WHAT GOOD SAFETY IN DESIGN LOOKS LIKE

Guidance Handbook
INTRODUCTION

At Arcadis, the health, safety and well-being of our employees and stakeholders are central to everything we do. In Our General Business Principles, we commit to providing a healthy and safe work environment for all our employees. To that end, our global health and safety vision and policies are built around a proactive risk- and behavior-based approach that integrates health and safety (H&S) into our culture, our values and the way we do business.

H&S is also an integral part of the solutions we provide to our clients and a key Arcadis differentiator.

It is important that a formal process incorporating hazard analysis is undertaken at the beginning of a design in order to mitigate or reduce potential risks to a building, facility, or structure in accordance with industry best practices, technical standards, legislative and local requirements.

Design professionals can positively influence the safety of a project by considering this at the design phase to reduce the need for decision making by site personnel. In doing so, they can identify the root cause for potential accidents and preventive measures to mitigate these, reducing the project risk and associated costs.
At Arcadis, the health, safety and well-being of our people, stakeholders and the community we exist in is at the forefront of everything we do. It guides our decision making process, shapes our commitment to provide a healthy and safe work environment for all Arcadians.

Arcadis follows a pro-active risk and behavior-based approach that integrates health and safety (H&S) into our culture, our values and the way we do business. Our global H&S management system is designed to standardize the process of H&S across the company while respecting the nuances of the culture, client expectations and regulation. Lessons learnt and best practices are shared globally and often. Our system empowers people to conduct their work in a way that protects themselves and others. It gives them the tools to implement healthy and safe work practices at all times and encourages them to use these tools off-the-job to maintain a healthy and safe personal lifestyle.

We continually strive to prevent harm and incidents by integrating TRACK, our Dynamic Risk Assessment Tool that help us to:

1. **Think through the task.**
2. **Recognize the hazards.**
3. **Assess the risks.**
4. **Control the hazards.**
5. **Keep H&S first in all things.**

**What Good Health & Safety Looks Like** is a tool to share knowledge and best practices, empowering people to be Health and Safety Stewards.

This book has been developed as guidance tool only for “What Good Health and Safety Looks Like”. This guidance book sets out common approaches and best practices which are not limited, however it is not a replacement for specific risk management processes, requirements in a particular country and implementation of higher specific requirements pertaining to particular industries to ensure any and all work processes are carried out safely.

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OUR APPROACH: SAFETY IN DESIGN

Whatever your role in construction, Safety in Design aims to improve health and safety in the industry by helping to:

- sensibly plan the work so the risks are managed from start to finish
- have the right people available for the right job at the right time
- cooperate and coordinate your work with others about the risks and how they are being managed
- have the right information about the risks
- communicate this information effectively to those who need to know
DESIGNER
DEFINITION
AND DUTIES

A designer is a person conducting a business or undertaking whose profession, trade or business involves them in:

• Any part of a construction project, including the design of temporary works, or who arranges or instructs someone else to do it.

• Preparing sketches, plans or drawings for a structure, including variations or changes to a structure.

• Making decisions for incorporation into a design that may affect the health or safety of persons who construct, use or carry out other activities in relation to the structure.

Construction design should be either demonstrated or acquired by persons with control over design and should reflect the knowledge that a competent designer would be expected to have.

A designer can be a company or individual.
THE DESIGNER

- A designer has a strong influence, particularly during the very early planning and design stages of a project.

- Their decisions can affect the health and safety of not only those contractors and workers carrying out the construction work, but those who use, maintain, repair, clean, refurbish and eventually demolish a building.

- Decisions such as selecting materials or components of a building can avoid, reduce or control risks involved in constructing a building and maintaining and using it after it is built.

When do the duties of a designer start and finish?

- A designer’s duties apply on appointment and when designs which may be used for construction work are started.

- While most design work is carried out during the pre-construction phase of a project, it is not unusual for it to extend into the construction phase.

- A designer should agree the scope of their appointment with whoever has appointed them.

Designers include:

- Architects, building designers, engineers, building surveyors, interior designers, landscape architects, town planners and all other design practitioners contributing to, or having overall responsibility for, any part of the design.

- Building service designers, engineering firms or others designing services that are part of the structure such as ventilation, electrical systems and permanent fire extinguisher installations.

- Contractors carrying out design work as part of their contribution to a project (for example, an engineering contractor providing design, procurement and construction management services).

