



Electricity Engineers'  
Association

**ASSET  
MANAGEMENT**

2017

A background image showing two workers in safety gear (hard hats and high-visibility clothing) working at an electrical substation. They are standing on a structure, possibly a transformer or insulator, with large electrical equipment and power lines visible in the background. The image is overlaid with a semi-transparent blue filter.

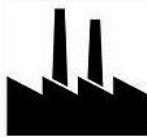
# Safety in Design Guide For the Electricity Supply Industry

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**EEA.CO.NZ**



# Overview of the NZ Electricity Sector



**5 main generators** producing 95% of NZ electricity

+

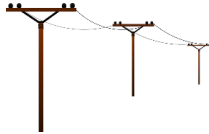
**Other smaller and independent generators**

(8 connected to the grid)



**1 grid owner**

Transpower



**29 regional distribution networks**



**22 retailers**

Many of which also generate electricity



# EEA Services

Health & Safety

Asset Management Leadership

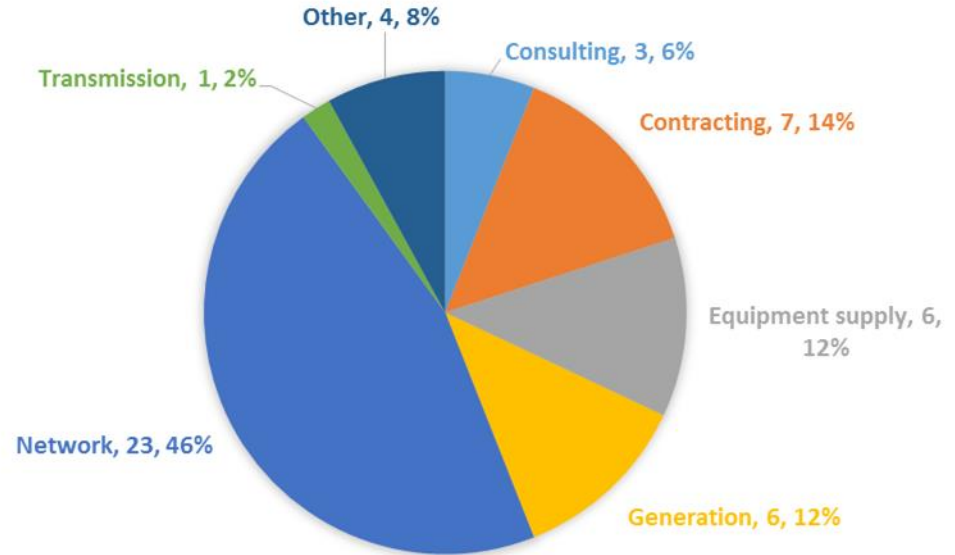
Good Practice Guides

Standards & Regulations

Professional development

Conferences & Forums

## CORPORATE MEMBERS - BUSINESS CATEGORY



# Guide Development

## Steering Group

- Mike Whaley (Powerco)
- Norman Geary (Meridian Energy)
- Johan Hendriks (Alpine Energy)
- Andrew Renton (Transpower)

Note: Led from an engineering and AM team

## Requirements

- Scalable
- ESI specific
- Generic and flexible for different users (i.e. distribution, generation etc)
- Practical to use
- Address cultural as well as technical issues



# Guide Development

## Objectives

Assist electricity businesses to develop processes which:

- Provide designs that are safe
- Document design decisions
- Continuously improve the safety of designs
- Meet statutory obligations

Targeted to operational and maintenance workers, construction managers, project managers, safety professionals, executives, designers and engineers.



# Guide Development

## Development Process

- Scoping (Jun 2015)
- Tender process (Nov 2015)
- Guide drafting (Nov – April 2016)
- Consultation Workshop (March 2016)
- Industry consultation on draft (April – July 2016)
- Post Consultation review (July - Sep 2016)
- Approval (Sep 2016)
- Publication (Oct 2016)



# Guide Structure

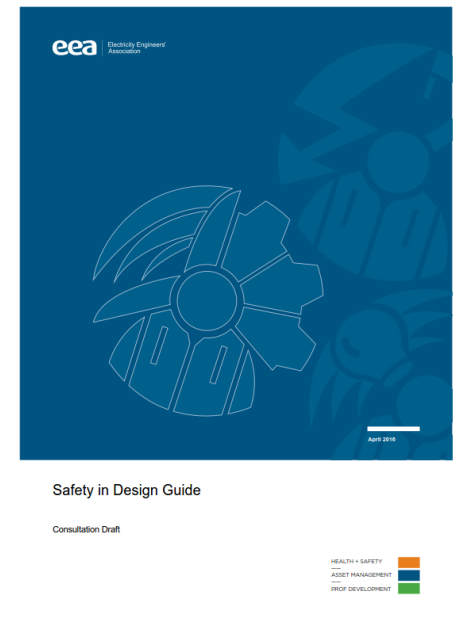
Part A: An introduction

Part B: A general overview of SiD

Part C: SiD Framework

Part D: Lifting Performance in SiD

Part E: Supporting Information (Appendices)



