

Rules to create Python Script

1. Import NumPy or Math Library: The script starts with import of NumPy or Math library. NumPy is the fundamental package for scientific computing and Math Library provides us access to some common math functions and constants in Python. These libraries have a large collection of high level mathematical functions to perform complex operations.

Sample Code: In the below sample code, NumPy (np) is used to perform trigonometric, exponential operations.

```
import numpy as np
# ~~~Input~~~
phi_prime=30.0 #in degree

# ~~~Calculation~~~
N_c=1/np.tan(phi_prime*np.pi/180)*((np.exp(2*(0.75*np.pi-phi_prime*np.pi/180/2)
```

2. Keywords: In order to have a better understanding of the python script with backend of website we use few keywords to capture input, to show selection box, to compute the expression and to print the result. The keywords which are discussed in the next steps should be included in the script.
3. Capture Input for Foundation Design Model: This block starts with the keyword `# ~~~Input~~~` All the variables are declared, initialized and values are assigned. These variables are considered as input to python script. The units of variables can be shown in comments for better understanding of models.

Sample Code: In the below sample code, variables P, B, E, nu are inputs to python script and used for the evaluation of expression.

```
import numpy as np
# ~~~Input~~~
P=31.25      #in kPa
B=4          #in meter
E=2300      #in kPa
nu=0.5
```

4. Selection Box as Input for Foundation Design Model: Some models can have selection values as input to the model. For example, some models require Foundation type where the type can have multiple values like Continuous, Square or Circular. This block starts with the keyword

~~~Selector~~~: Set of Values

Sample Code: In the below sample code, variables Soil_Condition and Sliding have multiple values and the default values are set.

```
# ~~~Selector~~~:cohesionless,cohesive
Soil_Condition="cohesionless"
# ~~~Selector~~~:along B-direction,along L-direction
Sliding="along B-direction"
```

5. Calculation of Expression for Model: This block starts with the keyword # ~~~ Calculation ~~~ The expressions are computed using the input variables and necessary print statements are to be provided to display the expected results of the model.

Sample Code:

```
# ~~~Calculation~~~

]if Type_of_circular_footing=="Perfectly flexible":

    delta=(P*B/E)*(1-nu**2)

]else:

    delta=(np.pi/4)*(P*B/E)*(1-nu**2)

]print "Elastic settlement of the foundation is",delta*1000,"mm"
```

Based on the print statement the result is shown on the website. The more readable the print statements are the better the understanding for other users.

Few Sample models are already available in the website. I request the users to download the sample models and have a better understanding of models before developing python scripts.