

| Unit Testing

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Lookup

TC1: Bw functions

The database relationship:

- bw_al_cu
 - bw_hvl_al
 - bw_hvl_cu
 - bw_ssd
 - bw_diameter

TC 1.1: Read Bw lookup tables	
Function Name:	queryBw
Test Type:	Functional
Execution:	Automated
Objective:	Verify that the relevant data from the Bw lookup tables can be extracted with measured HVL (Al/Cu), measured SSD (cm), and field size diameter (cm) from tables on the database.

Pre-Condition:	<ul style="list-style-type: none"> The user can extract the correct Bw value corresponding to SSD (cm), diameter (cm), and HVL Al/Cu (mm Al/Cu). If there is no corresponded value, the function will catch an exception.
Read Successfully:	The relevant data of Bw lookup tables can be extracted correctly.
Read Unsuccessfully:	The relevant data of Bw lookup tables can not be extracted with the queryBw function.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 1.2: Read Bw Excel Sheet

Function Name:	readBw
Test Type:	Functional
Execution:	Automated
Objective:	Verify that the relevant elements of Bw Excel can be read and stored in a list.
Pre-Condition:	<ul style="list-style-type: none"> The Bw Excel contains all elements which the readBw function needs. The data type of elements is as same as required.
Read Successfully:	All the required elements are read and stored in the list.
Read Unsuccessfully:	The application will catch an error. And all processes of this read function will be recalled.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 1.3: Save Bw lookup tables

Function Name:	saveBw
Test Type:	Functional
Execution:	Automated
Objective:	Verify that the Bw lookup tables can be saved on tables of the database
Pre-Condition:	<ul style="list-style-type: none"> The relevant Bw information has been read successfully and stored in the required list. The database is connected.
Save Successfully:	The relevant Bw information is saved on the bw_al_cu table and other relevant tables of the database.
Save Unsuccessfully:	The relevant Bw information is not saved on the bw_al_cu table and other relevant tables of the database. And all processes of this save function will be recalled.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC2: Farmer functions

The database relationships:

- chambers_list
 - beam_farmer_list
 - beam_farmer_chamber

TC 2.1: Read farmer lookup tables

Function Name:	queryFarmer
Test Type:	Functional

Execution:	Automated
Objective:	Verify that the relevant data from the Farmer lookup tables can be extracted from tables on the database
Pre-Condition:	<ul style="list-style-type: none"> The user can extract the correct Nk value corresponding to chamber SN, beam energy (kV), and measured HVL Al/Cu (mm Cu). If there is no corresponded value, the function will catch an exception.
Read Successfully:	The relevant data of Farmer lookup tables can be extracted correctly.
Read Unsuccessfully:	The relevant data of Farmer lookup tables can not be extracted correctly.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 2.2: Read Farmer Excel Sheet

Function Name:	readFarmer
Test Type:	Functional
Execution:	Automated
Objective:	Verify that the relevant elements of Farmer Excel can be read and stored in a list.
Pre-Condition:	<ul style="list-style-type: none"> The Farmer Excel contains all elements which the readFarmer function needs. The data type of elements is as same as required.
Read Successfully:	All the required elements are read and stored in the list.
Read Unsuccessfully:	The application will catch an error. And all processes of this read function will be recalled.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 2.3: Save Farmer lookup tables

Function Name:	saveFarmer
Test Type:	Functional
Execution:	Automated
Objective:	Verify that the Farmer lookup tables can be saved on tables of the database
Pre-Condition:	<ul style="list-style-type: none"> The relevant Farmer information has been read successfully and stored in the required list. The database is connected.
Save Successfully:	The relevant Farmer information is saved on the beam_farmer_chamber, beam_farmer_list, and chamber_list tables of the database.
Save Unsuccessfully:	The relevant Farmer information is not saved on the beam_farmer_chamber, beam_farmer_list, and chamber_list tables of the database. And all processes of this save function will be recalled.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC3: MurhoAI functions

