will arrange processes for peer review of such applications by industry experts. Consequently stream 4 has no content at present.

The italicised references (*CS...*) against each Aim refer to the corresponding knowledge evidence items in the ‘Manage health and safety in design’ Competence Standards.

Stream 1 is concerned with the tools needed to manage Health and Safety properly. It is targeted at all construction professionals. It is ideally suited to self study or online learning techniques or can be incorporated in health and safety training courses for professionals. It looks not only at Health and Safety law, but also some of the factors that affect application of the law and good practice in the construction industry.

Stream 1 is from pages 2 to 4 inclusive

Subject area	Learning outcome
1.1 Legal framework CS 1.1; 1.2; 1.6; 2.4; 2.5	Be able to understand that there are a range of different, inter-related branches of law in the UK and overseas.
1.2. Health and Safety law integrated into the wider picture CS 1.1; 1.2; 1.6; 2.4; 2.5	Understand the basics of law that impacts on Health and Safety management including criminal law, civil law (contract and tort/delict), European and international impacts including Directives as a source of UK law, overseas working, overseas suppliers to the UK.
1.3 Court systems CS 1.1; 1.2; 1.6	Be aware of the different court systems and the powers they hold including routes for appeal and related legal strategy. UK and international dimensions to be included where these relate to Health and Safety. Understand court authority with respect to decided cases.
1.4 Penalty and remedy CS 1.1; 1.2; 1.6	Understand the difference between penalty (in relation to criminal law) and remedy (in relation to civil law).
1.5 UK Health and Safety law CS 1.1; 1.2; 1.6; 2.4; 2.5	Understand that Health and Safety law is criminal law, but influenced in a variety of ways by civil law eg that a contract of employment confers statutory duties and also civil duty of care on defined parties; eg understand how contracts' condition can affect health and safety law and arrangements.
1.6 International issues for Health and Safety law CS 1.1; 1.2; 1.6; 2.4; 2.5	Understand that when working internationally there are significant differences that will need specialist advice.
1.7 Buying in overseas services for UK projects CS 1.1; 1.2; 1.6; 2.4; 2.5	Understand general duties, responsibilities and liabilities when using overseas suppliers eg for design or for specific structural, mechanical or electrical items recognising that there are differences in law, standards and practice.

<p>1.8 Enforcement of Health and Safety in the UK</p> <p>CS 1.1; 1.2; 1.6</p>	<p>Understand who enforces Health and Safety law under what circumstances and what powers they have available to them.</p>
<p>1.9 Enforcement advice and notices</p> <p>CS 1.1; 1.2; 1.6</p>	<p>Understand the role of enforcers as advisers. Know the significance of improvement and prohibition notices and the circumstances of their issue. Understand how to resolve such issues.</p>
<p>1.10 Prosecution processes</p> <p>CS 1.1; 1.2; 1.6</p>	<p>Understand different types of interviews (under caution) and rights of individuals under different circumstances. Understand the likely onward action in the event of a prosecution being brought against individuals or organisations.</p>
<p>1.11 Insurances</p> <p>CS 1.1; 1.2</p>	<p>Understand where appropriate insurance cover can assist in terms of risk management and mitigation. Know about employer's liability, professional indemnity and public liabilities.</p>
<p>1.12 Health and Safety at Work etc Act 1974</p> <p>CS 1.1; 1.2; 1.6; 2.4; 2.5</p>	<p>Understand the goal setting nature of this legislation. Know the general responsibilities of organisations and individuals in relation to the safety and health of all.</p>
<p>1.13 Management of Health and Safety at Work Regulations 1999</p> <p>CS 1.1; 1.2; 1.6; 2.4; 2.5</p>	<p>Be aware of the scope of the Regulations and their over riding importance in health and safety management systems - in particular know that risk assessment is required for all work activities and that this includes measures to control risk adequately.</p>
<p>1.14 Other Health and Safety Regulations</p> <p>CS 1.1; 1.2; 1.6; 2.4; 2.5</p>	<p>Be aware of other key Regulatory requirements and the scope of relevance including workplace, work equipment, lifting and handling, hazardous materials, asbestos, noise and vibration, work at height.</p>
<p>1.15 Construction Regulations</p> <p>CS 1.1; 1.2; 1.6; 2.4; 2.5</p>	<p>Understand the concepts that underpin the Regulations particularly in terms of communication, coordination and information flow. Understand the requirements on all duty holders.</p>
<p>1.16 Competence and adequate resources</p> <p>CS 1.1; 1.2; 2.1; 2.2</p>	<p>Understand the importance of competence throughout the supply chain. Understand how to assess competence and how this integrates with the significance of information passed on through the project processes. Know that adequate resources relates to time as well as other matters and be aware of ways in which such matters can be assessed.</p>

