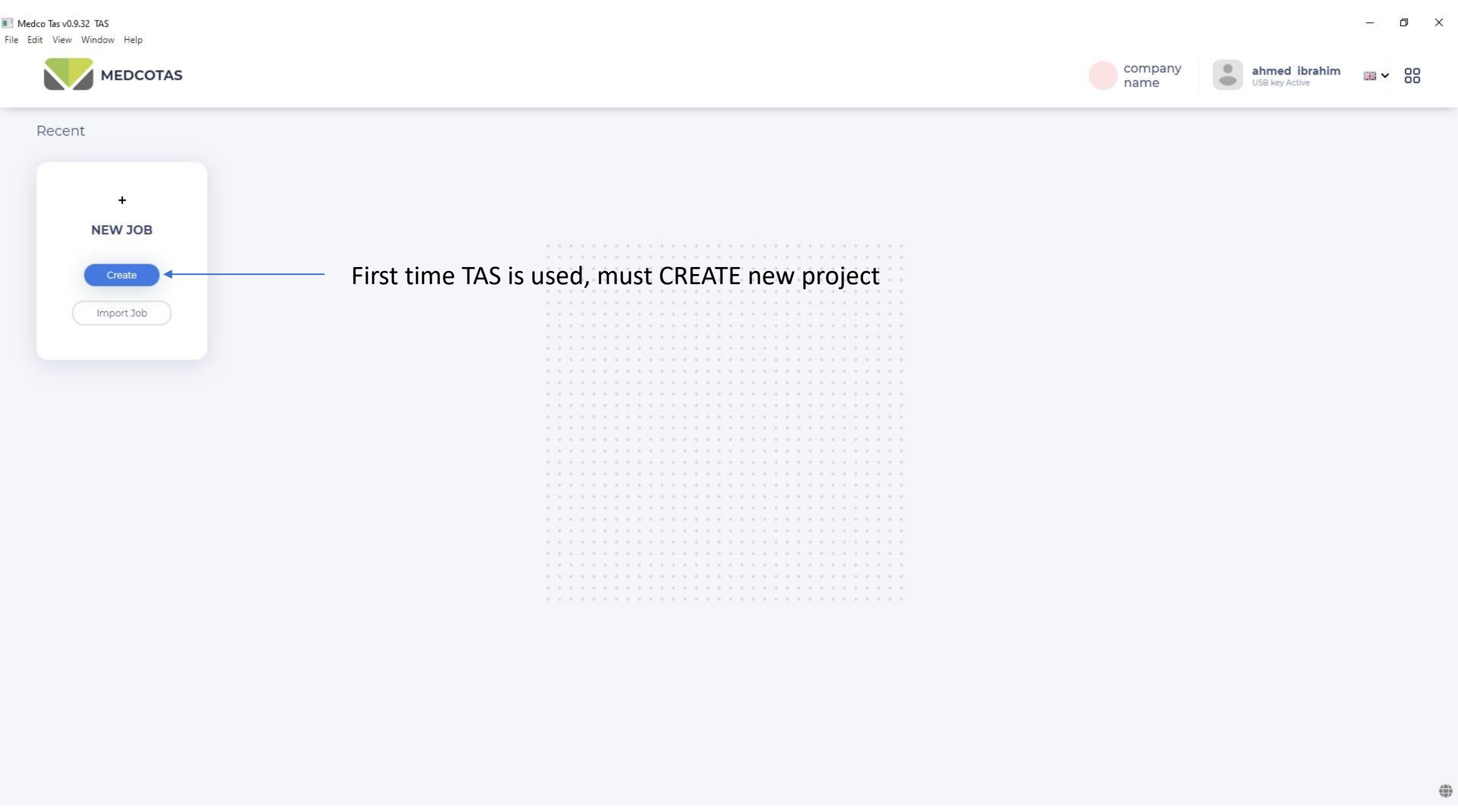
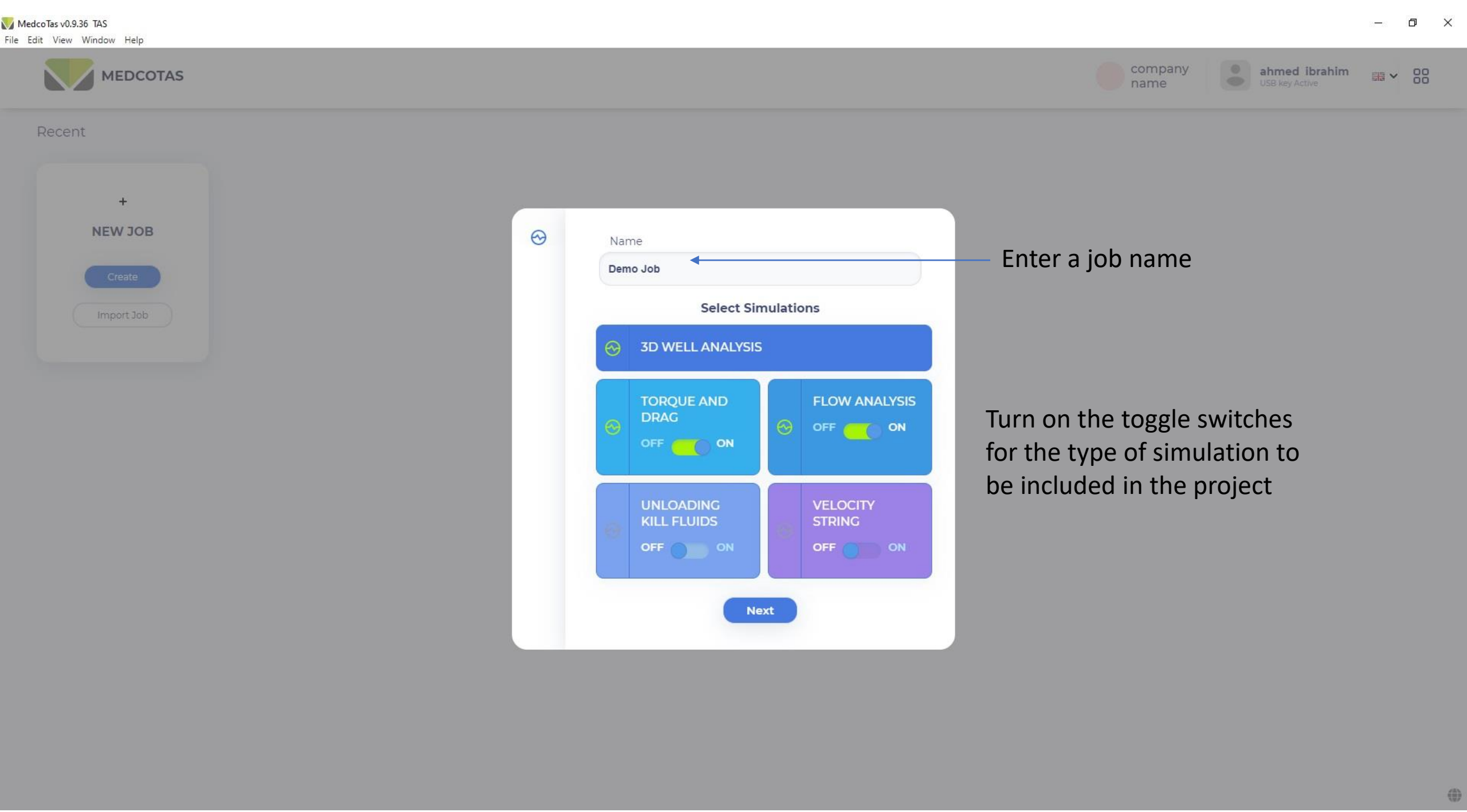
Tubing Analysis System

Simualtion Software


Medco Tas v0.9.32 TAS
File Edit View Window Help
MEDCOTAS
company name
ahmed ibrahim
USB key Active
Recent
+
NEW JOB
Create
Import Job
First time TAS is used, must CREATE new project


MedcoTas v0.9.36 TAS
File Edit View Window Help
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company name
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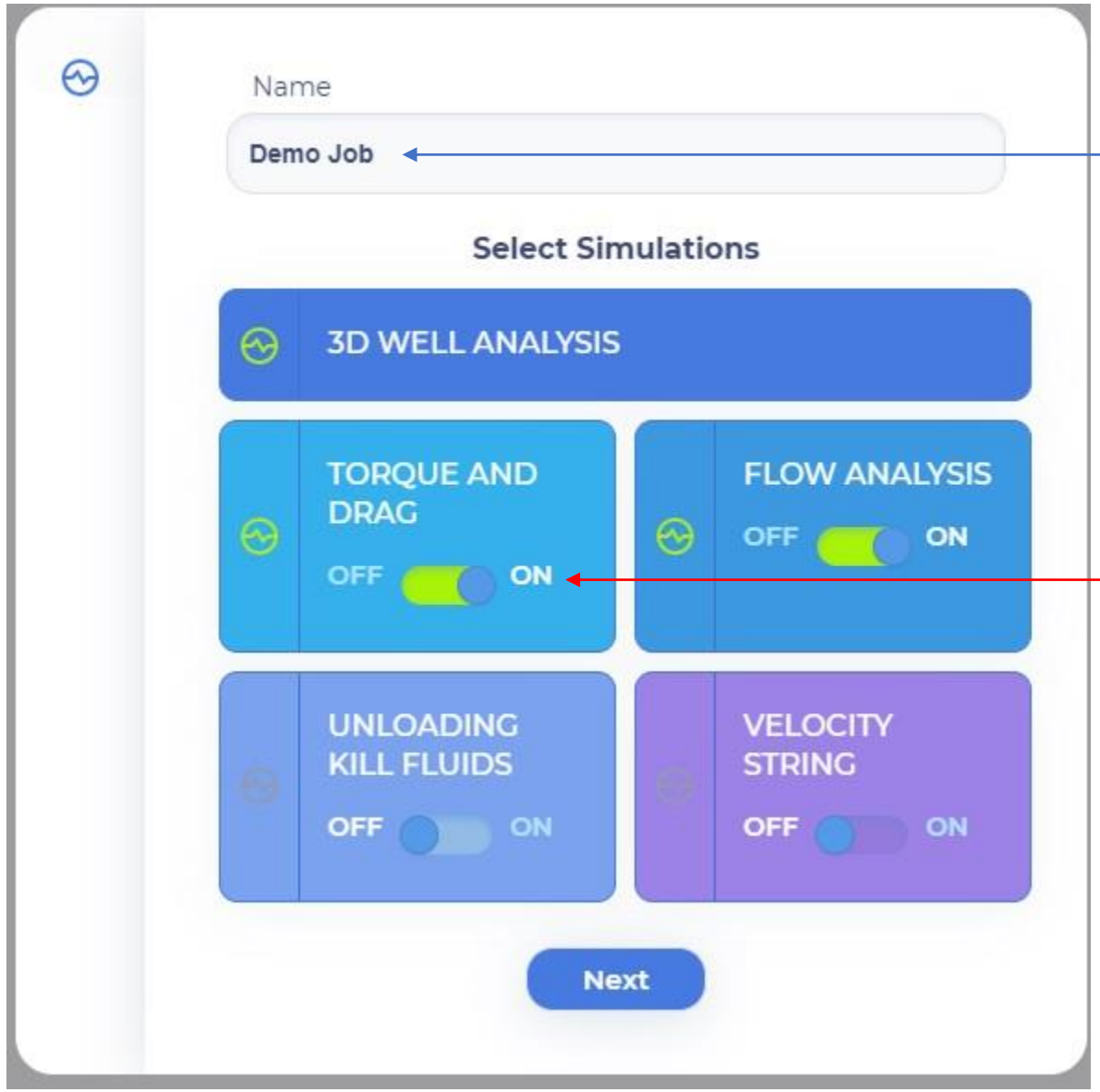
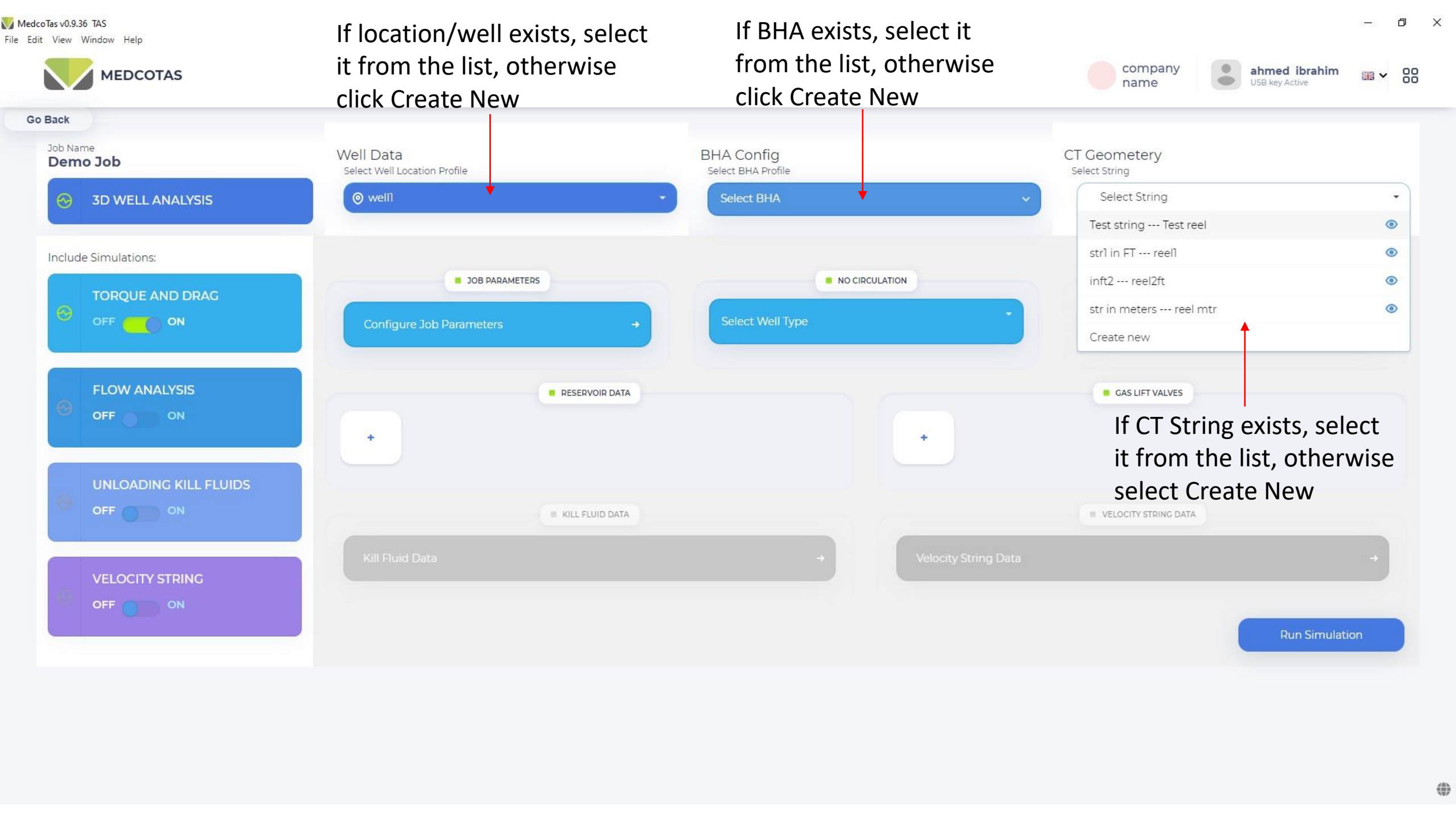
Recent
+
NEW JOB
Create
Import Job
Name
Demo Job
Select Simulations
3D WELL ANALYSIS
TORQUE AND DRAG
OFF ON
FLOW ANALYSIS
OFF ON
UNLOADING KILL FLUIDS
OFF ON
VELOCITY STRING
OFF ON
Next
Enter a job name
Turn on the toggle switches for the type of simulation to be included in the project



This project name is “Demo Job”

Type of simulations included in this project/job is Torque & Drag and Flow Analysis (Fluid Circulation)


MedcoTas v0.9.36 TAS
File Edit View Window Help
MEDCOTAS
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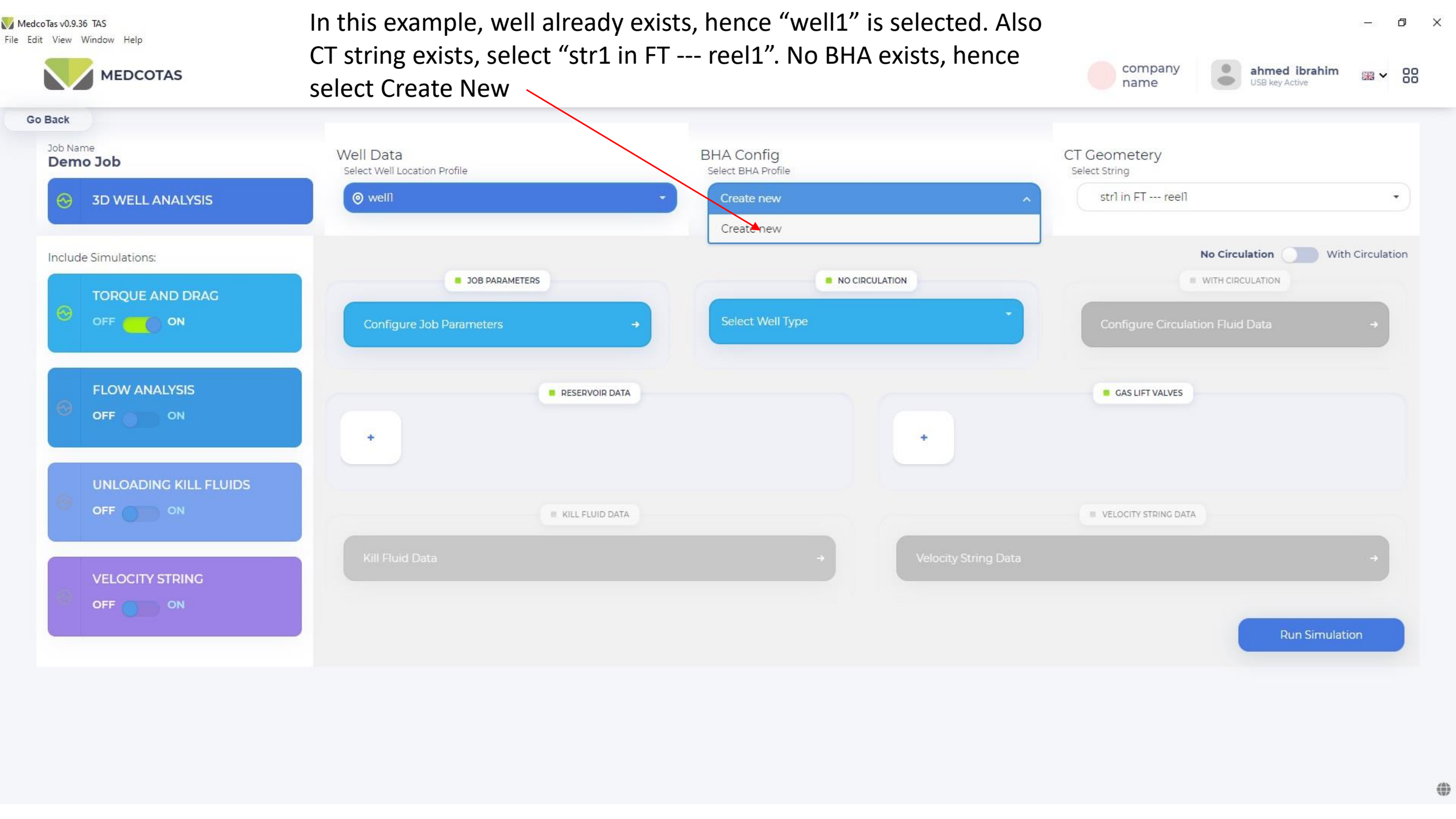
USB key Active
Go Back
If location/well exists, select it from the list, otherwise click Create New
If BHA exists, select it from the list, otherwise click Create New
Job Name
Demo Job
3D WELL ANALYSIS
Include Simulations:
TORQUE AND DRAG
OFF ON
FLOW ANALYSIS
OFF ON
UNLOADING KILL FLUIDS
OFF ON
VELOCITY STRING
OFF ON
Well Data
Select Well Location Profile
well1
BHA Config
Select BHA Profile
Select BHA
CT Geometery
Select String
Select String
Test string --- Test reel
str1 in FT --- reel1
inft2 --- reel2ft
str in meters --- reel mtr
Create new
If CT String exists, select it from the list, otherwise select Create New
JOB PARAMETERS
Configure Job Parameters
NO CIRCULATION
Select Well Type
RESERVOIR DATA
GAS LIFT VALVES
KILL FLUID DATA
Kill Fluid Data
VELOCITY STRING DATA
Velocity String Data
Run Simulation