- Temporary works engineers, including those designing formwork, falsework, scaffolding and sheet piling.

- Persons who specify how structural alteration, demolition or dismantling work is to be carried out.

- Sub consultants - that undertake any design work.
IS ARCADIS A DESIGNER?

YES. Arcadis is considered a person conducting a business or undertaking, that designs a structure that will be used, or could reasonably be expected to be used as a workplace.

Arcadis is therefore expected to ensure, so far as reasonably practicable, that the structure is without risks to health and safety.

This duty includes carrying out testing and analysis and providing specific information about the structure.

What specifically are the duties of a designer?

The designer is to ensure, so far as is reasonably practicable, that a structure that is designed is without risk to the health and safety of persons. A designer must:

- Understand and be aware of significant risks that workers and users can be exposed to, and how these can arise from their design decisions.
- Have the right skills, knowledge, and experience, and be adequately resourced to address the health and safety issues likely to be involved in the design.
- Co-operate with others who have responsibilities, in particular the principal designer.
- Take into account the general principles of prevention when carrying out their design work.
- Provide information about the risks arising from their design.
- Co-ordinate their work with that of others in order to improve the way in which risks are managed and controlled.

When we are contractually sub-contracting work to other designers we are also responsible for their work and quality of design.
Safety in Design is an important consideration to ensure health and safety on a project.

At the design phase, while taking into consideration various structural, environmental and client related factors, designers must also consider the applicable global design standards and legal framework.
Legal frameworks guide the ‘Safety in Design’ codes and / or standards to be adhered to. The following considerations need to be made:

- These may vary from region to region
- We need to follow a set of international and best practice and principles that others may use.
- Always check and verify the standards that are to be applied.

Above all else we always need to consider:

1. The structures to be used as a workplace are safe and without risk to health
2. That we demonstrate we have approached design with a risk management and whole lifecycle approach
3. Ensured the designer has the right capabilities to design the specific project
4. That appropriate consultation, co-operation and co-ordination has occurred
5. We transfer the right information at the right time

Examples of legislative frameworks or design standards. These are not limited.

**United Kingdom:** Construction Design Management - CDM

**USA:** National Institute of Occupational Safety and Health - NIOSH
- NIOSH’s PtD Webpage

**Australia:** Work Health and Safety Regulations

**Singapore:** Workplace Safety and Health Council - WSHC
- [https://www.wshc.sg](https://www.wshc.sg)

**United Kingdom:** British Standards Institute - BSI

**USA:** American National Standards Institution - ANSI
- [https://wwwansi.org/default.aspx](https://wwwansi.org/default.aspx)

**Europe:** CE Standards - CEN

**Singapore:** Singapore Standards Council- SSC
WHAT IS REASONABLY PRACTICABLE

Deciding what is ‘reasonably practicable’ requires taking into account and weighing up all relevant matters including:

- The **likelihood** of the hazard or the risk occurring
- The **degree** of harm that might result from the hazard or the risk
- Knowledge about the hazard or risk, and ways of eliminating or minimizing the risk
- The availability and suitability of ways to eliminate or minimize the risk, and
- After assessing the extent of the risk and the available ways of eliminating or minimizing the risk, the **cost** associated with eliminating or minimizing the risk, including whether the cost is grossly disproportionate to the risk

WEIGHING UP ALL RELEVANT MATTERS

- **COMPETENCE**: What you ought to know
- **AVAILABILITY / SUITABILITY**: Equipment and materials
- **LIKELIHOOD**: Of something happening
- **SERIOUSNESS**: Outcomes of wrong decisions or design
Safe design is the integration of control measures early in the design process and when contemplating the wider set of design objectives for the structure. These objectives include:

- Practicability
- Aesthetics
- Cost
- Functionality

Safe design is also successfully achieving a balance of these sometimes competing objectives, without compromising the health and safety of those potentially affected by the structure over its lifetime.
WHERE DOES SAFE DESIGN START?

Safe design begins at the pre-design development phase when making decisions about:

- The design and its intended purpose
- Materials to be used
- Methods of:
  - Construction
  - Maintenance
  - Operation
  - Demolition
  - Dismantling
  - Disposal

What legislation, codes of practice and standards need to be applied.
PRINCIPLES OF SAFE DESIGN

The principles of Safe Design provide guidance to those involved in the design of projects on how to mitigate and reduce risks and hazards for all stages of the asset lifecycle.

