

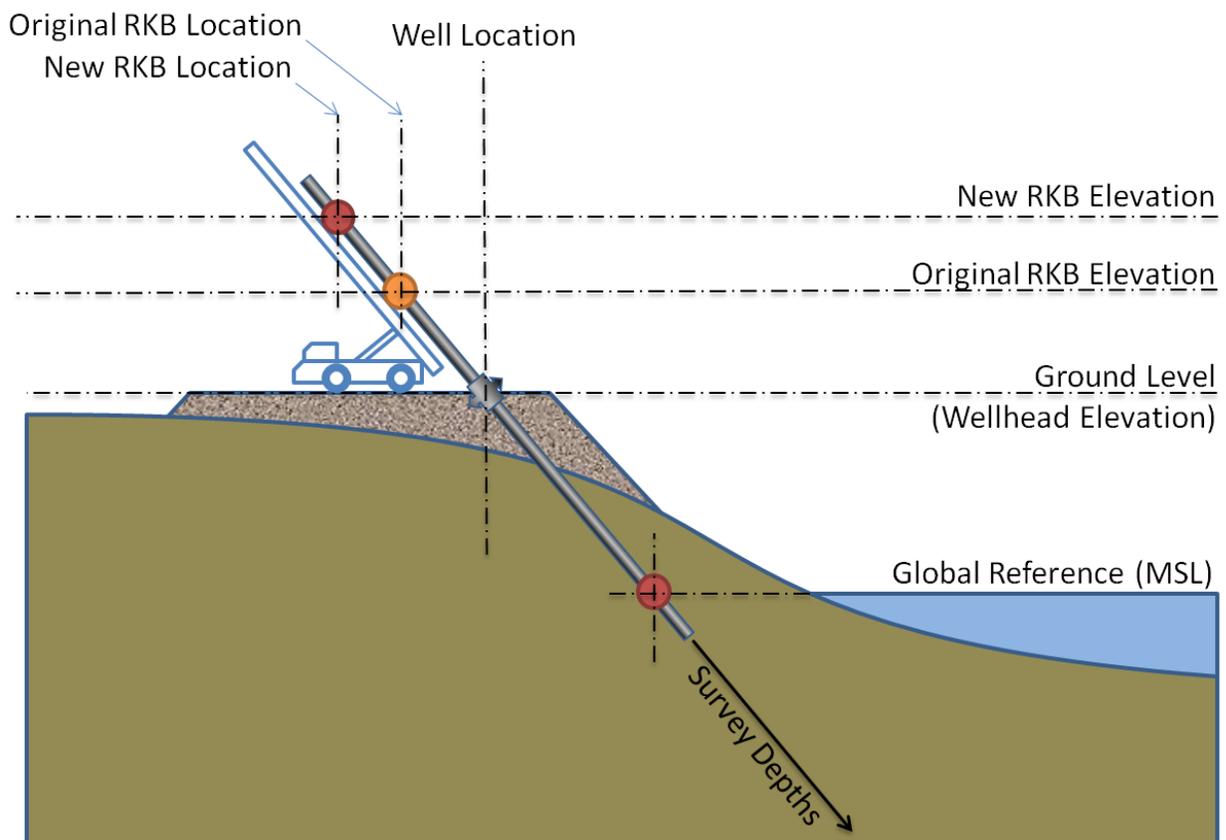
KellyDown Tips

Periodic tips to help you use KellyDown more effectively

Slant Wells in KellyDown

Slant wells or sloping conductors need to be handled differently from ordinary wells because changing the elevation of the RKB also changes the lateral position of the RKB and the RKB isn't directly above the wellhead location.

In KellyDown, the wellhead location and elevation are set in **Well Properties**. The wellhead will always remain in the same position both vertically and horizontally and is typically the origin of local coordinates. The global vertical and global horizontal coordinates of surveys should always remain constant regardless of the RKB Elevation.



Referring to the diagram shown above, the local coordinates originate at **Ground Level** at the wellhead, which is located at 600m above MSL and at 6,790,112.34 N, 568,990.12 E as shown in the **Well Properties**.

The **Ground Level** at the well location is 600m above MSL and the RKB is 2m above **Ground Level**.