<p>1.17 Communication and documentation</p> <p>CS 1.1; 1.2; 1.6; 1.7; 2.5; 2.6</p>	<p>Health and Safety Plans and Health and Safety Files. Auditable record keeping. Proportional, relevant and appropriate information flow. Use of contract drawings and documents to pass information across. Types of information. Consultation with appropriate parties.</p>
<p>1.18 Legislative and other constraints</p> <p>CS 1.1; 1.2; 1.6; 2.4; 2.5</p>	<p>Understand the critical impact, from a Health and Safety perspective on the lifecycle of projects and structures, of building regulations, specialist legal duties (e.g. for Government agency staff), environmental constraints, English Heritage concerns, planning constraints, economic considerations, Disability Discrimination Act, Fire Regulations etc in the life cycle of projects and structures.</p>
<p>1.19 Hazard data</p> <p>CS 1.5</p>	<p>Understand the significance of national, sectoral, organisational accident and ill health statistics to identify key hazards.</p>
<p>1.20 Hazard and risk</p> <p>CS 1.3; 1.4; 1.5; 1.6; 1.7; 1.8; 2.1; 2.2; 2.3; 2.4; 2.6</p>	<p>Know the definitions of hazard and risk and understand the importance of being able to manage them using various hierarchies.</p>
<p>1.21 Stakeholders</p> <p>CS 1.1; 1.2; 2.5; 2.6</p>	<p>Understand the wider contribution made by different stakeholders both within and outside the project teams.</p>
<p>1.22 Codes and standards etc.</p> <p>CS 1.1; 1.2; 2.4; 2.5</p>	<p>Be aware of the status, scope and application of Health and Safety Approved Codes of Practice and Guidance and the relationship Eurocodes, British Standards and other standards have.</p>
<p>1.23 Professional competence and development</p> <p>CS 1.1; 1.2; 2.1; 2.2</p>	<p>Understand what is expected in terms of maintaining personal and organisational competence and how this can be achieved through training, self study, networking, reading etc..</p>
<p>1.24 Information management</p> <p>CS 1.6; 1.7; 2.5</p>	<p>Understand how to maintain sufficient information and developing competence at personal and corporate level.</p>
<p>1.25 Industry wide schemes</p> <p>CS 1.1; 1.2</p>	<p>Be aware of the range of industry wide schemes to accredit competence or deliver training (e.g. CSCS, SiD, HSE etc), how to recognise them and what status they have as indicators of industry standards.</p>
<p>END OF STREAM 1</p>	

Stream 2 is concerned with how construction processes are influenced by design

Stream 2 is from pages 5 to 7 inclusive

<p>2.1 Health and Safety planning</p> <p>CS 1.2; 2.5</p>	<p>Know the statutory duties of the Principal Contractor in relation to the Health and Safety plan and file required by CDM - in particular understand that this is a development of earlier documentation and requires cooperation and coordination by all stakeholders and that both documents need iterative input and development.</p>
<p>2.2 Site set up</p> <p>CS 1.3; 1.4; 1.5</p>	<p>Understand the issues that relate to establishment of a site including a major site, a small site and a mobile site - in particular understand the time for site establishment required for welfare, plant and equipment, for material lay-down, for traffic and plant interfaces and for matters relating to the site location and adjacent property/activity/hazards.</p>
<p>2.3 Relationships</p> <p>CS 1.2; 2.5</p>	<p>Understand the role of other parties to the project including Client, Designers, Contractors, Specialist contractors, Temporary Works Designers, Consultant advisors (Health and Safety, environment, Planning Supervisor etc), workforce, etc. Know how to manage relationships for projects within scope and the benefits of integrated teams.</p>
<p>2.4 Communication</p> <p>CS 1.1; 1.2; 1.6; 1.7; 1.8; 2.5; 2.6</p>	<p>Understand the importance of continuous communication and feedback on a range of issues from all parties to the contract and others affected by the works, including managing changes.</p>
<p>2.5 Records</p> <p>CS 1.6; 2.5</p>	<p>Be aware of the importance of appropriate record keeping and the range of records that are appropriate to projects.</p>
<p>2.6 Competence checks</p> <p>CS 1.1; 1.2; 2.1; 2.2</p>	<p>Understand the current best practice requirements in respect of competence checks for suppliers at personal level (e.g. CSCS) and at corporate level.</p>
<p>2.7 Contract issues and procurement routes</p> <p>CS 1.1; 1.2</p>	<p>Understand the main range of procurement routes and contract arrangements from PFI to Minor Works and how these can affect the arrangements for Health and Safety management.</p>
<p>2.8 Personal responsibilities for safety on site</p> <p>CS 1.1; 1.2; 1.3; 1.4; 1.5; 1.6; 1.7; 1.8; 2.1; 2.2; 2.3; 2.4; 2.6</p>	<p>Know how to maintain personal safety in light of what the main hazards are on construction sites. Understand how to deal with non compliances.</p>

