Innova Engineering - Short Collar Correction Example

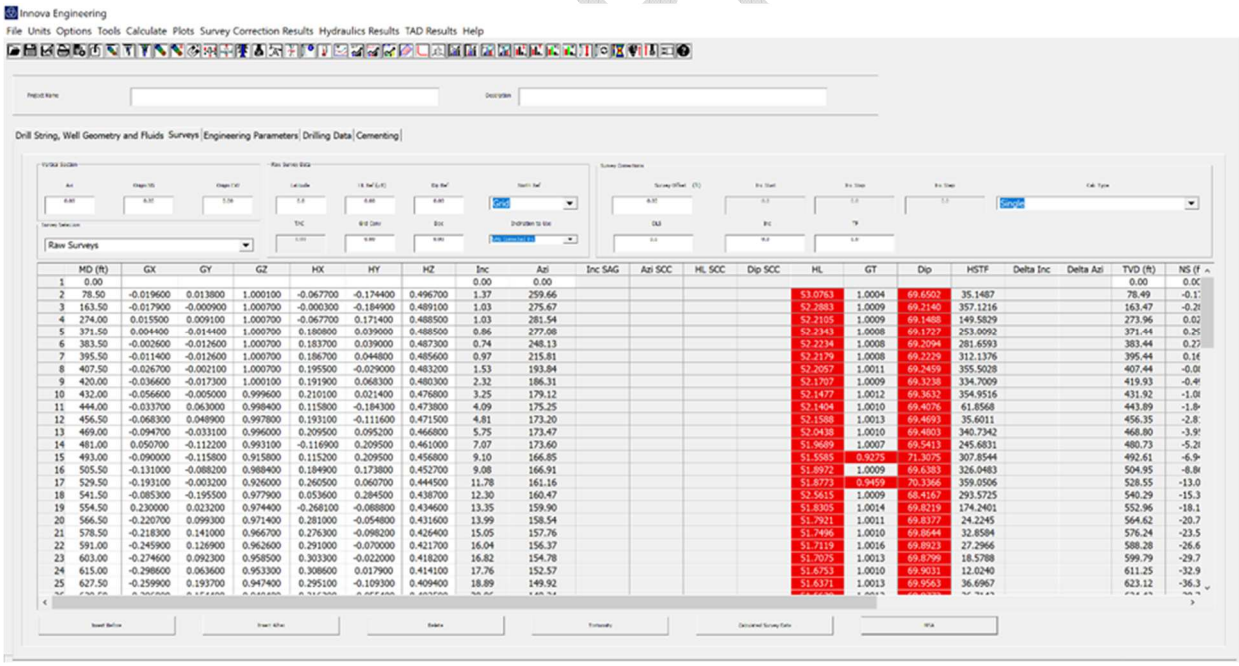
This tutorial details the steps required to create a project file and run Short Collar Correction (SCC) on raw magnetics survey data.

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**

If you have already completed the **Survey Import Example**, open your saved project file. Alternatively you can open **Survey Import – Example Project** located in **C:\Program Files (x86)\Innova Drilling & Intervention\Innova Engineering\Example Projects.**

If you would like to complete the example by initially learning how to import surveys in to Innova Engineering then follow steps outlined in **Survey Import Example** located in **C:\Program Files (x86)\Innova Drilling and Intervention\Innova Engineering\Manuals**.

It should be noted that the for the short collar correction algorithm to work correctly the Z axis must be aligned with the hole direction ie the Z axis points along hole. If this is not the case for the surveys which have been imported the short collar correction algorithm will not work. All major MWD companies, with the exception of Schlumberger, have the Z axis aligned with the along hole direction.