Well Properties

Well ID: Well Name:

General Rig Notes

Relative to: Global Origin (Grid North) Project Origin (Grid North) Structure Origin (Grid North) Geographical Origin

Well Elevation:

Northings:

Eastings:

Vertical Ref. Description:

Horizontal Ref. Description:

Lease/Block:

Slot Name:

Well Position Error:

Ground Level:

Kelly Bushing to Ground:

Slant Well

Inclination:

Azimuth:

Northings and Eastings are at Ground Level

Grid Convergence: 1.13°

Scale Factor: 0.999658

Creation Date: Last Update Date: Update User ID:

OK Cancel ?

When you create a Survey and/or Proposal under this well, KellyDown will automatically locate the **RKB** in the correct location 2m above **Ground Level** such that the pipe penetrates **Ground Level** at the well location. It will also add a station at **Ground Level** to confirm the location. You may delete this station if you wish.

KD Survey Data [Slant Well - Slant Well]

No.	Survey Depth (m)	Inclination (°)	Azimuth (°)	Vertical Depth (m)	Northings (m)	Eastings (m)	Dogleg Rate (°/30m)	Vertical Section (m)	Comment
0	0.00	75.00	90.00	0.00	0.00 N	7.46 W		7.46	RKB Elevation
▶ 1	7.73	75.00	90.00	2.00	0.00 N	0.00 E	0.000	0.00	Ground Level
*	Add New Survey Record								

We can see that the actual location of the **RKB** is 0.00 TVD, 0.00 N, 7.46 W relative to the wellhead. The **Measured Depth** and **Vertical Depth** both start at 0.00, and at **Ground Level**, the local survey coordinates are 2.00 TVD, 0.00 N, 0.00 E.

If we now enter a station where the well reaches **Mean Sea Level**, such that the **Vertical Depth** below **RKB** is 602m, we see that the **Easting** value is 2,239.23 N.

KD Survey Data [Slant Well - Slant Well]

No.	Survey Depth (m)	Inclination (°)	Azimuth (°)	Vertical Depth (m)	Northings (m)	Eastings (m)	Dogleg Rate (°/30m)	Vertical Section (m)	Comment
0	0.00	75.00	90.00	0.00	0.00 N	7.46 W		-7.46	RKB Elevation
1	7.73	75.00	90.00	2.00	0.00 N	0.00 E	0.000	0.00	Ground Level
▶ 2	2,325.95	75.00	90.00	602.00	0.00 N	2,239.23 E	0.000	2,239.23	MeanSea Level
*	Add New Survey Record								

Tip: an easy way to find the **Measured Depth** at which the well reaches **Mean Sea Level** is to add a temporary station that is well below **Mean Sea Level** at say 10,000m with the same inclination and azimuth as the slant. Then open the **Interpolation** module using the **View, Interpolations** menu. Enter a

Vertical Depth of 602.00m, which is the Vertical Depth at **Mean Sea Level**. The resulting **Measured Depth** should be 2,325.95m. Right click on the row heading and select **Insert into Survey Data** from the pop-up menu. Finally delete the temporary station at 10,000m.

No.	Measured Depth (m)	Inclination (°)	Azimuth (°)	Vertical Depth (m)	Northings (m)	Eastings (m)	Vertical Section (m)	Dogleg Rate (°/30m)	Toolface (°)
1	2,325.95	75.00	90.00	602.00	0.00 N	2,239.23 E	0.00	0.000	0.00

Add comments to the end of each line to identify the **RKB Elevation**, **Ground Level** and **Mean sea Level**.

Set the **Vertical Origin** and **Horizontal Origin** to **Global** (at the bottom left of the main KellyDown screen) so that the vertical depths are shown relative to **Mean Sea Level** and horizontal coordinates are shown as **Map Coordinates**.

No.	Survey Depth (m)	Inclination (°)	Azimuth (°)	Vertical Depth (m)	Northings (m)	Eastings (m)	Dogleg Rate (°/30m)	Vertical Section (m)	Comment
0	0.00	75.00	90.00	-602.00	6,790,112.34 N	568,982.66 E		-7.46	RKB Elevation
1	7.73	75.00	90.00	-600.00	6,790,112.34 N	568,990.12 E	0.000	0.00	Ground Level
2	2,325.95	75.00	90.00	0.00	6,790,112.34 N	571,229.35 E	0.000	2,239.23	MeanSea Level

Notice that the **Vertical Depth** of the top station is -602.00m and the **Vertical Depth** of the bottom station is 0.00m because the vertical depths are now all relative to **Mean Sea Level**.

