Report to the CIGRE Australian Technical Council

Study Committee SC B2 and Australian Panel AU B2 Activities

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Convenor CIGRE AU B2

AU B2 Report 2025

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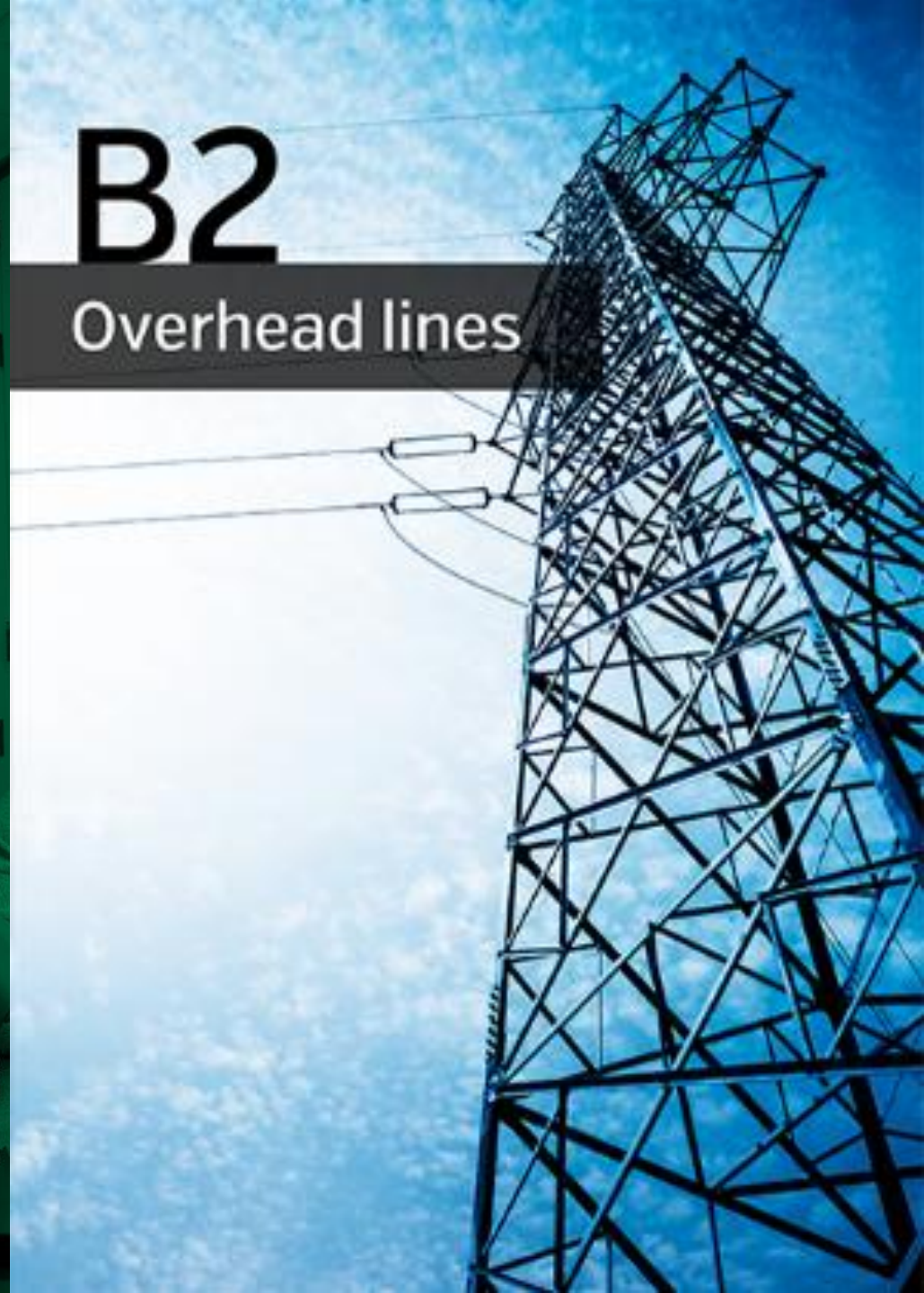
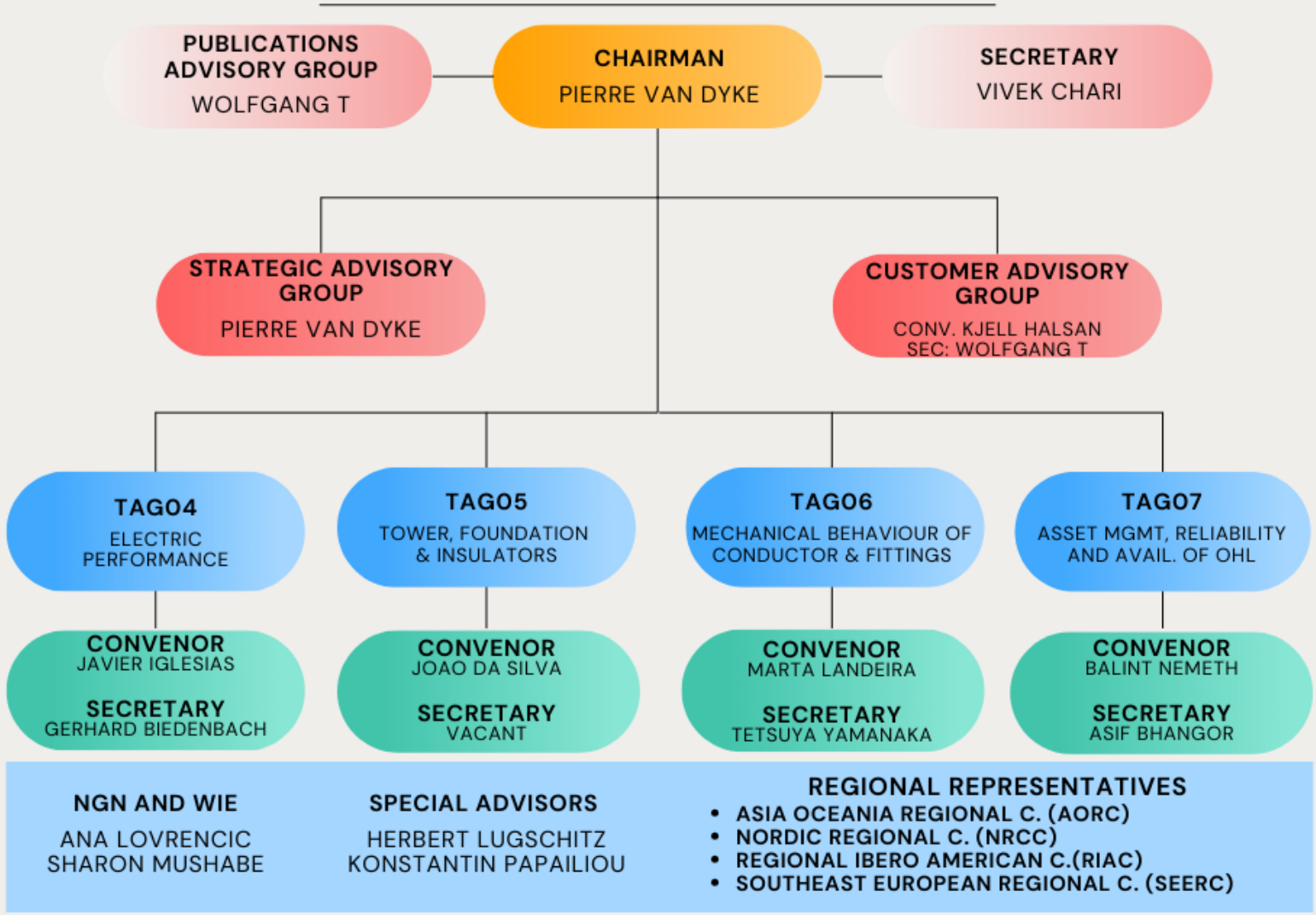
For power system expertise



