



Considerate Approach in Design and Construction for Safety

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Presentation Outline

1. Background
2. Basic Principles and Concepts of Safe Design
3. Examples









Duty of employer under OSHO

Provide and maintain :

1. safe plant /system of work;
2. access and egress;
3. working environment;
4. use, handling, storage and transport of plant and substances; and
5. information, instruction, training and supervision



Duty of occupier under OSHO

- Any degree of control on the premises or workplace.
- Ensure the safe and health of
 - ☐ The premises
 - ☐ The means of access to and egress
 - ☐ plant or substances



Major Stakeholders of Property

- Developer
- Major landlord + landlords
- Tenants
- Body Corporate
- Facility/Property Management

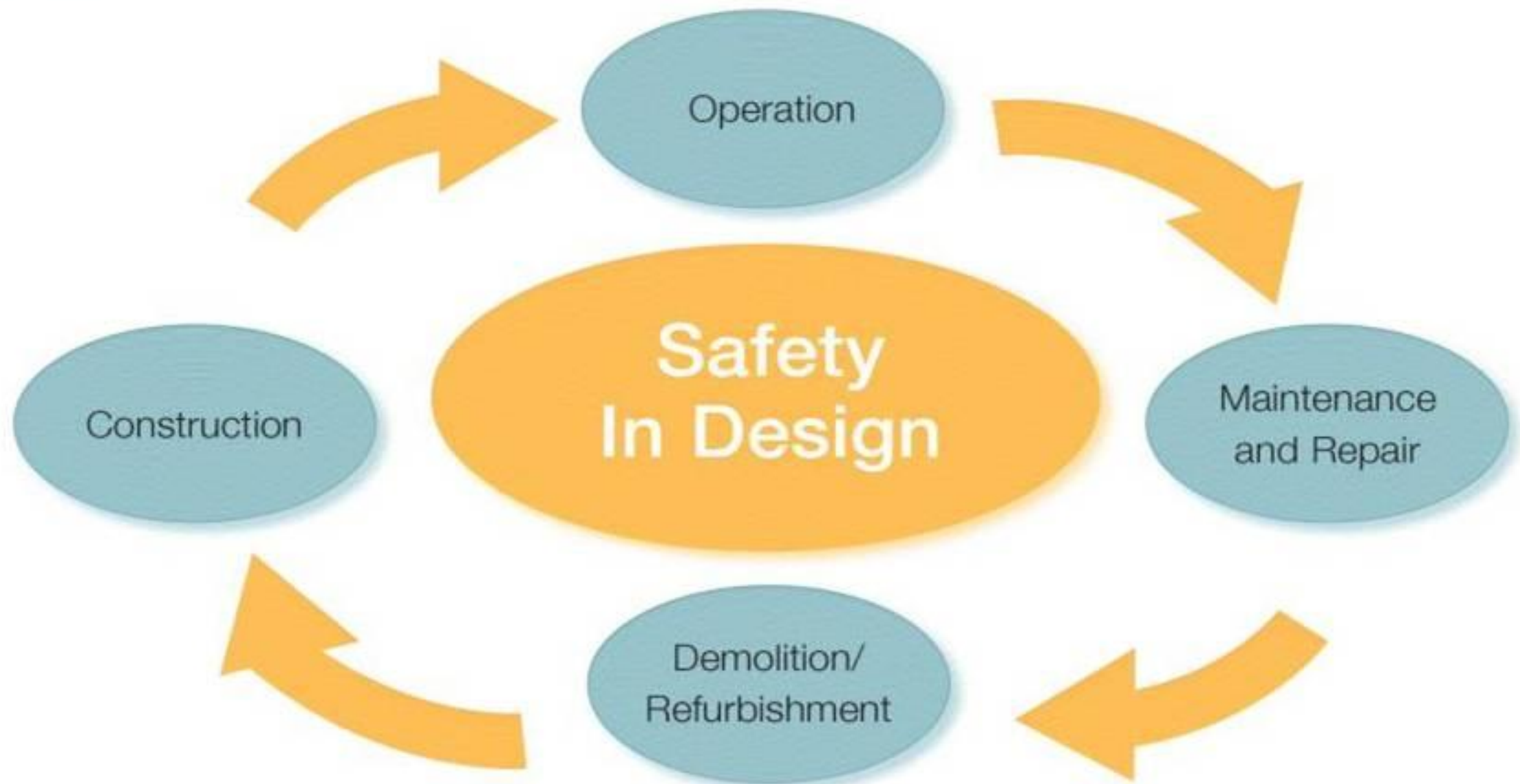


Considerate Approach in Design & Construction for Safety

Safe design, or safety in design,
-is about hazard identification and
-risk management early in the design
phase to eliminate or reduce risk of injury
in construction, use, maintenance and
demolition of structures.