In this example, well already exists, hence “well1” is selected. Also CT string exists, select “str1 in FT --- reel1”. No BHA exists, hence select Create New
MedcoTas v0.9.36 TAS
File Edit View Window Help
MEDCOTAS
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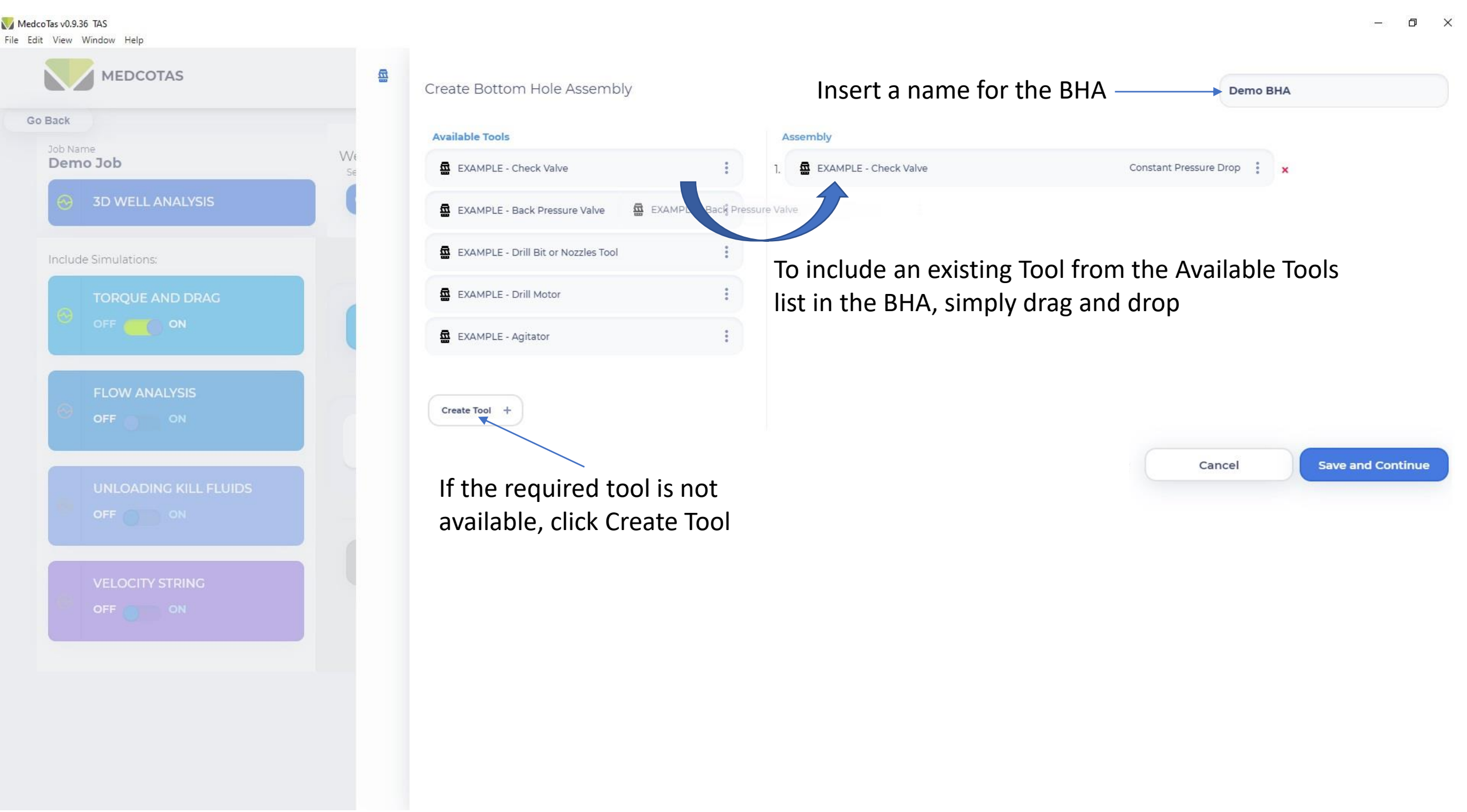
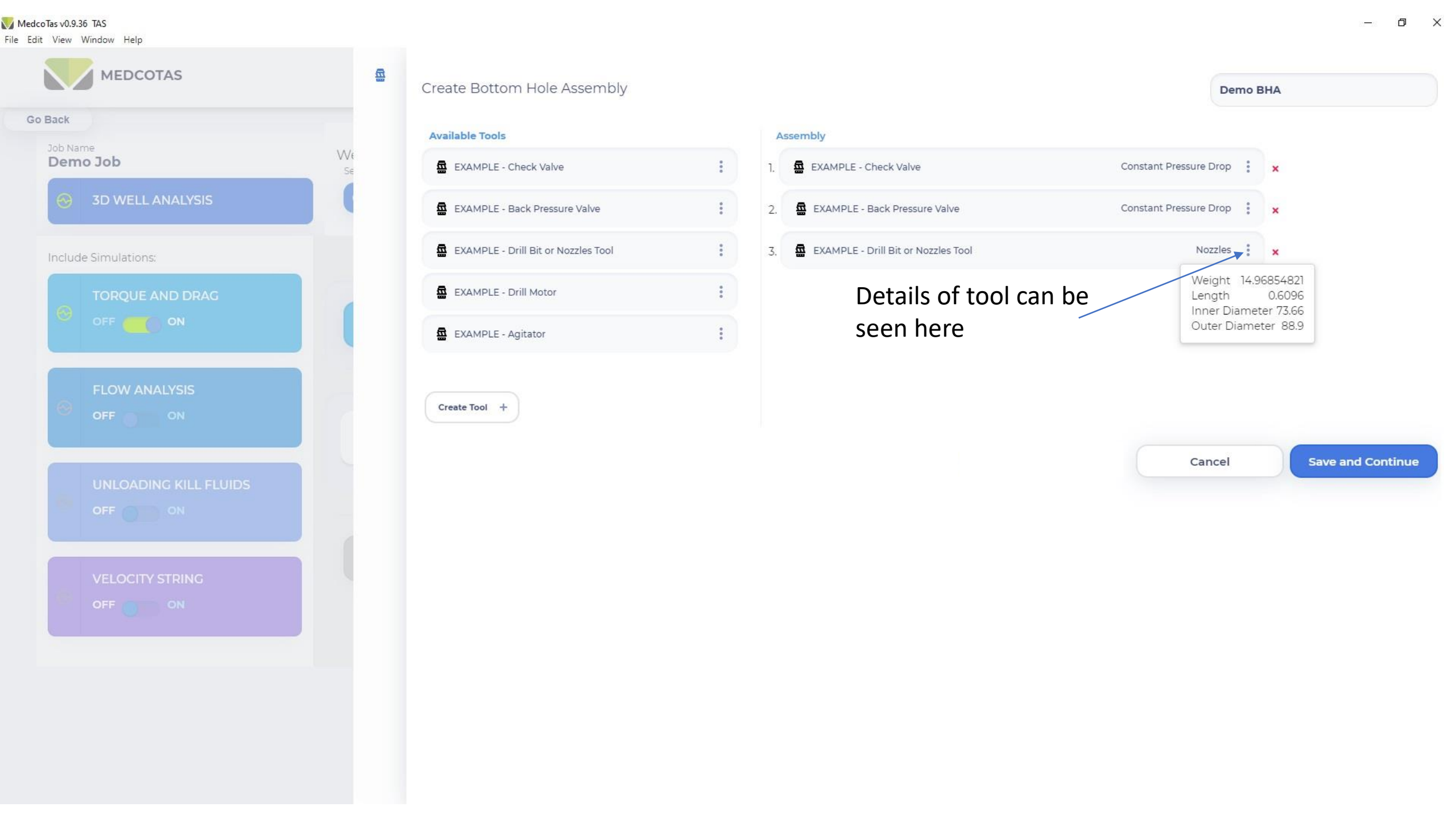
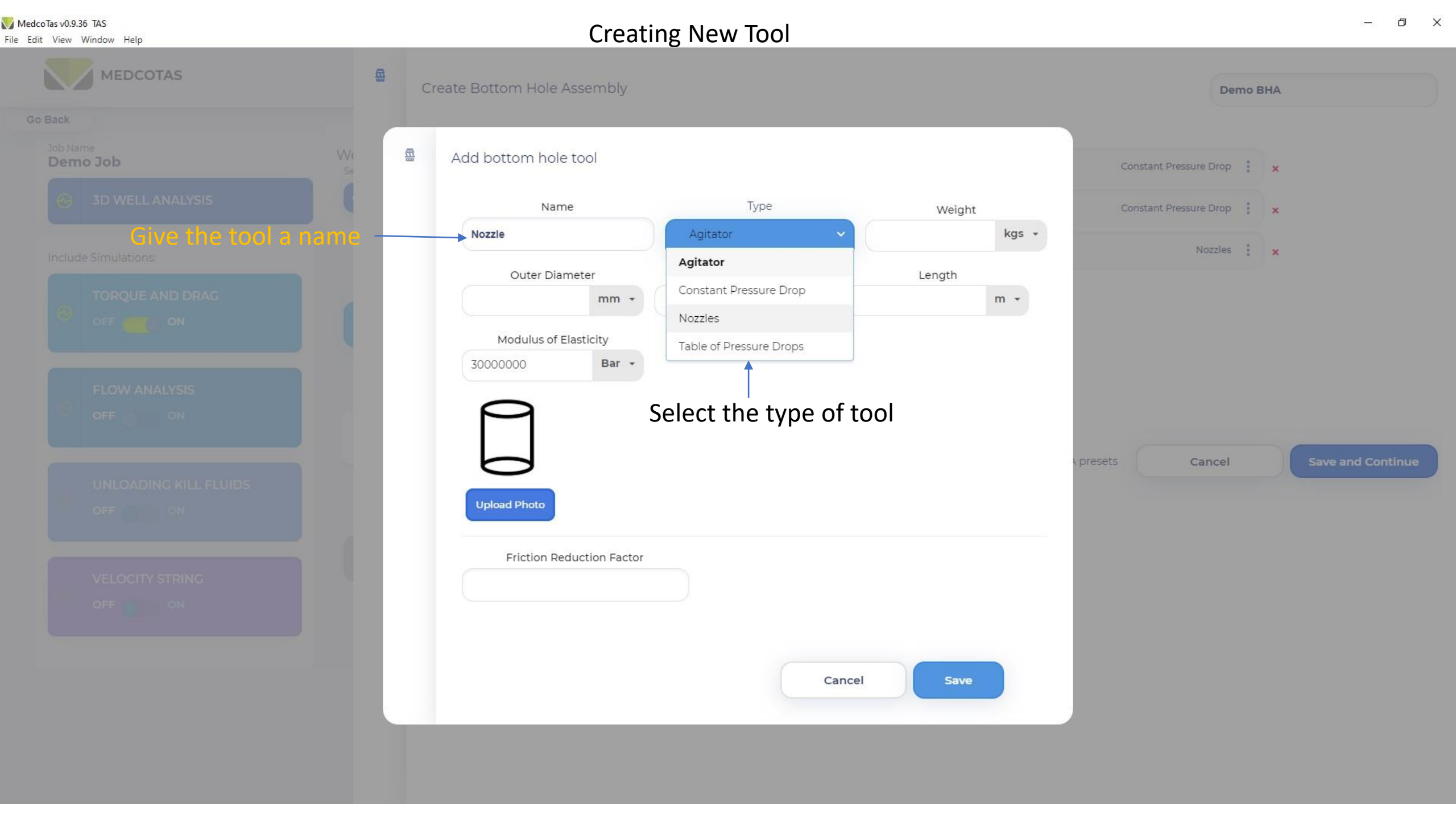
Go Back
Job Name
Demo Job
3D WELL ANALYSIS
Include Simulations:
TORQUE AND DRAG
OFF ON
FLOW ANALYSIS
OFF ON
UNLOADING KILL FLUIDS
OFF ON
VELOCITY STRING
OFF ON
Well Data
Select Well Location Profile
well1
BHA Config
Select BHA Profile
Create new
Create new
CT Geometery
Select String
str1 in FT --- reel1
No Circulation
With Circulation
JOB PARAMETERS
Configure Job Parameters
NO CIRCULATION
Select Well Type
WITH CIRCULATION
Configure Circulation Fluid Data
RESERVOIR DATA
GAS LIFT VALVES
KILL FLUID DATA
Kill Fluid Data
VELOCITY STRING DATA
Velocity String Data
Run Simulation


MedcoTas v0.9.36 TAS
File Edit View Window Help
MEDCOTAS
Go Back
Job Name
Demo Job
3D WELL ANALYSIS
Include Simulations:
TORQUE AND DRAG
OFF ON
FLOW ANALYSIS
OFF ON
UNLOADING KILL FLUIDS
OFF ON
VELOCITY STRING
OFF ON
Create Bottom Hole Assembly
Insert a name for the BHA
Demo BHA
Available Tools
EXAMPLE - Check Valve
EXAMPLE - Back Pressure Valve
EXAMPLE - Drill Bit or Nozzles Tool
EXAMPLE - Drill Motor
EXAMPLE - Agitator
Assembly
1. EXAMPLE - Check Valve
Constant Pressure Drop
To include an existing Tool from the Available Tools list in the BHA, simply drag and drop
Create Tool +
If the required tool is not available, click Create Tool
Cancel
Save and Continue

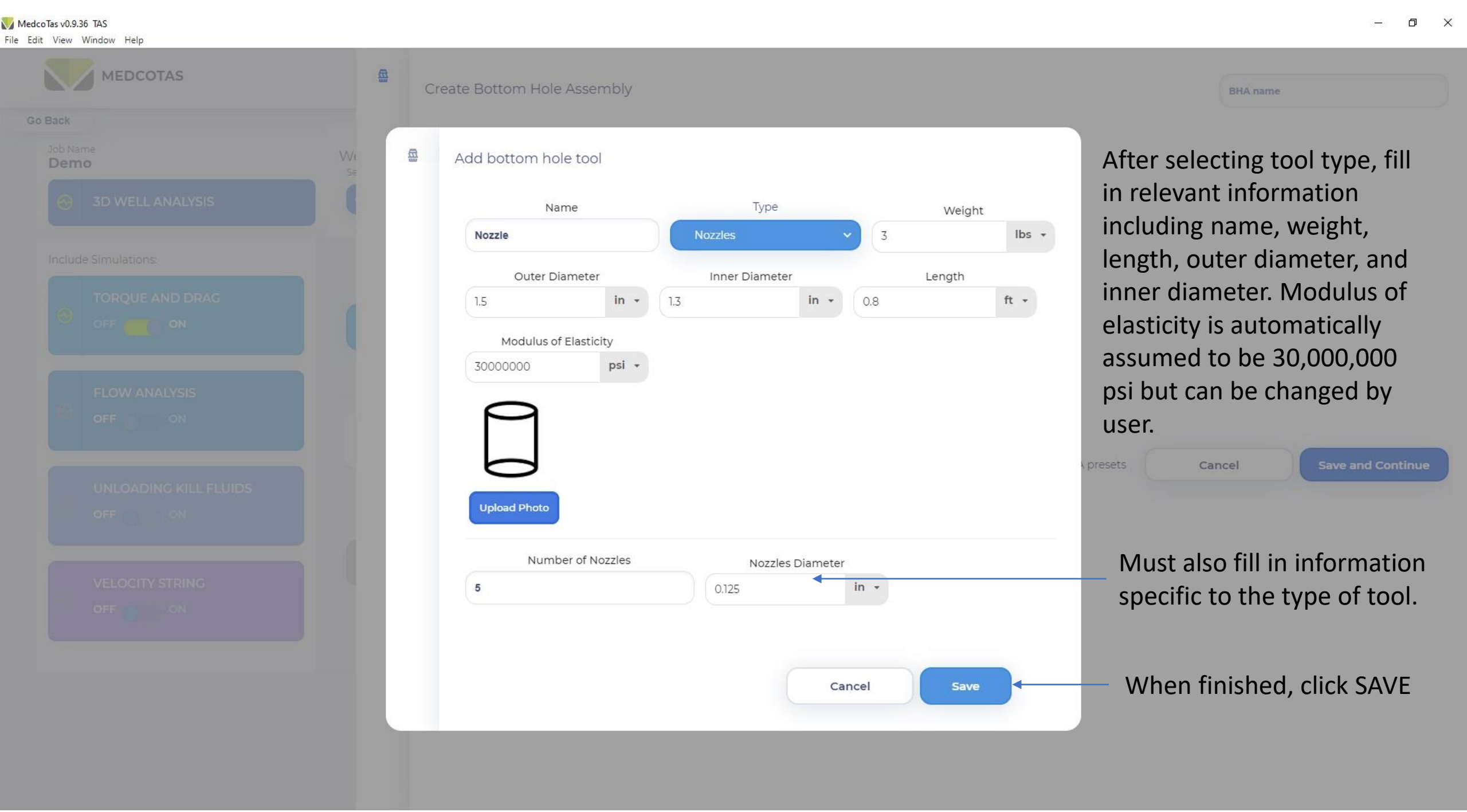

MedcoTas v0.9.36 TAS
File Edit View Window Help
MEDCOTAS
Go Back
Job Name
Demo Job
3D WELL ANALYSIS
Include Simulations:
TORQUE AND DRAG
OFF ON
FLOW ANALYSIS
OFF ON
UNLOADING KILL FLUIDS
OFF ON
VELOCITY STRING
OFF ON
Create Bottom Hole Assembly
Demo BHA
Available Tools
EXAMPLE - Check Valve
EXAMPLE - Back Pressure Valve
EXAMPLE - Drill Bit or Nozzles Tool
EXAMPLE - Drill Motor
EXAMPLE - Agitator
Create Tool +
Assembly
1. EXAMPLE - Check Valve Constant Pressure Drop
2. EXAMPLE - Back Pressure Valve Constant Pressure Drop
3. EXAMPLE - Drill Bit or Nozzles Tool Nozzles
Weight 14.96854821
Length 0.6096
Inner Diameter 73.66
Outer Diameter 88.9
Details of tool can be seen here
Cancel
Save and Continue