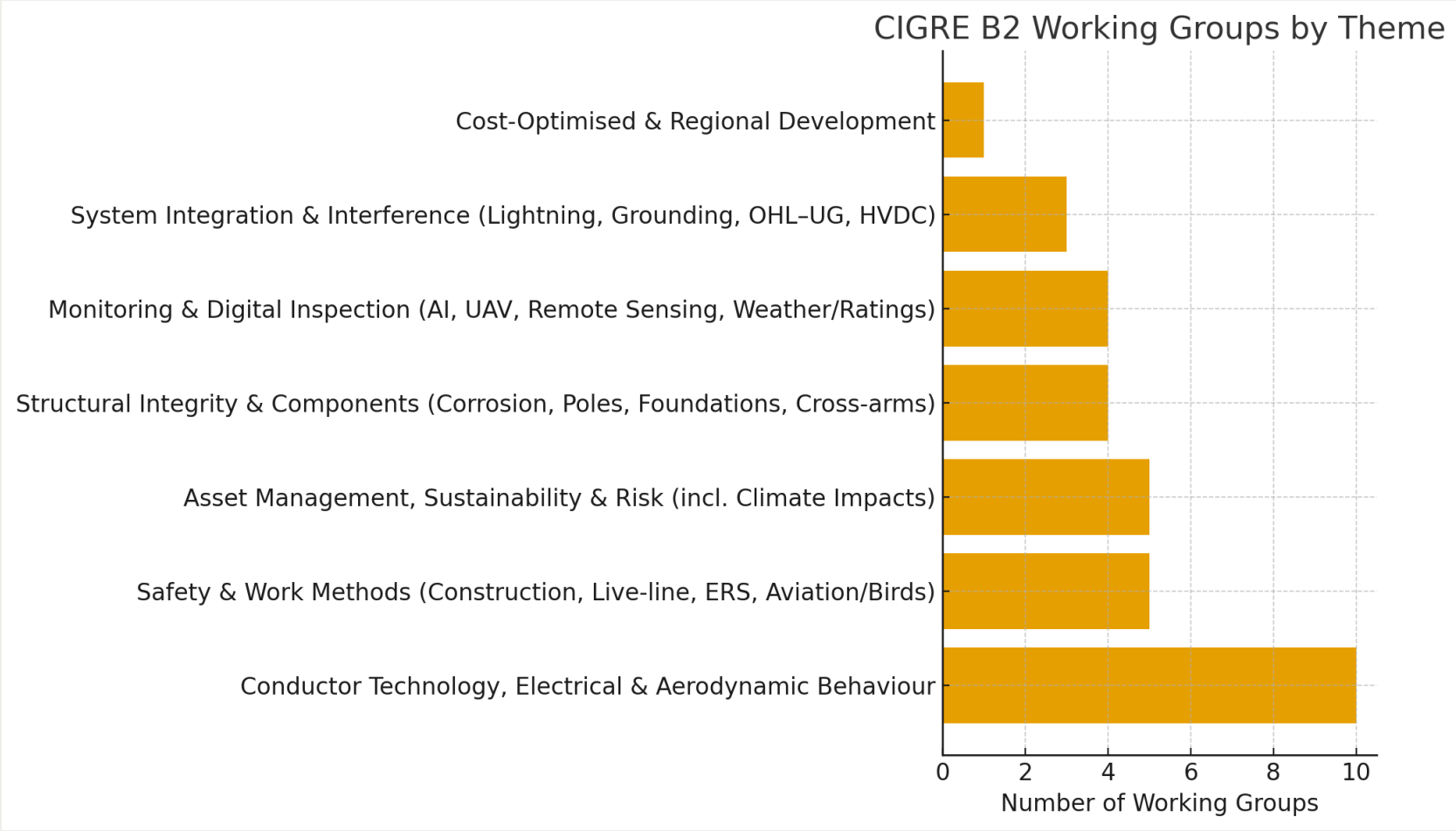
SC B2 THEMES

STUDY COMMITTEE B2 OVERHEAD LINES



SC B2 KEY FOCUS AREA

- 32 Working Groups
- WG Areas



SC B2 MAJOR ACHIEVMENTS

- CSE Papers CSE 035 December 2024
  - Improved model for overhead line audible noise prediction, Oliver PISCHLER, Uwe SCHICHLER, Isobel GREEN, David Borrie

- CSE 036 February 2025
  - Best paper CIGRE Paris 2024: Potential Wildfire-induced Tripping Section Assessment of Transmission Line Based on Tree Identification and Flame Combustion, Linmeng FAN, Enze ZHOU, Lei WANG, You ZHOU
  - Drag coefficient modeling for OHL conductors, S. STEEVENS, E. ULLOA JIMENEZ, J. UNTERFINGER, N. HÖLSCHER, I. GÜVEN, M. PASSMANN