The database relationship:

- murho_al

TC 3.1: Read MurhoAI lookup tables

Function Name:	queryMurhoAI
Test Type:	Functional
Execution:	Automated
Objective:	Verify that the correct mass-energy absorption coefficient for the Aluminum (murho AI) value is extracted using HVL AI (mm AI) value as input.
Pre-Condition:	<ul style="list-style-type: none"> The user can extract the correct murho value corresponding to HVL AI (mm AI). If there is no corresponded value, the function will catch an exception.
Read Successfully:	The relevant data of MurhoAI lookup tables can be extracted correctly.
Read Unsuccessfully:	The relevant data of MurhoAI lookup tables can not be extracted correctly.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 3.2: Read MurhoAI Excel Sheet

Function Name:	readMurhoAI
Test Type:	Functional
Execution:	Automated
Objective:	Verify that the relevant elements of MurhoAI Excel can be read and stored in a list.
Pre-Condition:	<ul style="list-style-type: none"> The MurhoAI Excel contains all elements which the MurhoAI function needs. The data type of elements is as same as required.
Read Successfully:	All the required elements are read and stored in the list.
Read Unsuccessfully:	The application will catch an error. And all processes of this read function will be recalled.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 3.3: Save MurhoAI lookup tables

Function Name:	saveMurhoAI
Test Type:	Functional
Execution:	Automated
Objective:	Verify that the MurhoAI lookup tables can be saved on tables of the database
Pre-Condition:	<ul style="list-style-type: none"> The relevant MurhoAI information has been read successfully and stored in the required list. The database is connected.
Save Successfully:	The relevant MurhoAI information is saved on the murho_al tables of the database.
Save Unsuccessfully:	The relevant MurhoAI information is not saved on the murho_al table of the database. And all processes of this save function will be recalled.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC4: MurhoCu functions

The database relationship:

- murho_cu

TC 4.1: Read MurhoCu lookup tables

Function Name:	queryMurhoCu
Test Type:	Functional
Execution:	Automated
Objective:	Verify that the correct mass-energy absorption coefficient for Copper (murho Cu) value is extracted using HVL Cu (mm Cu) value as input
Pre-Condition:	<ul style="list-style-type: none"> The user can extract the correct murho value corresponding to HVL Cu (mm Cu). If there is no corresponded value, the function will catch an exception.
Read Successfully:	The relevant data of MurhoCu lookup tables can be extracted correctly.
Read Unsuccessfully:	The relevant data of MurhoCu lookup tables can not be extracted correctly.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 4.2: Read MurhoCu Excel Sheet

Function Name:	readMurhoCu
Test Type:	Functional
Execution:	Automated
Objective:	Verify that the relevant elements of MurhoCu Excel can be read and stored in a list.
Pre-Condition:	<ul style="list-style-type: none"> The MurhoCu Excel contains all elements which the readMurhoCu function needs. The data type of elements is as same as required.
Read Successfully:	All the required elements are read and stored in the list.
Read Unsuccessfully:	The application will catch an error. And all processes of this read function will be recalled.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 4.3: Save MurhoCu lookup tables

Function Name:	saveMurhoCu
Test Type:	Functional
Execution:	Automated
Objective:	Verify that the MurhoCu lookup tables can be saved on tables of the database
Pre-Condition:	<ul style="list-style-type: none"> The relevant MurhoCu information has been read successfully and stored in the required list. The database is connected.
Save Successfully:	The relevant MurhoCu information is saved on the murho_cu tables of the database.
Save Unsuccessfully:	The relevant MurhoCu information is not saved on the murho_cu table of the database. And all processes of this save function will be recalled.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC5: Plane-parallel functions

The database relationship:

- chambers_list
 - beam_planeparallel_list
 - beam_planeparallel_chamber

TC 5.1: Query Planeparallel lookup tables

Function Name:	queryPlaneparallel
Test Type:	Functional
Execution:	Automated
Objective:	Verify that the correct Nk (mGy/nC) value is extracted using the kVp (KV), HVL Al (mm Al), HVL Cu (mm Cu), and chamber SN values as input.
Pre-Condition:	<ul style="list-style-type: none">The user can extract the correct Nk value corresponding to chamber SN, beam energy (kV), and measured HVL (Al/Cu).The user can extract two records with corresponding HVL (Al/Cu) values when The user measured cannot HVL extract (Al/Cu) any value record does not exist in the lookup table (for interpolation/extrapolation by the backend).
Read Successfully:	The relevant data of Planeparallel lookup tables can be extracted correctly.
Read Unsuccessfully:	The relevant data of Planeparallel lookup tables can not be extracted with the queryPlaneparallel function.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 5.2: Read Planeparallel Excel Sheet

Function Name:	readPlaneparallel
Test Type:	Functional
Execution:	Automated
Objective:	Verify that all the elements of Planeparallel Excel can be read and stored in a list.
Pre-Condition:	<ul style="list-style-type: none">The Planeparallel Excel contains all elements which the readPlaneparallel function needs.The data type of elements is as same as required.
Read Successfully:	All the required elements are read and stored in the list.
Read Unsuccessfully:	The application will catch an error. And all processes of this read function will be recalled.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 5.3: Save Planeparallel lookup tables

Function Name:	savePlaneparallel
Test Type:	Functional
Execution:	Automated
Objective:	Verify that the plane-parallel information is saved on the beam_plane_parallel_list table of the database.
Pre-Condition:	<ul style="list-style-type: none">The relevant Planeparallel information has been read successfully and stored in the required list.The database is connected.
Save Successfully:	The relevant Planeparallel information is saved on the beam_planeparallel_list table of the database.
Save Unsuccessfully:	The relevant Planeparallel information is not saved on the beam_planeparallel_list and beam_planeparallel_chamber table of the database. And all processes of this save function will be recalled.

Time constraint:	Minimum 1 seconds; Maximum 3 seconds
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TC6: Pstem functions

The database relationship:

- chambers_list
 - beam_planeparallel_list
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- beam_planeparallel_chamber
 - pstem_measured

TC 6.1: Query Pstem lookup tables	
Fucntion Name:	queryPstem
Test Type:	Functional
Execution:	Automated
Objective:	Verify that the relevant data from the Planeparallel lookup tables can be extracted with measured HVL (Al/Cu), measured SSD (cm), and field size diameter (cm) from tables on the database
Pre-Condition:	<ul style="list-style-type: none"> • The user can extract the correct Bw value corresponding to SSD (cm), diameter (cm), and HVL Al (mm Al). • The user can extract two or more records with corresponding SSD (cm), diameter (cm), and HVL Al (mm Al) values when SSD (cm), diameter (cm), and HVL Al (mm Al) values do not exist in the lookup table (for interpolation/extrapolation by the backend).
Read Successfully:	The relevant data of Bw lookup tables can be extracted correctly.
Read Unsuccessfully:	The relevant data of Bw lookup tables can not be extracted with the queryBw function.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 6.2: Read Pstem Excel Sheet	
Function Name:	readPstem
Test Type:	Functional
Execution:	Automated
Objective:	Verify that the correct Pstem value is extracted using the Plane-parallel chamber HVL (mm Al) values as input.
Pre-Condition:	<ul style="list-style-type: none"> • The user can extract the correct Pstem value corresponding to HVL Al. • The user can extract two or more records with corresponding field size (cm), and HVL (mm Al) do not exist in the lookup table (for interpolation/extrap
Read Successfully:	All the required elements are read and stored in the list.
Read Unsuccessfully:	The application will catch an error. And all processes of this read function will be recalled.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 6.3: Save Pstem lookup tables