Safe Design Lifecycle





Background

EC Directive 92/57/EEC

1. directive on minimum H&S requirements on temporary or mobile sites
2. places duties upon clients and contractors and introduces role of safety coordinators
3. H &S issues to be addressed from the initial stages of project

Hong Kong situation: 根據勞工處的意外統計數字，涉及維修保養、改建及加建工程和高空工作的工業意外一直佔建造業工業意外的大比例



- European Directive 92/57/EEC;
- UK: Construction (Design and Management) Regulations CDM 1994
– >2007
- Places duties upon key members of the project team
- Australia: Safe Design



Objectives of CDM Regulations

1. Protect OSH of people in construction , and others who may be affected by their activities;
2. Require a *systematic management* approach from concept to completion: hazards must be identified and eliminated where possible and the remaining risks reduced and controlled;
3. Reduce risks by “*safe design*” during construction and thought out the life cycle of the structure.



General principles of prevention for CDM

Every person shall

1. take account of the **general principles of prevention** in the performance of those duties during **all the stages** of the project in relation to **the design, planning and preparation of a project**.
2. ensure so far as is reasonably practicable that the general principles of prevention are applied in the carrying out of the construction work in relation to the construction phase of a project.



NATIONAL PRIORITIES

1. Reduce high incidence/severity risks
2. Improve the capacity of business operators and workers to manage OHS effectively
3. Prevent occupational disease more effectively
4. Eliminate hazards at the design stage
5. Strengthen the capacity of Government to influence OHS outcomes



SA- Applies to:

- ☐ ☐ **clients, designers,**
- ☐ ☐ **persons with control of a construction project or work,**
- ☐ ☐ **persons engaged to undertake construction work and**
- ☐ ☐ **construction sites**



5 Safe Design Principles in Australia

1. Control or Influence

Responsibility for safe design rests with parties or persons in control or having influence over the design of products, items or systems of work;

2. Lifecycle of Designed-Products

Apply a lifecycle approach to the safe design of designed products;

3. Systematic Risk Management

Implement a systematic risk management process;

4. Knowledge and Capability for Safe Design

Demonstrated capability, or accessed by, any designer or person with control and influence over safe design; and

5. Key Information Transfer and Feedback

Reciprocal transfer and feedback of information to all involved.

Duties of Designers of Buildings and Structures-Vic

Performance not prescriptive duty:

A person who designs a building or structure or part of a building or structure who knows, or ought reasonably to know, that the building or structure or the part of the building or structure is to be used as a workplace must ensure, so far as is reasonably practicable, that it is designed to be safe and without risks to the health of persons using it as a workplace for a purpose for which it was designed.



So who is a designer?

“Designer” is any person who

- *Prepares* a design (i.e. drawings, specification, bills of quantities, etc)
- Or *arranges* for any person under his control (including employees) to prepare a design
- Or *others whose decisions affect the way in which the construction will be carried out*



As the design develops so do the designers

- **Concept /feasibility:**
 - Client
 - Architect
 - Local authority
 - Statutory regulators
- **Detailed (design):**
 - Client
 - Architect
 - Structural engineers
 - M&E engineers
 - Transportation engineers, etc



More Designers

- **Construction:**
 - Planners
 - Principal contractors
 - Trade contractors
 - Specialist trade contractors
 - Detailers
 - Specifiers
 - Procurement teams
 - Installers / erectors, etc



Designers can be -

- **Client** - Business case
- **Architect** - Shape & form
- **Consulting Engineer** - Engineering performance
- **Main Contractor** - Construction plan
- **Contractor** - Specific details
- **Trade Contractor** - Particular ways of working