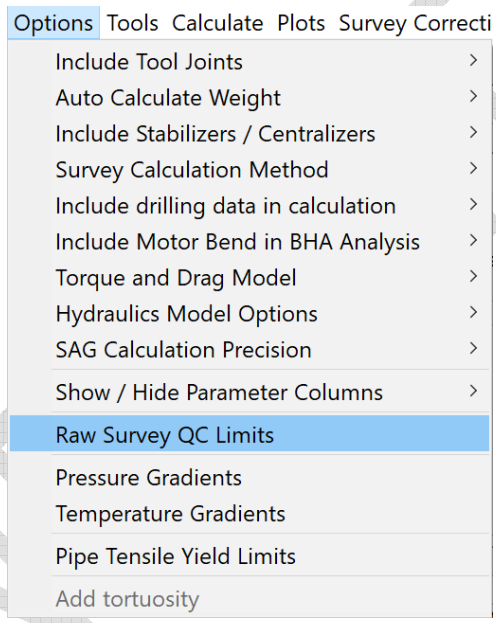


Setup the raw survey parameters as follows:

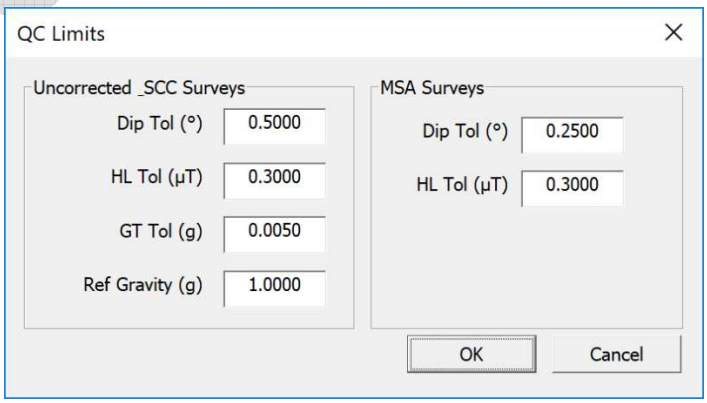
- Total Magnetic Field Strength Reference - 49.1727
- Magnetic Dip Angle Reference - 67.77
- Grid Convergence - 0.45
- Magnetic Declination - 0.59
- North Reference – Grid

If everything has been entered correctly the TAC (total applied correction) should be 0.14. This correction will be added to all calculated azimuths and short collar corrected azimuths.

Whenever a change to HL Ref or Dip Ref is detected, all short collar azimuths dips and HL's are recalculated and checked against the raw survey QC parameters which can be accessed from the options menu.