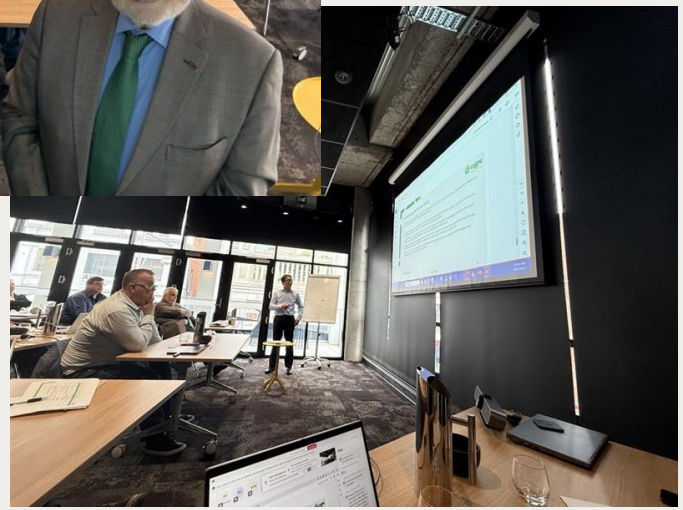
- B2 Green Books in preparation:
  - Dynamic loadings on towers and foundations, 2025
  - Innovative solutions for overhead line supports, expected date of publication: 2026

SC [Panel No.] Working Group NEW MEMBERS Required

- Call for new WG members list
  - B2.94 Inspection after installation, maintenance and end of life of high temperature conductors and fittings
  - B2.96 Composite Insulated Cross Arms for New build and Retrofitted Transmission Line Supports
  - New JWG C4/B1/B2/B4.78 Interference effects between HVDC circuits and nearby metallic infrastructure

Australian B2 Meeting 2025

- No. of Panel Members 32



Overhead Lines – Australian Panel
B2 Technical Session (Adelaide Chapter)

1st September 2025

Convenor: Asif Bhangor
Secretary: Kaween Gunatilaka

Australian B2 Major Achievements

- Provide overview of key issues we are trying to resolve here in Australia?
  - AS/ NZS 7000 update **(URGENT!!!)**
  - Safety in transmission line construction
  - Emergency response
  - Manage risks with low conductor spans (bushfire strategy)
  - New technologies/ materials (composite crossarms and poles, high temperature conductors)
  - Asset management using digitisation/ drone capture/ AI defect assessment

New Build Design Challenges - General

- Australia is experiencing new build in major flood zones for high voltage transmission projects
- Formulating a consistent set of design basis is a challenge due to preferential practices and misinterpretations amongst existing TNSPs' and new Owners/ Operators for **new build** (e.g. Orana, New England)

  Example:
  - *Why load test with 1/0.9 factor in Steel Towers is a common question asked,*
  - *What is the technical requirement if one already considers this in the loads and designs to suit the member capacities including as per AS7000?*
- In addition to the above another (new) issue is "**Flood protection design basis**"

Image: Courtesy Dawn Newspaper, Pakistan

Flood protection design – current provisions

- AS7000 states

6.2.4 Security requirements

Security requirements shall be provided in all designs to prevent or limit progressive or cascading structure failures in the event of collapse or failure of a support structure resulting from any external cause.

6.4 ACTIONS—PRINCIPAL CLASSIFICATIONS

An action *F*, can be either—

(iii) *Accidental actions, i.e. failure containment loads, flood debris loads, avalanches, etc. These relate to the security aspect of the overhead line*

Exceptional ice loads in alpine/sub-alpine regions including unbalanced ice loads can be treated as accidental actions by their nature and/or the structural response as follows:

(A) Static actions which do not cause significant acceleration of the components or elements.

(B) Dynamic actions which cause significant acceleration of the components or elements.

It is usually sufficient to consider the equivalent static effect of quasi-static actions, such as wind loads, in the design of overhead line supports (including foundations). Special attention should be paid to extraordinarily high and/or slender supports.