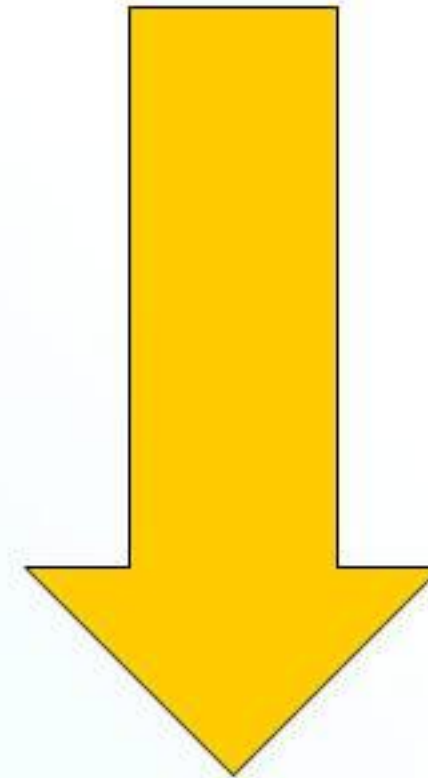
Aim of Safe Design

- Reduction of OSH Risks

- **Avoid**

- **Reduce**

- **Control**





Responsibilities

Designer:

- Eliminate hazards where feasible;
- Reduce risks from those hazards that cannot be eliminated;
- Provide information on residual risks.



Designers

- **Professional qualification**
- **Knowledge of construction**
- **Awareness of relevant legislation**
- **Health and safety design methods**
- **Skills and training of employees**
- **The time allowed**
- **The technical facilities**
- **Method of communicating issues**
- **Dealing with remaining risks**
- **Advice of the Planning Supervisor**



What do designers need to consider?

- Design is making decisions / making choices

Each choice has merits in

- Aesthetics
- Cost
- Buildability
- Programme
- Environmental
- Health & safety



Some of the questions being asked

- **Roofs**
 - With regard to roof maintenance, where does the design accommodate access issues.
- **Glazed canopies**
 - How does the design address cleaning of the glass roof screen.
- **Risk Assessment**
 - What design risk assessments were carried out with regard to roof maintenance.
- **Training**
 - What training have designers had to enable them to understand and comply with their CDM duties.



Changes affect Designers - Regulation 11

1. Those able to assess and manage the residual risks has the primary responsibility for risk assessment.
2. Designers will have responsibility for the environment which they have created.
3. Designers are advised to design for all people to the same standard
4. CDM 2007 does not limit the hazards to be considered; it requires that matters specially covered by the Workplace Reg are taken into account.



Changes affect Designers - Regulation 11

5. “Structure-designed as a workplace” refers specifically to the workplace, any person using a structure designed as a workplace will include not only people who work there but others using the structure (usually a bldg)
6. Workplace “in-use” hazards will involve a much wider range of hazards than those encountered in construction.
7. Designers have a duty of care to other affected by use of the structure (eg neighbours or passers-by under Health & Safety at Work Act 1974).



Changes affect Designers - Regulation 11

Examples of categories of types of hazards:

1. Physical environment:
Lighting (operation period),
Noise (EPD requirement-noise barrier),
Vibration (engine room, a/c unit-associated noise),
Temperature (Roof top, adjacent structure-restaurant)
Wetness and humidity (electric fault, rusting, mould)
2. Chemical/biological environment eg. Sanitary conditions, animals, moulds and fungual growths, smoke, dusts and fibres, other contamination/pollution (landfill site, waste treatment plant, hospital))
3. Hazardous systems eg. Electricity, piped gases/liquid hot water and steam (Gas station, chemical plant, container terminal)



Changes affect Designers - Regulation 11

Examples of categories of types of hazards:

4. Normal activities eg. Posture and manual handling, use of vehicles, use of plant/equipment, industrial processes, use of doors and windows, use of lifts/escalators, movable walkway; (related OSH concerns-MH, transportation, fire, transportation by means of ropes and guideways, etc.)
5. Slips and trips eg. Motion on floors/ramps, use of stairs(equal opportunity- the disables (handicapped, blinds, deaf, etc)



Changes affect Designers - Regulation 11

Examples of categories of types of hazards:

6. Working at height eg. Using access equipment-ladders, unprotected edges, adjacent to fragile surface; (proper and safe means of access and egress and working stage/platform)
7. Abnormal events eg. Fire, explosion, falling objects, disproportionate collapse, drowning and asphyxiation, crowding, malicious human intervention .(become city landmark, popular venue for event- Lan Kwai Fong, SOHO, Times Square, Pedestrian Special Zone, etc.- emergency preparedness)



Continuous Documentation

- **The (health and safety) risk register**
 - A ‘live’ document
 - Managed by the planning supervisor
 - Populated by all project team members
 - Regularly re-visited
 - On the agenda at ‘all’ meetings
 - Monitored to demonstrate progress
 - Used as a reminder of outstanding actions
 - A measure of performance

NB Designers cannot avoid their responsibilities (Reg 13).



