
 Title: **ROFMOD 5 - Tutorial 2: Scenarios**

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 Time needed: About 30 to 45 minutes

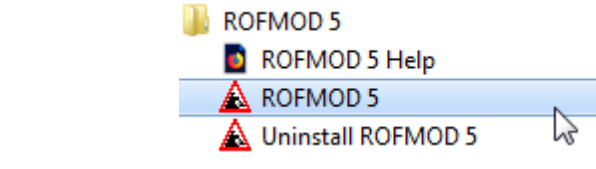
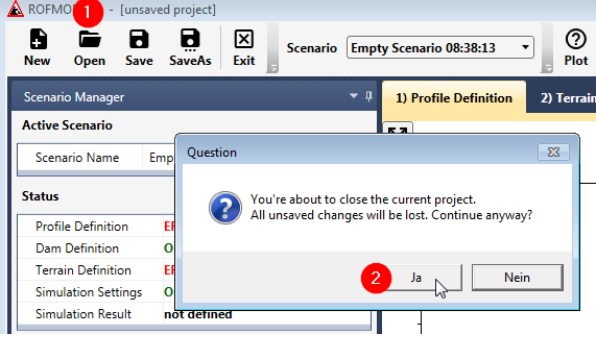
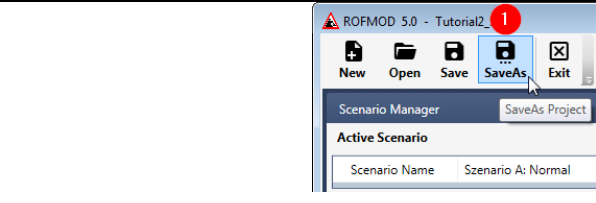
Summary

In this tutorial we would like to explain the **scenario management** and its possibilities. Starting from a given scenario, we will work out **variants with different terrain and forest zones**. In the final scenario, we insert a **protection dam** and consider its effect.

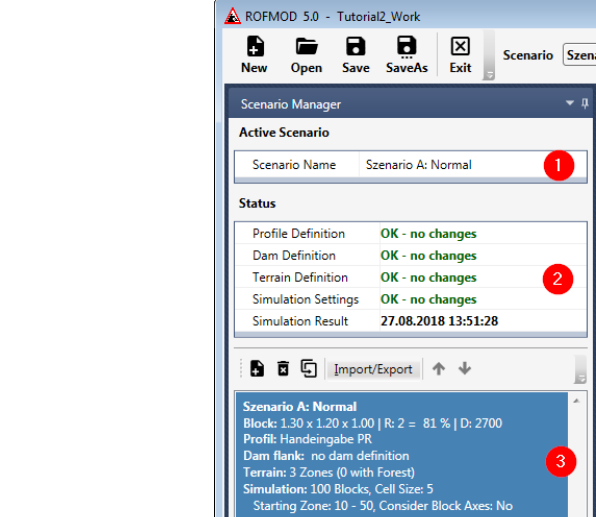
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0. Getting started

<p>Start "ROFMOD 5" on your Windows PC.</p>	
<ol style="list-style-type: none"> 1. Click "Open" to open an existing project file. 2. Confirm the dialog that warns you that the current project is lost with "Yes". <p>Open the project file "Tutorial2_Start.pzip"</p>	
<ol style="list-style-type: none"> 1. Save the current project under a new name, for example "Tutorial2_Work.pzip". 	

1. Examine the existing scenario

<h3>1.1 Scenario Manager</h3> <ol style="list-style-type: none"> 1. Scenario name of the active scenario 2. Scenario status: All settings have been taken into account in this simulation. The saved calculation is from August 27, 2018. 3. Summary of the active scenario: Block size, profile description, dam definition, terrain zones summary, simulation settings 	
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1.2 Profile Definition

1. Examine the profile.
2. Look at the key figures.
3. Look at the starting zone.

1.3 Terrain Definition

1. Look at overview
2. Examine the zone limits
3. Study the zone parameters. Apparently different damping and roughness values were used. A forest zone was not defined.