The default parameters are shown below



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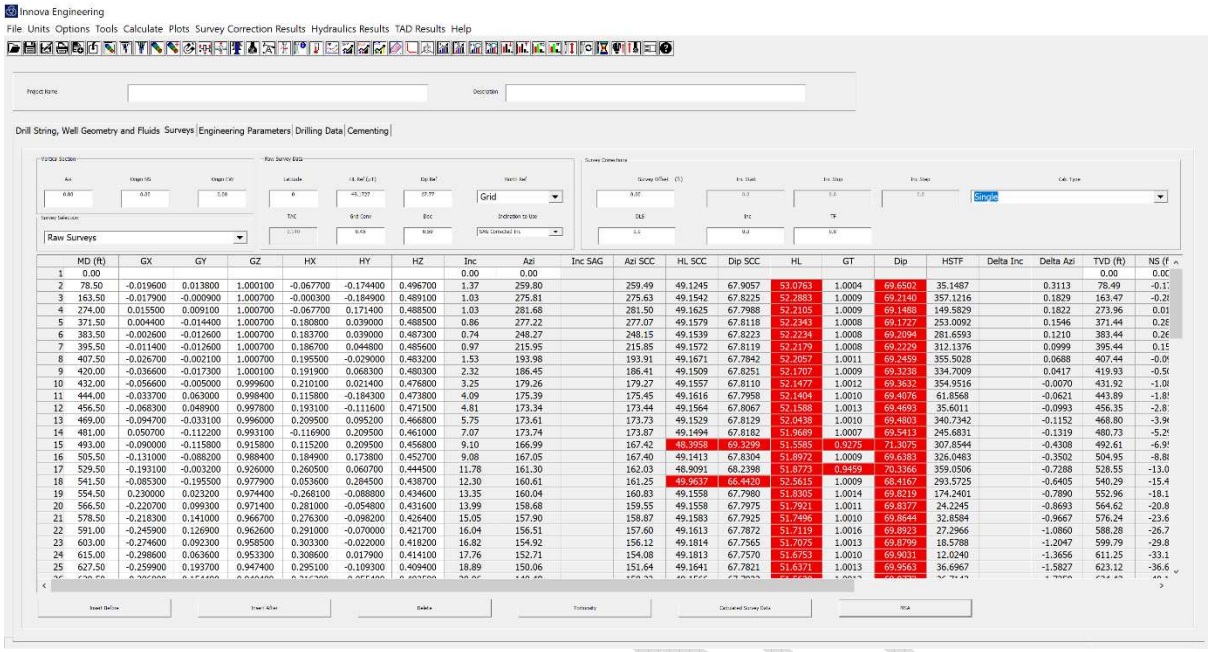
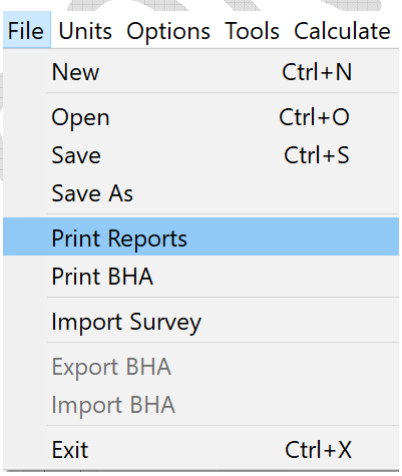
Any values which fail QC are highlighted in red