Discrete Documents

- Pre-construction Health and Safety Plan
- Construction Health and Safety Plan
- Health and Safety File



Discrete Documents – Pre-construction H&S Plan

- **Pre-construction Health and Safety Plan**
 - A record of what designers have identified as key issues
 - The risk register is an important part of H&S Plan
 - To warn potential contractors
 - Part of briefing / tender documents
 - Contractors assessed on their response to H&S Plan



Discrete Documents – Construction H&S Plan

- **Construction Health and Safety Plan**
 - Further develops the Pre-construction H&S Plan
 - Describes how work will actually be done, safely
 - Responds to changes in work scope or timescale



Discrete Documents – H&S File

- **Health and Safety File**
 - Records health & safety critical information for users, modifiers, demolishers
 - Key source of health & safety information for future construction works



Key Provisions of CDM

3 “C”

1. Competence

- (a) appoint or engage a CDM co-coordinator, designer, principal contractor or contractor unless he has taken reasonable steps to ensure that the person to be appointed or engaged is competent;
- (b) accept such an appointment or engagement unless he is competent;
- (c) arrange for or instruct a worker to carry out or manage design or construction work unless the worker is—
 - (i) competent, or
 - (ii) under the supervision of a competent person.



Key Provisions of CDM

2. Cooperation

(1) Every person shall

- (a) seek the co-operation of any other person concerned in any project involving construction work at the same or an adjoining site so far as is necessary to enable himself to perform any duty or function under the Regulations; and
 - (b) co-operate with any other person concerned in any project involving construction work at the same or an adjoining site so far as is necessary to enable that person to perform any duty or function under the Regulations.
- (2) Every person concerned in a project who is working under the control of another person shall report to that person anything which he is aware is likely to endanger the health or safety of himself or others.



Key Provisions of CDM

3. Coordination

All persons concerned in a project on whom a duty is placed by the Regulations shall co-ordinate their activities with one another in a manner which ensures, so far as is reasonably practicable, the health and safety of persons –

- (a) carrying out the construction work; and
- (b) affected by the construction work.



Some Observed Weakness of Designers (UK & Australia)

Australia (Victoria)

- Only half design companies do collect basis information from client or research.
- Many designers are using a first principles approach rather than risk management eg minimising potential for falls for aged care.
- Principal designers are tending not to let other designers have a view of the operational and OHS issues of the final workplace.
- Designers may have a narrow view of OHS- often excludes people on people issues (occupational violence, manual handling)



Some Observed Weakness of Designers (UK & Australia)

UK (HSE)

1. many designers were unaware of their duties under the CDM Regs.
2. Not thinking about safety aspects when it came to maintenance, repairing and cleaning.
3. Not realizing problems they were causing for contractors, trying to manage the risks as a result.



Designer: safe design for marvelous building





Appropriate adoption of competence in design,
and

Partnership in the right approach





Thank You!

Designer competence: Provision of safe means of access and egress, and guardrails to video recording point



Designer competence: hanging mechanism for shopping arcade



Designer competence: hanging device for banner in shopping arcade



Designer competence: guardrails at roof of plant and engine room



Designer competence: manual handling and safe access to planter



Designer competence: Fall arresting system at sound barriers



Designer competence: provision of fall arresting system in maintenance of cover of substation in Sydney



Design Competence: maintenance consideration
Contractor competence: provision of metal scaffold
(proper working platform)



Designer Competence: provision of gondola for maintenance

Contractor competence: adoption of gondola for maintenance



Design Competence: maintenance consideration



Designer competence: Provision of working stage -remind of falling hazard
Contractor competence: adoption of appropriate working method



Designer competence: consideration and use of elevated tower
Contractor competence: adopt of suitable equipment and safe operation



Designer competence: floor slab fall arresting system
Contractor competence: fall protection



Designer Competence: consideration of permanent access-
remind of use of suitable access

Contractor Competence: adopt suitable access



Designer competence: remind of falling hazard

Contractor competence: provision of working stage or fall protection system



Designer competence: remind traffic safety

Contractor competence: implement appropriate control measures



Designer competence: consideration of falling hazard
Contractor competence: provision of working stage-fall protection system



Designer competence: consideration-remind of underground utilities
Contractor competence: adopt the appropriate control measures



Designer competence: anticipated maintenance work at flat roof- working at height (including cleaning)



Designer Competence: anticipated garden maintenance- work on slope



Designer competence: consideration of planter and flat roof maintenance