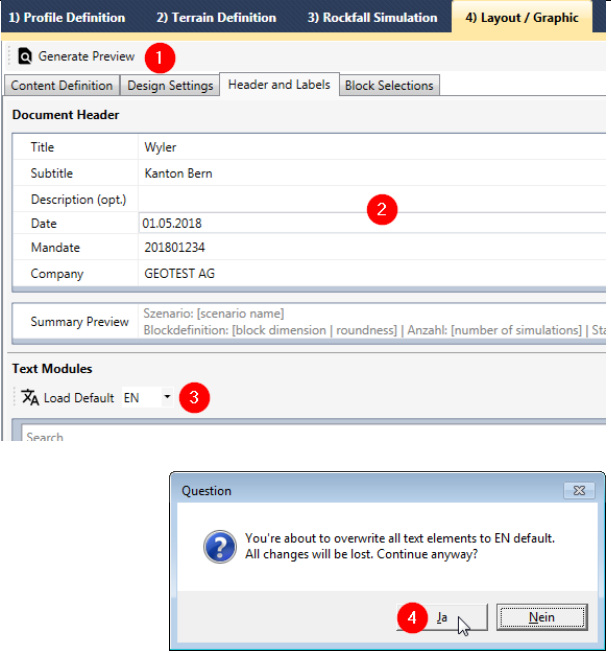
1.4 Rockfall Simulation

1. Take a look at the simulation result.
2. Study the statistics. For example, how far the blocks got.
3. Look at the block definition.
4. Look at the simulation settings.

1.5 Layout / Graphic

1. Generate the preview, to get an idea of the output document.
2. Check the document header for completeness.
3. Text modules are recorded in German. Change this by choosing "EN" and pressing the button "Load Default".
4. Confirm the following dialog with "Yes" to overwrite all text modules with the English default.

Generate a new preview.

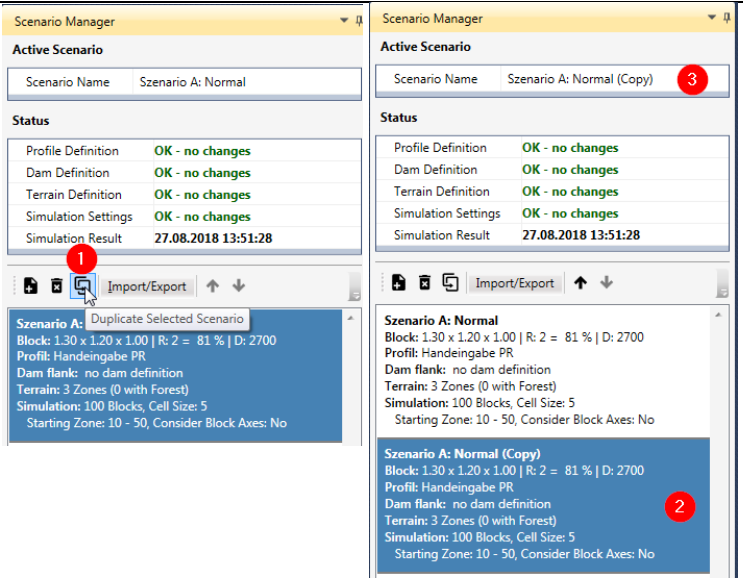


2. "Szenario A" with forest

We now want to copy "Scenario A" and add a forest zone.

2.1 Copying the scenario

1. Copy "Szenario A".
2. A copy of the scenario has been added to the scenario manager. "(Copy)" is automatically appended to the scenario name.
3. Change the scenario name to "Szenario AW: Normal Forest"



2.2 Adding forest zone

1. Select the third zone (number 3).
2. Set the forest simulation mode to "Normal".
3. Change the values: $a = 2$, $b = 2$, and trunks per hectare = 250
4. The graphic shows the forest zone qualitatively. The forest zone is also drawn into the profile plot.

The screenshot displays the 'Terrain Definition' tab in the GEOTEST software. It is divided into several panels:

- Zone Limits:** A table with columns for zone number, start and end x-coordinates, and material codes. Zone 3 is highlighted in blue.

