

## BLUE SOFTWARE

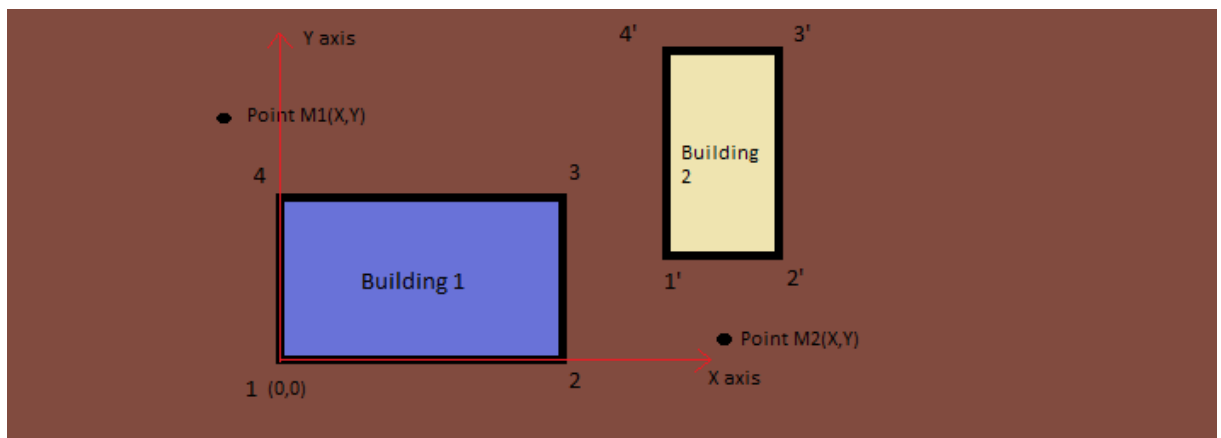


The excel spreadsheet **BLUE SOFTWARE** has been developed by a group of three students of the National Advanced School of Public works of Cameroon, Yaoundé. It is used for the computation of the primary consolidation settlement induced at any point on the plane of a soil with defined profile, below one or two uniformly loaded rectangular areas. It also allows for the computation of the differential settlement between any two points in the plane of the soil. It is assumed that the rectangular foundation is flexible, so that the pressure transmitted to the ground is uniform. [Clic here](#) to have a better understanding of settlements of fine grained soils. Here, are the guidelines for the use of the spreadsheet.

### THE INPUTS

- **Coordinates of the points of the foundations, the uniform pressure, and the coordinates of point M1 and M2.**

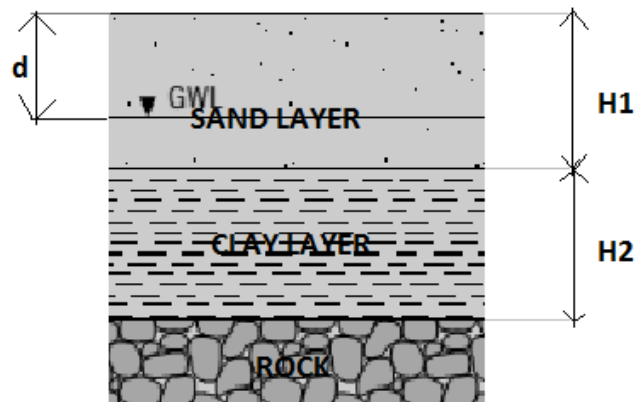
Points 1, 2, 3, 4, 1', 2', 3' and 4' are arranged as followed:



**Building 1 is always the building at the left**, and point 1 of building 1 is taken as the origin of the coordinates (X,Y) of any point in the plane. Point M1 or M2 can be selected anywhere in the plane.

- **Soil profile**

H1, H2 and d are defined as follows:



➤ **Clay characteristics**

$C_c$  is the compression index, or the coefficient of compression;

$C_s$  is the swell index or the coefficient of recompression;

$e_0$  is the initial void ratio of the clay layer;

$OCR$  is the overconsolidation ratio of the clay layer. It must be greater than one.

➤ **Scenarios and number of sublayers (n)**

The spreadsheet proposes three scenarios:

Scenario 1: Building 1 and 2 are constructed at the same time;

Scenario 2: Building 2 is constructed many years after building 1;

Scenario 3: Building 2 is constructed many years after building 1 have been constructed and destroyed.

The numbers of sublayers of clay is written as **n**. It can take values to more than a thousand.

### THE SOLVERS

The spreadsheet has three solvers:

➤ **Solver of point M1**

This solver computes the total settlement induced at point M1. **It does not take into consideration any levelling of the soil.**

➤ **Solver of point M2**

This solver computes the total settlement induced at point M2. **It does not take into consideration any levelling of the soil.**

- Solver for the differential settlement

This solver computes the differential settlement of points M1 and M2, and takes into account the levelling of the soil, on the demand of the user.

#### **RECOMMANDATIONS BEFORE USING ANY SOLVER**

- Make sure that no cells required for the input data is empty, if not the considered values will be zero;
- Respect the instructions given by the spreadsheet with filling the inputs;
- It is recommended to solve first for point M1 and M2 before solving the differential settlement. If not considered settlement for the non solved point will be zero;
- One having solved a first time, if you change any inputs different from the scenario and the number of sublayers, the computations are done automatically for any solver. But if you change the value of the scenario or the value of n it is highly recommended to reset all the tables before solving! If not you may have fake results.

#### **THE UNITS**

- The coordinates (X and Y) and distances ( $H_1, H_2, d, \Delta H_i, Z_i$ ) are in meters;
- The settlements provided by the solvers are in centimeters;
- The stresses are in Kpa;

*Enjoy blue software!*