If the RKB is changed, perhaps because the well is serviced by a different drilling rig, we need to change the **RKB Elevation**, but the actual physical well will not change and the global vertical depth and map coordinates where the well penetrate **Mean Sea Level** should remain the same.

In our example, let's assume that the **New RKB** is 0.50m higher than the **Original RKB**. In other words, the **New RKB** is 2.50m above **Ground Level**.

Open **Well Properties** and change the **Kelly Bushing to Ground** value to 2.50m. Click the **OK** button and answer **Yes** to relocate the Well's **Reference Point**.

Well Properties

Well ID: Well Name:

General Rig Notes

Relative to: Global Origin (Grid North) Project Origin (Grid North) Structure Origin (Grid North) Geographical Origin

Well Elevation:

Northings:

Eastings:

Vertical Ref. Description:

Horizontal Ref. Description:

Lease/Block:

Slot Name:

Well Position Error:

Ground Level:

Kelly Bushing to Ground:

Slant Well

Inclination:

Azimuth:

Northings and Eastings are at Ground Level

Grid Convergence:

Scale Factor:

Creation Date: Last Update Date: Update User ID:

KellyDown 3.07.04.02

The Elevation of the Well has changed.

Do you wish to relocate the well's reference point (change the RKB Elevation) or move the whole well including all of its profiles to the new elevation?

Click "Yes" to relocate the Well's Reference Point.
Click "No" to move the whole well and all of its profiles.

Open the **Survey Data** again and notice that the data has changed slightly. The surface **Easting** value has changed from 7.46 W to 9.33 W. This is the new location of the **RKB** relative to where the well penetrates the ground.

A new station has been inserted at 1.93m. This is actually the **Original RKB Elevation** that has been moved down vertically by 0.50m as can be seen by the **Vertical Depth** value. The **Vertical Depth** on the third line is 2.50m. This is the station where the well penetrates the ground. The coordinates at this depth are 0.00 N, 0.00 W.

No.	Survey Depth (m)	Inclination (°)	Azimuth (°)	Vertical Depth (m)	Northings (m)	Eastings (m)	Dogleg Rate (°/30m)	Vertical Section (m)	Comment
0	0.00	75.00	90.00	0.00	0.00 N	9.33 W		-9.33	RKB Elevation
1	1.93	75.00	90.00	0.50	0.00 N	7.46 W	0.000	-7.46	
2	9.66	75.00	90.00	2.50	0.00 N	0.00 E	0.000	0.00	Ground Level
▶ 3	2,327.88	75.00	90.00	602.50	0.00 N	2,239.23 E	0.000	2,239.23	MeanSea Level
* Add New Survey Record									

Similarly, the **Vertical Depth** on the bottom line has moved down by 0.50m. The **Measured Depth** has been extended to 2,327.88m and the **Vertical Depth** is now 602.5m, but the **Northing** and **Easting** values are the same because the well penetrates **Mean Sea Level** at the same point as it did before.

Notice that the bottom two comments have also been moved down by the same amount. KellyDown adjusts any survey tools and casing strings so they are also relative to the new **RKB Elevation**.

Set the Horizontal and Vertical origins to **Global** again and observe that the **Vertical Depth** and **Map Coordinates** of the bottom station are the same as they were before we changed the **RKB Elevation**.

No.	Survey Depth (m)	Inclination (°)	Azimuth (°)	Vertical Depth (m)	Northings (m)	Eastings (m)	Dogleg Rate (°/30m)	Vertical Section (m)	Comment
0	0.00	75.00	90.00	-602.50	6,790,112.34 N	568,980.79 E		-9.33	RKB Elevation
1	1.93	75.00	90.00	-602.00	6,790,112.34 N	568,982.66 E	0.000	-7.46	
2	9.66	75.00	90.00	-600.00	6,790,112.34 N	568,990.12 E	0.000	0.00	Ground Level
▶ 3	2,327.88	75.00	90.00	0.00	6,790,112.34 N	571,229.35 E	0.000	2,239.23	MeanSea Level
*	Add New Survey Record								

In other words, the global position of the well has remained the same but the measured depth at each survey is now relative to the new **RKB Elevation**.

If you have a question you would like answered in KellyDown Tips, reply to this email with your question.
 If you would like anything added to KellyDown to make it more useful or user friendly, reply to this email with your requests.
 You can download the latest version of KellyDown from www.kellydown.ca
 If you would like to be removed from this email distribution list, reply with "Unsubscribe" in the subject line.