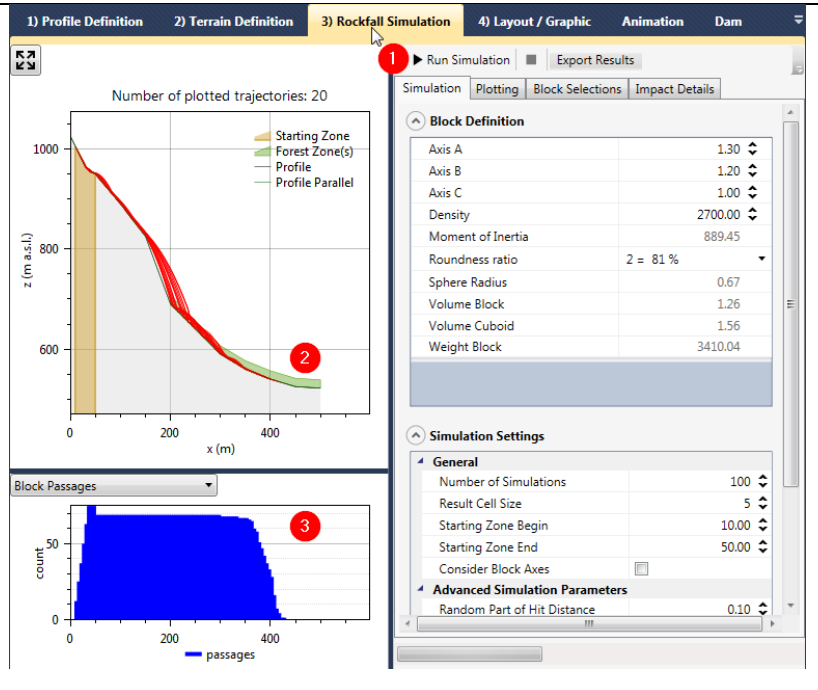
Zone	Start (m)	End (m)	Material
1	0.0	150.0	D20 / R6
2	150.0	200.0	D15 / R4
3	200.0	500.0	D25 / R10 Mode: Normal
- Profile Plot:** A graph of elevation z (m a.s.l.) vs. horizontal distance x (m). It shows a 'Profile' line, a 'Starting Zone' (yellow), and a 'Forest Zone(s)' (green) starting at $x = 200.0$.
- Zone Parameters:** A table for the selected zone (Zone 3) showing material properties:

Damping	25 - medium-hard; dry, medium-deep soil c material / talus material, scree
Roughness	R = 10
Roughness Calculator	[Icon]
Description	
- Selected Zone:** A detailed configuration panel for the forest simulation.
 - Forest Simulation Mode:** Set to 'Normal - defined by probabilistic forest pa'.
 - Block Settings:** Block size 1.30 x 1.20 x 1.00 | R: 2 = 81% | D: 2700.
 - Forest Parameters:**
 - Average Trunk Diameter (calcul...): 0.28
 - Maximal Tree Height (calculated): 16.80
 - Forest Parameters (Normal):**
 - Forest Parameter a: 2.00
 - Forest Parameter b: 2.00
 - Trunks per Hectare: 250
 - Hit Distance Inclined (calculated): 31.25
- Forest Simulation Mode:** Simulation parametrization set.
- Forest Parameters:** A table for the selected zone (Zone 3) showing material properties:

Damping	25 - medium-hard; dry, medium-deep soil c material / talus material, scree
Roughness	R = 10
Roughness Calculator	[Icon]
Description	
- Forest Simulation Mode:** Simulation parametrization set.
- Forest Parameters:**
 - Average Trunk Diameter (calcul...): 0.28
 - Maximal Tree Height (calculated): 16.80
 - Forest Parameters (Normal):**
 - Forest Parameter a: 2.00
 - Forest Parameter b: 2.00
 - Trunks per Hectare: 250
 - Hit Distance Inclined (calculated): 31.25
- Forest Parameter b:** A section for adjusting parameter b.
- forest characteristics (a 2, b 2):** trunk diameter: average 0.28, median 0.27. A histogram shows the trunk diameter distribution in cm.

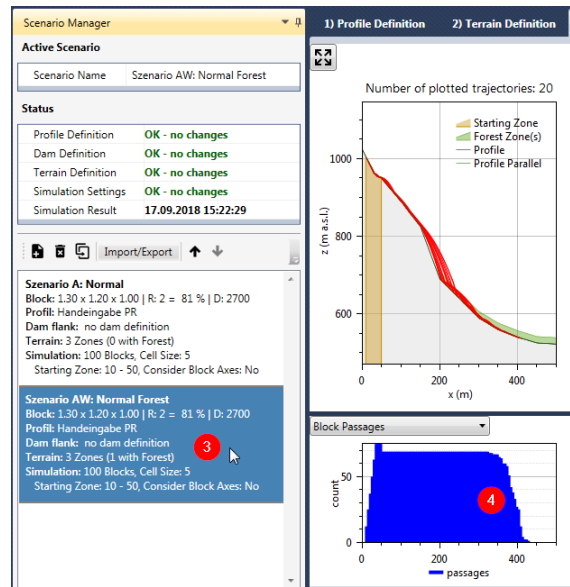
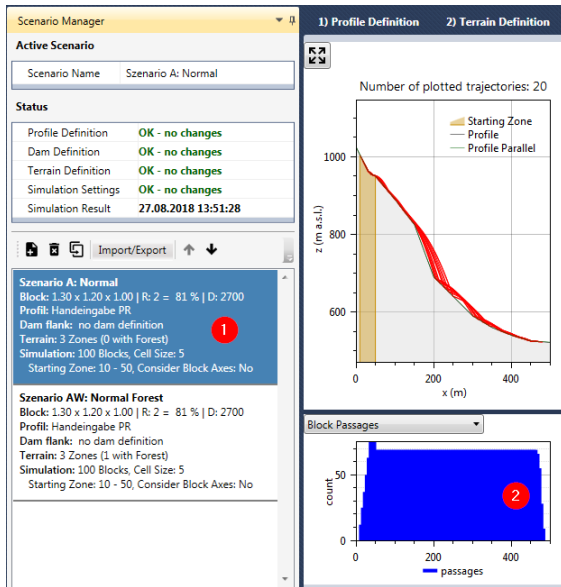
2.3 Simulating rock fall

