AVAILABLE GUIDANCE FOR INTERACTION ISSUES

EPR

‘Fundamentals of Calculation of Earth Potential Rise in the Underground Power Distribution Cable Network’ by Ashok K. Parsotam (1997)

- **available free from NZCCPTS website (companion paper to Cable Sheath Bonding Guide)**

Usefulness of Ashok Parsotam's paper

- can be treated as a guide or reference document
- includes methods for calculating line and cable series impedance parameters for use in load flow and short circuit analysis
- practical guide for engineers with basic knowledge of power system analysis

AS/NZS 3835:2006 Earth Potential Rise – Protection of telecommunications network users, personnel and plant

Part 1	Code of Practice
Part 2	Application Guide
HB 219	Worked Examples for Application Guide (handbook)

Usefulness of AS/NZS 3835:2006

- good outline of EPR
- examples explained in Application Guide (case studies)
- detailed examples in handbook

CCPT Induced Voltages Handbooks

HB 101-1997 (CJC 5) Co-ordination of Power and Telecommunications – Low Frequency Induction (LFI): Code of Practice for the mitigation of hazardous voltages induced into telecommunications lines

Also HB 102-1997 (CJC 6) Application Guide to the LFI Code

- **Both available via SAI Global**

LFI Code	$18.70
LFI Application Guide	$96.84

Usefulness of CCPT Handbooks

- **provide guidance for calculating induced voltages and mitigation options**

NZCCPTS Power Co-ordination Overview Guide

Usefulness

- Broad overview of the subject (i.e. covers the range of issues of relevance)
- Refers to detailed guides for specific areas of concern
- Fills in the gaps not covered by the specific guides

GUIDANCE FOR SPECIFIC CONCERNS

A **NZCCPTS Neutral Earthing Resistor or Reactors (including Resonant Reactance Earthing) Guide**

- **sets out recommended practices which should be used for the planning, design, and co-ordination of power systems, when it is desired to install neutral current limiting devices to limit the flow of current during a phase to earth fault**

Focuses on the control of induced voltage or earth potential rise hazard to telecommunication users, staff and plant. Principles apply to installations for any purpose

- **describes different devices and methods of earthing**
- **effects of fault currents on EPR and on induced voltages**

- describes methods of mitigating EPR and induction hazard, for telecommunication networks
- covers AC network benefits of installing NER's
- includes details of 10 year study on using NER's
- provides details of an application of resonant earthing installation

Examples and Experience

- installation in Sockburn area (Christchurch) to mitigate serious telecommunication damage
- Darfield (Canterbury) resonant earthing installation

Availability

- Free PDF download from NZCCPTS website

B1 NZCCPTS Single Wire Earth Return Systems (SWER) Guide

- sets out conditions and procedures which should be used for the planning, design, construction and extension of single wire return high voltage power lines so that they may co-exist satisfactorily with telecommunication lines and systems

- describes how to determine and calculate the level of interference caused to nearby telecommunication circuits
- identifies methods to reduce interference
- describes procedures to control EPR hazards around return electrodes

B2 EEA Guide for HV SWER Systems

- developed from NZECP41
- provides basic design information in relations to the earthing of SWER systems, and performance requirements in terms of associated hazard and interference effects and limits

- deals specifically with SWER lines that may exceed the load current limit set out ECP41
- Available as free PDF download from EEA website

Note: NZCCPTS and EEA Guides have much in common.

Examples of SWER Installations

C NZCCPTS Application Guide for Cable-Sheath Bonding Guide

- sets out the technical issues and implications for nearby telecommunication network plant of various cable sheath bonding arrangements for high voltage power cables between substations
- describes different bonding systems

- summarizes aspects relevant to causes and magnitude of hazardous electrical interference to nearby telecommunication plant
- outlines legislative requirements
- summarizes impact of various cable sheath bonding systems on both power and telecommunication networks
- outlines advantages and disadvantages on various cable sheath bonding systems
- illustrates method of calculation

Example

- Transpower 220kV substation cable connection to nearby Tangiwai pulp mill – initially cable sheath bonded at mill end only, required bonding at both ends to avoid telecommunication damage

Availability

- Free PDF download from NZCCPTS website

Note: Cable Sheath Bonding Guide available together with companion paper ‘Fundaments of Calculation of Earth Potential Rise in the Underground Power Distribution Cable Network’

D NZCCPTS Cable Separations Guide

- Specifies minimum separations between buried power (HV and LV) cables and telecommunication cables
- Main strength is the provision of associated ‘Application Rules’, which detail acceptable exceptions to these separations
- Appendix A discusses how these separations and rules were derived

E NZCCPTS Cost Apportioning Guide

- Specifies the principles for apportioning the cost of mitigating Power Co-ordination hazards or noise interference
- Common sense principles
- Only 5 pages long

General

- Both parties must agree problem requires mitigation
- Cost apportioning principles apply to the cost of the ‘Minimum Overall Cost Option’
- Party doing the mitigation is independent of who pays for it

New Works/Alterations

- Party proposing the New Works or Alterations pays 100%

Existing Works

- Both parties share the cost 50:50

Also sections on:

- **Costs of investigation**
- **Definition of ‘Existing Works’**
- **Situations that are a combination of ‘New Works’ and ‘Existing Works’**
- **Dispute resolution**