Creating New Tool



Downhole Tools Types

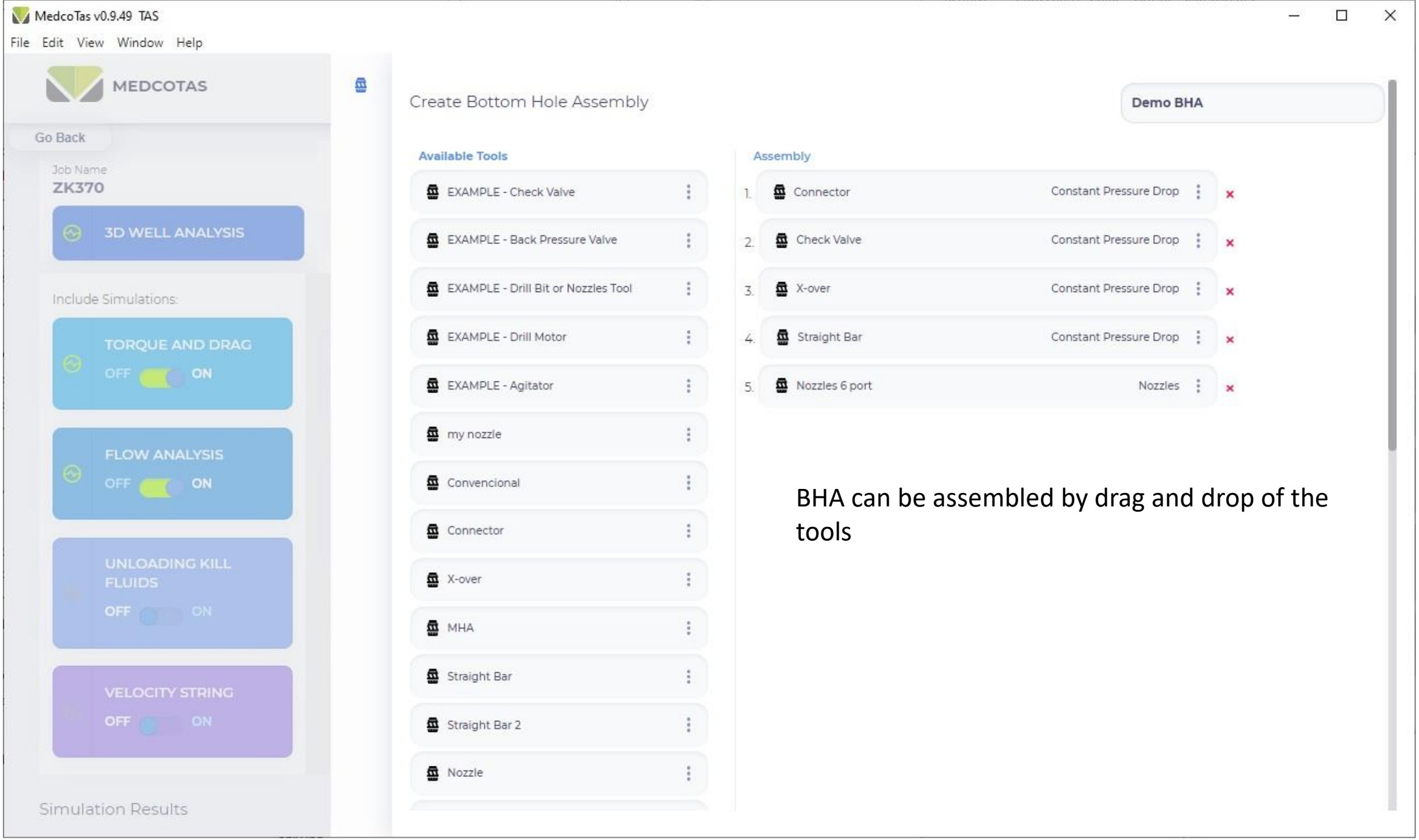
1. **Constant Pressure Drop**: Regardless of flow rates, this tool will produce a constant pressure drop. Examples include Check Valve and Back Pressure Valve.
2. **Table of Pressure Drops**: A 3-point table of pressure drops vs flow rates is required here. TAS will then interpolate or extrapolate to calculate the appropriate pressure drop based on the fluid flow through the tool. Example, drill motor.
3. **Compute through Nozzles**: For this type of tool, number of nozzles and nzzole's diameter are required. TAS will compute pressure drop for flow through the nozzles. Example, jetting tool or drill bit.
4. **Agitator**: A special type of tool that produces axial oscillations, thus reducing friction between the coiled tubing and the wellbore.

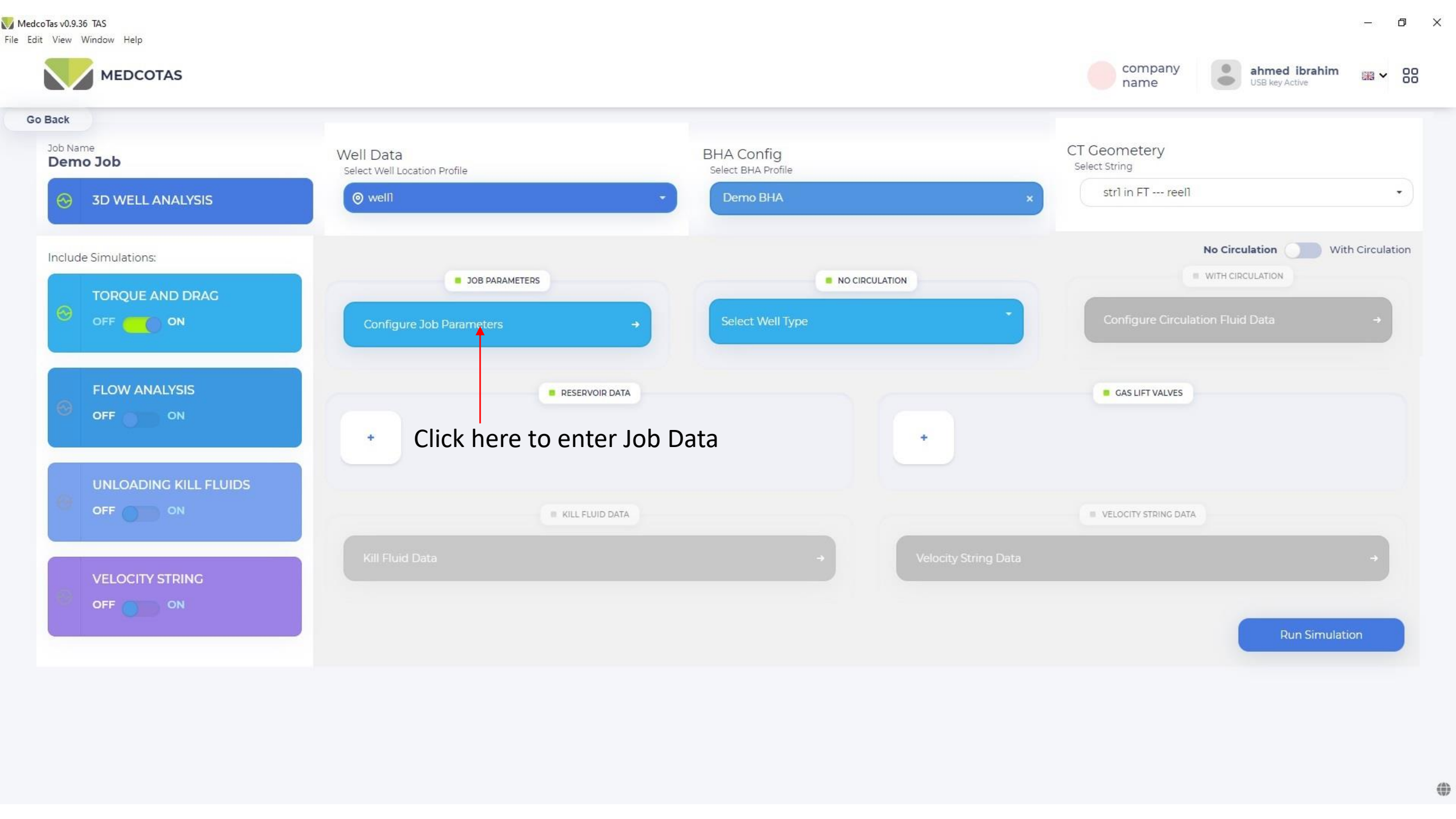


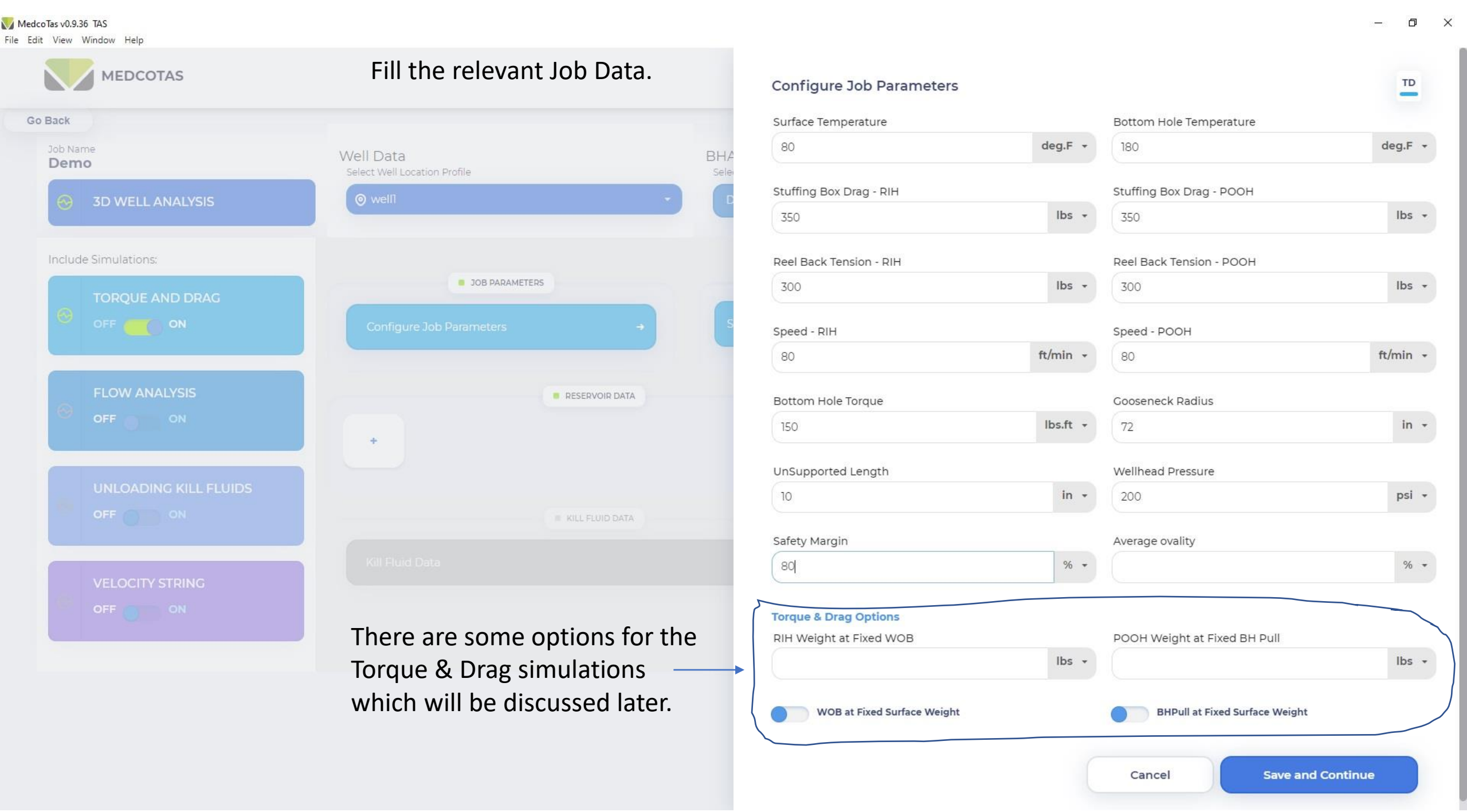
After selecting tool type, fill in relevant information including name, weight, length, outer diameter, and inner diameter. Modulus of elasticity is automatically assumed to be 30,000,000 psi but can be changed by user.

Must also fill in information specific to the type of tool.

When finished, click SAVE


MedcoTas v0.9.49 TAS
File Edit View Window Help
MEDCOTAS
Go Back
Job Name
ZK370
3D WELL ANALYSIS
Include Simulations:
TORQUE AND DRAG
OFF ON
FLOW ANALYSIS
OFF ON
UNLOADING KILL FLUIDS
OFF ON
VELOCITY STRING
OFF ON
Simulation Results
Create Bottom Hole Assembly
Demo BHA
Available Tools
EXAMPLE - Check Valve
EXAMPLE - Back Pressure Valve
EXAMPLE - Drill Bit or Nozzles Tool
EXAMPLE - Drill Motor
EXAMPLE - Agitator
my nozzle
Convencional
Connector
X-over
MHA
Straight Bar
Straight Bar 2
Nozzle
Assembly
1. Connector Constant Pressure Drop
2. Check Valve Constant Pressure Drop
3. X-over Constant Pressure Drop
4. Straight Bar Constant Pressure Drop
5. Nozzles 6 port Nozzles
BHA can be assembled by drag and drop of the tools


