

Example 15: Verifying grid foundation on elastic springs

1 Description of the problem

To verify the mathematical model of *ELPLA* for analyzing grid foundations, the results of grid foundation on elastic springs obtained by *Szilard* (1986), Example 4.4.5, page 350, are compared with those obtained by *ELPLA*.

Geometry and loads of the foundation are the same as those of *Szilard* (1986) as shown in Figure 22. The grid has rectangular cross section of 2.5 [m] width and 0.5 [m] depth, yields Moment of Inertia $I = 0.026 \text{ [m}^4\text{]}$ and Torsion modulus $J = 0.091 \text{ [m}^4\text{]}$.

The parameters of grid material are *Young's* modulus $E_b = 3 \times 10^7 \text{ [kN/m}^2\text{]}$ and Shear modulus $G_b = 1 \times 10^7 \text{ [kN/m}^2\text{]}$. Modulus of subgrade reaction of the soil is $k_s = 40\,000 \text{ [kN/m}^3\text{]}$.

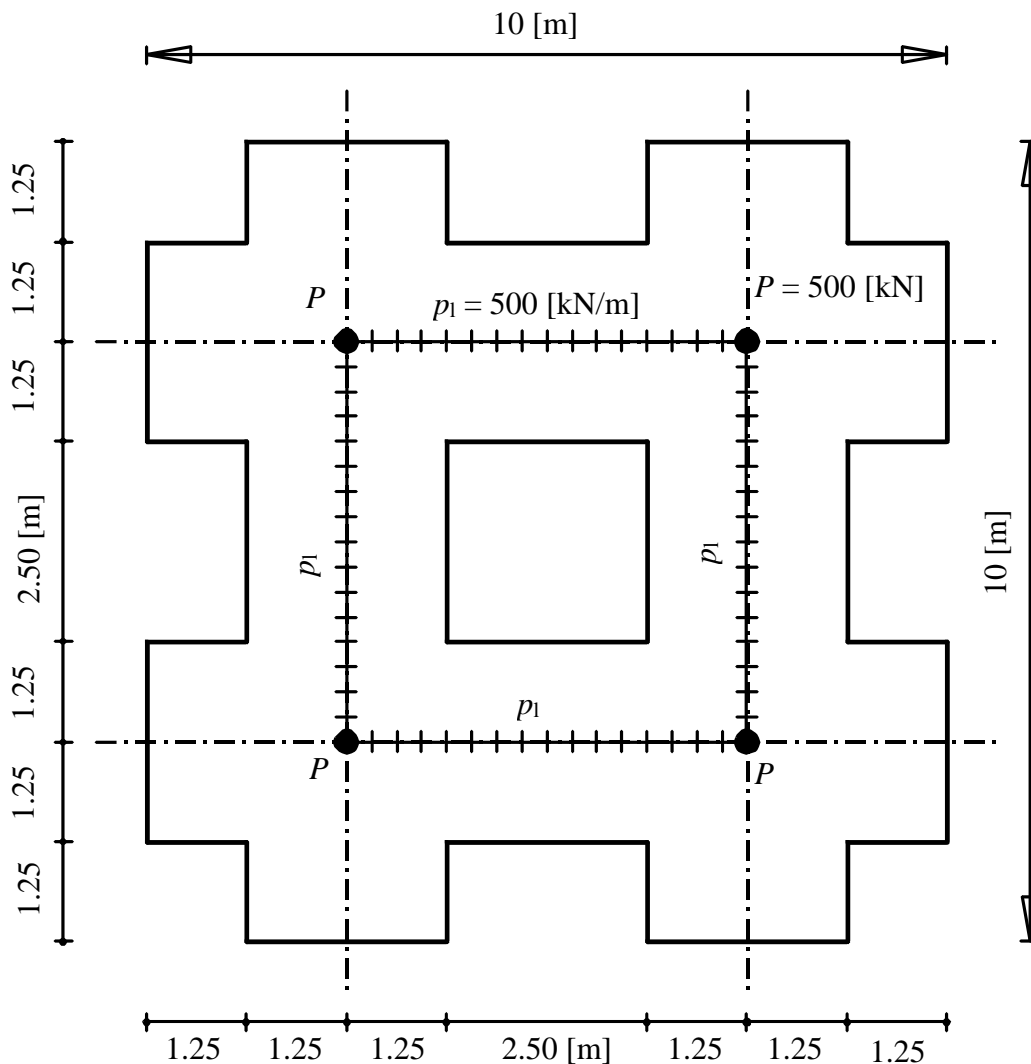


Figure 22 Grid foundation: geometry and loads

Examples to verify and illustrate *ELPLA*

Table 20 Comparison of the results at four selected points *a*, *b*, *c* and *d* on the grid obtained by *ELPLA* with those obtained by *Szilard* (1986)

Point	Settlement s [cm]		Moment M_b [kN.m]		Shear force Q_s [kN]	
	<i>Szilard</i> (1986)	<i>ELPLA</i>	<i>Szilard</i> (1986)	<i>ELPLA</i>	<i>Szilard</i> (1986)	<i>ELPLA</i>
<i>a</i>	0.02	0.02	0	0	0	5
<i>b</i>	0.09	0.09	153	151	148	130
<i>c</i>	0.09	0.09	125	149	-103	-112
<i>d</i>	0.10	0.10	-6	-7	0	-11