



Abu Dhabi EHSMS Regulatory Framework (AD EHSMS RF)

EHS Regulatory Instrument

Code of Practice

**EHS RI - CoP 20.0 – Safety in Design
(Construction)**

Version 2.0

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ACKNOWLEDGEMENTS

With gratitude Abu Dhabi EHS Center acknowledges the great support provided by the Executive Council in facilitating the issuance of Abu Dhabi Emirate Environment, Health and Safety Management System (AD EHSMS) and its implementation at Emirate level.

The issuance of the system would not have been possible without the supervision, diligent efforts and productive recommendations of the AD EHS Center Board of Directors.

These documents (Regulatory Instruments) constitute the efforts of the Abu Dhabi EHS Center and the concerned Sector Regulatory Authorities and who worked together to integrate all relevant regulatory requirements under AD EHSMS. The input, contribution and constructive views of all sectors is highly appreciated.

May these documents prove to be beneficial and helpful in system implementation and in expanding the knowledge in the EHS field.



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Preface

This Abu Dhabi EHS Regulatory Instrument was developed by the AD EHS Center which identified a need for such a Regulatory Instrument to set the minimum mandatory requirements and address the hazards and risks associated with safety in design of buildings and products.

Every effort was made in developing this document so that it does not conflict with existing local or federal laws and regulations. In case of conflict, requirements of the existing local and federal laws and regulations shall prevail, and all concerned are obliged to bring the same to the attention of AD EHS Center for resolution.

This AD EHS Regulatory Instrument has been developed, reviewed and approved, following the process as described in *AD EHSMS Implementation Guideline: The Integration of EHS Requirements in the Emirate of Abu Dhabi*, by the following stakeholders:

- Abu Dhabi EHS Higher Committee;
- Abu Dhabi EHS Center;
- Environment Agency Abu Dhabi;
- Department of Municipal Affairs;
 - Abu Dhabi Municipality;
 - Al Ain Municipality;
 - Western Region Municipality;
- Department of Transport – Abu Dhabi;
- Abu Dhabi Water and Electricity Authority;
- Health Authority - Abu Dhabi;
- Higher Corporation for Specialized Economic Zones (ZonesCorp);
- Center for Waste Management – Abu Dhabi;
- Abu Dhabi Tourism Authority;
- Abu Dhabi Food Control Authority;
- Abu Dhabi Education Council; and
- Other Relevant Federal and Local Competent Authorities.

The AD EHSMS consists of the following hierarchy of documents:

- AD EHSMS RF Elements - Mandatory System Requirements

EHS Regulatory Instruments:

- Standards and Guideline Values - Mandatory EHS threshold and exposure Levels
- Codes of Practice - Mandatory EHS technical requirements – subject specific
- Mechanisms - Mandatory system implementation processes and procedures

Guidelines:

- Technical Guidelines - Non-mandatory guidance on how to implement an EHS Regulatory Instrument
- AD EHSMS Guidance Documents - Non-mandatory guidance and interpretation of an *AD EHSMS RF* concept and/or principle

Further, this document is not intended to conflict with any contractual obligations in effect at the time of its issuance. However, all future contracts shall adhere to applicable requirements stated herein, and existing long term contracts shall be brought into compliance with its requirements as soon as reasonably practicable as stipulated by relevant subject authorities.

This document will be reviewed periodically as part of the continual improvement cycle.

1. Introduction

- (a) This Code of Practice (CoP) obligates those persons or employers that are classed as designers under *AD EHSMS RF – Element 01 – Roles, Responsibilities and Self-Regulation* to eliminate or reduce risk that can arise through construction or end use of a structure or piece of equipment. At each stage of design, designers shall ensure that all foreseeable risks have been identified and analysed to reduce the risk to as low as a reasonable practicable.
- (b) The scope of this CoP covers the construction, operational and decommissioning design of buildings, structures and workplaces. It does not cover product design which shall be designed to the appropriate international or local standards (eg. European Conformity “EC Marking”).
- (c) Designers of operational workplaces / areas shall incorporate ergonomic and material flow considerations.
- (d) Designers’ earliest decisions fundamentally affect the health and safety of construction and operation activities. These decisions influence later design choices, and considerable work may be required if it is necessary to unravel earlier decisions. It is therefore vital to address health and safety from the very start.

