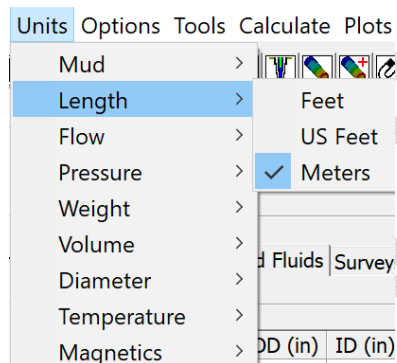


Innova Engineering - Hydraulics – Riserless Example

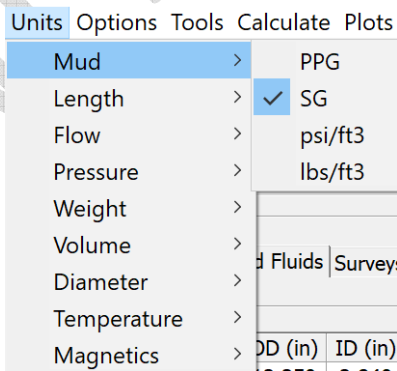
This tutorial demonstrates how to use Innova Engineering to generate hydraulics results for a deep-water hole section with returns to seabed.

This example project guide comes as part of the standard install and can be found in the following location: **C:\Program Files (x86)\Innova Drilling and Intervention\Innova Engineering\Manuals**

Create a new project and change the length units to meters from the unit menu:



Change the mud units to S.G.



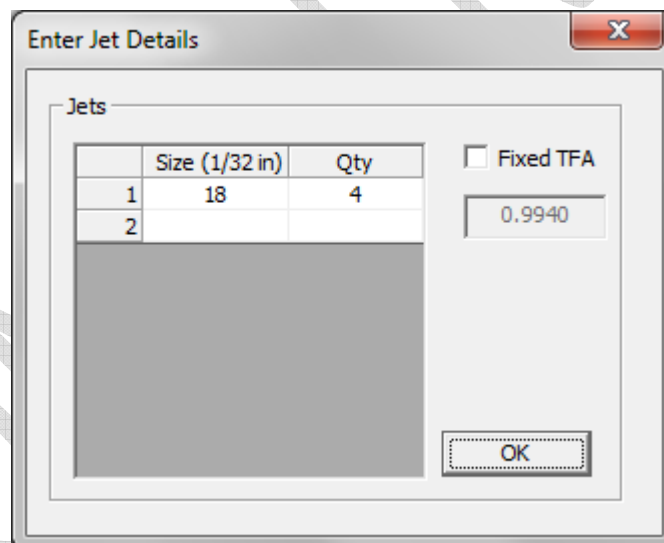
Enter the following Drill String

	Description	OD (in)	ID (in)	TJ OD (in)	TJ ID (in)	Weight (lb/ft)	Type	Length (m)	Total Length (m)	Non-Magnetic
1	26" Rock Bit	26.000	3.000			1779.92	Bit	0.500	0.50	☐
2	BHA	9.500	3.000			216.82	Drill Collar	60.470	60.97	☐
3	8 1/4" Drill Collar	8.250	2.813			160.51	Drill Collar	60.000	120.97	☐
4	HWDP	5.500	3.250	6.250	3.500	54.86	Drill Pipe	85.000	205.97	☐
5	5 1/2" Drill Pipe	5.500	4.776	6.250	5.500	20.32	Drill Pipe	2074.000	2279.97	☐
6										☐

Click on row 1 to bring up the properties of the PDC bit

Component Details	
SN	
Gauge OD (in)	
TFA (sq in)	
Connection Top	
Bit Formation Index (0-1)	
Bit Type	
Tensile Yield (klbs)	
Torsional Yield (kftlbs)	

Click on the cell for the bit TFA and click on the “...” button to bring up the bit jets dialog. Enter 4 x 18 jets or click the fixed TFA check box and enter 0.9940 and click the OK button.



The dialog box titled "Enter Jet Details" contains a table for jet configuration. It has a "Fixed TFA" checkbox and a text field for TFA value. The table has columns for "Size (1/32 in)" and "Qty".

	Size (1/32 in)	Qty
1	18	4
2		

Fixed TFA: ☐ TFA Value: 0.9940

OK

Enter the well geometry

Well Geometry					
	Type	MD (m)	TVD (m)	ID (in)	OD (in)
1	Air Gap	25.00	25.000		
2	Open Water	2200.00	2200.000		
3	Open Hole	3200.00	3200.000	26.00	26.000
4					

Enter the fluid details

Fluid properties

Mud Weight (ppg) PV
 Fluid Library YP

600	
300	
200	
100	
6	
3	
N	0.152
k	69.756

Cuttings Details

Density (ppg) ☐
 Diameter (in) ☐
 Thickness (in) ☐

Additional Fluids

	Vol (bbls)	Density (ppg)
1		

☐ Enable

Select the engineering parameters tab and enter the following details in the hydraulics section.