1. Run the simulation.
2. The forest zone appears in the result plot.
3. Look at the block passages plot: the blocks get stopped earlier.



2.4 Compare Scenarios "A" and "AW"

1. Switch to "Szenario A".
2. Look at the block passages.
3. Switch to "Szenario AW".
4. Compare the block passages.

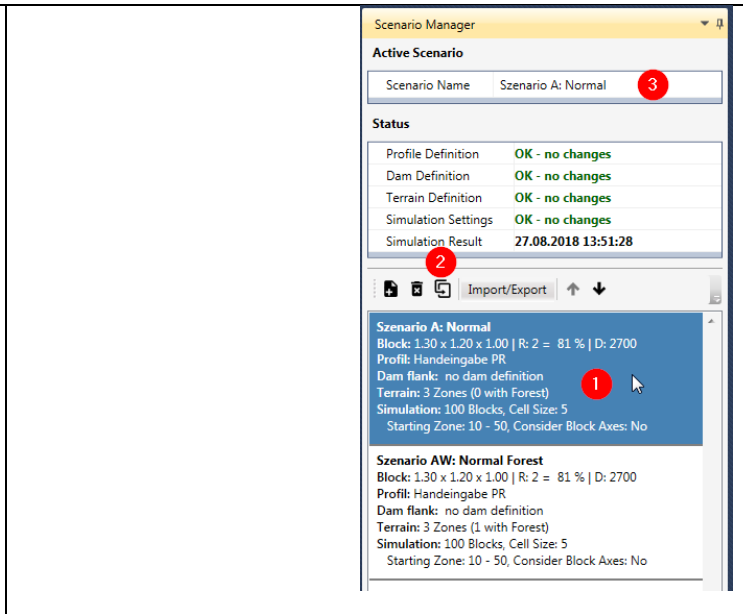


3. “Scenario A” with soft underground

We now want to copy “Scenario A” and add a soft zone with more damping.

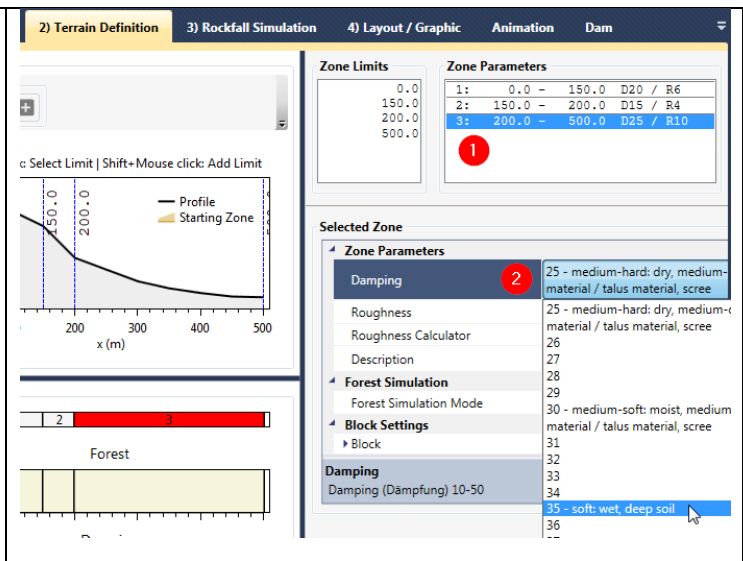
3.1 Copying the scenario

1. Select “Scenario A”.
2. Copy “Scenario A”. A copy of the scenario has been added to the scenario manager. “(Copy)” is automatically appended to the scenario name.
3. Change the scenario name to “Scenario B: Soft”