<p>2.9 Cost of accidents and ill health</p> <p>CS 1.6; 1.7; 1.8</p>	<p>Be aware of the direct and hidden costs of accidents and ill health, and the impact these have on project and organisation profitability and on human wellbeing.</p>
<p>2.10 Hazards</p> <p>CS 1.3; 1.4; 1.5; 1.6; 1.7; 1.8; 2.1; 2.2</p>	<p>Understand the main hazards on construction sites including refurbishment sites. Understand the relative risks associated with different construction solutions and how these can be applied to reduce overall project risks. These to include the following:</p> <ul style="list-style-type: none"> • Interface with others especially traffic management and site delivery • Site specific problems – buried and overhead services, contaminated land, adjacent structures • Place of work – at height, in excavations, confined spaces, in the open, in occupied premises etc • Workplace relationships – working above/below others, work that affects others, programming etc • Plant and machinery – movement, space required, noise, vibration, exhaust, etc • Housekeeping • Storage including lay-down and hazardous/flammable substances • Substances use/alternates and existing materials including asbestos/biohazards/paints • Handling of materials by machine or manually including cranes and complex lifts • Permits • Non destructive testing • Commissioning of plant • Electricity • Processes – Demolition/temporary stability/ future stability • Security.
<p>2.11 Safe systems of work</p> <p>CS 2.3; 2.4; 2.5; 2.6</p>	<p>Recording and communicating information, especially including relevant design information to inform method statements and safe systems of work.</p>
<p>2.12 Common problems faced by contractors</p> <p>CS 1.3; 1.4; 1.5</p>	<p>Understand the common problems faced by contractors in relation to unforeseen circumstances, communication breakdown, change control, weather extremes, access, material placement.</p>

<p>2.13 Temporary works design</p> <p><i>CS 1.3; 1.4; 1.5; 2.1; 2.2</i></p>	<p>Understand the importance of competent design for temporary works coordination, allowance for temporary works in the permanent works, temporary conditions of permanent works, implementation, maintenance requirements, construction loading.</p>
<p>2.14 Building services</p> <p><i>CS 1.3; 1.4; 1.5; 2.1; 2.2</i></p>	<p>Understand the need to consider the spatial requirements for design installation, commissioning, operation, maintenance and decommissioning of building services, including access and space requirements.</p>
<p>2.15 Buildability</p> <p><i>CS 1.3; 1.4; 1.5; 2.1; 2.2</i></p>	<p>Understand a range of general construction methods and possible constraints, including location, assembly and composition.</p>
<p>2.16 Refurbishment and demolition</p> <p><i>CS 1.3; 1.4; 1.5; 2.1; 2.2</i></p>	<p>Be aware of the particular issues relating to refurbishment and demolition projects especially existing substances, contamination, structural instability, structural alteration and temporary instability.</p>
<p>2.17 Prefabrication and systems</p> <p><i>CS 1.3; 1.4; 1.5; 2.1; 2.2</i></p>	<p>Understand the strengths and weaknesses of systems build and prefabrication. Be aware of how to source information about construction products.</p>
<p>END OF STREAM 2</p>	

Stream 3 is concerned with the high level project management of the design processes as they relate to Health and Safety