MedcoTas v0.9.36 TAS
File Edit View Window Help
MEDCOTAS
company name
ahmed ibrahim
USB key Active
Go Back
Job Name
Demo Job
3D WELL ANALYSIS
Include Simulations:
TORQUE AND DRAG
OFF ON
FLOW ANALYSIS
OFF ON
UNLOADING KILL FLUIDS
OFF ON
VELOCITY STRING
OFF ON
Well Data
Select Well Location Profile
well1
BHA Config
Select BHA Profile
Demo BHA
CT Geometery
Select String
str1 in FT --- reel1
No Circulation
With Circulation
JOB PARAMETERS
Configure Job Parameters
NO CIRCULATION
Select Well Type
WITH CIRCULATION
Configure Circulation Fluid Data
RESERVOIR DATA
GAS LIFT VALVES
Click here to enter Job Data
KILL FLUID DATA
Kill Fluid Data
VELOCITY STRING DATA
Velocity String Data
Run Simulation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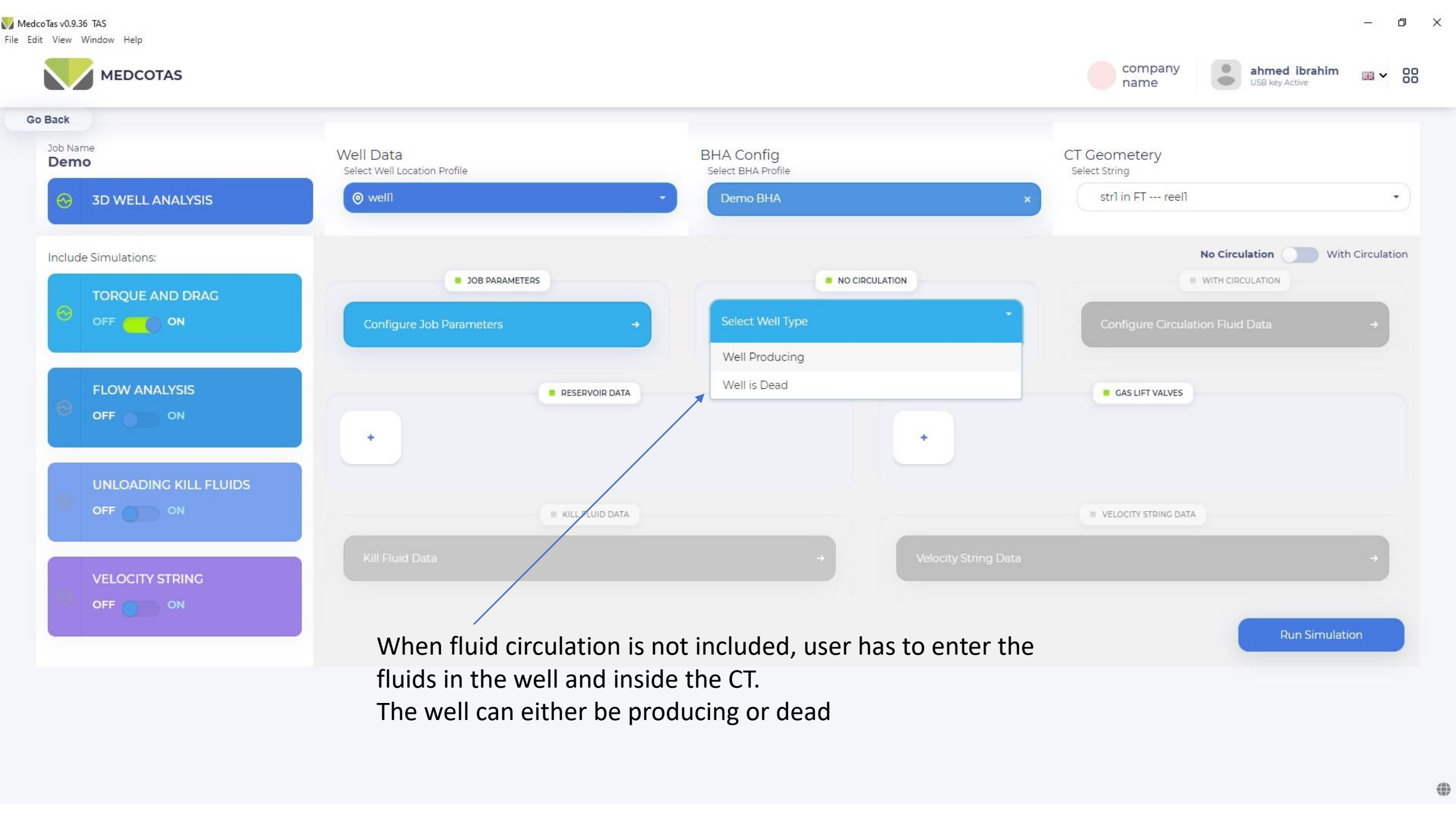
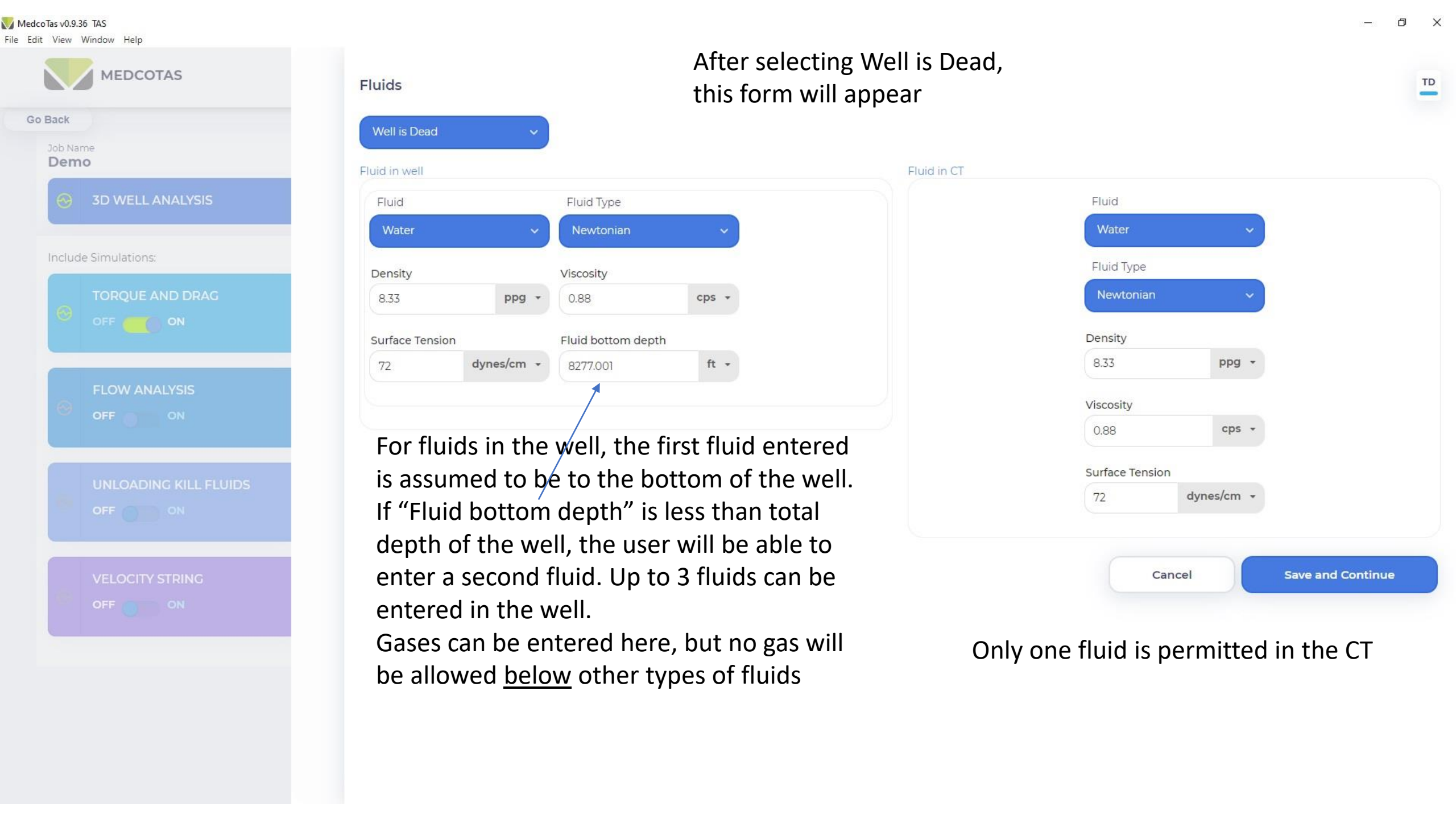
File Edit View Window Help
MEDCOTAS
Fill the relevant Job Data.
Go Back
Job Name
Demo
3D WELL ANALYSIS
Include Simulations:
TORQUE AND DRAG
OFF ON
FLOW ANALYSIS
OFF ON
UNLOADING KILL FLUIDS
OFF ON
VELOCITY STRING
OFF ON
Well Data
Select Well Location Profile
well
JOB PARAMETERS
Configure Job Parameters
RESERVOIR DATA
KILL FLUID DATA
Kill Fluid Data
There are some options for the Torque & Drag simulations which will be discussed later.
Configure Job Parameters
TD
Surface Temperature
80
deg.F
Bottom Hole Temperature
180
deg.F
Stuffing Box Drag - RIH
350
lbs
Stuffing Box Drag - POOH
350
lbs
Reel Back Tension - RIH
300
lbs
Reel Back Tension - POOH
300
lbs
Speed - RIH
80
ft/min
Speed - POOH
80
ft/min
Bottom Hole Torque
150
lbs.ft
Gooseneck Radius
72
in
UnSupported Length
10
in
Wellhead Pressure
200
psi
Safety Margin
80
%
Average ovality
%
Torque & Drag Options
RIH Weight at Fixed WOB
lbs
POOH Weight at Fixed BH Pull
lbs
WOB at Fixed Surface Weight
BHPull at Fixed Surface Weight
Cancel
Save and Continue



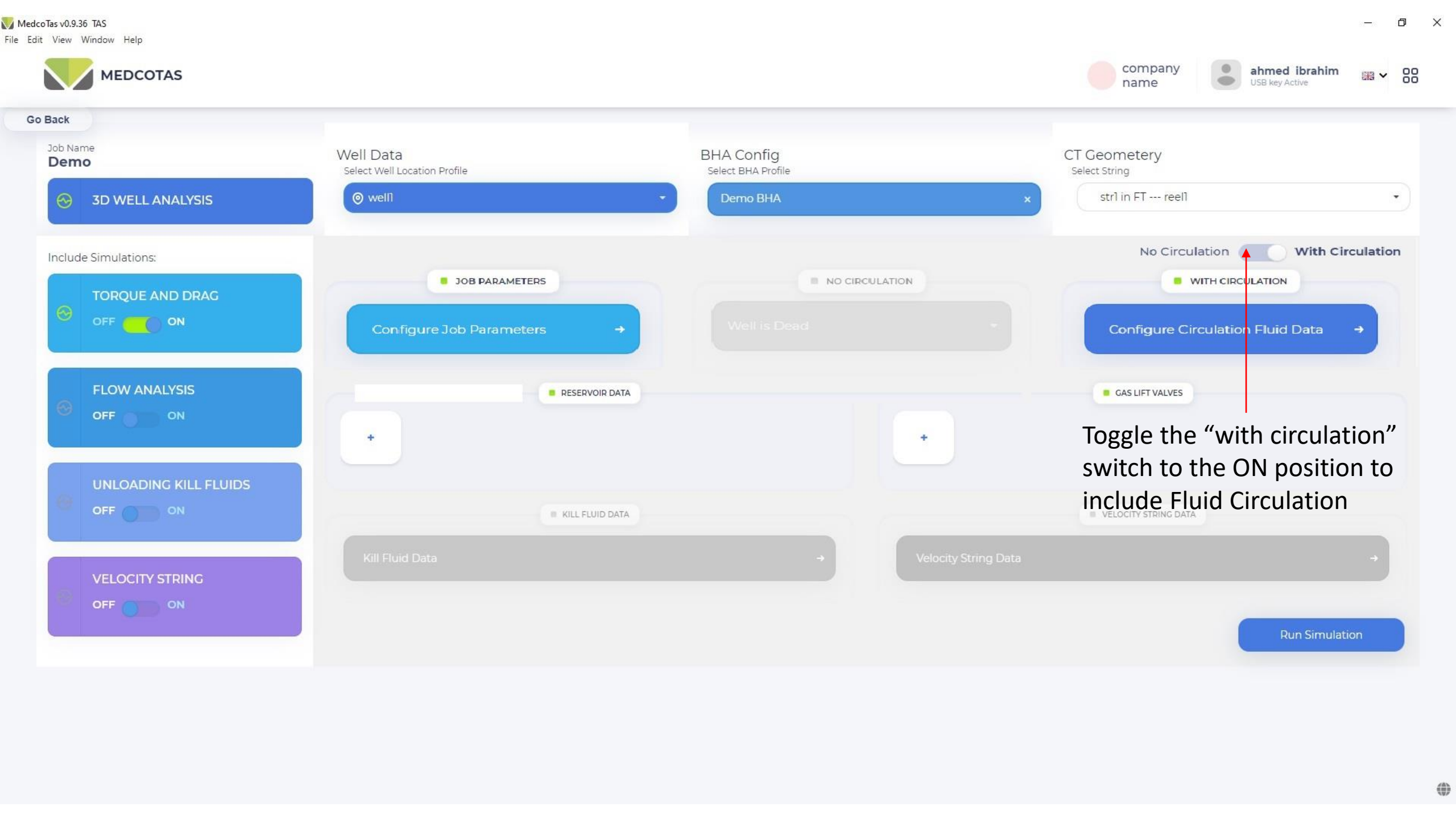
When fluid circulation is not included, user has to enter the fluids in the well and inside the CT.
The well can either be producing or dead



After selecting Well is Dead, this form will appear

For fluids in the well, the first fluid entered is assumed to be to the bottom of the well. If “Fluid bottom depth” is less than total depth of the well, the user will be able to enter a second fluid. Up to 3 fluids can be entered in the well.
Gases can be entered here, but no gas will be allowed <u>below</u> other types of fluids

Only one fluid is permitted in the CT


MedcoTas v0.9.36 TAS
File Edit View Window Help
MEDCOTAS
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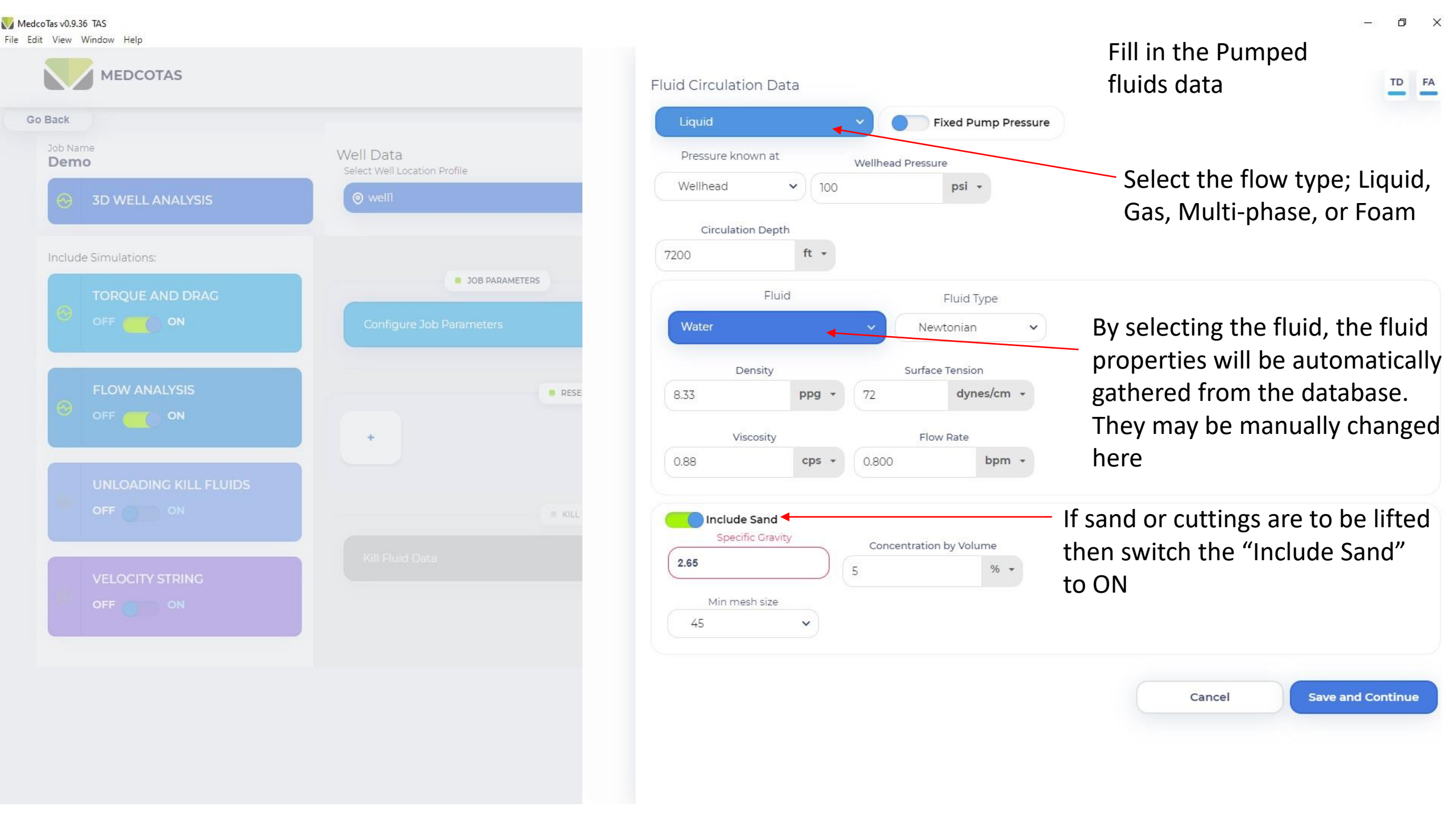
Go Back
Job Name
Demo
3D WELL ANALYSIS
Include Simulations:
TORQUE AND DRAG
OFF ON
FLOW ANALYSIS
OFF ON
UNLOADING KILL FLUIDS
OFF ON
VELOCITY STRING
OFF ON
Well Data
Select Well Location Profile
well1
BHA Config
Select BHA Profile
Demo BHA
CT Geometery
Select String
str1 in FT --- reel1
No Circulation
With Circulation
JOB PARAMETERS
Configure Job Parameters
NO CIRCULATION
Well is Dead
WITH CIRCULATION
Configure Circulation Fluid Data
RESERVOIR DATA
GAS LIFT VALVES
KILL FLUID DATA
Kill Fluid Data
VELOCITY STRING DATA
Velocity String Data
Run Simulation
Toggle the “with circulation” switch to the ON position to include Fluid Circulation

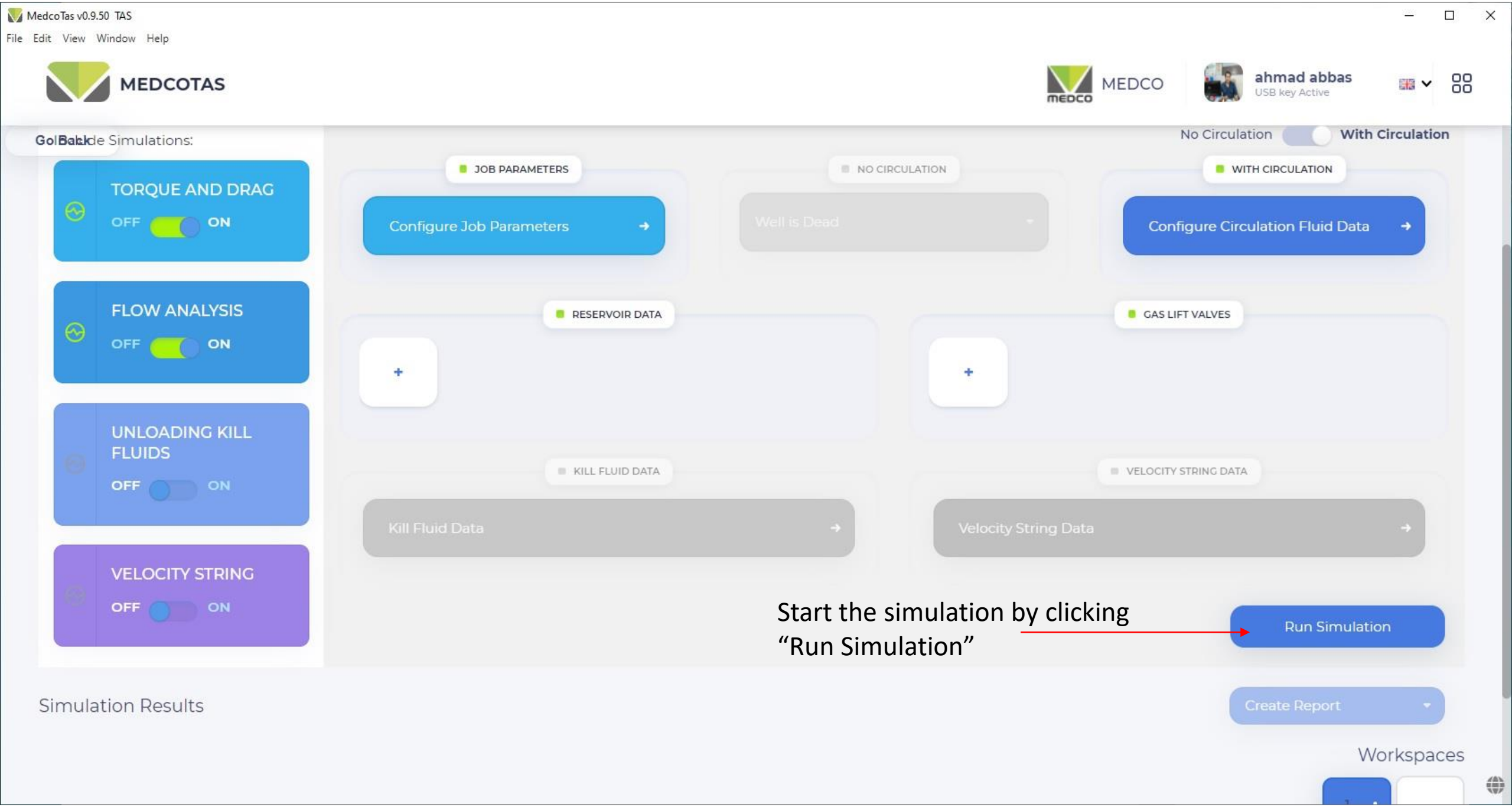


Fill in the Pumped fluids data

Select the flow type; Liquid, Gas, Multi-phase, or Foam

By selecting the fluid, the fluid properties will be automatically gathered from the database. They may be manually changed here