2. Training and Competency

- (a) Employers shall ensure that EHS training complies with the requirements of:
 - (i) *AD EHSMS RF – Element 05 – Training and Competency*;
 - (ii) *AD EHS RI – Mechanism 7.0 – AD EHS Professional Entity Registration*; and
 - (iii) *AD EHS RI – Mechanism 8.0 – AD EHS Practitioner Registration*.
- (b) The client shall ensure that a person is competent to undertake the roles and responsibilities are engaged for the project. This shall be done through an examination of the person or entities experience, qualification and resources, both financial and staffing as highlighted in Section 3.3.
- (c) The client shall ensure that each designer engaged has appropriate experience and technical expertise, in relation to the scheme they are engaged for.

3. Requirements

3.1 Definitions

- (a) Designers:
 - (i) designers are those who have a trade or a business which involves them in:
 - 1) preparing designs for construction work and operational design and layout, including variations. This includes preparing drawings, design details, specifications, bills of quantities and the specification (or prohibition) of materials, as well as all the related analysis, calculations, and preparatory work; or

- 2) arranging for their employees or other people under their control to prepare designs relating to a structure or part of a structure.
- (ii) it does not matter whether the design is recorded (eg. on paper or a computer) or not (eg. it is only communicated orally).
- (iii) designers therefore include:
 - 1) architects, civil and structural engineers, building surveyors, landscape architects, other consultants, process design engineers, manufacturers and design practices (of whatever discipline) contributing to, or having overall responsibility for, any part of the design, this includes for example drainage engineers designing the drainage for a new development;
 - 2) anyone who specifies or alters a design, or who specifies the use of a particular method of work or material, such as a design manager, quantity surveyor who insists on specific material or a client who stipulates a particular layout for a new building;
 - 3) building service designers, engineering practices or others designing plant which forms part of the permanent structure (including lifts, heating, ventilation and electrical systems), for example a specialist provider of permanent fire extinguishing installations;
 - 4) those purchasing materials where the choice has been left open, for example those purchasing building blocks and so deciding the weights that bricklayers must handle;
 - 5) contractors carrying out design work as part of their contribution to a project, such as an engineering contractor providing design, procurement and construction management services;
 - 6) temporary works engineers, including those designing auxiliary structures, such as formwork, false work, façade retention schemes, scaffolding, and sheet piling;
 - 7) interior designers, including shop fitters who also develop the design;
 - 8) heritage organizations who specify how work is to be done in detail, for example providing detailed requirements to stabilize existing structures; and
 - 9) those determining how buildings and structures are altered, for example during refurbishment, where this has the potential for partial or complete collapse.

3.2 Designers Duties

(a) Designers shall:

- (i) ensure that they are competent and appropriately resourced to address the health and safety issues reasonably foreseeable to be involved in the design;
- (ii) ensure that the design complies with all applicable legislation and building codes;
- (iii) ensure that clients are aware of their duties;
- (iv) avoid foreseeable risks to those involved in the construction and future use of the structure, and in doing so, they shall eliminate hazards, so far as is reasonably practicable, and reduce risk associated with those hazards which remain;

- (v) ensure internal design and layout is as safe as reasonably practicable, considering process design, ergonomic, material flow, etc;
 - (vi) provide appropriate information about any significant risks associated with the design to relevant persons;
 - (vii) co-ordinate their work with that of others in order to improve the way in which risks are managed and controlled.
- (b) In carrying out these duties, designers need to consider the hazards and risks to those who:
- (i) carry out construction work including demolition;
 - (ii) operate industrial processes / facilities;
 - (iii) clean any window or transparent or translucent wall, ceiling or roof in or on a structure or maintain the permanent fixtures and fittings;
 - (iv) use a structure designed as a place of work; and
 - (v) may be affected by such work, such as customers or the general public.

