Paris Session 2022



Cable coupling and possible mitigations

Study Committee B4
PS 1-4: Harmonic and filtering and interference in HVDC Application
Question 1.7

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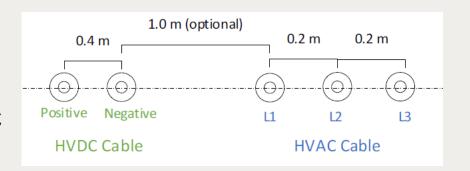


Learning from studies and industrial experiences

- The electromagnetic interference between HVDC and HVAC underground cables is not observed risky in steady-state harmonic frequency range
 - Relatively low source harmonics, especially for VSC
 - Low mutual impedance, and further damping in victim system
 - Noticed less risky in practical projects
- Attention to be paid to induced fundamental component from HVAC to HVDC cables and be further investigated
 - Saturation of HVDC converter transformer by cross-modulation due to the DC side fundamental current
 - Tolerance of the saturation from HVDC systems
- Electromagnetic interference between HVDC and HVAC cables due to transient is observed non-negligible
 - High induced voltage due to fault current
 - The immunity against the coupling of transient needs to be investigated

Possible mitigation actions

• In principle to mitigate EMI by reducing the distances separately between DC poles and AC phases, making them small enough compared to the distance between DC and AC cables



- General way to reduce the electromagnetic interaction
 - Shorter length of parallel cables
 - Larger separation between HVDC/HVAC cables
 - Small earthing resistance of cable sheath
- For an existing cable system
 - A better earthing for the cable sheath
 - Such as lower resistance of cable sheath earthing
- Without any change of hardware, to damp the induced components such as by the HVDC control system Group Discussion Meeting