CONSTRUCTION LIFESTYLE
Safe design applies to every stage in the lifecycle from conception through to demolition. It involves eliminating hazards or minimizing risks as early in the lifecycle as possible.

PERSONS WITH CONTROL
Persons who make decisions affecting the design of structures, facilities or processes are able to promote health and safety at the source.

INFORMATION TRANSFER
Effective communication and documentation of design and risk control information between all persons involved in the phases of the lifecycle is essential for the safe design approach.

SYSTEMATIC RISK MANAGEMENT
The application of hazard identification, risk assessment and risk control processes to achieve safe design.

SAFE DESIGN KNOWLEDGE AND CAPABILITY
Should be either demonstrated or acquired by persons with control over design and should reflect the knowledge that a competent designer would be expected to have.
**WHAT DOES SAFE DESIGN APPLY TO?**

Safe Design is applicable to all types of construction projects as anything that is constructed, whether fixed or moveable, temporary or permanent and includes:

- Buildings, masts, towers, framework, pipelines, transport infrastructure and underground works (shafts or tunnels), and
- Any component of a structure and part of a structure
- A roadway or pathway
- Foundations, earth retention works and other earthworks, including river works and sea defense works
- Formwork, falsework or any other structures designed or used to provide support, access or containment during construction work
- An airfield
- A dock, harbor, channel, bridge, viaduct, lagoon or dam
- A sewer or sewerage or drainage works

**WHY IS SAFE DESIGN SO IMPORTANT?**

- Safe design helps eliminate hazards at the design or planning stage. This is often easier and cheaper to achieve than making changes later when hazards become real risks at the workplace.
- Safe design results in many benefits, including:
  - Better understanding of the design requirements and limitations
  - More effective prevention of injury and illness
  - Improved usability of structures
  - Improved productivity and reduced costs
  - Better forecasting and management of production and operational costs over the lifecycle of a structure
  - Compliance with legislation
  - Innovation considering that safe design often demands new thinking to resolve hazards in the construction phase and the end use
SAFE DESIGN PHASES

There are essentially three key stages in the design process where safe design should be considered:

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<tr>
<th>Design Phase</th>
<th>Requirements</th>
<th>Examples of Considerations</th>
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<tbody>
<tr>
<td>Pre-design phase</td>
<td>Identification of critical health and safety related risks that may affect</td>
<td>• Site geology e.g. soft soils</td>
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<td>• Proposed use zoning</td>
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<td>Conceptual and schematic</td>
<td>Identification of reasonably foreseeable safety risks with a design project</td>
<td>• Specification of materials with high durability and low maintenance requirements.</td>
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<td>design phase</td>
<td>associated with the construction/manufacture, installation,</td>
<td>• Hazardous area classification</td>
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<td>(This may include preliminary design)</td>
<td>commission/use, maintenance/repair, demolition and disposal</td>
<td>• Redundancy, introduction of duplicates to allow safe continued operation in the event of</td>
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<td>• Providing permanent safe access to roofs, plant rooms and windows for maintenance and repair</td>
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<td>purposes such as stairs or walkways with guardrails.</td>
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<td>• Taking into consideration ergonomic principles e.g. avoid designing construction activities</td>
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<td>Focusing on ways in which a design can be modified to eliminate or reduce</td>
<td>that require work in restricted spaces or designs that require repetitive or prolonged</td>
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<td>issues that may affect the ongoing safety of persons involved in constructing,</td>
<td>movements to complete the task.</td>
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<td>using, maintaining or demolishing the design product.</td>
<td>• Eliminating the need for installing temporary barriers, by integrated guardrail system</td>
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<td>along roof edges</td>
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<td>• Inclusion of construction access into building fabric e.g. removable panels</td>
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<td>• Lifting lugs installed into prefabricated work pieces to facilitate the movement of heavy</td>
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<td>Detailed design phase</td>
<td>At each stage of the design process risk identification should take place to</td>
<td>Remember—design (construction and temporary works) does continue through the construction</td>
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<td>(This includes full documentation</td>
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<td>(particularly D&amp;B) and our obligations as designers remain where contractually engaged</td>
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<td>to allow construction (including</td>
<td>reasonably practicable (SFAIRP) through the implementation of control</td>
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DESIGNER COMPETENCE, KNOWLEDGE AND CAPABILITY

What skills, knowledge and experience does a designer need to carry out their duties in a way that ensures health and safety?

