Electricity Engineers' Association

ASSET MANAGEMENT

Criticality Guide Working Group

UPDATE JUNE 2018

EEA.CO.NZ

Background Context

- EEA AHI Guide
- Great Britain DNO Common Methodology
- Commerce Commission Open Letter

Why are we doing this?

- Good asset management practice should consider both health and consequences when choosing interventions, i.e. be risk based.
- The Commerce Commission is encouraging the industry to adopt a criticality (risk) based approach to asset management and may in time require reporting on this.
- To address feedback received following issue of the health indicator guide.

What is criticality?

DNO Common Methodology

Criticality Index	This is a framework for collating information on the Consequences of Failure of distribution assets and for tracking changes over time. The Criticality Index is a comparative measure of Consequence of Failure. For a particular asset, the Criticality Index is provided by:- • the location of the asset within the Criticality Index Bands; and • the Average Overall Consequence of Failure, for the relevant Health Index Asset Category

FMECA

Criticality = Probability x Severity

Recap - EEA AHI Output

H5	As new condition – no drivers for replacement
H4	Asset serviceable – no drivers for replacement, normal in service deterioration
H3	End of life drivers for replacement present, increasing Asset related risk
H2	End of life drivers for replacement present, high asset related risk
H1	Replacement recommended

Figure 1: EEA Asset Health Indicator (AHI) Scale

Recap - DNO Common Methodology Output

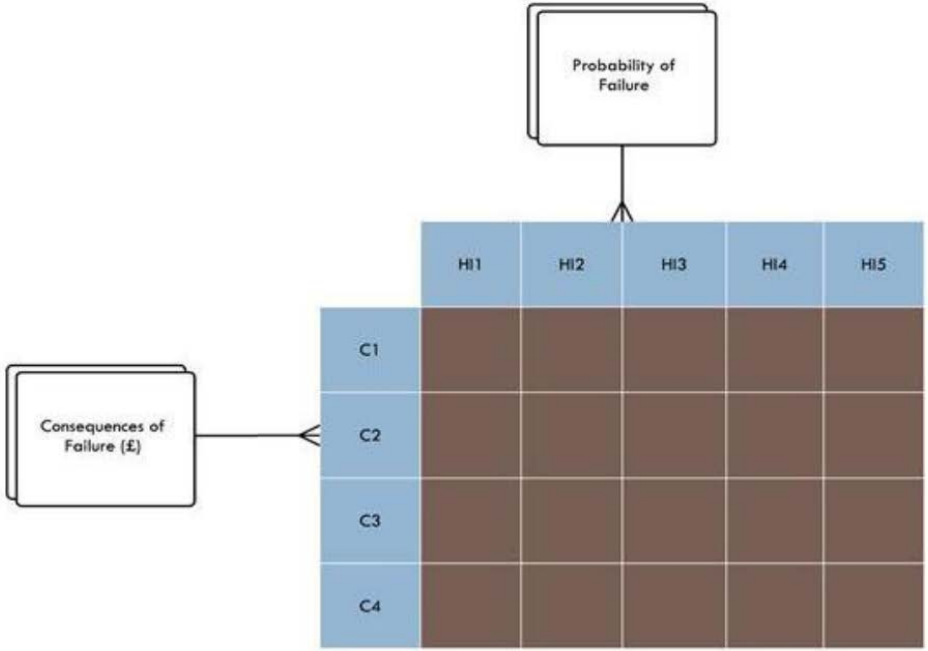

FIGURE 2: RISK REPORTING MATRICES

Characteristics

It is proposed that that a future EEA asset criticality guide should have the following characteristics:

- Compatible with the EEA asset health indicator guide,
- Be simple to apply, yet consistent with more complex quantitative methodology's
- Provide useful asset management insight for appropriately prioritising and quantifying required investment.
- Be acceptable to both the EDB community and the Commerce Commission as a framework for disclosing the combination of asset health and criticality (such as a risk reporting matrix).
- Be potentially upwardly compatible with commercially available or home grown fully quantitative approaches.

Options

1. Develop a NZ quantitative methodology similar to the DNO Common Methodology.
   a) Complex…… Difficult and time consuming
   b) Cut down/simplified….. Compromised
   c) Implementation requires software systems…. who?

2. Develop a Qualitative guide, similar to the AHI guide
   a) Simplistic and coarse,
   b) Not monetised - good…. And bad….

3. Blended
   a) A qualitative framework aligned to work with the AHI guide and form a reporting framework,
   b) A guide for calculating monetised consequences in each of the four dimensions, safety, network performance, financial and environmental, with seeding data for the NZ context.
   c) A logical link between the qualitative framework and the quantitative calculations to provide consistency and a link to 3rd party health and criticality tools.

Advantages of the Blended Approach

- 4-5 Level qualitative approach for those that do not wish to engage in quantitative analysis.
- 4-5 level guide would be compatible as a reporting tool with a wide range of quantitative methodology's and software systems.
- An industry guide for calculating monetised consequences which could have application for a wide range of risk management activity and could be useful for informing the implementation of independent vendor methodology's and software systems.
- Individual EDB's may take their own approach to developing/purchasing quantitative tools.