# Sid Framework – Enablers

- Leadership
- Awareness and Capability
- Design Standards
- Assurance

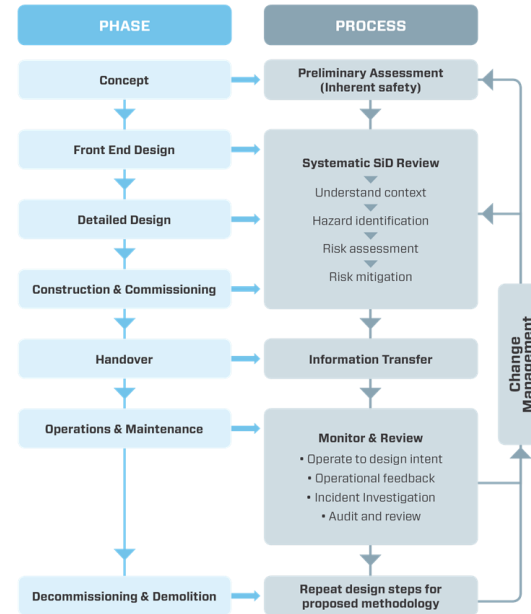
Activity	Board	Executive Leaders	Technical (engineering and safety)	Project Managers
Routinely ask for progress/performance/inclusion of SiD				
Hold the executive accountable for maintaining their obligations				
Ensure adequate funding and support is available for SiD requirements				
Incorporate adequate technical approval into business case approval processes				
Clearly define SiD obligations for outsourced providers				
Provide adequate resources to undertake SiD				
Establish KPIs and objectives for SiD				
Ensure assurance programmes (audits etc.) include SiD				
Maintain training and capability of teams for SiD				
Approve design changes based on SiD requirements				





# SiD Framework - Process

- Preliminary Assessment
- Systematic Review
- Information Transfer
- Monitor and Review
- Change Management
- Decommissioning and Demolition



# Lifting Performance

## Implementation Questions

- 1) Who should be the overall owner of the SiD process ?
- 2) Who should lead the development of the SiD process ?
- 3) Who should be the custodian of the SiD process ?
- 4) How should effectiveness of SiD be measured ?
- 5) What are the linkages with other processes ?
- 6) What structural boundaries does it cross ?
- 7) Who will have authority over critical decisions about safety in design ?



# Tools

## **Routine Tools**

Inherent Safety Assessment  
Field Checklist  
Hazard Identification Review (HAZID)  
HAZID Guidewords  
Risk Registers

## **Specialist Tools**

Hazard and operability study  
Safety Integrity level review  
Failure modes and effects analysis  
CHAIR study  
Bow tie Review  
Human factors review



# Running a Successful Review

**Design Sections  
(Nodes)**

**Attendees**

**Facilitation**

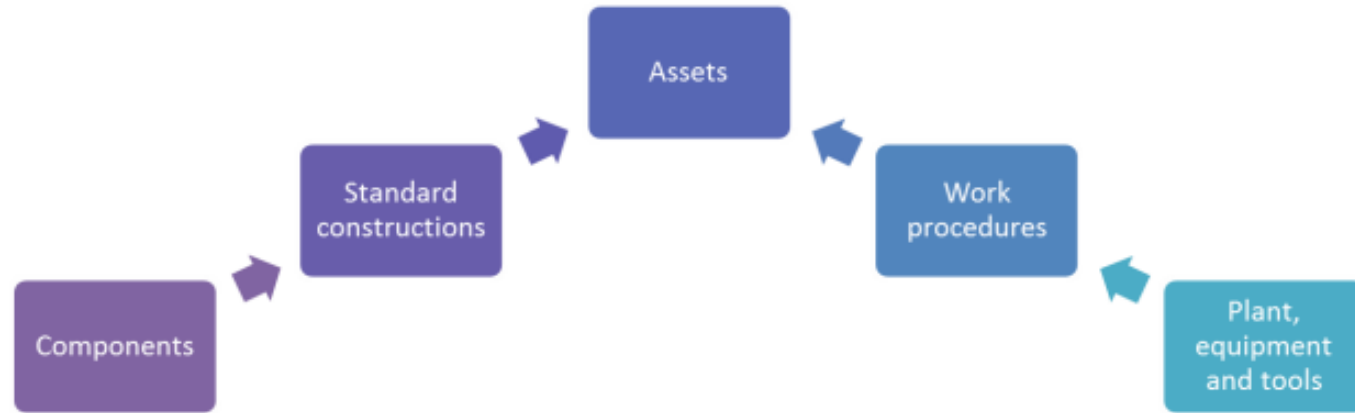
**Information availability**

**Clear Terms of Reference**

**Time Use**



# Case Studies



**Chain of Safety in Design**



Hazard description	Design element type	Example design element	Applicable?	Example explanation for HAZID
Falling while accessing a pole from pole steps	Components	Pole step design	Yes	Pole step design can change the pole step strength, quality, grip and reduce exposed sharp edges
	Standard constructions	Pole standard construction	Yes	Pole steps could be eliminated, the spacing could be reduced or positions optimised for accessing pole equipment
	Assets	Line design	Yes	The overall design of the line will influence the methods which can be used to access structures.
	Work procedures	Pole climbing procedure	Yes	The procedure may influence the component and standard construction design. It specifies whether the pole steps should be used for specific tasks, within which conditions and with which controls.
	Plant, equipment, tools	N/A	No	Use of a bucket truck would eliminate this hazard however that is a work procedure
Pole falling	Components	Pole design	Yes	Applying appropriate assessment during product approval and quality control during procurement and logistics
	Standard constructions	Pole standard construction	No	The selection of the appropriate pole size is determined in the line design
	Assets	Line design	Yes	Ensuring that pole maximum loads are not exceeded
	Work procedures	Stringing procedure	Yes	Ensuring that pole working loads are not exceeded during construction
	Plant, equipment, tools	N/A	No	

#### Example HAZID Elements



# Questions and Comments?

[Guide available for download from the EEA website](#)