Hydraulics

Hyd. Model ROP ECD Adj (ppg)
 Surge/Swab RPM SW Den (ppg)
 Surge/Swab Ref Surface Pressure Loss (psi)
 User defined ☐ Calc Depth(m)

Flow Rates

	Flow Rate (gpm)
1	900.00
2	1000.00
3	1100.00
4	1200.00
5	

☒ Manual flow increment

Tripping Speeds

	Tripping Speed (m/min)
1	15.00
2	22.50
3	30.00
4	37.50
5	45.00

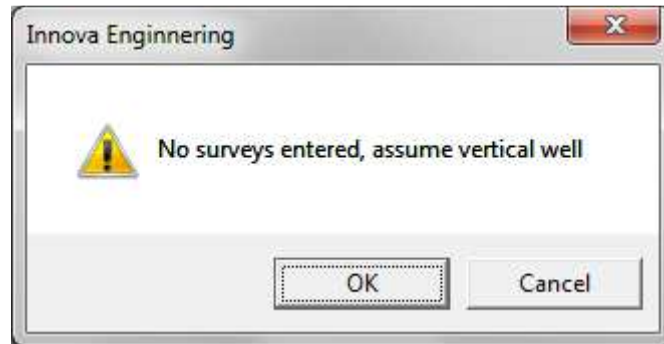
☐ Manual tripping increment

All parameters are now entered, and the calculation can now be run from the calculation menu or by pressing the calculate hydraulics button on the toolbar

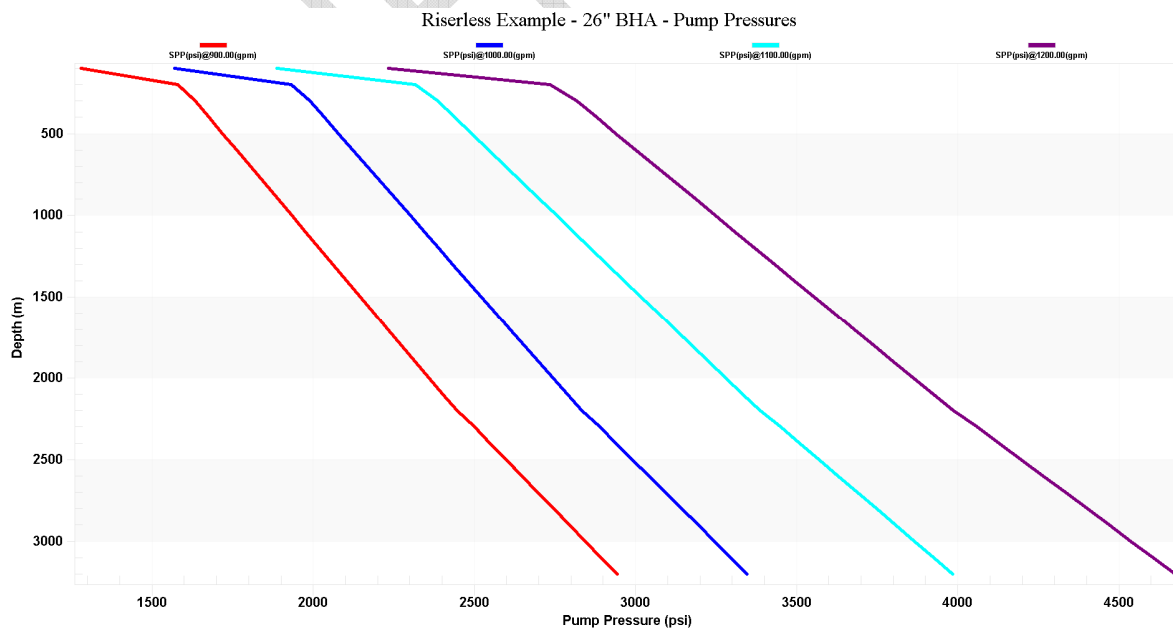
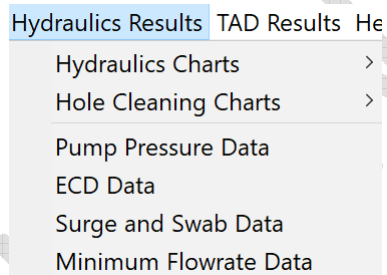
- Calculate Plots Survey Correction Results
- Hydraulics
 - Torque and drag
 - Wellpath magnetic interference
 - BHA Analysis and SAG Correction
 - Torque and Drag Snapshot
 - BHA Sensitivity Analysis