If sand or cuttings are to be lifted then switch the “Include Sand” to ON


MedcoTas v0.9.50 TAS
File Edit View Window Help
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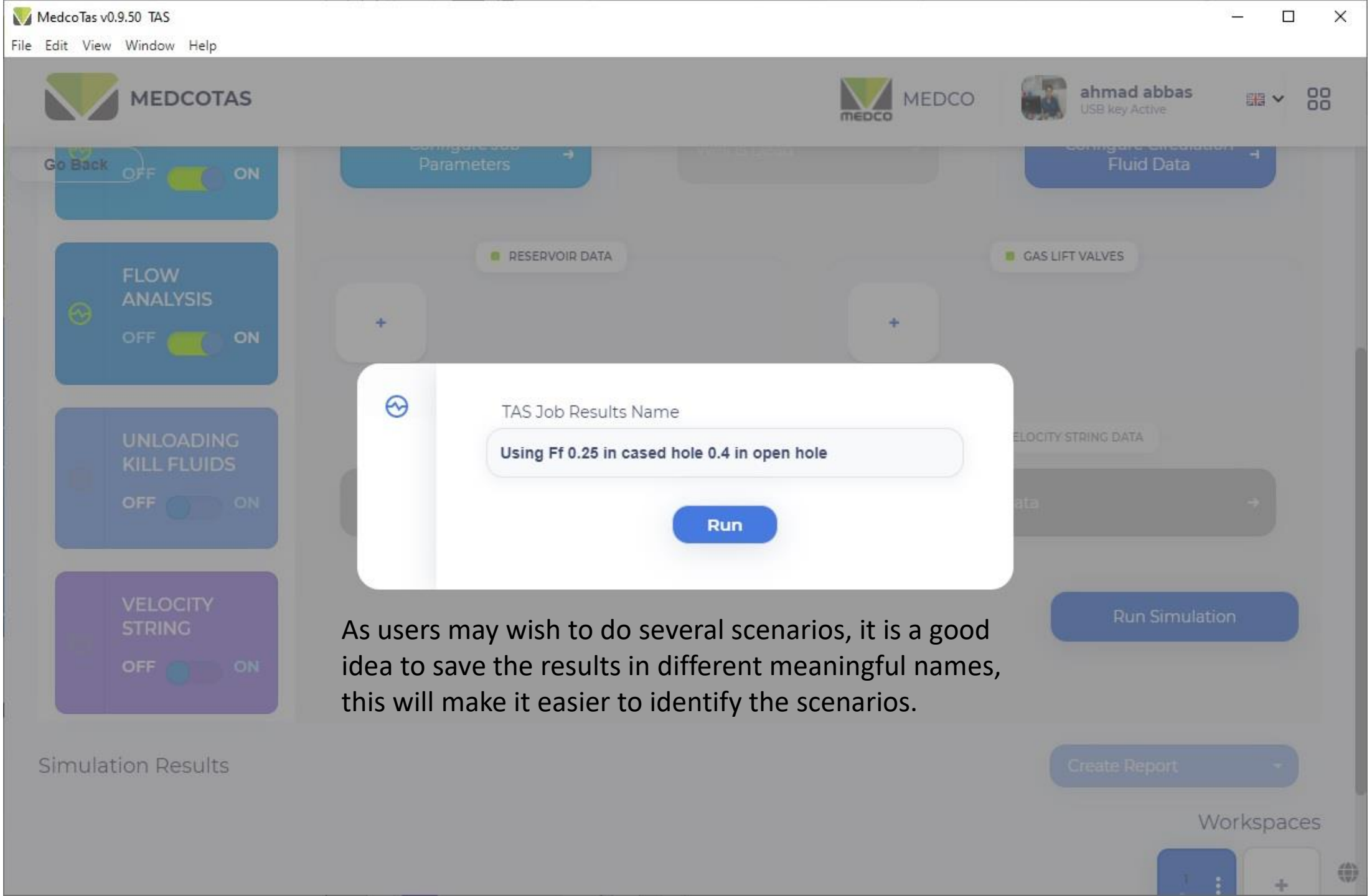
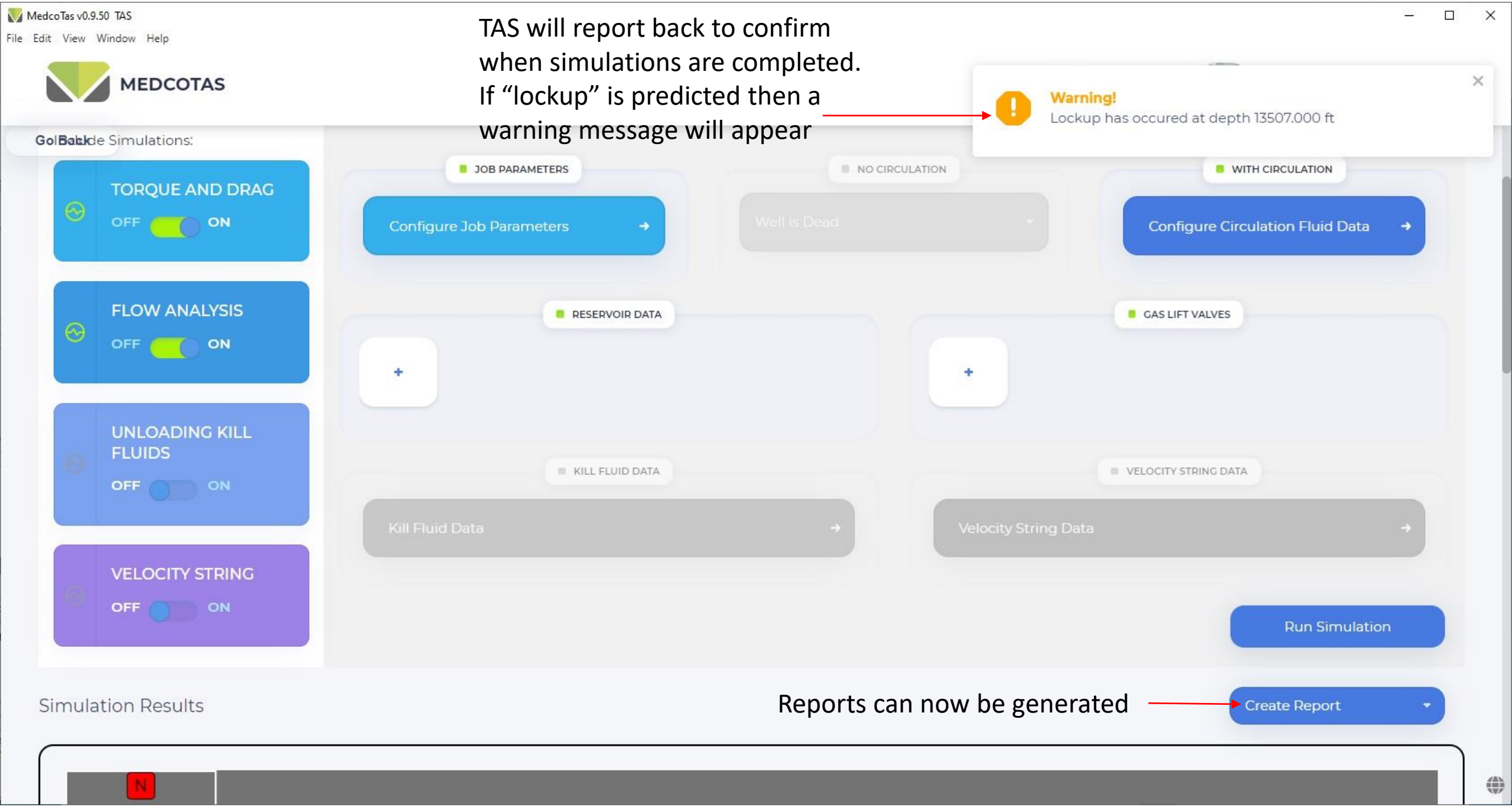
USB key Active
Go Back
Select Side Simulations:
TORQUE AND DRAG
OFF ON
FLOW ANALYSIS
OFF ON
UNLOADING KILL FLUIDS
OFF ON
VELOCITY STRING
OFF ON
No Circulation With Circulation
JOB PARAMETERS
Configure Job Parameters
NO CIRCULATION
Well is Dead
WITH CIRCULATION
Configure Circulation Fluid Data
RESERVOIR DATA
GAS LIFT VALVES
KILL FLUID DATA
Kill Fluid Data
VELOCITY STRING DATA
Velocity String Data
Start the simulation by clicking
“Run Simulation”
Run Simulation
Simulation Results
Create Report
Workspaces



As users may wish to do several scenarios, it is a good idea to save the results in different meaningful names, this will make it easier to identify the scenarios.


MedcoTas v0.9.50 TAS
File Edit View Window Help
MEDCOTAS
TAS will report back to confirm when simulations are completed.
If “lockup” is predicted then a warning message will appear
Warning!
Lockup has occured at depth 13507.000 ft
Go Back
Select Simulations:
TORQUE AND DRAG
OFF ON
FLOW ANALYSIS
OFF ON
UNLOADING KILL FLUIDS
OFF ON
VELOCITY STRING
OFF ON
JOB PARAMETERS
Configure Job Parameters
NO CIRCULATION
Well is Dead
WITH CIRCULATION
Configure Circulation Fluid Data
RESERVOIR DATA
GAS LIFT VALVES
KILL FLUID DATA
Kill Fluid Data
VELOCITY STRING DATA
Velocity String Data
Run Simulation
Simulation Results
Reports can now be generated
Create Report

Generating Reports

When generating reports, the user is free to customise the report to their own requirements. It is also possible to create some report templates and these will be available at a touch of a button.

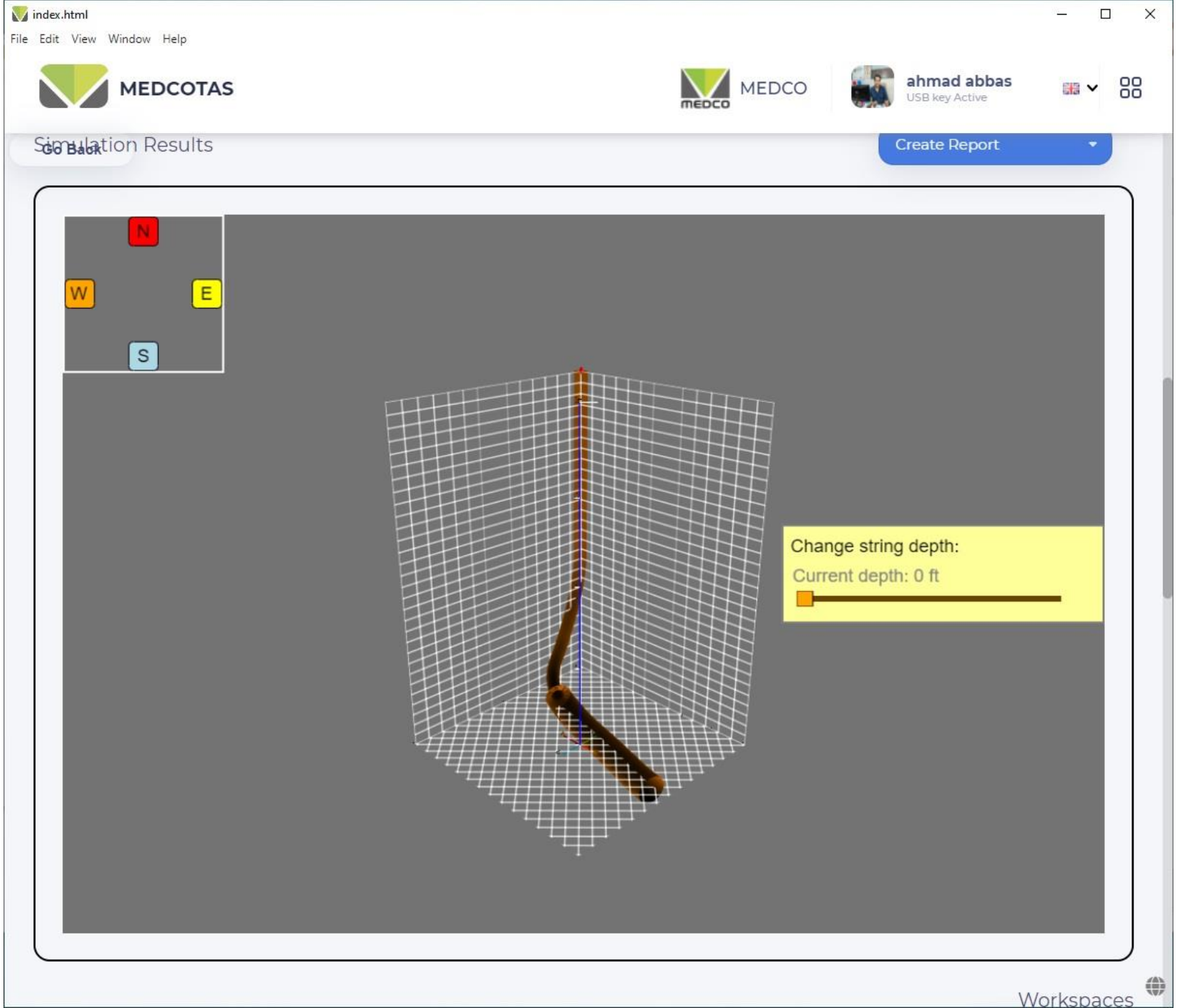
The reports can include system and/or user defined (custom) data & graphs. There is also a number of general information data that is available to add as comments.

First, the user will need to create a “Workspace” and create some “Custom Charts and Tables”. Once these have been created, they will become available for inclusion in the report.

3-D Well Schematic is immediately available after successfully running simulation.

To adjust the view, use the mouse left button to tilt, rotate or yaw and right button to move the schematic in any direction. To zoom in and out, hold the CTRL key and use the scroll on the mouse.

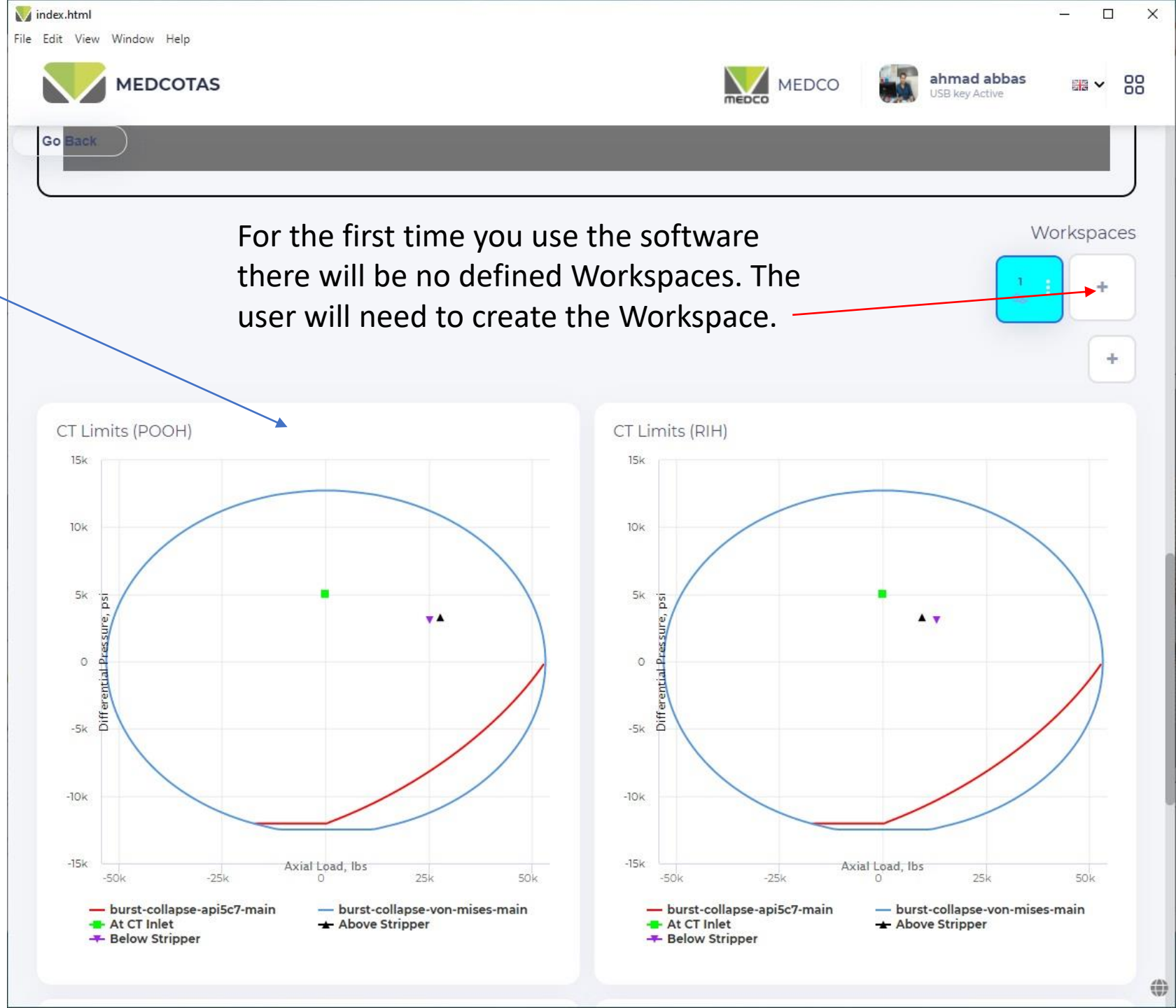
The view that you see here will be the one included in the report.