- A designer must be able to demonstrate they have the health and safety skills, knowledge and experience
- The level required should be proportionate to the complexity of the project and the range and nature of the risks involved.

In addition to core design capabilities relevant to the designers role, a designer should also have:

- Knowledge of work health and safety legislation, codes of practice and other regulatory requirements
- An understanding of the intended purpose of the structure
- Knowledge of risk management processes
- Knowledge of technical design standards
- An appreciation of construction methods and their impact on the design

These refer to the skillsets, knowledge and understanding that a competent designer would be expected to have.
Safe design applies to every stage in the asset lifecycle from conception through to demolition.

This involves eliminating hazards or minimizing risks as early as possible, to optimizing the lifecycle of assets commencing at the conceptual design through to the completion of the project. This is supported by thorough planning, analysis, assessment, reporting and execution of health and safety standards and processes.
SAFE DESIGN THROUGHOUT ASSET CYCLE

Safe design must be considered throughout the entire asset cycle including the following phases:

- Construction
- Commissioning
- Fit-out
- Use as a workplace (the structure being used for the purpose for which it was designed)
- Cleaning and Maintenance
- Alterations, refurbishment, renovations, repair
- Demolition, dismantling or disposal

WHO DOES THE LIFECYCLE APPROACH PROTECT

- In the same way that designers consider the future impact of a structure on environmental sustainability, they should consider how their design will affect the health and safety of those who will interact with the structure throughout its life.
- The designer is to ensure, so far as is reasonably practicable, that a structure is designed to be without risks to the health and safety of persons who:
  - Are at a workplace and use the structure for the proposed purpose it was designed for
  - Construct the structure at a workplace
  - Carry out any reasonably foreseeable activity at a workplace in relation to the manufacture, assembly, use, proper demolition or disposal of the structure or
  - Are in the vicinity of a workplace and are exposed to the structure or whose health and safety may be affected by an activity related to the structure
The application of hazard identification, risk assessment and risk control processes to achieve safe design

A “hazard” means anything that has the potential to cause injury, disease, damage to property, or harm to the environment. A “risk” is the possibility that harm might occur when exposed to a hazard. “Risk control” or risk management is an action taken to eliminate health and safety risks so far as is reasonably practicable. These are important processes in developing ‘safe designs’.
The designer should:
• Identify the client’s main objectives and outcomes for the design
• Establish the intended and foreseeable uses of the design as well as the complexity of the project
• Establish the risk management context by identifying the breadth of workplace hazards and relevant applicable:
  - Legislation
  - Codes of practice
  - Design Standards
• Identify the required design disciplines, skills and competencies
• Identify the roles and responsibilities of stakeholders in relation to the project
• Establish collaborative relationships with clients and others who influence the design outcome

RISK MANAGEMENT AT PRE-DESIGN PHASE

GENERAL PRINCIPLES OF PREVENTION

- Avoiding risks by asking yourself if you can get rid of the problem (or hazard) altogether
- Evaluating the risks that cannot be avoided
- Combating the risks at source
- Adapting to technical progress: consider new techniques or technologies
- Replacing the dangerous with the non-dangerous or the less dangerous
- Giving collective protective measures priority over individual protective measures
- Making provisions so that the work can be organised to reduce exposure to hazards
- Giving appropriate instructions to employees
HIERARCHY OF CONTROL

The control measures prescribed by the hierarchy must be implemented in the order specified or in combination (if no single measure is sufficient) to ensure the risk is reduced so far as is reasonably practicable (SFAIRP).
DESIGN RISK ASSESSMENT

The safe design risk assessment is normally undertaken in a workshop environment. It is important that this process is systematic and not limited to one or two people’s experience of situations.

- Risk workshops should where possible include:
  - Clients
  - Designers
  - Contractors
  - Equipment manufacturers
  - Plant operators
  - Maintenance personnel
  - Safety experts
  - End Users

WHAT HAZARDS SHOULD BE RISK ASSESSED?

- Hazards that can be affected, introduced or increased by the design of an asset should be risk assessed and consideration should be given to possible ways that the hazards could be eliminated or minimized.

