Introduction

The GeoGauge™ Excel® Template is intended as a tool to assist in the cataloging and analysis of measurements that are downloaded from the gauge. It is structured to handle the first 20 measurements in the gauge's memory, which contain data for all 25 frequencies in complex form. It can be readily expended to handle the remaining measurements in memory as the same algorithms apply to calculating such quantities as modulus and density. Please contact Humboldt if assistance is needed in performing this extension.

Inputs

The primary input to the template is the downloaded data. Open the file in Excel®. Select all the data, excluding the last column (the 1st eleven columns). Copy the data. Select the yellow shaded cell in the upper left portion of the template (cell A6). Paste the data. In column AC, independently measured values of moisture content can be entered if predictions of dry density are desired. The remaining inputs are:

Cell	Description
AF9	Assembly Mass (the mass in kg of the gauge's internal measurement assembly. It is slightly different for each gauge. The value for your gauge is available from Humboldt
AF10	Poisson's Ratio (A value to be assigned by you. Used in the calculation of modulus).
	The following three inputs are used in the prediction of dry density from stiffness and moisture content. Refer to page 4 of the User Guide or a superceding report from Humboldt for further explanation)
AF11	Density, r0 (pcf) (theoretical void free dry density of soil)
AF13	Slope, C vs. K/m (The slope of the line formed by ordered pairs of C, a constant you must determine, and the ratio of stiffness to moisture content.)
AF14	Intercept, C vs. K/m (The intercept of the line formed by ordered pairs of C, a constant you must determine, and the ratio of stiffness to moisture content.)

Outputs

Row 6 will contain the following labeled information for the first measurement stored in memory in sequential order, from left to right.

- Run #: The number sequentially assigned to a stored measurement by the gauge
- Meas: The displayed value of stiffness (MN/m)
- CalFac: The gauges calibration factor, determined at the factory
- Date: The date on which the measurement was taken (e.g., 10/17/98)
- Time: The time at which the measurement was taken (e.g., 14:10, 24 hr. clock)

Rows 7 through 31 will contain the data for each of the gauge's 25 frequencies. The columns in these rows contain the following.

Column	Description
A	Bin No. (Identifiers for the data belonging to each frequency
B	Frequency (Hz)

	Digitally encoded values for the following 8 complex quantities
	Noise Data
C	Real Displacement
D	Real Force
E	Imaginary Displacement
F	Imaginary Force
	Signal Data
G	Real Displacement
H	Real Force
I	Imaginary Displacement
J	Imaginary Force
	"Flags" indicating preamp overload on either displacement or force (0 = no overload, 1 = overload). Frequencies were an overload exist are not used in calculations.
K	Noise Data
L	Signal Data
	Values for the following 8 complex quantities in volts, calculated from the digitally encoded quantities.
	Noise Data
M	Real Displacement
N	Real Force
O	Imaginary Displacement
P	Imaginary Force
	Signal Data
Q	Real Displacement
R	Real Force
S	Imaginary Displacement
T	Imaginary Force
	Signal to noise ratio (dB) for each of the gauge's displacement and force channels. The lower of the two is displayed on the gauge.
U	Displacement
V	Force
W	Stiffness (MN/m)
X	Stiffness (lbf/in)
Y	Calculated Young's Modulus (MPa)
Z	Calculated Young's Modulus (psi)
AA	Calculated Shear Modulus (MPa)
AB	Calculated Shear Modulus (MPa)
AC	Moisture Content (% by weight/100)
AD	Predicted Dry Density (pcf)

Row 32 contains the averages for columns W through AB.

All the above outputs are repeated for the next 19 measurements in the gauge's memory starting in rows 33, 60, 87, 114, 141, 168, 195, 222, 249, 276, 303, 330, 357, 384, 411, 438, 465, 492 and 519.