# Guideline – Safety in Design

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** This person will have the power to grant the process owner the authority and responsibility to manage the process from end to end.*

*** Frequency period is dependent upon circumstances– maximum is 5 years from last issue, review, or revision whichever is the latest. If left blank, the default shall be 1 year unless otherwise specified.*

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| ***STAKEHOLDERS*** *The following positions shall be consulted if an update or review is required:* | |
|---|---|
| Manager Engineering & Project Services | Asset Managers |
| Manager Systems & Network Planning | Manager Assets Services |
| Senior Manager Safety, Health and Wellbeing | |

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# 1 PURPOSE

This document provides guidelines to persons involved in the design of Horizon Power's assets about managing the safety of employees and the public via information and advice on eliminating hazards and controlling risks at the design stage.

# 2 APPLICATION

Whenever design work is undertaken to construct new assets, modify or remove existing assets, demonstration of due diligence about safety is required. This must cover the full life cycle of the asset that is created or the remaining life of the modified asset and thought about early in the design stage.

The essential elements covering a designer's responsibility in ensuring the safety of the asset during its life cycle are addressed in this document. It is aimed at achieving Horizon Power's safety values and complying with Western Australian statutory requirements – Western Australia Work Health and Safety Act [10] and Electricity (Network Safety) Regulations [11].

This document does not cover the processes that are required to be established to ensure 'safety in design' is implemented as per this guideline. It does apply to the following activities:

- Projects (big and small);
- Development of Policies, Procedures, Guidelines and Standards;
- Development of Specifications for procurement of Equipment; and
- Contracts with service providers.

# 3 NORMATIVE REFERENCES

## 3.1 Standards

### 3.1.1 Horizon Power Standards

[1]. Asset Class Documents, Pages - Asset Management Frameworks (sharepoint.com)

[2]. *Checklist - Distribution Design Safety*, DM# 5369320

[3]. *Checklist - SCADA Design Safety*, DM# 12503368

[4]. *Manual - Horizon Power Instruction,* available at: Pages - Horizon Power Instructions Manual (HIM) (sharepoint.com)

[5]. *Manual - Switchgear Instruction,* available at: Horizon Power Switchgear Instruction Manual (artefactsystems.com.au)

[6]. *Procedure - Formal Safety Assessment*, DM# 5381710

[7]. *Standard - Electrical Safety*, DM# 2305182

### 3.1.2 Australian Standards

The following standards are available at http://www.saiglobal.com.

[8]. *AS 5577 Electricity network safety management systems*, Standards Australia, 2013

[9]. *AS/NZS ISO 31000, Risk management – Principles and guidelines*, Standards Australia, 2018

### 3.1.3 Other References

[10]. *Western Australia – Work Health and Safety Act*, 2020 available at: https://www.legislation.wa.gov.au/

[11]. *Western Australia – Electricity (Network Safety) Regulations*, 2015 (Amdt 2017 & 2021) available at: https://www.legislation.wa.gov.au/

[12]. *Western Australia – Code of Practice (CoP): Safe design of structures*, 2022 available at: http://www.dmirs.wa.gov.au/

### 3.1.4 Compliance with Standards

Various Standards are referenced in this Guideline. The Standards have reference to the year they were published.

## 3.2 Definitions and Abbreviations

For the purposes of this specification, definitions shall apply as in the relevant Australian Standards (AS 5577 [8] & AS/NZS ISO 31000 [9]) with the addition of a few general definitions listed below in alphabetical order.

**ALARP:** As Low As Reasonably Practicable. The concept that risk shall be managed to a level that is as low as reasonably practicable. This is typically demonstrated through a documented assessment showing that the cost involved in reducing the risk further would be grossly disproportionate to the benefit gained. Good industry practice is considered a baseline for achievement.

**Asset Class Strategies:** A suite of documents for asset classes that justify separate and central analysis on the basis of the risk to Horizon Power. The strategies collect and analyse information on each asset class from across Horizon Power, identify significant issues and risks, and present recommended strategies and actions.

**CoP:** Code of Practice

**Custom Design:** Design drawings and other design parameters developed by a designer that are not directly based on standards approved by Horizon Power (e.g. distribution construction standards).

**Risk:** Risk in the context of this document relates to health and safety risks.

**Standard Design:** Design drawings and other design parameters that have been approved by Horizon Power (e.g. distribution construction standards) for direct application by designers.

# 4 SAFETY IN DESIGN

## 4.1 Concept of Safety in Design

Safety in design is about demonstrating safety due diligence by the designer whilst meeting design objectives (see CoP Safe design of structures [12]). It is the integration of 'hazard identification' and 'risk assessment methods' early on in any asset related design work (see Formal Safety Assessment [6]), to minimise the risk of injury or harm throughout the life of the asset.

Safety in design begins in the conceptual and planning phases with an emphasis on making choices about design, equipment, tools and installation methods. The designer needs to consider how safety can best be achieved in each of the lifecycle phases.

It is part of a wider set of design objectives, including practicability, aesthetics, cost and the functionality of the finally built asset. Safe design is the process of successfully achieving a balance of these sometimes competing objectives, without compromising the safety of those potentially affected by the asset over its life.