- Systems of work which are foreseeable as part of the construction method and the intended use of the structure as a workplace should also be assessed.
ELIMINATE, REDUCE AND CONTROL RISK

- As a designer you will need to take account of the general principles of prevention when preparing or modifying your design including:
  - Workers, or anyone else who may be affected during construction.
  - Those who may maintain or clean the building once it is built.
  - Those who use the building as a workplace.
- Health and safety risks must be considered alongside other factors that influence the design:
  - Such as cost
  - Fit for purpose
  - Aesthetics
  - Environmental impact
- When considering health and safety risks, you are expected to do what is reasonable at the time that the design is prepared, taking into account current industry knowledge and practice.
- Risks that cannot be addressed at the initial stage of a project should be reviewed later on, during the detailed design stage.
- You should take into account the requirement for maintenance, cleaning and access to the finished project.
- The level of detail required in passing on information about risks should be proportionate to the risks involved.
- Insignificant risks can usually be ignored, as can risks arising from routine construction activities, unless the design compounds or significantly alters these risks.
- Any records you wish to keep should not be over-complicated, but proportionate to the risks involved including:
  - Notes on drawings
  - Sketches
  - Risk registers and similar items
- If you are unsure how the design might be constructed, or are not aware of certain construction or maintenance techniques, talk to possible contractors, specialists, manufacturers or suppliers before completing your design.

REVIEWING CONTROL MEASURES

At various points in the design process, designers should review design solutions to confirm effectiveness of risk controls (risk assessment) and if necessary redesign, to minimize the risks so far as is reasonably practicable.
- Wherever possible this review should involve the Principal Contractor or others who will eventually construct the structure.
- If this is not possible, then the client and designer should consult people with knowledge and experience in construction and maintenance processes.
REVIEWING CONTROL MEASURES

RED

Hazardous procedures, products and processes that should be eliminated from the project where possible.

- Lack of adequate pre-construction information (such as asbestos surveys).
- Details of geology, obstructions, services, ground contamination and so on.
- Hand-scabbling of concrete (such as ‘stop ends’).
- Demolition by hand-held breakers of the top sections of concrete piles (pile cropping techniques are available).
- Specification of fragile roof lights and roofing assemblies.
- Processes giving rise to large quantities of dust (such as dry cutting, blasting and so on).
- On-site spraying of harmful substances.
- Specification of structural steelwork which is not purposely designed to accommodate safety nets.
- Design of roof mounted services that require access (for maintenance and so on), without provision for safe access (such as barriers).
- Glazing that cannot be accessed safely.
- Entrances, floors, ramps and escalators not specifically designed to avoid slips and trips during use and maintenance.
- Design of environments involving adverse lighting, noise, vibration, temperature, humidity and draughts during use and maintenance operations.
- Designs of structures that do not allow for fire containment during construction.

AMBER

Products, processes and procedures to be eliminated or reduced as far as possible and only specified or allowed if unavoidable. Including amber items would always lead to the provision of information to the principal contractor.

- Internal manholes and inspection chambers in circulation areas.
- External manholes in heavily used vehicle access zones.
- Specification of lip details (such as trip hazards) at the tops of pre-cast concrete staircases.
- Specification of small steps (such as risers) in external paved areas.
- Specification of heavy lintels. (Slim metal of hollow concrete lintels are better alternatives).
- Large and heavy glass panels.
- Chasing out concrete, brick or blockwork walls or floors for the installation of services.
- Specification of heavy building blocks (such as those weighing more than 20 kgs).
- Specification of solvent-based paints and thinners, or isocyanates, particularly for use in confined areas.
- Specification of curtain wall or panel systems without provision for tying or raking scaffolds.
- Specification of a blockwork wall more than 3.5 metres high using retarded mortar mixes.
- Site traffic routes that do not allow for one-way systems and/or vehicular traffic segregated from site personnel.
- Site layout that does not allow adequate room for delivery and/or storage of materials, including site-specific components.
- Heavy construction components which cannot be handled using mechanical lifting devices (because of access restrictions/floor loading and so on).
- On-site welding, in particular for new structures.
- Use of large piling rigs and cranes near live railways and overhead electric power lines or where proximity to obstructions prevents guarding of rigs.

GREEN

Products, processes and procedures to be positively encouraged.