Design basis for flood protection design

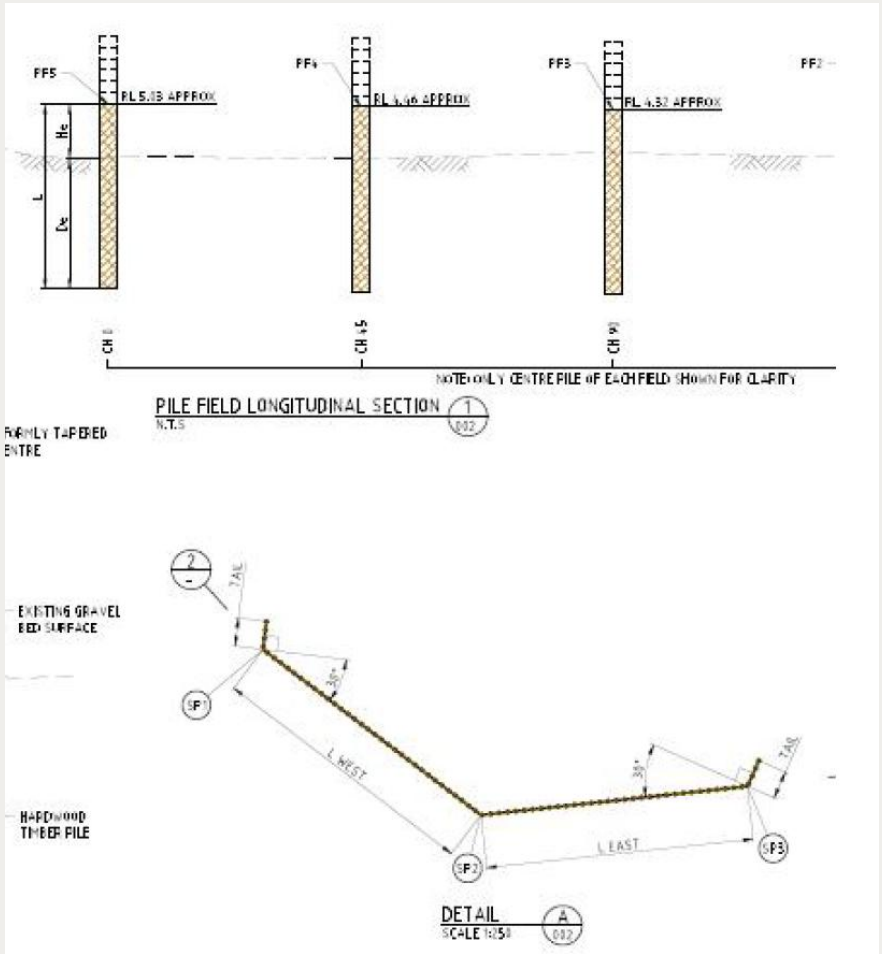
#	Aspect	Criteria	Impact
1	Flood levels	Annual exceedance probability similar to extreme wind events (i.e. 1 in 500 year event?)	• Extensive heights of towers above ground • Large flow velocities leading to large debris load
2	Debris loads	Coincident with Ultimate wind case? What sort of debris loads should be considered? 2 Tonnes? 4 Tonnes? 10 Tonnes?	Large debris loads leading to large moment and lateral impact forces on extensions for towers
3	Stopping distance	What should be the basis of the stopping distance? 25mm? 50mm? 100mm?	Smaller stopping distance means larger impact on the tower extensions
4	Protection mechanisms	Varying protection mechanisms available in the market including *Pile fields (timber/ steel), Stayed impact poles*	• All expensive solutions with little or no O&M data • Large footprint

Hence…Flood protection design basis

- New transmission Owners/ Operators including existing TNSP's do not have a clear and common set of criteria for flood protection design
- International literature including CIGRE is also lacking clear design basis
- No clear guidelines for Climate Change….hence the creation of B2.95 (separate presentation)

Image: Courtesy Alan Delac (Powerlink CIGRE B2 2011 Presentation)

Hence…Flood protection design basis



Images: Courtesy Alan Delac (Powerlink CIGRE B2 2011 Presentation)

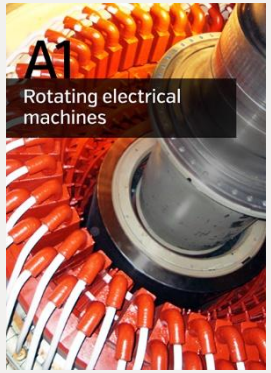
AS7000 to capture flood protection design?

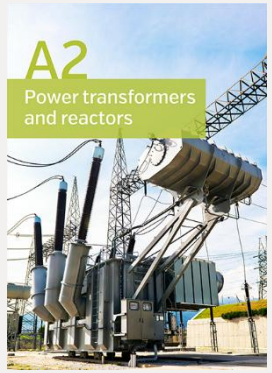
- Can Australia/ New Zealand agree on a minimum set of rules for flood protection design including?
  - Whether consider impact of climate change in flood level height?
  - Coincident flood levels with ultimate wind conditions?
    - Or Servicebility wind coincident with flood levels?
  - Debris impact assessment including stopping distance?
    - E.g what should be the impact load levels? 2T? 4T? 10T?
  - Criteria for carrying out the flow velocity calculations?
    - Engage Hydrologist? Separate assessment criteria?
  - O&M requirements for flood protection design?
  - Emergency response to be considered in the design or not?
  - Risk based assessment to be considered?