## 4.2 Principles of Safe Design

Fundamental principles of safe design are discussed below:

### 4.2.1 Persons in Control

Persons who make decisions affecting the design are responsible for the safety of the design.

This includes people who are directly involved in the design activity such as engineers, as well as those who make decisions that influence the design outcome such as customers, developers, consultants, equipment suppliers, managers, financial controllers and peers.

In the case of shared work, responsibilities should be consistent with the degree of control a person has in the design.

### 4.2.2 Asset Lifecycle

Safe design applies to every stage in the asset lifecycle. Horizon Power's Asset Management System (AMS) model is shown below:

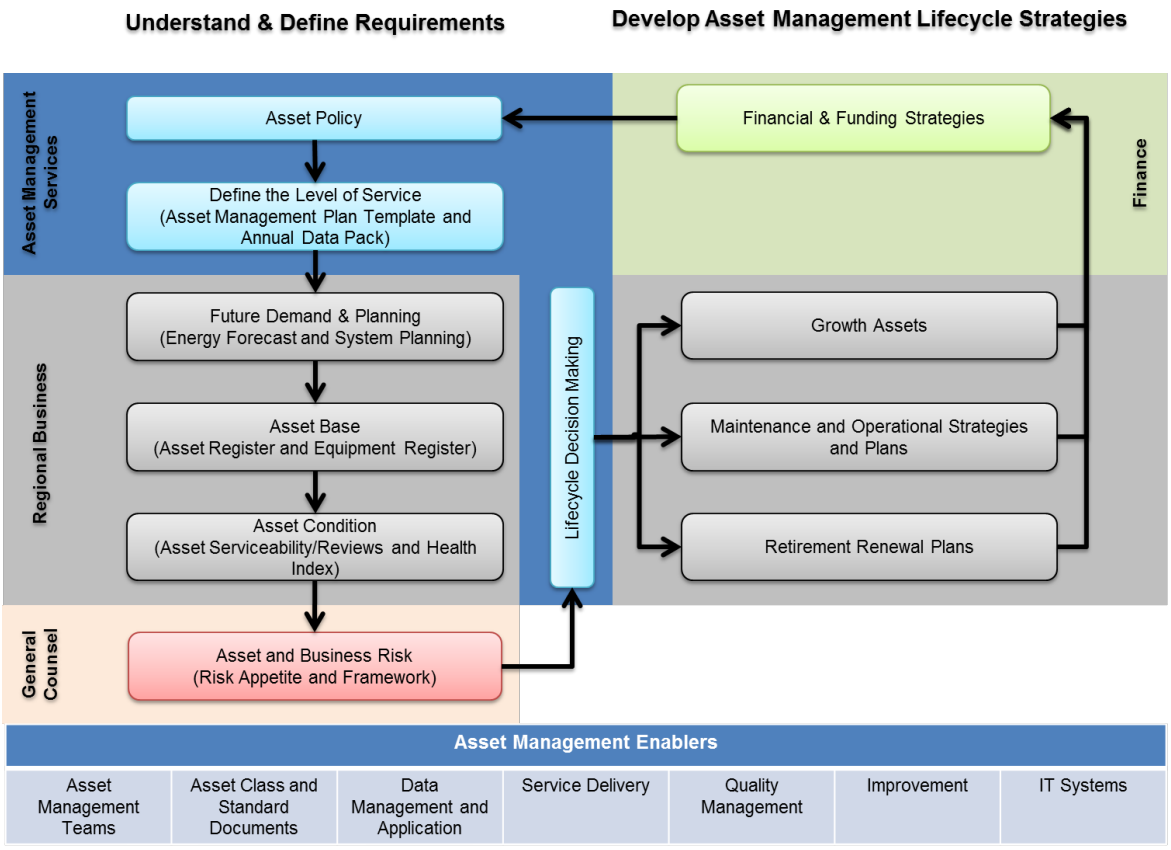


**Figure 1 – Horizon Power's Asset Management System**

Safety in design applies to the life cycle development strategies shown in Figure 1 above, which are:

1) Design - This applies to both growth assets and renewal of aged or defective equipment
2) Installation, maintenance and operations
3) Commissioning, decommissioning and disposal

In the early stages of design there is greater scope of eliminating or controlling hazards and risks that could impact on downstream users in the lifecycle.

The designer must have a good understanding of the lifecycle of the asset being designed including the needs of users and the environment in which the asset is installed. Asset Class Documents [1] define the asset management approach on various asset classes and provide guidance about managing assets during their life cycle.

### 4.2.3 Systematic Risk Management

Systematic risk management is the application of hazard identification, risk assessment and risk control processes to achieve safe design as required by Electricity (Network Safety) Regulations [11], AS 5577 [8] and AS/NZS ISO 31000 [9]. Persons involved in design activities must take steps to:

- Identify design related hazards;
- Assess risks arising from design related hazards [6];

- Demonstrate ALARP;
- Eliminate hazards and control risks;
- Note Residual risks [6];
- Maintain records of risk assessments [6]; and
- Consult with individuals or groups involved in the lifecycle management of asset and other relevant stakeholders.