- Adequate access for construction vehicles to minimise reversing requirements (one-way systems and turning radii).
- Provision of adequate access and headroom for maintenance in plant room and adequate provision for replacing heavy components.
- Thoughtful location of mechanical and electrical equipment, light fittings, security devices and so on to facilitate access, and placed away from crowded areas.
- Specification of concrete products with pre-cast fixings to avoid drilling.
- Specification of half board sizes for plasterboard sheets to make handling easier.
- Early installation of permanent means of access, and prefabricated staircases with hand rails.
- Provision of edge protection at permanent works where there is a foreseeable risk of falls after handover.
- Practical and safe methods of window cleaning (such as from the inside).
- Appointment of a temporary works co-ordinator.
- Off-site timber treatment if PPA- and CCA-based preservatives are used (boron or copper salts can be used for cut ends on site).
- Off-site fabrication and prefabricated elements to minimise on site hazards.
- Encourage the use of engineering controls to minimise the use of personal protective equipment.

OTHERS

Some of our challenges.

- Location of existing services.
- Deep excavations.
- Location of pump houses.
- Constructability.
- Remote locations.
- Depth of pipe.
- Competency of Contractors.
HELP... WHAT IF I DON’T KNOW ALL THAT?

Many design projects are too large and complex to be fully understood by one person.

Various people with specific skills and expertise may need to be included in the design team or consulted during the design process to fill any knowledge gaps. Examples include:

- Engineers
- Project managers
- Technical experts
- Occupational hygienists
- Ergonomists / human factors specialists
- Work health and safety experts
Before commencing the design phase, it is important to have an overview of all crucial information needed for decision making.

Developing a clear understanding of the project scope of work, parties involved, legislative and local requirements, processes and requisite information to need to be shared at various stages is very important. This section helps provide an overview of the important questions to consider before getting started.
WHAT INFORMATION DO I NEED TO OBTAIN?

Depending on the type and scope of the project you can reasonably expect the following:

- Pre-construction information
- A client brief, including how the finished project will be used
- Any known information from clients regarding existing structures or land
- Information on the site and ground conditions, any existing structures or operational activities, noise levels, any restrictions on working hours, existing utility services and ecological, environmental or heritage constraints
- Details of the project team (such as the client, other designers, specialist suppliers, contractors, principal contractor, existing users and so on)
- The methods for communicating during the design, including how you will communicate information such as design risks and the level of detail. Methods could include drawings, registers, electronic systems, email and web-based systems
- Information held by others (such as other designers)
- Sustainability objectives, for example: BREEAM, LEED, Estidama, Green Star

WHAT INFORMATION DO I NEED TO PROVIDE?

You are expected to provide information about your design to help protect those constructing and subsequently using or maintaining the building or structure. Here are a few points to consider:

- You need to provide the right level of information to the right people at the right time.
- Information should be project specific and of suitable and sufficient detail to those who need it.
- You should agree with the principal designer how information will be exchanged.
- This may include risks that, due to the nature of the project or design, could be difficult to manage, are unusual or not likely to be obvious to a designer or contractor with the appropriate skills, knowledge and experience.
WHAT INFORMATION DO I GIVE TO WHO?

INFORMATION FOR THE CLIENT
You must provide the client with health and safety information that might affect them or future users, during or after construction, for example, details of how to clean, access or maintain parts of your design.

INFORMATION FOR THE PRINCIPAL DESIGNER
You must provide certain information to the principal designer.
- Information relating to your designs, including any unusual remaining risks and the key assumptions and decisions you have made. This is an important part of the pre-construction information which will be provided to the principal contractor.
- Details of significant risks that are a part of your design. This could include sequencing of erection, any phased handovers or temporary support that is required.
- Information for inclusion in the health and safety file. This might include information which you have gathered during the preparation or in the course of your design that could be of future use to the client or end user in the use, maintenance, future work on, or demolition of the structure.

INFORMATION FOR OTHER DESIGNERS
You must provide the following information to other designers.
- Design loads, where you are responsible for the selection of plant, equipment, materials or civil and structural design.
- Design parameters, where they could affect how others design their elements of the work, for example the need for maintenance access, ventilation, power and waste, sequences and stability.
- Key principles used in your design, such as loads, and stability, principles used for avoiding disproportionate collapse, principles and precautions relating to fire, and assumptions of the ground conditions.
- Design drawings relevant to their designs, with significant risks, such as existing services, clearly identified.
- Specifications, but only to the extent that these will inform their designs.
- Information you have obtained to aid your design that could be useful to others, for example information from structural and asbestos surveys, highways authorities, utility owners, site security history and contaminated land information. Some of this information may have originally come through.