Function Name:	savePstem
Test Type:	Functional
Execution:	Automated
Objective:	Verify that the Pstem information is saved on the pstem_measured table of the database.
Pre-Condition:	<ul style="list-style-type: none"> The Pstem information is added to the pstem_measured table on the database.
Save Successfully:	The relevant Pstem information is saved on the pstem_measured table of the database.
Save Unsuccessfully:	The relevant Pstem information is not saved on the pstem_measured table of the database. And all processes of this save function will be recalled.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

Calculation

TC 7: Get a list of BackResults

Function Name:	getBackResult
Test Type:	Functional
Execution:	Automated
Objective:	Verify whether the calculation of back results is correct or not.
Pre-Condition:	<ul style="list-style-type: none"> The input parameters are correct.
Calculate Successfully:	The returned backresult list contains the correct result.
Calculate Unsuccessfully:	The function returns null.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 8: Query the specific beam planeparallel Nk

Function Name:	queryBoundaryBeamPlaneparallelNk
Test Type:	Functional
Execution:	Automated
Objective:	Verify that the correct Beam planeparallel Nk value is extracted using the chamber ID, and date as input.
Pre-Condition:	<ul style="list-style-type: none"> The input parameters are valid.
Query Successfully:	The returned result contains the correct planeparallel Nk example.
Query Unsuccessfully:	The function returns null.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 9: Query the latest beam planeparallel Nk

Function Name:	queryLatestBeamPlaneparallelNk
Test Type:	Functional
Execution:	Automated
Objective:	Verify that the late Beam planeparallel Nk value is extracted using the date.

Pre-Condition:	<ul style="list-style-type: none"> The input parameter is valid.
Query Successfully:	The returned result is the late planeparallel Nk example according to the input date.
Query Unsuccessfully:	The function returns null.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 10: Query the specific hvl

Function Name:	queryBoundaryHvl
Test Type:	Functional
Execution:	Automated
Objective:	Verify that the correct Hvl value is extracted using the beam farmer ID as input.
Pre-Condition:	<ul style="list-style-type: none"> The input parameters is valid.
Query Successfully:	The returned result contains the correct Hvl example.
Query Unsuccessfully:	The function returns null.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 11: Query the latest farmer lookup table

Function Name:	queryLatestFarmerLookupTable
Test Type:	Functional
Execution:	Automated
Objective:	Verify that the latest farmer lookup table is extracted using the date.
Pre-Condition:	<ul style="list-style-type: none"> The input parameter is valid.
Query Successfully:	The returned result is the latest farmer lookup table example according to the input date.
Query Unsuccessfully:	The function returns null.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 12: Check whether there is data that has lower Hvl

Function Name:	checkHvlLower
Test Type:	Functional
Execution:	Automated
Objective:	Check whether there is data that has lower hvl.
Pre-Condition:	<ul style="list-style-type: none"> The input parameter is valid.
Check Successfully:	The function returns true.
Check Unsuccessfully:	The function returns false.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 13: Check whether there is data that has higher Hvl

Function Name:	checkHvlUpper
Test Type:	Functional
Execution:	Automated
Objective:	Check whether there is data that has higher hvl.
Pre-Condition:	<ul style="list-style-type: none"> The input parameter is valid.
Check Successfully:	The function returns true.
Check Unsuccessfully:	The function returns false.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 14: Query the Input cone data list

Function Name:	queryInputConeDataList
Test Type:	Functional
Execution:	Automated
Objective:	Verify that the Cone data is extracted by using the audit ID.
Pre-Condition:	<ul style="list-style-type: none"> The input parameter is valid.
Query Successfully:	The returned result is the input cone data list as specified cone id.
Query Unsuccessfully:	The function returns null.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 15: Select data from the farmer table

Function Name:	selectFromFarmer
Test Type:	Functional
Execution:	Automated
Objective:	Verify that the specified data can be extracted from the farmer table as required.
Pre-Condition:	<ul style="list-style-type: none"> The input parameter is valid.
Select Successfully:	The returned result contains the farmer data information as the required type.
Select Unsuccessfully:	The function returns null.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 16: Calculate Nk value

Function Name:	calculateNkValue
Test Type:	Functional
Execution:	Automated
Objective:	Calculate the nk value from the beam data list.
Pre-Condition:	<ul style="list-style-type: none"> The input parameter is valid.
Calculate Successfully:	The returned result is the correct calculation.
Calculate Unsuccessfully:	The function returns a null or incorrect calculation.