Identifying and consulting with all relevant stakeholders during the risk management process is most likely to produce workable measures that draw on the knowledge and expertise of those either performing tasks or overseeing the downstream lifecycle processes.

The designer needs to determine if further advice or confirmation is required from relevant stakeholders and consult with them at the earliest possible time. In particular, for complex or non-standard installations, it is important for the designer to liaise with persons or groups with the relevant skills and expertise to ensure safety is maintained throughout the life of the installation.

For projects over a certain value or that satisfy certain criteria, the requirement to hold Safety in Design workshops with all relevant stakeholders, shall be included in the processes for 'Safety in Design'.

### 4.2.4 Safe Design Knowledge and Capability

Safe design knowledge and capability must be either demonstrated or acquired by persons with control over design. In addition to the core design capabilities, the following skills and knowledge must be demonstrated or acquired by a designer or persons with control over safe design:

- Knowledge of applicable safety regulations [11];
- Knowledge of the lifecycle;
- Knowledge of hazard identification, risk assessment and control methods [6];
- Knowledge of technical design standards (e.g. Australian Standards); and
- Ability to source and apply information and data on human capabilities and behaviours.

Various persons with specific skills and expertise may need to be included in the design team or consulted during the design process to fill in the knowledge and experience gaps.

## 4.3 Information Transfer

A Formal Handover to those involved with the next phases of the project lifecycle is critical. The incoming team must be informed of the risks involved, risk control measures and the residual risks.

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.

## 4.4 Review of Safety in Design

The design process shall incorporate a step that covers design review. Additional risks if any, evolving from the review shall be addressed and documented properly prior to passing on the design to the construction phase.

## 4.5 Application of Safety in Design

### 4.5.1 Considerations of Lifecycle Phases

Safety in design applies to the life cycle development strategies shown in Figure 1 under Section 4.2.2, which are:

1. Design
2. Installation, maintenance and operations
3. Commissioning, decommissioning and disposal

The application of safety in design considering the various lifecycle phases are discussed below:

#### 4.5.1.1 Design

Consideration may be given to using standard designs or doing custom designs. Different environmental, network and operating conditions may require different approaches to design.

A thorough knowledge of the network, site conditions and the operating environment where assets are to be installed can be profoundly useful to the designer in understanding the possible safety issues from an installation during its lifecycle.

Detailed and easily understandable checklists that are part of the design process, will facilitate designers to cover the essential elements and aid designers to identify areas where further expertise may need to be sought from different groups or specialists. Checklists shall cover the various matters the designer needs to consider throughout the lifecycle of the asset downstream of the design phase.

Documents such as Checklists Distribution Design Safety [2] and SCADA Design Safety [3] may be made compulsory as part of the design check by both designers and reviewers.

#### 4.5.1.2 Installation, Operations and Maintenance

Lifetime operating conditions of the asset shall be taken into account during the design stage. Access for vehicles, equipment and personnel during installation, maintenance and operations; safe approach distances and sufficient clearances to live parts are some of the issues that need to be taken into account. The safety of workers and the public from hazards related to traffic, flooding, fire, touch and step voltages need to be considered.

Horizon Power's Electrical Safety Standards [7], Instruction Manual [4] and Switchgear Instruction Manual [5] covers the field practices involved in installation, maintenance and operations activities.

#### 4.5.1.3 Commissioning, Decommissioning and Disposal

Safety during commissioning, decommissioning and disposal of assets has to be considered, particularly to employees. When designs are not based on standard designs, there may be particular commissioning requirements depending on the type of asset, which designers need to be aware of.

There may be particular decommissioning/disposal requirements pertaining to health and environmental requirements, depending on the type of asset, which designers need to be aware of (e.g. wood poles).

Horizon Power's Electrical Safety Standards [7], Instruction Manual [4] and Switchgear Instruction Manual [5] covers the field practices involved in decommissioning and disposal activities.

### 4.5.2 Standard / Custom Designs and Specifications

The principles outlined in this clause apply to both standard and custom designs, and specifications.

Relevant Australian standards, industry guidelines and legislation must be reviewed and referenced in all standards and specifications that are developed. Any departures must be noted, explained and compliance verified. Relevant prior safety incidents must be reviewed and incorporated where applicable to prevent recurrence.

All technical terms must be clearly defined and abbreviations explained. Writing must be clear and concise such that a lay person can understand. Ambiguous statements and conflicting information that could confuse the reader must be avoided.

Stakeholders must be consulted and their comments and concerns about safety must be addressed and documented. Risks that have been reduced and eliminated as well as the residual risks must also be documented.

## APPENDIX A REVISION INFORMATION

(Informative) Horizon Power has endeavoured to provide standards of the highest quality and would appreciate notification of errors or queries.

Each Standard makes use of its own comment sheet which is maintained throughout the life of the standard, which lists all comments made by stakeholders regarding the standard.

A comment sheet found in **DM# 2048801** can be used to record any errors or queries found in or pertaining to this standard. This comment sheet will be referred to each time the standard is updated.

| Date | Rev No. | Notes |
|---|---|---|
| 28/08/2023 | 0 | Initial Document Creation |
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