INFORMATION FOR PRINCIPAL CONTRACTORS AND CONTRACTORS
You must provide the following information to the principal contractor and contractors.
- Any relevant assumptions your design makes, such as temporary works or sequencing required where these are not obvious to a contractor with suitable skills, knowledge and experience. For example, you should identify whether a wall will become unstable if it is unsupported while carrying out work nearby or the way in which you have assumed temporary props or platforms will be installed or used.
- Any survey or report obtained as part of your appointment that could be useful to others in the management of health and safety.
- You should consider the user of the information and how best to provide it.
- For example information that a contractor needs on site is probably best shown on drawings and not in specifications or margin notes.

GOOD PRACTICE
Take the designer to meetings to support the constructability of the proposed design.
COMMUNICATION AND COOPERATION

- You must co-operate with the client, other designers and anyone else who provides you with information, in particular the principal designer.
- You should co-ordinate and communicate with others to provide clear information on how to control any remaining risks. This includes temporary and permanent works designers.
- Depending on the nature and extent of design work, there may be a need to carry out design reviews in order to focus on areas of the design where there are health and safety risks requiring resolution.
- On projects where more than one contractor is involved, the principal designer should take the lead in managing a review process.
  - For example, they may ask you to review your design when a subsequent designer or contractor asks for a change. On smaller projects these reviews could be part of normal project meetings.
- Communicate with those that you need to not those that you don’t need to.
In this section we will look at how the successful use of design risk workshops resulted in the delivery of robust design solutions that added value to the project.

Health & Safety processes in design range from maintaining Designer’s Hazard Records to maintaining Hazard Warnings, and effective communication of design and risk control information at the preliminary stages to timely post construction review.
COMPLETING OUR PROCESS

Effective communication and documentation of design and risk control information between all persons involved in the phases of the lifecycle is essential for the safe design approach.

- Understand the scope of work
- Undertake design risk assessment during and through design process
- Identify significant project specific hazards remaining
- Utilize required forms for particular business
- Only use forms that are approved unless there are client specific requirements
- Complete the forms in full
- Transfer information to the relevant parties
- Always put significant hazards and risks onto the drawing block
- Highlight in colour or bold so the hazards and risks stand out

For example, according to the Work Health and Safety Regulations 2011, when it comes to risk management, a procedure is a form of ‘administrative control’ that means a method of work, a process or a procedure designed to minimize risk.
COMPLETING OUR PROCESS

Health & Safety
Designer’s Hazard Record

Hazard Warnings

Hazard Warnings
A1 WORKING IN A CONFINED SPACE - THE TANK HAS CONSTANT ABNORMALLY HIGH LEVELS OF N2.
B1 THE TUNNEL LINING IS REPORTEDLY ONLY 1 OR 2 INCHES THICK AND IS POSSIBLY IN A DELICATE STATE.

For more detailed information please refer to the designer’s H&S hazard record.

Everyday or low risk hazards have not been indicated on this drawing. Where they have hazards that should be obvious to a competent contractor.

Should any additional hazards be identified the contractor should notify all the relevant project team members.
The effectiveness of safety in design should be evaluated at the completion of construction to enable identification of the most effective design practices or innovation that could be used on other projects.

The review could involve a post construction workshop attended by all relevant parties and include the following information:

- Post occupancy evaluations for buildings
- Defect reports
- Accident investigation reports
- Information regarding modifications
- User difficulties
- Deviations from intended conditions of use

A designer can be a company or individual
EXAMPLES OF GOOD PRACTICE TO ADOPT

- Eliminate hazards at design stage
- Review design at concept stage
- Have you design peer reviewed
- Develop good working relationships
- Ensure you understand the scope of work
- Undertake an early site visit – if required
- Hold regular design meetings
- Verify design changes – including VO’s
- Communicate with those you need to communicate with
- Ask for photographs of the location to visualise the wider challenges of the design
- Complete risk assessments this is a continual process
- Obtain any preconstruction information to assist with design
- Provide the right information to the right people
- Transfer the right information at the right time
- Use building information modelling (BIM)
- Add risk information to the drawing
- Make sure you are using the latest design standards
- Remember not everyone is a designer
- Verify any design change
- Be innovative
- One size doesn’t fit all
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