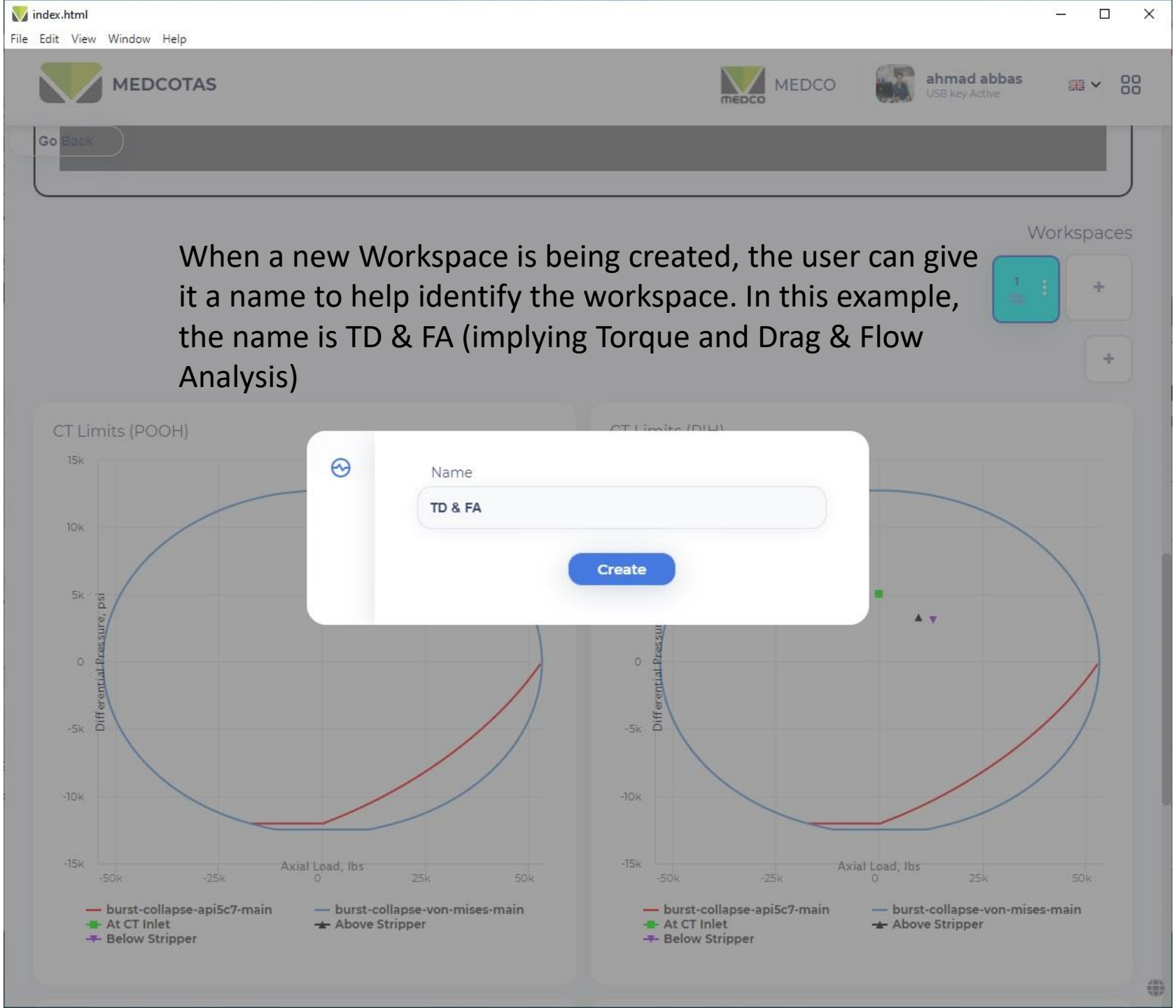


If the simulations include Torque & Drag, the CT Limits charts (Burst/Collapse) for Run-In-Hole (RIH) and Pull-Out-Of-Hole (POOH) are automatically included.

Note that objects, such as charts or tables, included in a workspace will be retentive, i.e. they will automatically appear when you select the particular workspace next time the program is used. The user will be able to add/remove objects.

For the first time you use the software there will be no defined Workspaces. The user will need to create the Workspace.




index.html
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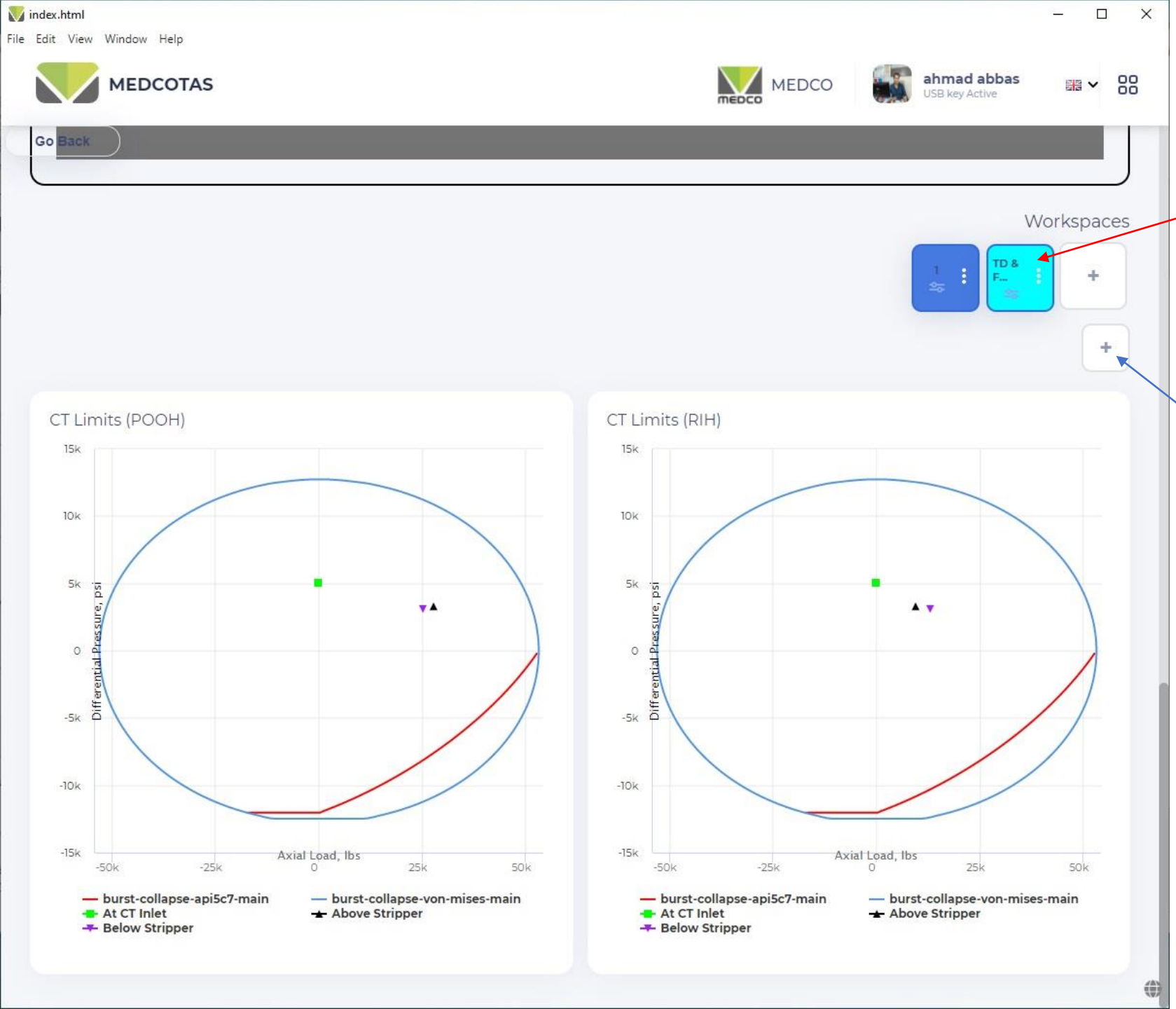
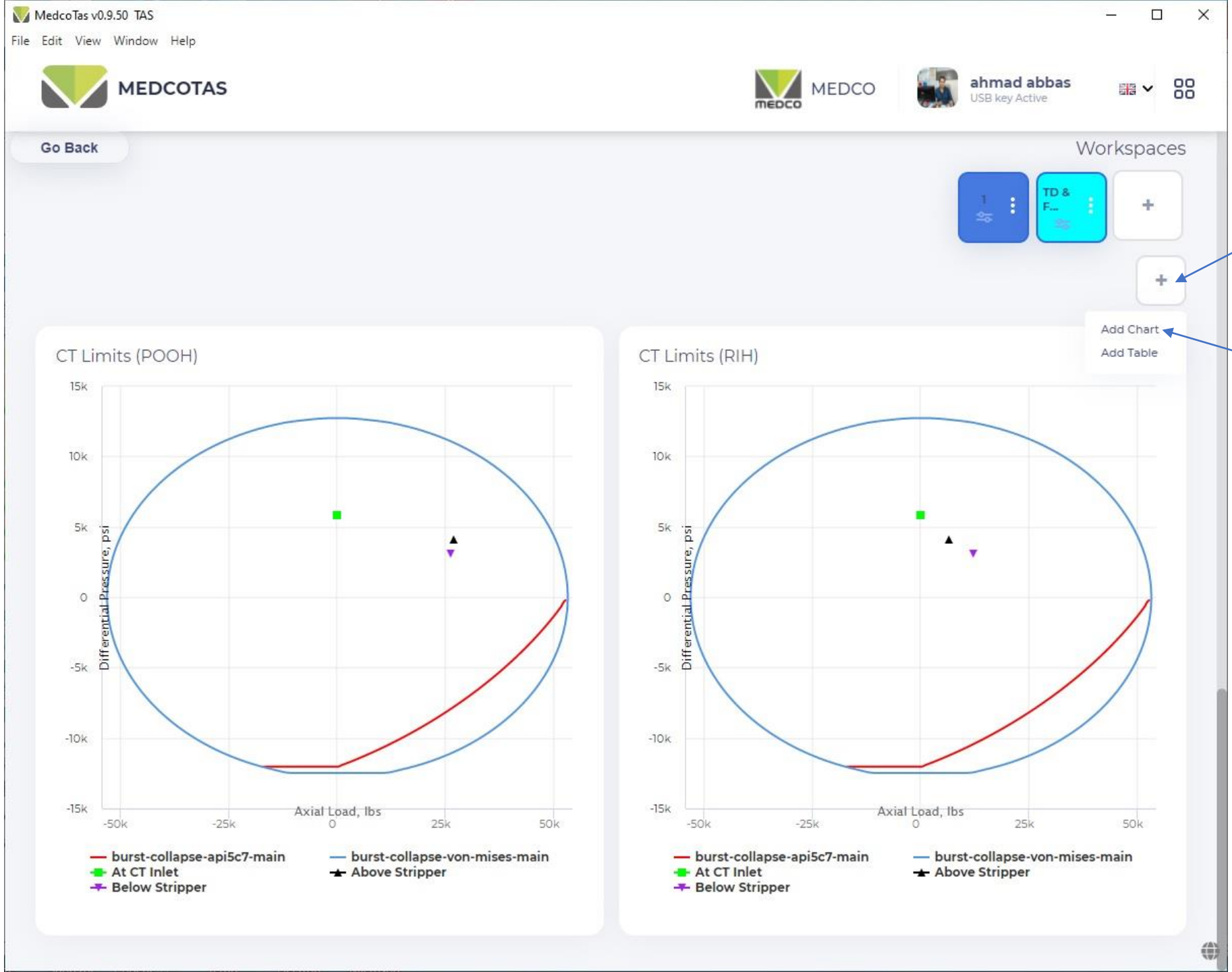
Go Back
Workspaces
When a new Workspace is being created, the user can give it a name to help identify the workspace. In this example, the name is TD & FA (implying Torque and Drag & Flow Analysis)
Name
TD & FA
Create
CT Limits (POOH)
Differential Pressure, psi
Axial Load, lbs
burst-collapse-api5c7-main
burst-collapse-von-mises-main
At CT Inlet
Above Stripper
Below Stripper



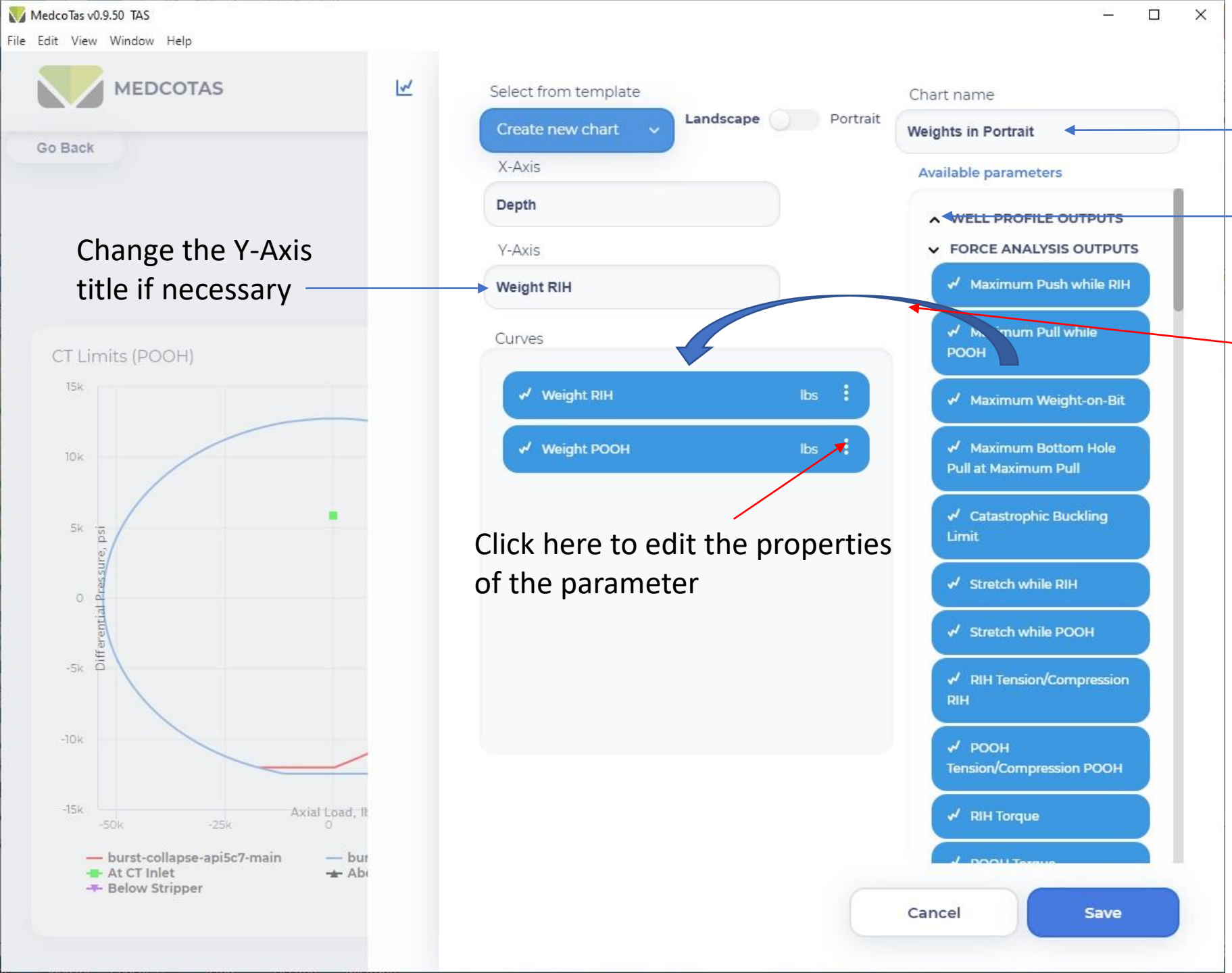
The selected workspace will be identified by a bright color