Stream 3 is from pages 8 to 10 inclusive

<p>3.1 Designer definitions</p> <p><i>CS 1.2; 2.1; 2.2</i></p>	<p>Understand who is a designer and what constitutes design.</p>
<p>3.2 Other designers</p> <p><i>CS 1.2</i></p>	<p>Understand ways in which different design disciplines can coordinate their work activities and the needs and contribution of each to the project and structure.</p>
<p>3.3 Project teams</p> <p><i>CS 1.1; 1.2; 1.8; 2.1; 2.2</i></p>	<p>Understand the role of the Client (competent or occasional, hands on or distant), the professionals involved in project inception, design and delivery and the contribution capability of each. Understand stakeholder requirements, in particular the client's requirements. Recognise the importance of team reviews when teaching Health and Safety issues.</p>
<p>3.4 Project processes</p> <p><i>CS 1.8; 2.1; 2.2</i></p>	<p>Be aware of the project processes: planning, permissions, public enquiries, procurement routes, contracts, specifications and bills of quantities, programmes, general legal and commercial matters relating to project management in the built environment, gateway management and management of changes.</p>
<p>3.5 CDM principles</p> <p><i>CS 1.2; 2.5; 2.6</i></p>	<p>Understand the extent to which designers can contribute towards the objective of improved communication, co-ordination and use of resources.</p>
<p>3.6 CDM detail</p> <p><i>CS 1.1</i></p>	<p>Know the duties of all parties so that designers know how to advise Clients. In particular be able to advise the Client as appropriate on matters of Health and Safety and risk.</p>
<p>3.7 CDM application</p> <p><i>CS 1.1; 1.2</i></p>	<p>Be aware of flexibility and alternatives in terms of arrangements that can be put in place to comply with statutory duties and the appropriate arrangements for works, which always require safe systems of work regardless of formal CDM limits.</p>

<p>3.8 Designer contribution to whole life Health and Safety</p> <p>CS 1.3; 1.4; 1.5; 2.1; 2.4; 2.5</p>	<p>Understand the ways in which designers can intervene to improve Health and Safety throughout a project and the life cycle of a structure. In particular be aware of important interventions that are possible at feasibility, concept and detailed design in relation to the designing out of hazards or their appropriate reduction.</p> <p>Understand how to use industry standard support such as;</p> <ul style="list-style-type: none"> • CIRIA Guidance for designers • CIC Design guides • Standards and codes of practice <p>Know how to demonstrate effective interventions and compare and contrast solutions with others that are subject to different constraints.</p>
<p>3.9 Design processes</p> <p>CS 1.6; 1.7; 1.8; 2.1; 2.2; 2.3; 2.4</p>	<p>Understand the range of complex inputs facing designers of different types, the decision tree manner in which these are intuitively or systematically dealt with. Know how to engage in hazard elimination and management processes.</p>
<p>3.10 Life cycle issues</p> <p>CS 2.1; 2.2</p>	<p>Understand life cycle costing in relation to demonstration of various solutions, costs and risks throughout a structures life.</p>
<p>3.11 Operational issues</p> <p>CS 1.1;1.2; 1.3; 1.4; 1.5; 2.5; 2.6</p>	<p>Be aware of Design Quality Indicators, Building Regulations, requirements of facilities managers and end users in relation to safety, health and wellbeing.</p>
<p>3.12 Business case for design inputs</p> <p>CS 1.1; 1.2</p>	<p>The business case arguments for design effort in relation to Health and Safety and to which parties such benefits accrue under different contract arrangements. Understand effectiveness of early design solutions.</p>
<p>3.13 Audits and records</p> <p>CS 1.6; 1.7; 2.5</p>	<p>Understand the benefits of formal recording. Be aware of the range of methods for recording such decisions that do not interrupt the design processes including on drawings, in meeting minutes, in specifications and bills of quantity. Understand when there is a need to explain the rationale for a decision.</p>
<p>3.14 Communicating significant issues</p> <p>CS 2.5; 2.6</p>	<p>Understand the extent of information that is to be judged significant and so needs to be communicated and how to match this to contractor competence. Understand that too much information may hide critical information. Understand how to manage the potential gaps and overlaps that this key area covers.</p>

3.15 Conflicting demands <i>CS 2.1; 2.2</i>	Understand how to manage conflicting demands between Health and Safety and other matters such as cost, environment, heritage, functionality.
3.16 Design constraints and opportunities <i>CS 2.1; 2.2</i>	Be aware of the strengths and weaknesses of standard solutions versus innovation for a range of projects.
3.17 Information sharing <i>CS 1.2; 2.5; 2.6</i>	Be aware of the advisability of developing corporate competence as well as individual competence and how this can be managed with respect to appropriate design solutions. Be aware of how information sharing across industry can also assist in driving up standards and changing culture as well as reduce liability.
3.18 Maintaining competence <i>CS 1.1; 1.2; 2.1; 2.2</i>	Be aware of the range of ways in which information can be managed at personal, project, company level. Be aware of the need to maintain professional competence and the means of doing this through training, self study, peer consultation, meetings, journals etc..
3.19 Residual hazards <i>CS 2.2; 2.3; 2.5; 2.6</i>	Understand how to track residual hazards that may need to be passed on to the principal contractor or client to manage and ways in which this can be managed.
End of stream 3	

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