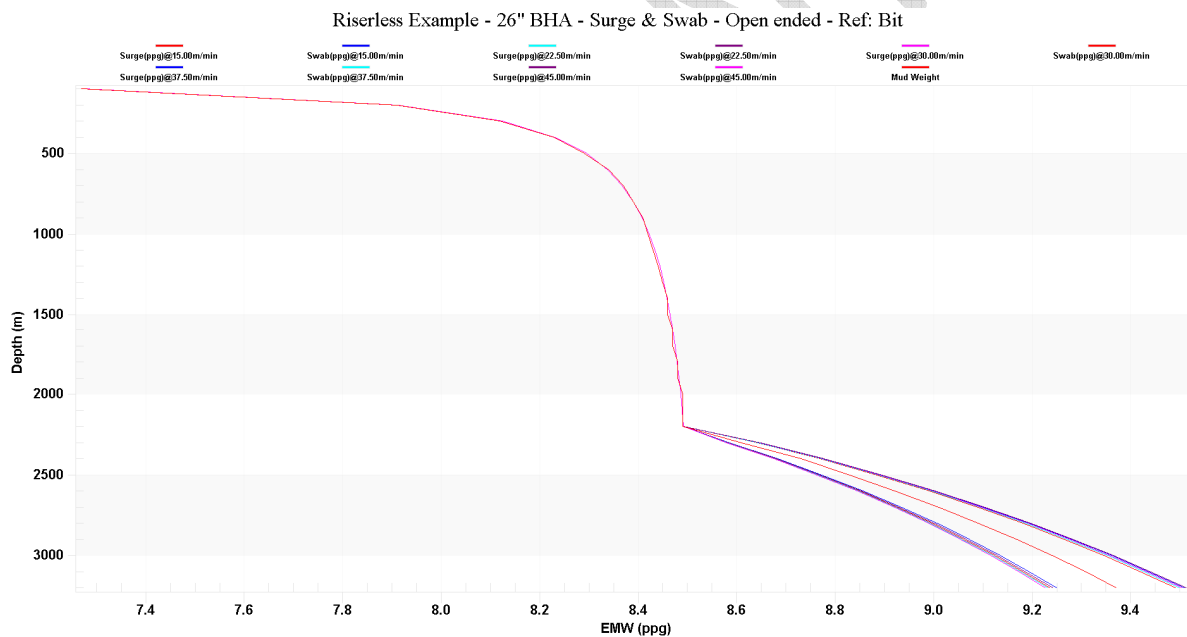
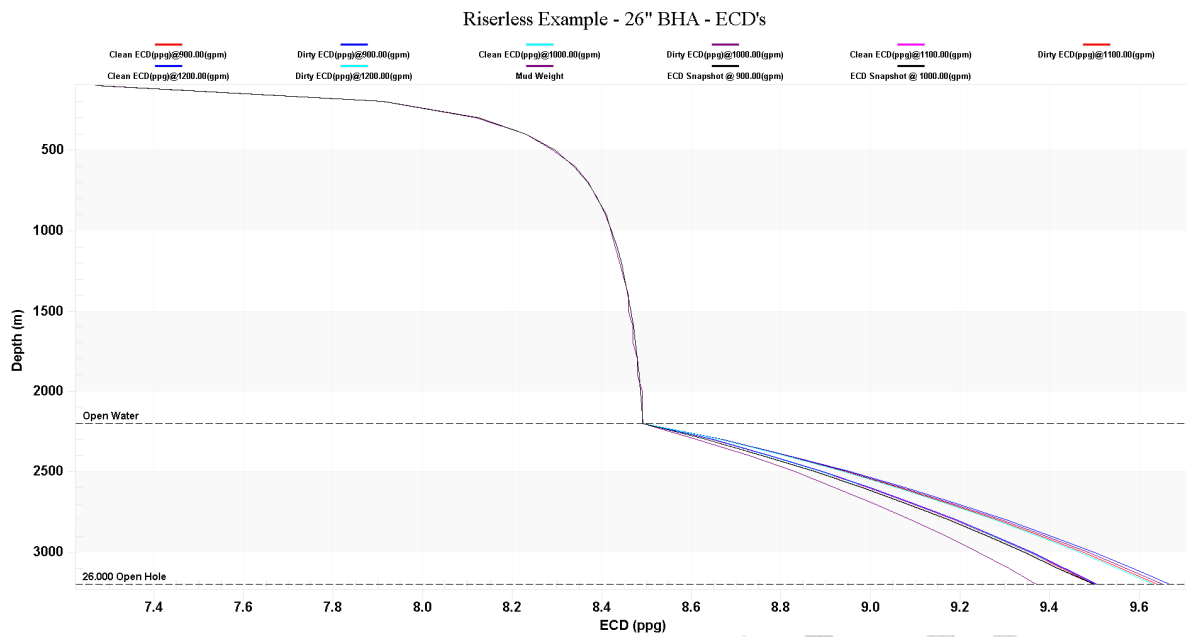


Calculate Hydraulics and the following warning will be displayed



Click OK to the warning and view the results. Charts and tabular data can be viewed from the "Hydraulics results" menu or the toolbar buttons





The ramp in pressure gradient can be seen due to there being no riser.

As a reference a completed Engineering Project file entitled **Riserless - Example Project.ieng** can be found in the following location: **C:\Program Files (x86)\Innova Drilling and Intervention\Innova Engineering\Example Projects**.