Paris Session 2022

Answer to Q6 on paper A1-PS1-10834

SCA1 Rotating Electrical Machines

PS1_Generation mix of the Future

Q6_What is the wider industry doing or could do to monitor and manage sub-synchronous oscillations from a design and manufacturer standpoint?

COSTAN, BIELLMANN, FERNAGUT (France)

General approach to mitigate SSRI

On each new project, plant designer and turbogenerator shaft-line manufacturer question the TSO about possible risks of SSRI.

If risks are identified, a detailed study is performed by the TSO with support from the plant designer to quantify risks and define appropriate mitigation measures if needed.

Typical mitigation measures may include :

- Modifications in the control of the power-electronics converters (HVDC lines, wind farms,…).
- Modifications in the control of the generator AVR,
- Installation of protections on the turbogenerator shaft-line.

Approach being formalized by the Cigre working group C4/B4-52, which will soon publish the guide ‘Sub-synchronous Oscillation Studies in Power Electronics Dominated Power Systems’.

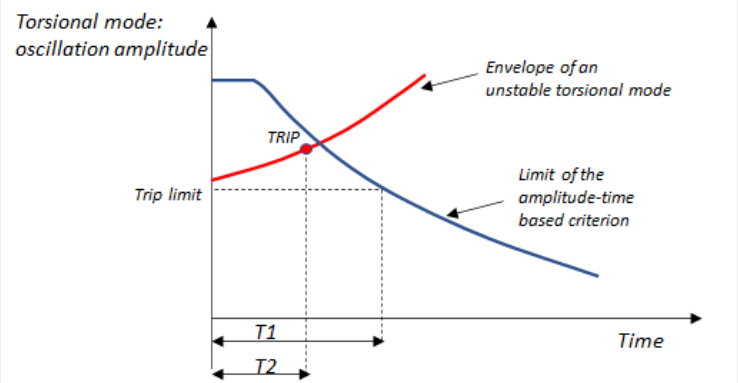
Example on the French nuclear fleet

One nuclear powerplant is equipped in France with such protection:

Gravelines (6x900MW), located near the IFA2000 2000MW HVDC connection with the UK.

This protection may be activated on two criteria:

- 1rst criterion, which triggers the IFA2000 connection if oscillations exceed a certain amplitude for a certain duration (amplitude time-based criterion).
- 2nd criterion, which disconnects the powerplant from the grid in the case of unstable oscillation mode.



T1: time delay for the amplitude-time based criterion
T2: time delay for the instability criterion