Time constraint:	Minimum 1 seconds; Maximum 3 seconds
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TC 17: Query the latest BwAICu data

Function Name:	queryLatestBwAICu
Test Type:	Functional
Execution:	Automated
Objective:	Verify that the latest bwalcu table data is extracted using the SSD, diameter, and hvl.
Pre-Condition:	<ul style="list-style-type: none"> The input parameter is valid.
Query Successfully:	The returned result is the latest bwalcu data example according to the inputs.
Query Unsuccessfully:	The function returns null.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 18: get the target boundary

Function Name:	getRange
Test Type:	Functional
Execution:	Automated
Objective:	Verify the target boundary.
Pre-Condition:	<ul style="list-style-type: none"> The input parameter is valid.
Get Successfully:	The returned result is the correct target's boundary.
Get Unsuccessfully:	The function returns null.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 19: Calculate Bw value

Function Name:	calculateBwValue
Test Type:	Functional
Execution:	Automated
Objective:	Calculate the Bw value from the beam data list and con data list
Pre-Condition:	<ul style="list-style-type: none"> The input parameter is valid.
Calculate Successfully:	The returned result is the correct calculation.
Calculate Unsuccessfully:	The function returns a null or incorrect calculation.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 20: Calculate Bw value with specified inputs

Function Name:	bwCalculation
Test Type:	Functional
Execution:	Automated
Objective:	Calculate the Bw value according to the given cone, beam, and type inputs.

Pre-Condition:	<ul style="list-style-type: none"> The input parameter is valid.
Calculate Successfully:	The returned result is the correct calculation.
Calculate Unsuccessfully:	The function returns a null or incorrect calculation.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 21: Calculate Murho value

Function Name:	calculateMruhoValue
Test Type:	Functional
Execution:	Automated
Objective:	Calculate the Bw value by giving the beam data list as input.
Pre-Condition:	<ul style="list-style-type: none"> The input parameter is valid.
Calculate Successfully:	The returned result is the correct calculation.
Calculate Unsuccessfully:	The function returns a null or incorrect calculation.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 22: Calculate Murho value with specified inputs

Function Name:	murhoCalculation
Test Type:	Functional
Execution:	Automated
Objective:	Calculate the Murho value by given beam data, murhoal list, and murhocu list inputs.
Pre-Condition:	<ul style="list-style-type: none"> The input parameter is valid.
Calculate Successfully:	The returned result is the correct calculation.
Calculate Unsuccessfully:	The function returns a null or incorrect calculation.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 23: Calculate ccc value

Function Name:	calculateCccValue
Test Type:	Functional
Execution:	Automated
Objective:	Calculate the ccc value by giving the beam data list, cones list, and bw results list as inputs.
Pre-Condition:	<ul style="list-style-type: none"> The input parameter is valid.
Calculate Successfully:	The returned result is the correct calculation.
Calculate Unsuccessfully:	The function returns a null or incorrect calculation.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds

TC 24: Calculate pstem value

Function Name:	calculatePstemValue
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Test Type:	Functional
Execution:	Automated
Objective:	Calculate the pstem value by giving the beam data list, cones list, and audit beam list as inputs.
Pre-Condition:	<ul style="list-style-type: none">• The input parameter is valid.
Calculate Successfully:	The returned result is the correct calculation.
Calculate Unsuccessfully:	The function returns a null or incorrect calculation.
Time constraint:	Minimum 1 seconds; Maximum 3 seconds