3.3 Competency Assessments

- (a) It is vital that prior to appointment, all designers are prequalified to ensure that they have the required Health and Safety competencies to undertake the role they are being engaged for.
- (b) Further to the requirements detailed within *AD EHSMS RF – Element 03 – Management of Contractors*, additional competency assessments shall be undertaken for designers.
- (c) The competency assessment shall be specific and in line with the complexity of the project, however shall consider:
 - (i) complexity of the scheme;
 - (ii) size of the scheme;
 - (iii) surrounding neighborhood and existing structure; and
 - (iv) program requirements (eg. fast-track).
- (d) Further consideration shall be given to the people who will be undertaking the design work from within the organisation and their personal experience review to ensure they have appropriate experience and understanding for the role they are being engaged for.

3.4 Preparation of a Design

3.4.1 Planning

- (a) Designers have to weigh many factors as they prepare their designs. EHS considerations have to be weighed alongside other considerations, including cost, fitness for purpose, aesthetics, buildability, maintainability and environmental impact.
- (b) Designer shall take into account the reliability while considering the safety factor for design.

- (c) Designer shall consider the impact of construction and operation on neighbouring structures (if any).
- (d) Designers also need to take account of other relevant EHS requirements.
- (e) Designers shall also ensure that other regulatory requirements are considered.

3.4.2 Design Risk Assessment

- (a) Designers shall avoid foreseeable risks 'so far as is reasonably practicable, taking due account of other relevant design considerations'. The greater the risk, the greater the weight that shall be given to eliminating or reducing it. Designers are not expected to consider or address risks which cannot be foreseen, however, designers shall not produce designs that cannot be constructed, operated, maintained, used or demolished in as far as reasonable practicable is safety.
- (b) Designers shall critically assess their design proposals at an early stage, and then throughout the design process, to ensure that health and safety issues are identified, integrated into the overall design process and addressed as the work progresses.
- (c) Where hazards are identified, designers shall follow the hierarchy of control as identified in *AD EHSMS RF – Element 02 – Risk Management*.
- (d) The designer risk assessment shall typically focus on the following topics listed below:
 - (i) requirements listed by applicable Environmental Impact Assessments;
 - (ii) physical environment (eg. lighting, noise, vibration, temperature, wetness, humidity and draughts);
 - (iii) chemical and/or biological environment eg. sanitary conditions, hazardous materials, smoke, dusts, fibres, and other contamination/pollution;
 - (iv) hazardous systems (eg. gas, electricity, hot water steam, piped gases/liquids, hot surfaces, storage);
 - (v) normal activities (eg. posture and manual handling, use of vehicles, use of plant and equipment, industrial processes, use of doors and windows/glazing, use of lifts, escalators and moving walkways);
 - (vi) routine and non-routine operations;
 - (vii) slips and trips (eg. whilst in motion on floors and ramps, whilst using stairs or escalators, whilst essentially static);
 - (viii) need for emergency shutdown of automatic operating systems (eg. escalators);
 - (ix) working at heights (eg. using access equipment such as ladders, at unprotected edges and adjacent to fragile surfaces);
 - (x) abnormal events (eg. fire, explosion, falling objects, disproportionate collapse etc); and
 - (xi) consideration for the use of the facility and evacuation of the occupants including physically handicapped, pregnant women, and children.

- (e) For temporary employer supplied accommodation and residential cities, compliance with *AD EHS RI – CoP 18.0 – Employer Supplied Accommodation*.
- (f) The designer shall compile a Risk Register and submit the same along with the design to the Building and Construction SRA for approval and issuance of a 'Building Permit'. When compiling the Risk Register it shall be open to the project interested parties for input and resolution and management of issues through the design meetings.