To start adding charts to the current workspace, click the “+” button



Click the “+” button and then select the object type, i.e. chart or table

First we will create a chart



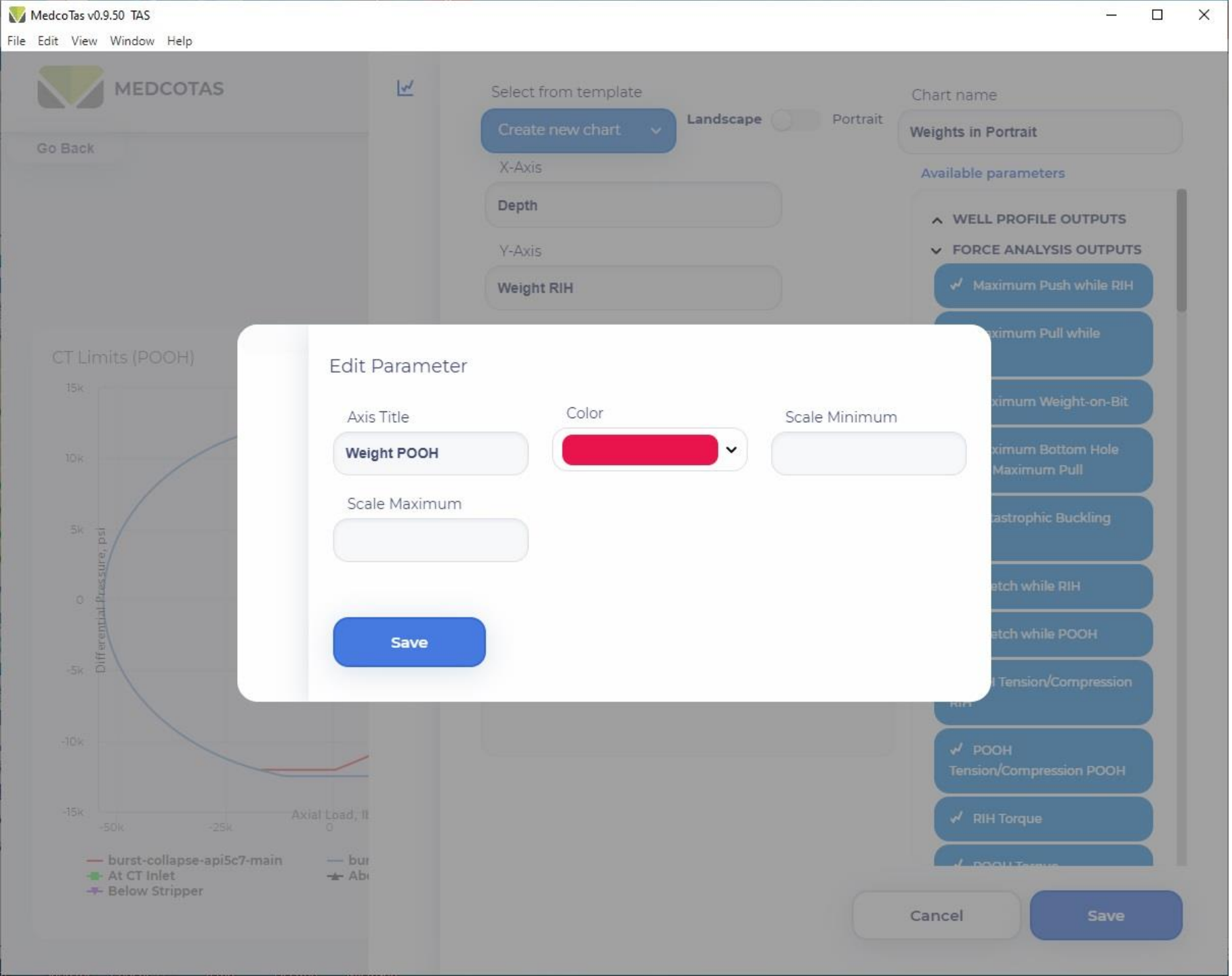
Change the Y-Axis title if necessary

Click here to edit the properties of the parameter

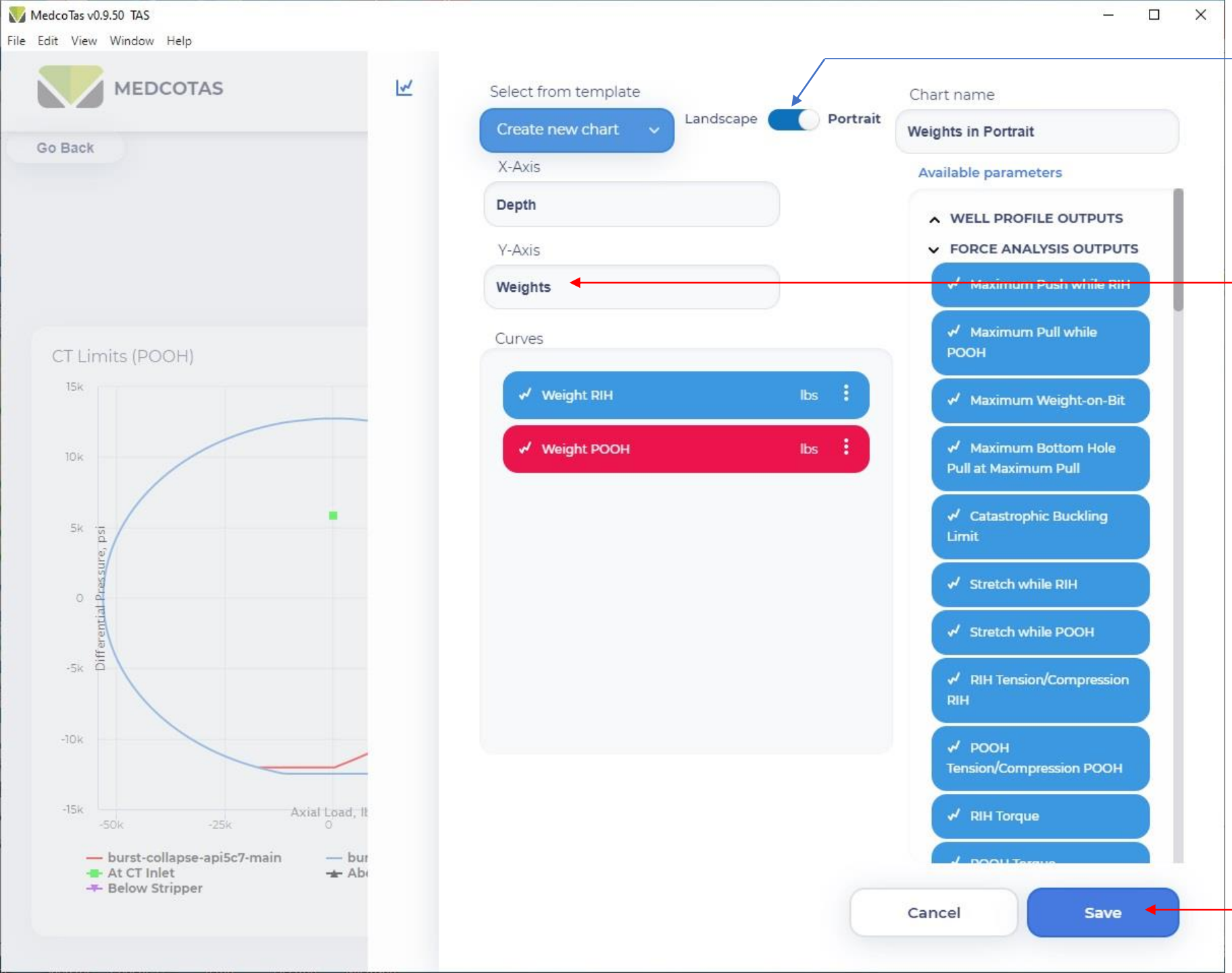
Give the chart a name

Use the dropdown to minimise a group of outputs

Drag & drop the parameters you wish to include in the chart



Edit properties of the curve if required



Toggle the switch to plot the chart in portrait

Change Y-Axis title if required

Click SAVE

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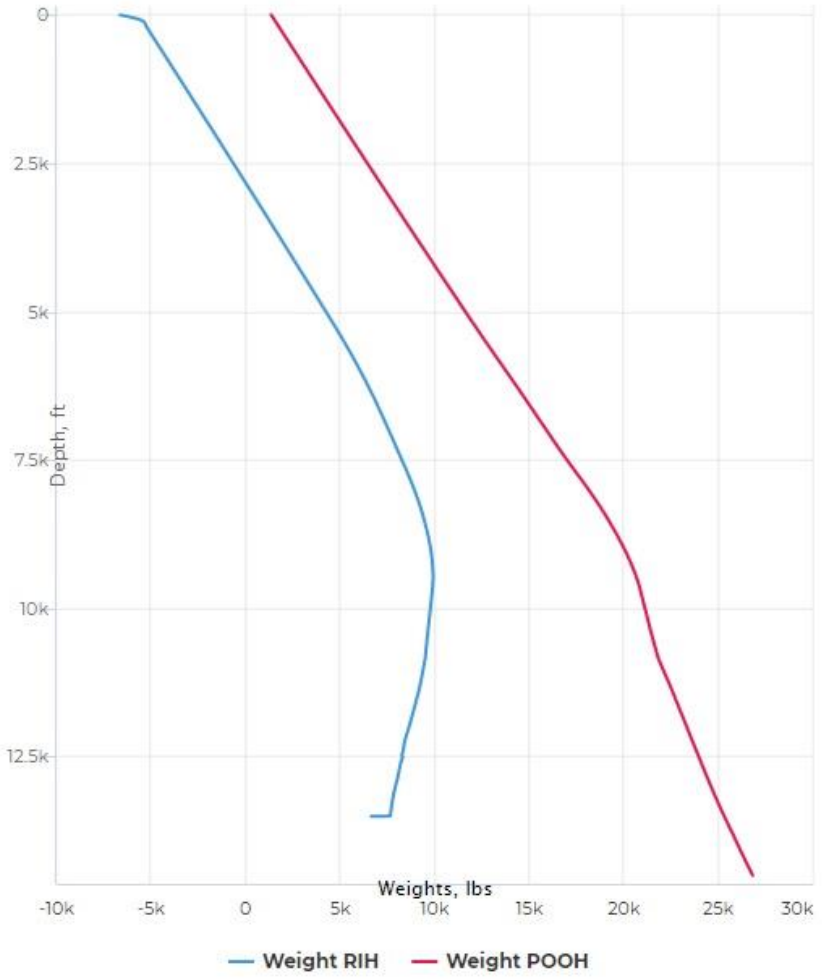
Go Back

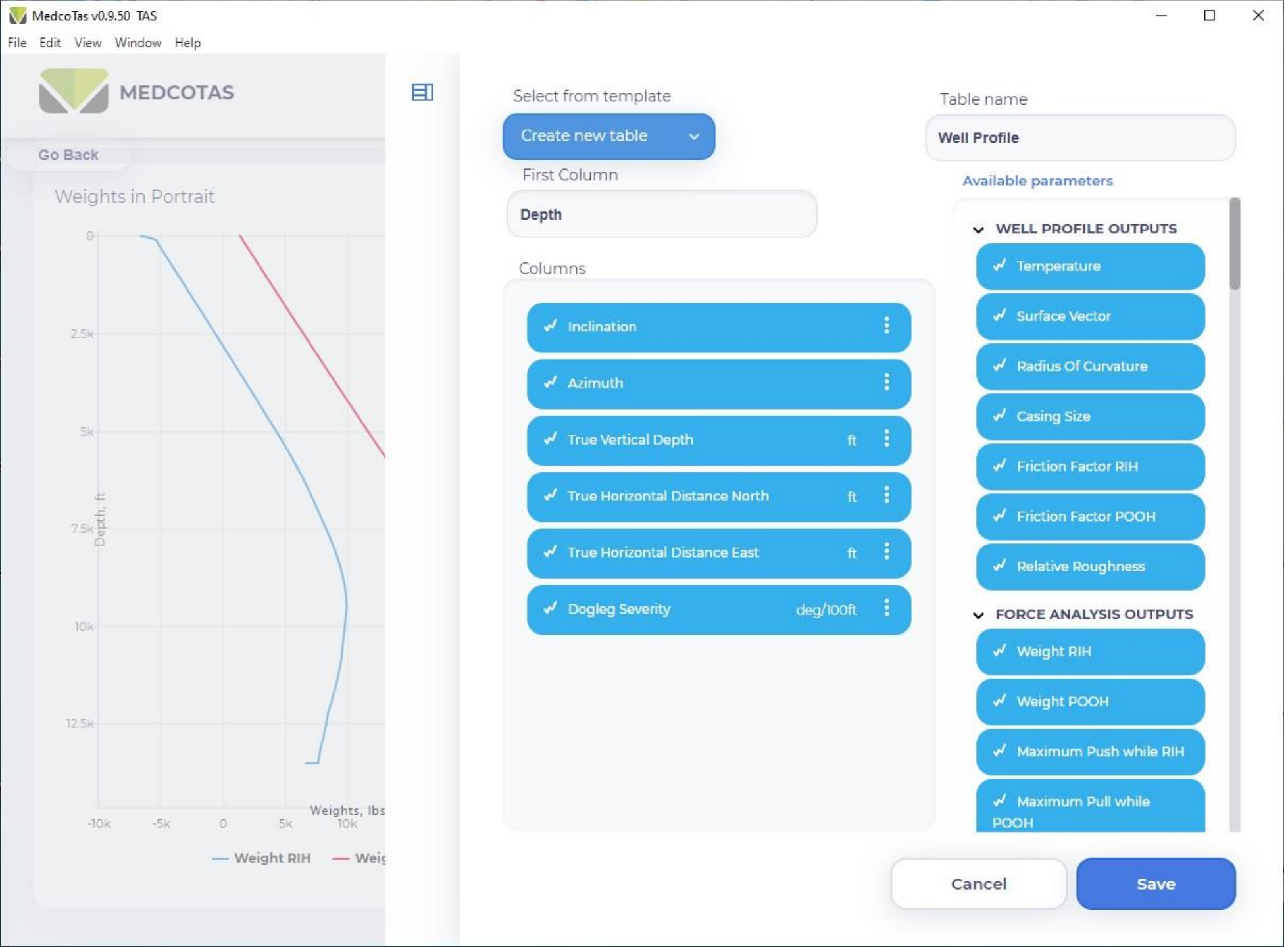
Weights in Portrait



Click here to add another chart

This time will add a table

Creating a Table



MedcoTas v0.9.50 TAS

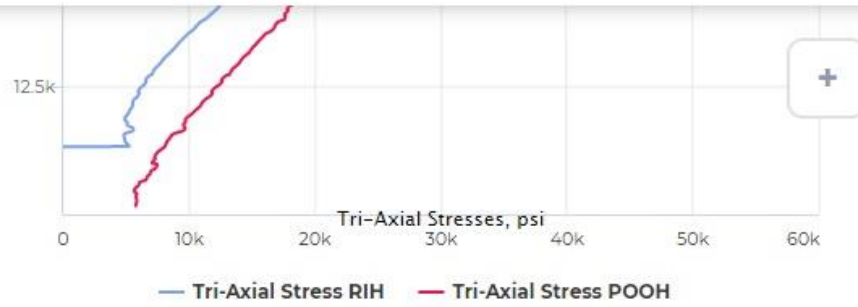
File Edit View Window Help

MEDCOTAS

MEDCO

ahmad abbas
USB key Active

Go Back

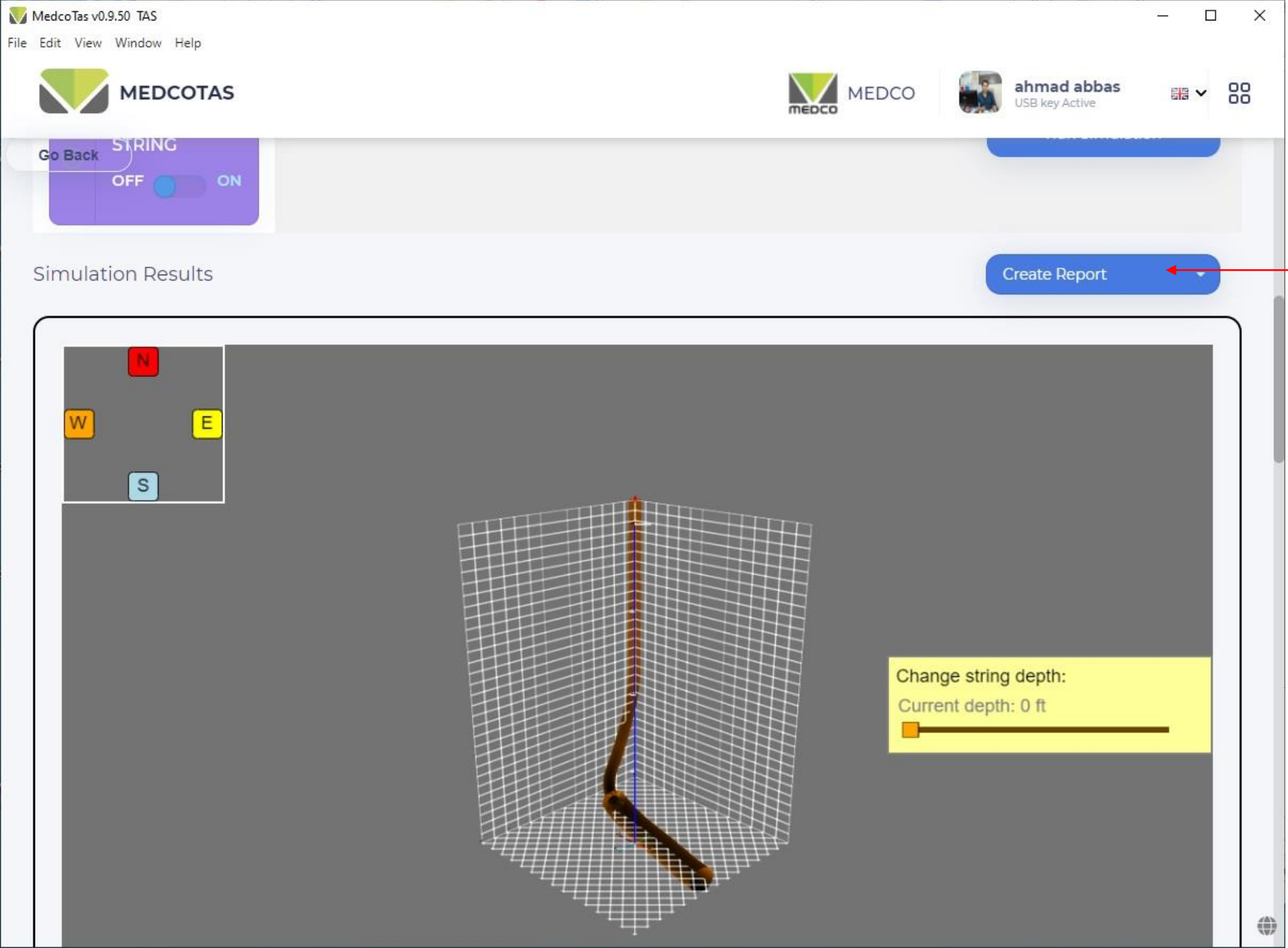


Well Profile

Depth, ft	Inclination	Azimuth	True Vertical Depth, ft	True Horizontal Distance North, ft	True Horizontal Distance East, ft	Dogleg Severity, deg/100ft
0.000	0.000	0.000	0.000	0.000	0.000	0.000
100.000	0.310	189.290	100.000	-0.267	-0.044	0.310
200.000	0.160	199.160	199.999	-0.666	-0.133	0.155
300.000	0.180	225.600	299.998	-0.908	-0.291	0.080
400.000	0.170	206.510	399.998	-1.150	-0.470	0.059
500.000	0.200	229.120	499.997	-1.397	-0.668	0.078
600.000	0.170	214.000	599.997	-1.634	-0.883	0.057
700.000	0.230	211.730	699.996	-1.928	-1.071	0.061
800.000	0.410	194.710	799.995	-2.445	-1.268	0.202
900.000	0.490	188.110	899.991	-3.214	-1.419	0.095
1000.000	0.630	183.800	999.987	-4.186	-1.516	0.146
1100.000	0.600	186.330	1099.981	-5.255	-1.610	0.040
1200.000	0.680	185.010	1199.975	-6.367	-1.719	0.081
1300.000	0.640	185.730	1299.968	-7.514	-1.827	0.041

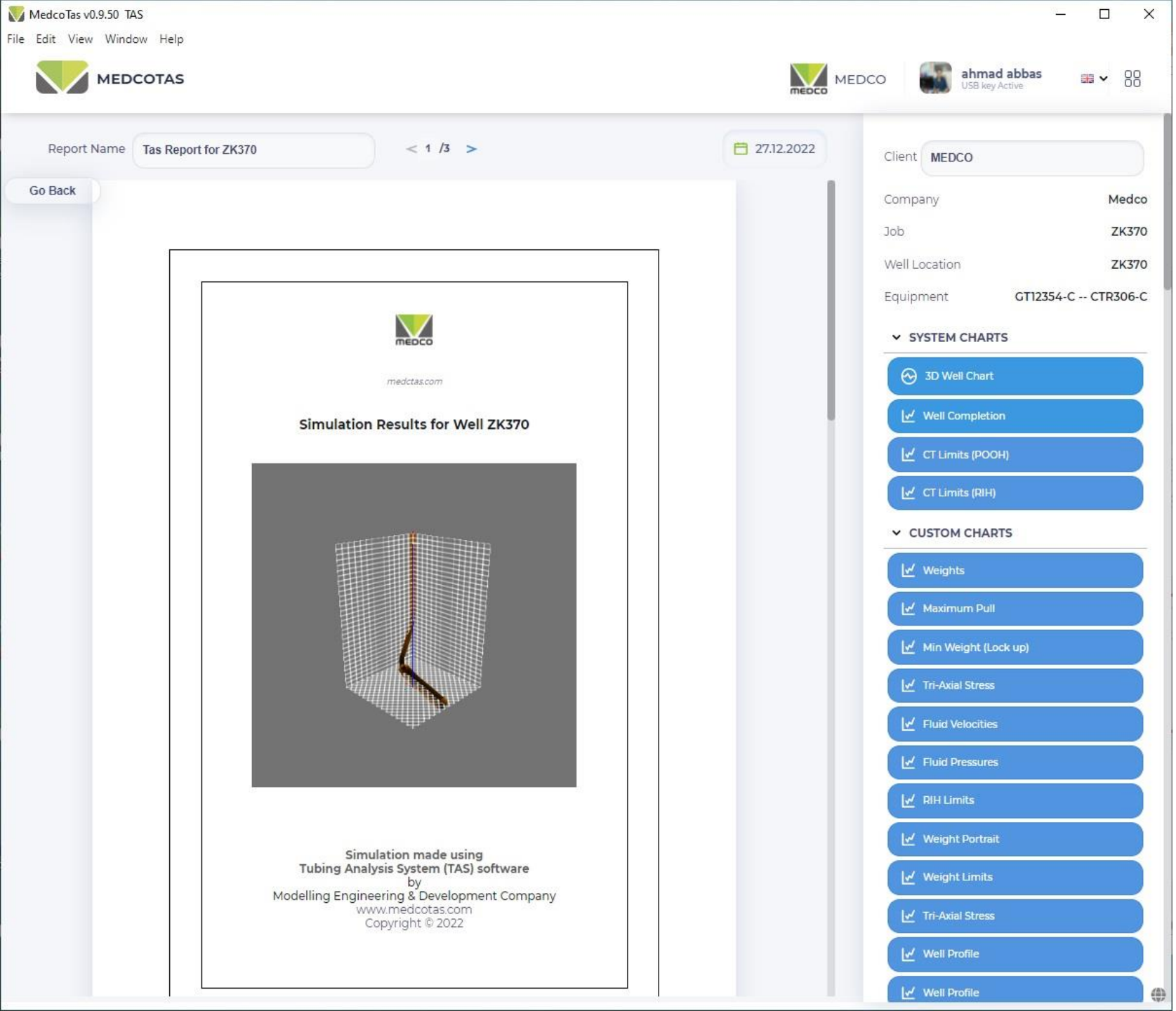
The charts and tables will be available for next time the program is used, there will be no need to re-create them.