Qualitative criteria – words and numbers

Qualitative criteria could follow a similar format and approach to that used in the AHI guide

Table 1: Example condition EOL driver rating criteria

Condition EOL driver	H5	H4	H3	H2	H1
Paper degree of Polymerisation (DP)	>950	950 - 700	700 - 500	500 – 200	<200
Tank external condition	As new condition	Some deterioration of paintwork and/or minor repairable oil leaks. Manageable through normal maintenance	Transformer tank, fins and ancillaries have significant corrosion or damage and/or significant oil leaks. Repairs/refurbishment practicable and cost effective	Transformer tank, fins and ancillaries are corroded or damaged to an advanced extent. Refurbishment is either marginally or not cost effective.	Transformer tank, fins and ancillaries are corroded or damaged to an extent where repair or refurbishment is not economic and failure to exclude water or contain oil is likely.

Quantitative - example

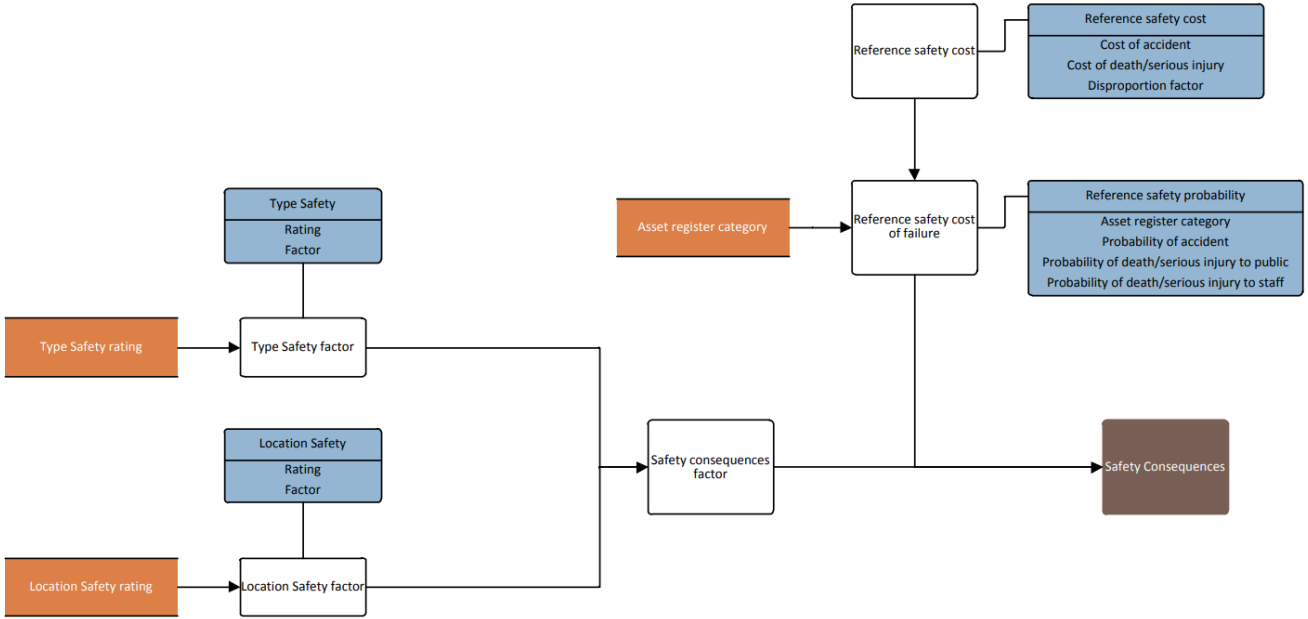

FIGURE 24: SAFETY CONSEQUENCES OF FAILURE

Quantitative Criteria - example

TABLE 215: REFERENCE SAFETY PROBABILITIES

Asset Register Category	PROBABILITY OF EVENT PER ASSET FAILURE		
	Lost Time Accident	Death or Serious Injury to public	Death or Serious Injury to staff
LV Poles	0.000816	0.00003264	0.00001632
6.6/11kV Poles	0.000272	0.00001088	0.00000544
20kV Poles	0.000272	0.00001088	0.00000544
33kV Pole	0.000272	0.00001088	0.00000544
66kV Pole	0.000272	0.00001088	0.00000544
33kV Tower	0.000136	0.00000544	0.0000272
66kV Tower	0.000136	0.00000544	0.0000272
132kV Tower	0.000136	0.00000544	0.0000272
33kV Fittings	0.000544	0.00002176	0.0001088
66kV Fittings	0.000544	0.00002176	0.0001088
132kV Fittings	0.000544	0.00002176	0.0001088
[illegible]	[illegible]	[illegible]	[illegible]

From DNO Common Methodology

Quantitative Criteria - example

TABLE 216: REFERENCE SAFETY COST

Reference safety cost	Value (£)
Lost Time Accident	£9,000
Death or Serious Injury to public	£1,600,000
Death or Serious Injury to staff	

From DNO Common Methodology

Possible Output

Asset fleet ZZZ as of 1 April 2018

		Criticality				
		1	2	3	4	5
AHI	1	0	0	1	1	0
	2	0	1	2	3	0
	3	2	16	5	2	0
	4	6	22	12	4	0
	5	15	32	18	5	0

Numbers in cells indicate the number of assets within each Criticality/AHI band. This could be used for both governance reporting and as a prioritisation mechanism.

Project Approach

- AMG plays role of steering committee, setting direction and making key governance decisions.
- Form working group.
  - Paul Blackmore - Powerco
  - Derek Caudwell - Horizon
  - Richard Steer –Wellington Electricity
  - Daniel Law - Orion
  - Robert McDowell - Transpower
  - Michael Eschenbruch – Genesys Energy
- Engage consultant to act as researcher and document editor.
- We plan to have produced a draft and facilitate a discussion at this form in 2019.