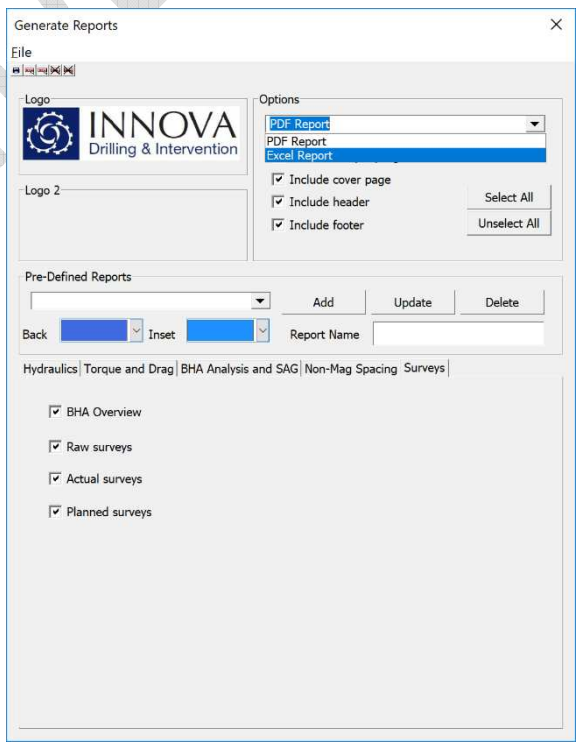


	MD (ft)	GX	GY	GZ	HX	HY	HZ	Inc	Azi	Inc SAG	Azi SCC	HL SCC	Dip SCC	HL	GT	Dip	HSTF	Delta Inc	Delta Azi	TVD (ft)	NS (f
1	0.00							0.00	0.00											0.00	0.00
2	78.50	-0.019600	0.013800	1.000100	-0.067700	-0.174400	0.496700	1.37	259.80		259.49	49.1245	67.9057	53.0763	1.0004	69.6502	35.1487		0.3113	78.49	-0.1
3	163.50	-0.017900	-0.000900	1.000700	-0.000300	-0.184900	0.489100	1.03	275.81		275.63	49.1542	67.8225	52.2883	1.0009	69.2140	357.1216		0.1829	163.47	-0.2
4	274.00	0.015500	0.009100	1.000700	-0.067700	0.171400	0.488500	1.03	281.68		281.50	49.1625	67.7988	52.2105	1.0009	69.1480	149.5829		0.1822	273.96	0.01
5	371.50	0.004400	-0.014400	1.000700	0.180800	0.039000	0.488500	0.86	277.22		277.07	49.1579	67.8118	52.2343	1.0008	69.1727	253.0092		0.1546	371.44	0.2
6	383.50	-0.002600	-0.012600	1.000700	0.183700	0.039000	0.487300	0.74	248.27		248.15	49.1539	67.8223	52.2234	1.0008	69.2094	281.6593		0.1210	383.44	0.2
7	395.50	-0.011400	-0.012600	1.000700	0.186700	0.044800	0.485600	0.97	215.95		215.85	49.1572	67.8119	52.2179	1.0008	69.2229	312.1376		0.0999	395.44	0.1
8	407.50	-0.026700	-0.002100	1.000700	0.195500	-0.029000	0.483200	1.53	193.98		193.91	49.1671	67.7842	52.2057	1.0011	69.2459	355.5028		0.0688	407.44	-0.0
9	420.00	-0.036600	-0.017300	1.000100	0.191900	0.068300	0.480300	2.32	186.45		186.41	49.1509	67.8251	52.1707	1.0009	69.3238	334.7009		0.0417	419.93	-0.5
10	432.00	-0.056600	-0.005000	0.999600	0.210100	0.021400	0.476800	3.25	179.26		179.27	49.1557	67.8110	52.1477	1.0012	69.3632	354.9516		-0.0070	431.92	-1.0
11	444.00	-0.033700	0.063000	0.998400	0.115800	-0.184300	0.473800	4.09	175.39		175.45	49.1616	67.7958	52.1404	1.0010	69.4076	61.8568		-0.0621	443.89	-1.8
12	456.50	-0.068300	0.048900	0.997800	0.193100	-0.111600	0.471500	4.81	173.34		173.44	49.1564	67.8067	52.1588	1.0013	69.4693	35.6011		-0.0993	456.35	-2.8
13	469.00	-0.094700	-0.033100	0.996000	0.209500	0.095200	0.466800	5.75	173.61		173.73	49.1529	67.8129	52.0438	1.0010	69.4803	340.7342		-0.1152	468.80	-3.9
14	481.00	0.050700	-0.112200	0.993100	-0.116900	0.209500	0.461000	7.07	173.74		173.87	49.1494	67.8182	51.9689	1.0007	69.5413	245.6831		-0.1319	480.73	-5.2
15	493.00	-0.090000	-0.115800	0.915800	0.115200	0.209500	0.456800	9.10	166.99		167.42	48.3958	69.3299	51.5585	0.9275	71.3075	307.8544		-0.4308	492.61	-6.9
16	505.50	-0.131000	-0.088200	0.988400	0.184900	0.173800	0.452700	9.08	167.05		167.40	49.1413	67.8304	51.8972	1.0009	69.6383	326.0483		-0.3502	504.95	-8.8
17	529.50	-0.193100	-0.003200	0.926000	0.260500	0.060700	0.444500	11.78	161.30		162.03	48.9091	68.2398	51.8773	0.9459	70.3366	359.0506		-0.7288	528.55	-13.0
18	541.50	-0.085300	-0.195500	0.977900	0.053600	0.284500	0.438700	12.30	160.61		161.25	49.9637	66.4420	52.5615	1.0009	68.4167	293.5725		-0.6405	540.29	-15.4
19	554.50	0.230000	0.023200	0.974400	-0.260100	-0.088800	0.434600	13.35	160.04		160.83	49.1558	67.7980	51.8365	1.0014	69.8219	174.2401		-0.7890	552.96	-18.1
20	566.50	-0.220700	0.099300	0.971400	0.281000	-0.054800	0.431600	13.99	158.68		159.55	49.1558	67.7975	51.7921	1.0011	69.8377	24.2245		-0.8693	564.62	-20.8
21	578.50	-0.218300	0.141000	0.966700	0.276300	-0.098200	0.426400	15.05	157.90		158.87	49.1583	67.7925	51.7496	1.0010	69.8644	32.8584		-0.9667	576.24	-23.6
22	591.00	-0.245900	0.126900	0.962600	0.291000	-0.070000	0.421700	16.04	156.51		157.60	49.1613	67.7872	51.7119	1.0016	69.8923	27.2966		-1.0860	588.28	-26.7
23	603.00	-0.274600	0.092300	0.958500	0.303300	-0.022000	0.418200	16.82	154.92		156.12	49.1814	67.7565	51.7075	1.0013	69.8799	18.5788		-1.2047	599.79	-29.8
24	615.00	-0.298600	0.063600	0.953300	0.308600	0.017900	0.414100	17.76	152.71		154.08	49.1813	67.7570	51.6753	1.0010	69.9031	12.0240		-1.3656	611.25	-33.1
25	627.50	-0.259900	0.193700	0.947400	0.295100	-0.109300	0.409400	18.89	150.06		151.64	49.1641	67.7821	51.6371	1.0013	69.9563	36.6967		-1.5827	623.12	-36.6

