Annex B

FACT SHEET

DESIGN FOR SAFETY IN BUILDINGS AND STRUCTURES

OVERVIEW

In line with the Workplace Safety and Health Act (WSH Act) and framework, reducing risk at source is one of the components to improving construction safety. To address risk at source for a construction project, there is a need to look at who creates the risk and address the issue from there. While the WSH Act imposes duty on the occupiers of worksites, employers and principals to address safety and health risks during the construction stage, the risks inherent in the design of a building or structure also need to be addressed and means to mitigate the risks identified.

2 To assist the stakeholders in the construction industry to address risks at source, the WSH Council Construction and Landscaping Committee has worked with the Ministry of Manpower to develop the Guidelines on Design for Safety in Buildings and Structures which provides the framework and process to address risks at the design and planning stages of a construction project.

3 Design for Safety in Buildings and Structures (or Design for Safety, in short) is about identifying and eliminating occupational safety and health hazards at the design stage or controlling risks, as early as possible, in the planning and design of buildings and structures. Design for Safety does not address methods to make construction safer but how to make a building/structure safer to build, use, maintain and even for safe demolition.

WHAT DO THE GUIDELINES COVERED?

4 The guidelines serve to assist key stakeholders on the process of Design for Safety and the transfer of vital health and safety information along the construction process chain. To facilitate this, duties of the various stakeholders, i.e. clients, designers, project safety and health co-ordinators and main contractors are specified.

5 To ensure that the design is safe, a systematic design review approach is introduced in the project flow. A safety & health review committee, convened for the project, should consist of the main key stakeholders, such as the client, design engineer, architect, Project Safety & Health Coordinator and main contractor if he is on board already.

Designer

- Depending on the scope of works required, a professional engineer or an architect is required to be responsible for the design under the Building Construction Act regulated by the Building and Construction Authority.
- A competent designer therefore should:
    - Have relevant qualifications as required by the Professional Engineers Board or the Board of Architects; and
    - Have safety and health experience.
- In line with the WSH Act, the person who creates the risk must be responsible to mitigate it. This is applicable to the designers (architects and engineers), who should ensure that the risks created as a result of their design, be reviewed through a systematic process and the resultant mitigated risk be passed to the contractor to ensure proper management.

- In specifying the design of a building or structure, the designer should understand how the building or structure can be constructed, cleaned, maintained, and decommissioned or demolished safely. He must therefore study the design and look at risks to those carrying out the proposed works and others affected by it, such as the public or people using the building or structure in the future.

Project Safety and Health Coordinator

- The Project Safety and Health Coordinator should follow through with the project from the design stage, to the construction stage until the handover to the client for maintenance.
- As such, the Project Safety and Health Coordinator should be on-board the team as early as the concept design stage so as to facilitate the design review.
- The duty of the Project Safety and Health Coordinator is to:
    - Facilitate the process to involve all stakeholders to review the design and mitigate the risks;
    - Maintain records of safety and health issues arising from the Design Review Process and actions taken; and
    - Ensure the relevant safety and health information is passed on to the contractor for his tendering and work purpose.

- The Project Safety and Health Coordinator should not be in charge of safety and health at the site, nor should he take over the safety and health responsibilities of the designer and the contractor.
- However, he should ensure relevant information on safety and health is passed on to the designers, contractors and all other relevant stakeholders at the appropriate time.

Client

- The client first fulfills his role by choosing a competent coordinator and designer to undertake his project. The client must demonstrate that he has checked the competence of the coordinator and designer.
- While the client specifies the type of construction and materials required for the project, he has to be advised by the coordinator and designer on the safety and health aspects of the design. This does not mean the client is limited to making choices that limit the creativity of the designer, but all risks and hazards arising from the design should be mitigated.
- As such, it is vital that the client participates in the Design Review Process so as to be kept informed on the basis of the design and other important design or safety decisions.
- The client should also be advised on the time required for the completion of the project. Sufficient time must be allocated to address risks by implementing suitable control measures. The time allocated for the project should be deemed sufficient by the designer and coordinator and agreed by the contractor when tendering for the project. This should be supplemented by some form of project planning by any stakeholder to show the practicality of the time frame.
- The client should also provide relevant information that is needed by the project team to enable them to carry out their duties properly at different stages of the project.
- When appointing a contractor for the project, the client must select the contractor based on some form of assessment based on both the price and quality. BCA's Price Quality Method is one method that could be used.

Main Contractor

- Main contractors, being responsible for the planning, management and co-ordination of construction works, play a critical role in ensuring that

hazards identified, both prior to and during the actual construction works, are properly addressed.

- Where identified hazards or risks are not eliminated/mitigated at the design phase, the residual risks must be addressed and managed by the main contractors and sub-contractors during the construction phase.
- To enable the effective management of safety and health during the construction phase, it is essential that relevant information pertaining to risks identified during the design stage be provided to main contractors.
- Where possible, main contractors should be involved in identifying and through design mitigating the occupational safety and health risks at the concept or detailed design phase, e.g. a main contractor may be involved in the detailed design phase of a 'design and build' project.
- The main contractor must be competent to carry out the work that he is engaged to do in a safe manner. In addition, the main contractor should ensure that sub-contractors and designers engaged to carry out the works are competent and adequately resourced.
- The main contractor should, in discussion with sub-contractors carrying out the works, take reasonable steps to ensure that risks identified are properly managed.
- He should also ensure that all sub-contractors are provided with the required information to enable them to carry out the works safely.
- Upon being awarded the contract, the main contractor should arrange with the Project Safety and Health Coordinator along with the designers for temporary works, specialist designers, etc. to carry out a design review prior to commencement of works.

6 To assist the stakeholders in reviewing the design for safety and health risks, a risk management process called GUIDE is recommended in the

guidelines. With GUIDE, the stakeholders have a systematic process whereby the risks of the design are highlighted, reviewed, addressed and recorded.

7 The Guidelines also provide examples of occupational safety and health hazards, commonly present in the various stages of a building's lifecycle.

BENEFITS FOR EMPLOYEES AND EMPLOYERS

8 Some overseas studies have shown that a fairly large percentage of construction accidents could have been eliminated, reduced, or avoided by making better choices in the design and planning stages of a construction project. Addressing construction safety in the design and planning phase, therefore, can have a substantial impact on reducing injuries and the cost associated with safety related project delays.

9 It is often cheaper and more practical to address risks at the design or planning stage, rather than making elaborate and costly changes to the building later in the building's lifecycle when the hazards become real risks to building's owners, users, employees and businesses.