Also, all charts and tables created will be available for the reports.



Scroll up till the “Create Report” button is visible.

Click here and select “Create New Report”

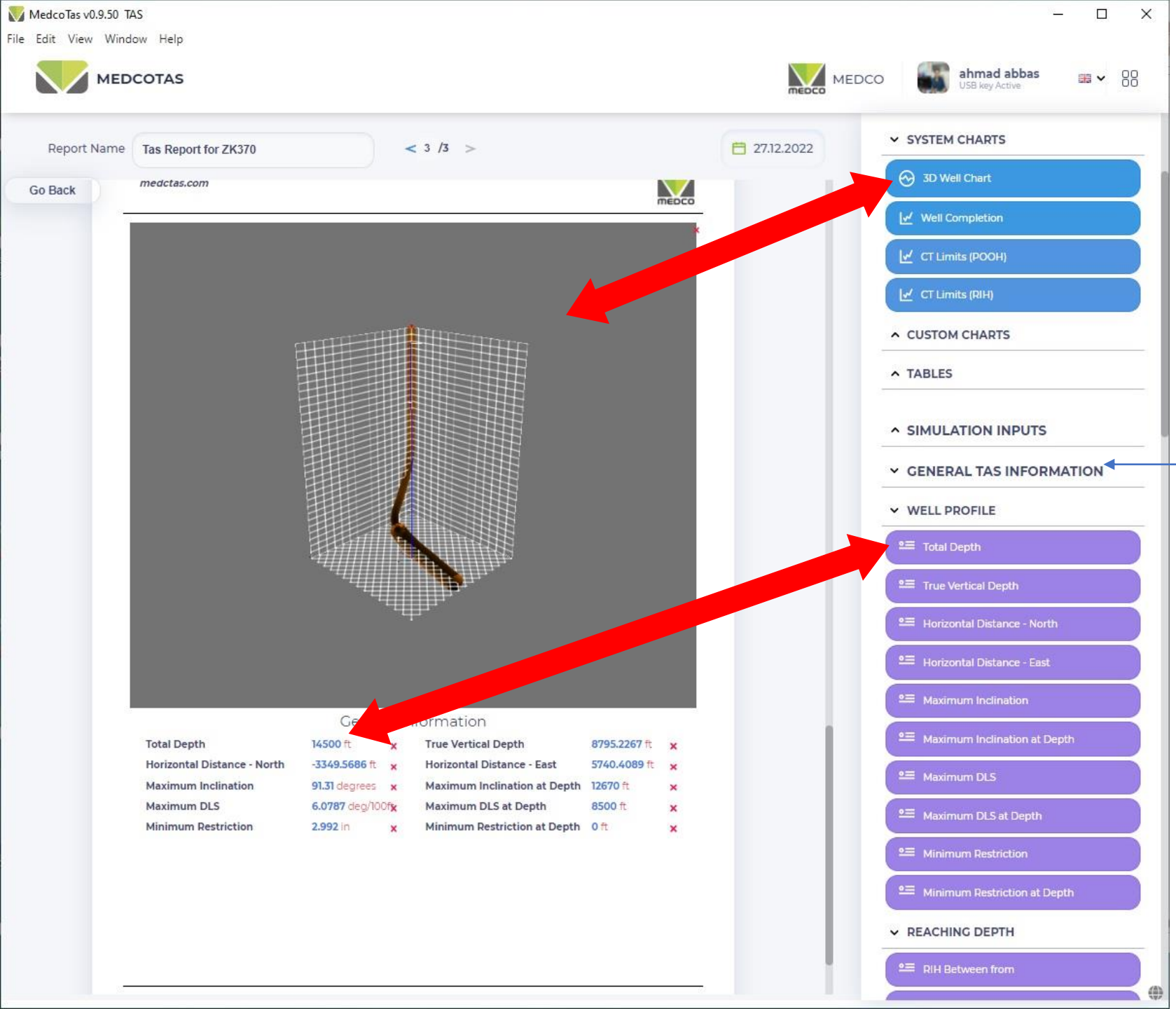


The user is able to design the report. When doing so, the user can decide which charts, tables, and information to be included in the report.
A template can also be saved and will become available next time the program is used.

The report can include;

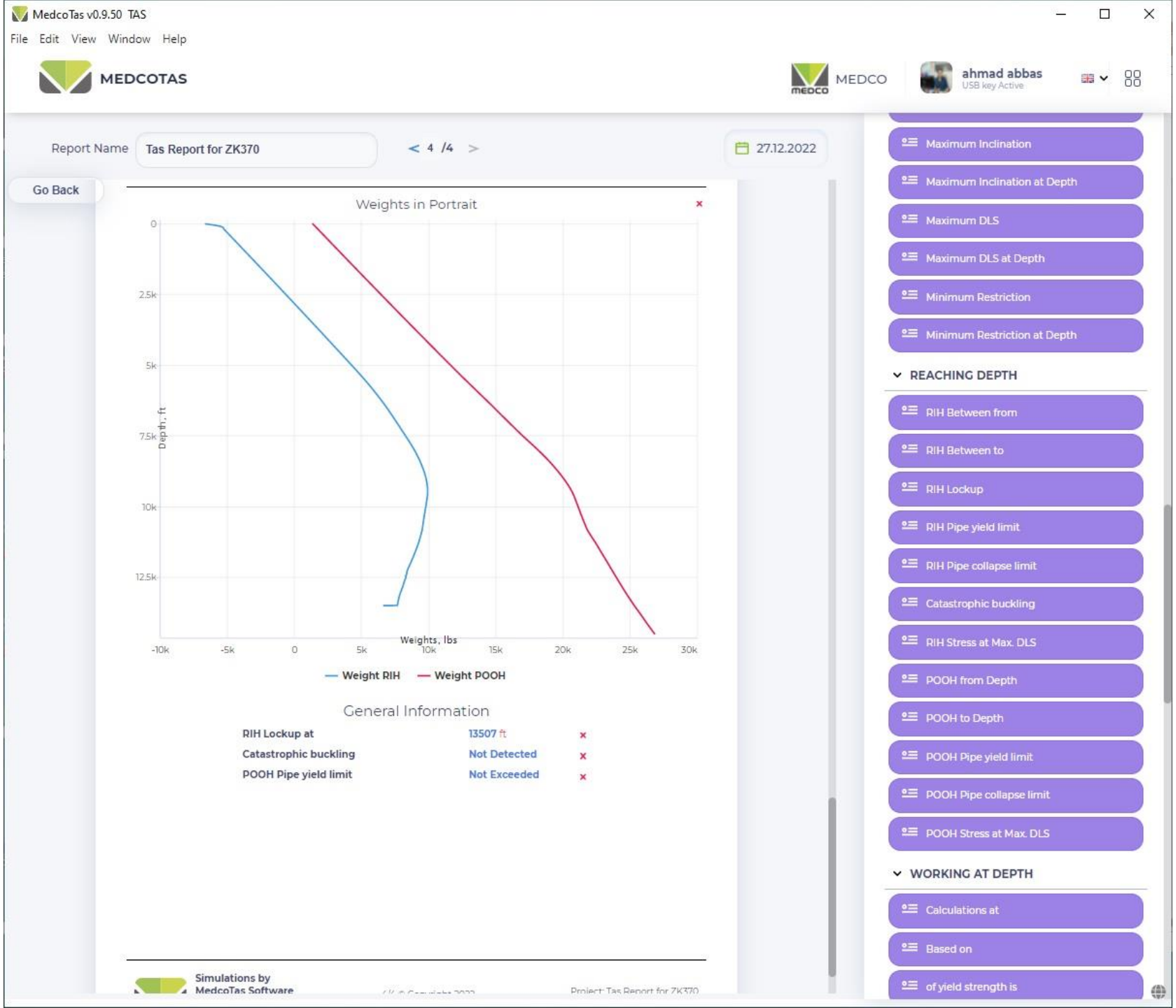
1. One or more system charts. These would normally include Set-Down Weight Analysis if no lockup was predicted. In our example, lockup was predicted, so we don't see this system chart.
2. One or more Custome Charts.
3. One or more Customs Tables.
4. Input Data.
5. General information, like comments.

Scroll down to the bottom, then drag and drop items into the report.

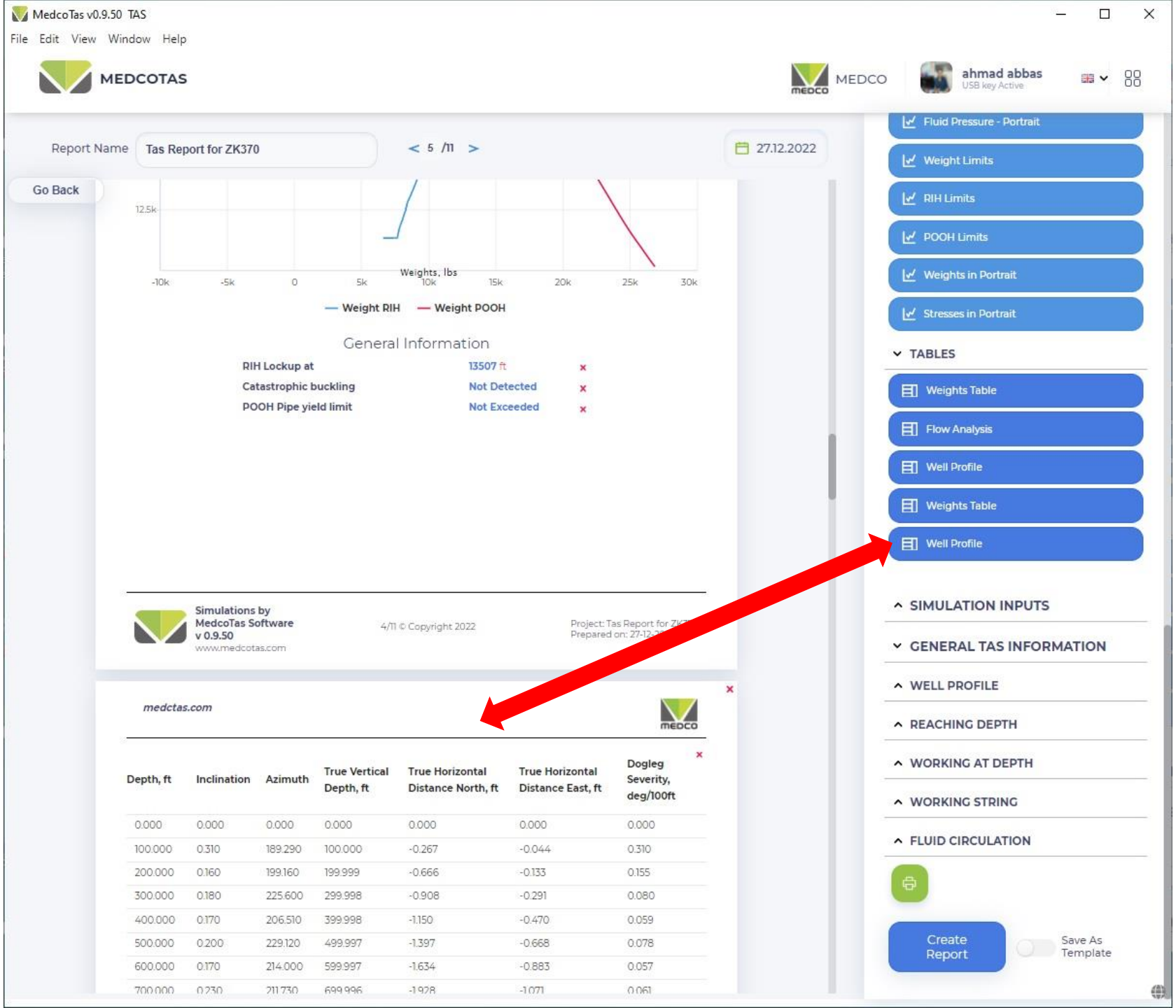


Drag & Drop the item required, in this example, the 3D Well Chart

From General TAS Information, select the information (comments) and again Drag & Drop



Keep on adding charts, tables, and comments as required


MedcoTas v0.9.50 TAS
File Edit View Window Help
MEDCOTAS
MEDCO
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USB key Active
Report Name
Tas Report for ZK370
< 5 /11 >
27.12.2022
Go Back
12.5k
Weights, lbs
-10k -5k 0 5k 10k 15k 20k 25k 30k
Weight RIH
Weight POOH
General Information
RIH Lockup at 13507 ft
Catastrophic buckling Not Detected
POOH Pipe yield limit Not Exceeded
Simulations by MedcoTas Software v 0.9.50
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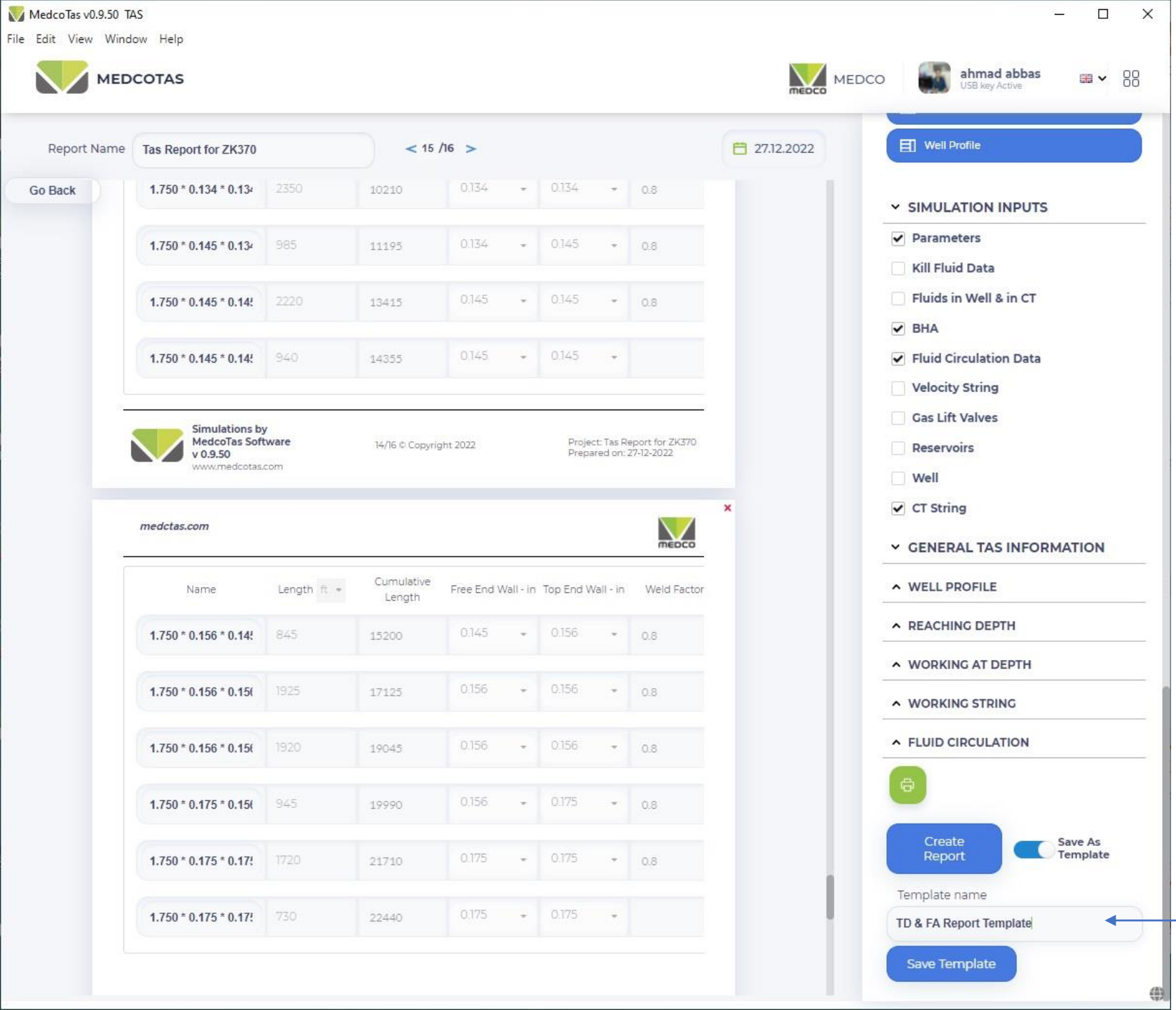
Depth, ft
Inclination
Azimuth
True Vertical Depth, ft
True Horizontal Distance North, ft
True Horizontal Distance East, ft
Dogleg Severity, deg/100ft
0.000 0.000 0.000 0.000 0.000 0.000 0.000
100.000 0.310 189.290 100.000 -0.267 -0.044 0.310
200.000 0.160 199.160 199.999 -0.666 -0.133 0.155
300.000 0.180 225.600 299.998 -0.908 -0.291 0.080
400.000 0.170 206.510 399.998 -1.150 -0.470 0.059
500.000 0.200 229.120 499.997 -1.397 -0.668 0.078
600.000 0.170 214.000 599.997 -1.634 -0.883 0.057
700.000 0.230 211.730 699.996 -1.928 -1.071 0.061
Fluid Pressure - Portrait
Weight Limits
RIH Limits
POOH Limits
Weights in Portrait
Stresses in Portrait
TABLES
Weights Table
Flow Analysis
Well Profile
Weights Table
Well Profile
SIMULATION INPUTS
GENERAL TAS INFORMATION
WELL PROFILE
REACHING DEPTH
WORKING AT DEPTH
WORKING STRING
FLUID CIRCULATION
Create Report
Save As Template



When ready to finalise the report, it is a good idea to save a template. This will save time next time the program is used, as the template will be automatically available.

It is also a good idea to save templates for different types of simulations.

Give the template a meaningful name which will make it easier to remember