3.4.3 Design Safety Review

- (a) An independent design safety review shall be carried out at two different stages (i) at an early stage and (ii) the second one at the final draft stage. These reviews shall be documented and submitted along with the design for approval (to the relevant Municipality).
- (b) Regular reviews of the design involving all members of the design team shall be undertaken to ensure appropriate consideration is given to buildability, usability and maintainability. When considering buildability, meetings shall include the contractor so that difficulties associated with construction can be discussed and solutions agreed before the work begins. When discussing usability and maintainability, involving the client or those who will be responsible for operating the building or structure will mean that appropriate consideration can be given to the health and safety of those who will maintain and operate the structure once it has been completed.

3.5 Provision of Information

- (a) Designers shall provide information that other project team members or relevant persons are reasonably foreseeable to need to identify and manage risk.
- (b) The information shall be project specific, and concentrate on significant risks which may not be obvious to those who use the design.
- (c) Designers shall also provide information about aspects of the design that could create significant risks during future construction work or maintenance.
- (d) Designers shall provide information on the "Asset Integrity Management Approach", which shall include reliability centred maintenance for the designed life of the structure / facility.
- (e) Significant risks are not necessarily those that involve the greatest risks, but those, including health risks that are:
 - (i) not likely to be obvious to a competent contractor or other designers;
 - (ii) unusual; or
 - (iii) likely to be difficult to manage effectively.
- (f) Information shall be brief, clear, precise, and in a form appropriate for the users. This can be achieved using:
 - (i) notes on drawings – this is preferred, since the notes will then be immediately available to those carrying out the work. They can refer to other documents if more detail is needed, and be annotated to keep them up to date;

- (ii) written information provided with the design - this shall be project specific, and shall only contain information which will be useful to those constructing or maintaining the structure;
 - (iii) suggested construction sequences showing how the design could be erected safely, where this is not obvious, for example suggested sequence for erecting pre-cast panel concrete structures. Contractors may then adopt this method or develop their own approach; and
 - (iv) it is not always reasonably practicable to provide all the information at the same time, particularly when design work is continuing whilst construction work is underway. In these circumstances information shall be released as the design develops, but construction work shall not be allowed to proceed unless all the information necessary for the work to be carried out safely has been provided.
- (g) Designers shall provide information for the EHS file including but not limited to:
- (i) any residual hazards which remain and how they have been dealt with (eg. surveys or other information concerning asbestos; contaminated land; water bearing strata; buried services etc);
 - (ii) key structural principles (appropriate bracing, sources of substantial stored energy – including pre- or post-tensioned members) and safe working loads for floors and roofs, particularly where these may preclude placing scaffolding or heavy machinery there; hazardous materials used (eg. lead paint; pesticides; special coatings which shall not be burnt off etc);
 - (iii) information regarding the removal or dismantling of installed plant and equipment (eg. any special arrangements for lifting, order or other special instructions for dismantling etc);
 - (iv) health and safety information about equipment provided for cleaning or maintaining the structure;
 - (v) the nature, location and markings of significant services, including underground cables; gas supply equipment; fire-fighting services etc; and
 - (vi) information of the structure, its plant and equipment (eg. the means of safe access to and from service voids, fire doors and compartmentalization etc).

3.6 Cooperation and Coordination

- (a) Where more than one designer has been appointed for a project, a lead designer shall be nominated. The lead designer shall be the main focal point and shall manage the design process.
- (b) Designers shall co-operate with the client, and other designers and contractors, including those designing temporary works. This is to ensure that incompatibilities between designs are identified and resolved as early as reasonably practicable, and that the right information is provided in the pre-construction information.

4. References

- *AD EHSMS RF – Element 02 – Risk Management*
- *AD EHS RI – CoP 18.0 – Employer Supplied Accommodation*
- *L144 – Managing Health and Safety in Construction – HSE Books ISBN 978 0 7176 6223 4*
- *www.saferdesign.org*

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