

## Ground Grid Design at the Egyptian Side of the Proposed High Voltage Direct Current Link Tying Egypt and Saudi Arabia

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**Abstract :** This paper presents a safe and realistic design for the proposed high voltage direct current grounding grid for the converter station at Badr City in Egypt. The outcomes show that the estimated results for touch and step voltages are below the safe limits for humans in monopolar operation and fault conditions. The cross-section area of earthing conductor is computed using IEC TS 62344. The results show that touch voltage in monopolar and fault conditions are 46.6 V and 167.68 V, respectively. The optimum number of required earthing rods is obtained by an analytical method. The step voltages are 12.9 and 43 V in monopolar operation and fault conditions. In addition, this paper presents an experimental case study to verify the simulation work executed using CYMGrd software (finite element method based). The percentage error between the measured and simulated surface potential is below 15.9%.

**Keywords :** grounding, monopolar, fault conditions, step potential, touch potential, CYMGrd, finite element method, experimental case study

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