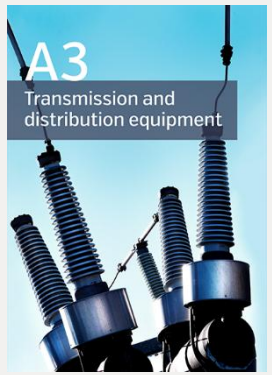
THANK YOU

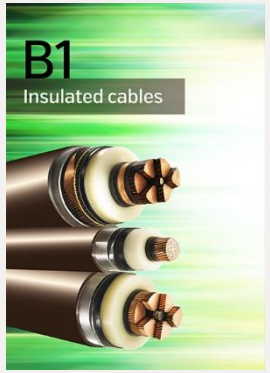
APPENDIX

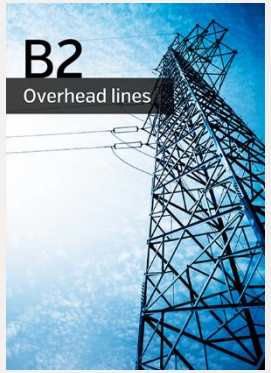
For reference only

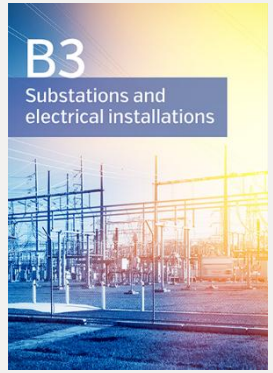


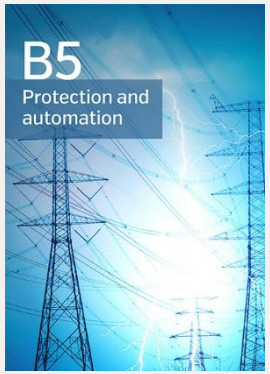


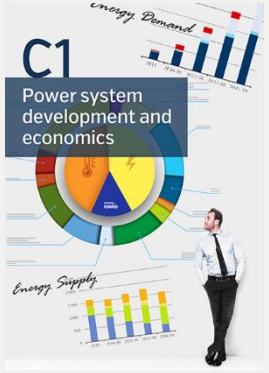


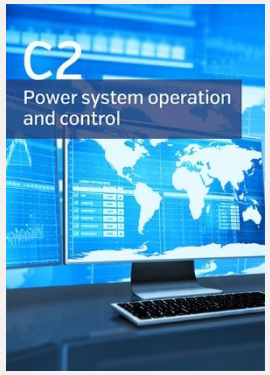


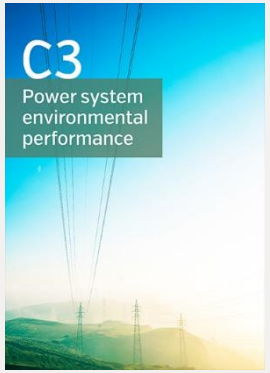


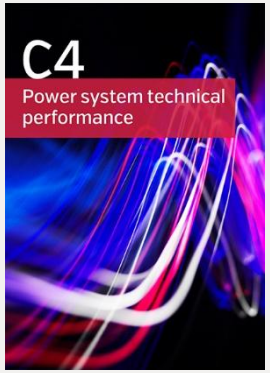


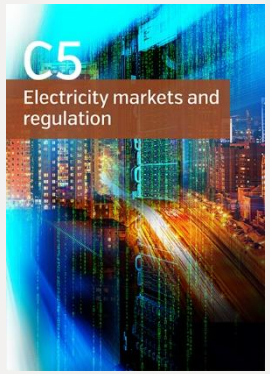


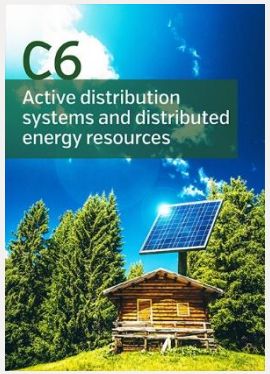


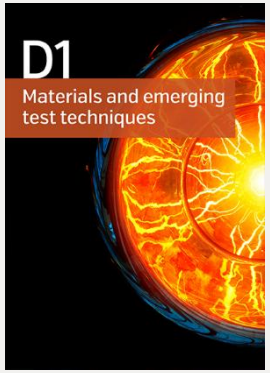


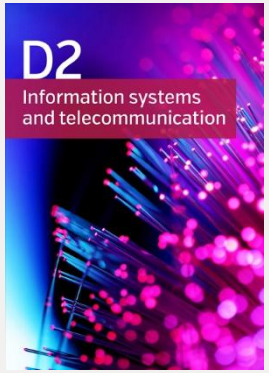












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