The correction that has been applied can be seen in the delta Azi column. Ensure that the GT, HL SCC and SCC Dip values all pass QC.

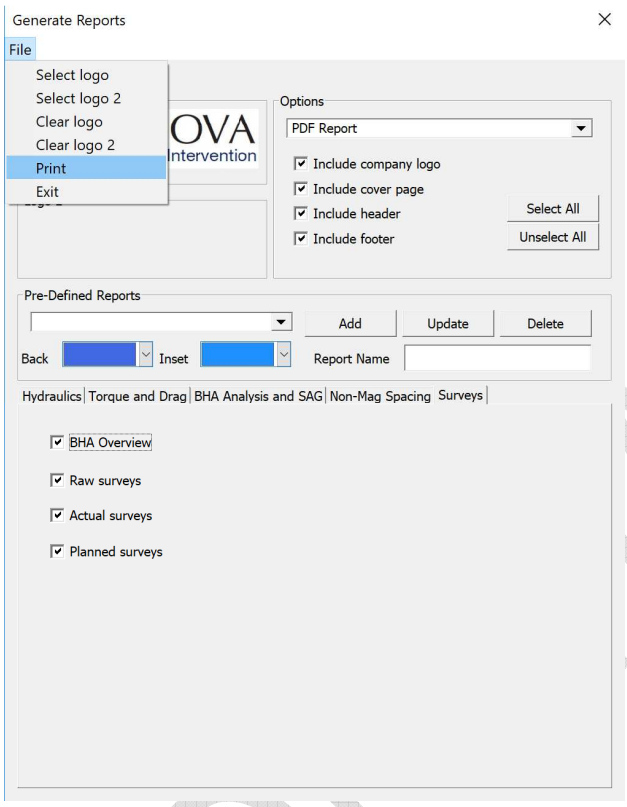
A raw survey report can be generated by clicking File->Print Reports.



