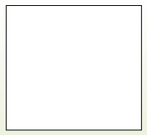
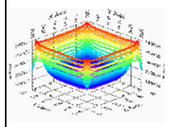
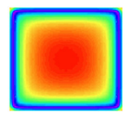
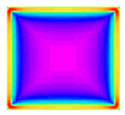
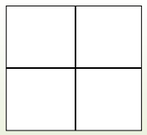
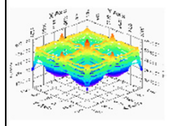
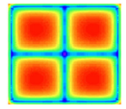
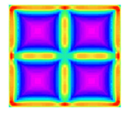
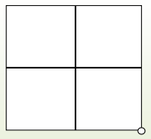
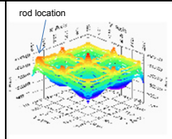
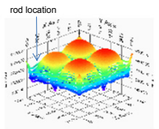
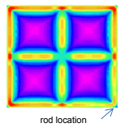
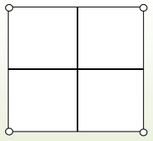
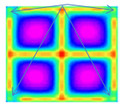
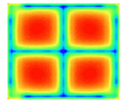
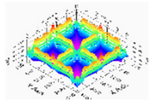
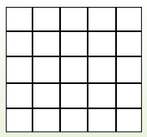
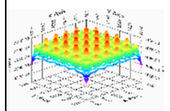
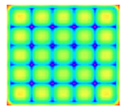
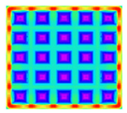
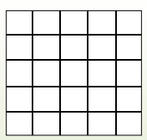
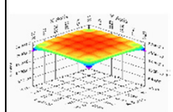
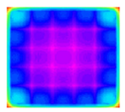
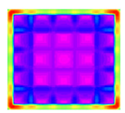
Parametric Analysis of Simple Earthing Grids Containing Rods

OVERVIEW

The summary of some of the results of an extensive study conducted using a computer program designed to determine grounding performance in two-layer soils are pres

- A variety of earthing grid configurations and two-layer soil conditions are analysed in detail.
- The calculated earth grid impedances, surface, step and touch potentials are summarised in several 3D and 2D charts below.

Case ID	Inputs								Grid impedance (*Ohms*)	Grid Potential Rise, GPR (*V*)	Surface Potential - Maximum (*V*)		Touch Potential - Maximum (*V*)		Step Potential - Maximum (*V*)	
	Grid	Number of meshes	Number of rods (qty:[length])	Dimensions (*m*)	Depth of burial (*m*)	Soil model: Top layer soil resistivity (*Ohms.m*)	Soil model: Depth of top layer (*m*)	Soil model: Bottom layer soil resistivity (*Ohms.m*)	SafeGrid	SafeGrid	SafeGrid Software		SafeGrid Software		SafeGrid Software	
S1		1	0	30 x 30	0.5	1000	3	100	11.81	11806		7224		10511		2817
S4		4	0	30 x 30	0.5	1000	3	100	8.88	8879		6724		7059		2068
S4R1		4	1:[10 m]	30 x 30	0.5	1000	3	100	5.92	5921		4567		4526		1332
S4R4		4	4:[10 m]	30 x 30	0.5	1000	3	100	3.12	3116		2522		1906		577
S25HL		25	0	30 x 30	0.5	1000	3	100	6.35	6351		5162		4314		1452
S25LH		25	0	30 x 30	0.5	55	3	430	3.21	3205		3182		610		204

NOTES:

1. Common inputs:

Two layer soil structure model (varying)

Depth of grid conductor burial = **0.5 *m***

Earth fault current which flows into the grid = **1000 *A***

Grid conductor type & material = **annealed bare stranded copper**

Conductor radius = **5.85 *mm* (eq. to 70 *mm*^{2})**

Frequency at which conductor impedance is calculated = **50 *Hz***

2. Colour scales:

Scales indicate the colours used by the earthing software to represent high to low values (relative) in their plots.