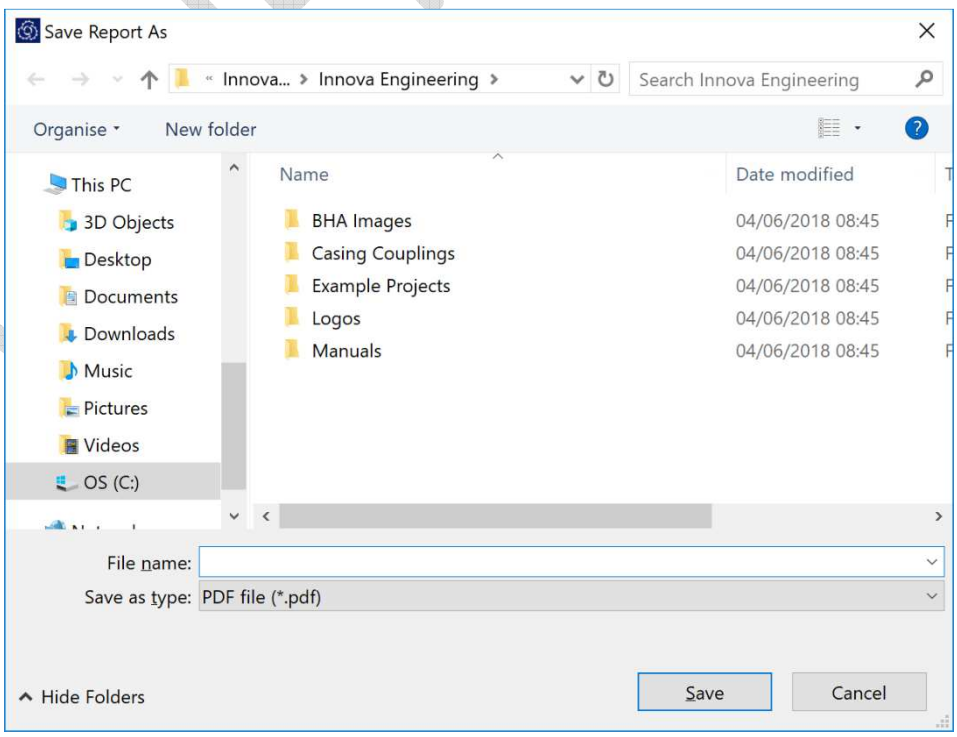


Click on the Surveys tab and select either PDF Report or Excel Report.

Click File->Print within the Generate Reports window, or press the Print radio button



Create a name for the Survey Report file.



A preview of the report will be displayed after selecting 'Save'.

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

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Axial Correction

Axial correction or Short Collar Correction (SCC) is used with magnetic survey tools when there is insufficient non-magnetic material above or below the sensor. A magnetic survey tool has magnetometers measuring the Earth's magnetic field in three axes, X, Y and Z. The Z axis is assumed to be aligned in the along hole direction of the drill string. The sensor must be surrounded by non-magnetic material which shields the X and Y magnetometers from magnetic interference. In normal drilling operations usually enough non-magnetic material above and below the sensor is incorporated to magnetically isolate it from the steel components within the drill string.

This however is not always possible, resulting in magnetic interference in the Z axis magnetometer. This can be corrected by using a mathematical algorithm. This algorithm assumes that the value for the X and Y axis magnetometers are correct and using values for dip angle and HL for the surface location, the Z axis magnetometer can be corrected. There are, however limits to when this correction can be used, and these are listed below.

Inclination Range (Deg)	Azimuth Range (Deg)	Limitations
0-60	0-360	No Limitations
60-90	0-60, 120-240, 300-360	No Limitations
60-90	60-70, 110-120, 240-250, 290-300	See Note (1)
60-90	70-110, 250-290	See Note (2)

- **Note 1** – If **possible, SCC should NOT be used** and the BHA should be correctly spaced with non-magnetic tubulars as required.
- **Note 2** – **SCC must NOT be used if the well path is known to be within these parameters.** Again, the BHA should be correctly spaced with non-magnetic tubulars as required.
- If the above parameters are encountered, then the SCC algorithm will not function correctly and erratic corrected data will be seen. It is therefore necessary to discuss beforehand with the Directional Driller / Company Representative as to an agreeable plan of action if the above criteria are expected to be encountered during drilling.

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