3.2 Editing the damping

1. Select the third zone (number 3).
2. Change the damping to “35”.



3.3 Simulating rock fall

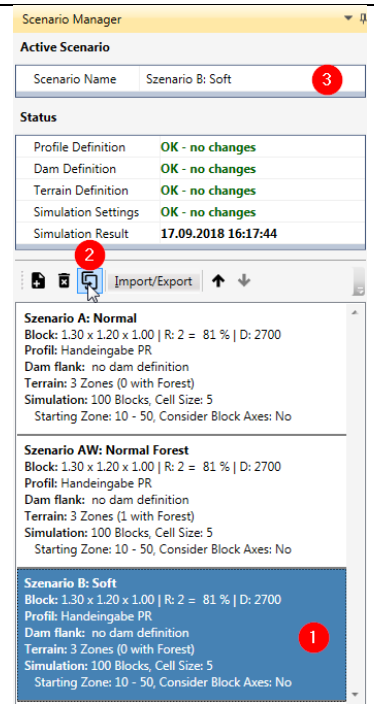
1. Run the simulation.
2. Look at the block passages plot: the blocks get stopped earlier than in “Scenario A”.

4. “Scenario B” with forest

We now want to copy “Scenario B” and add a forest zone.

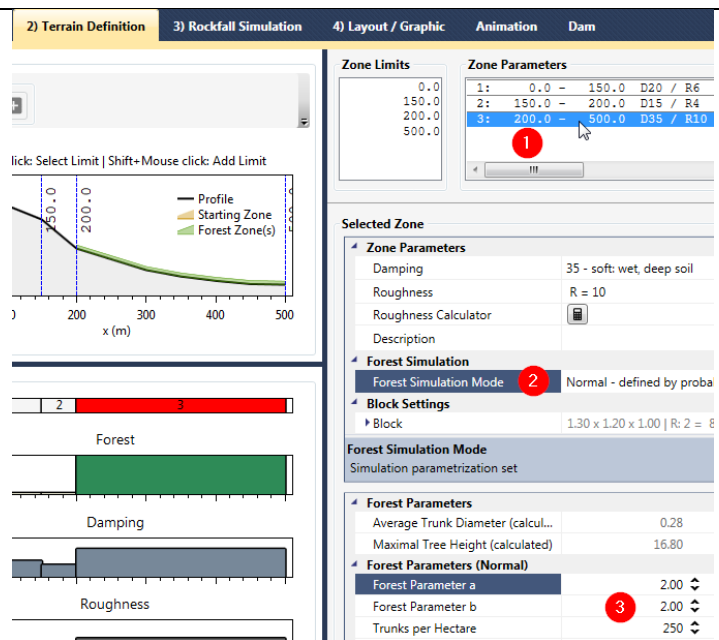
4.1 Copying the scenario

1. Select “Scenario B”.
2. Copy “Scenario B”. A copy of the scenario has been added to the scenario manager. “(Copy)” is automatically appended to the scenario name.
3. Change the scenario name to “Scenario BW: Soft Forest”



4.2 Adding forest zone

1. Select the third zone (number 3).
2. Set the forest simulation mode to “Normal”.
3. Change the values: a = 2, b = 2, and trunks per hectare = 250



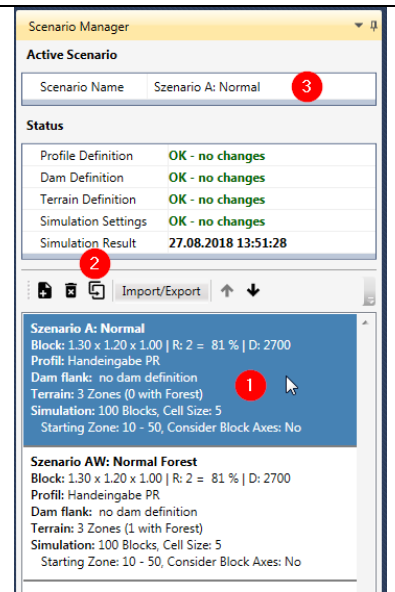
4.3 Simulating rock fall

1. Run the simulation.
2. Look at the block passages plot: the blocks get stopped earlier than in “Scenario B”.

5. “Szenario A” with a protection dam

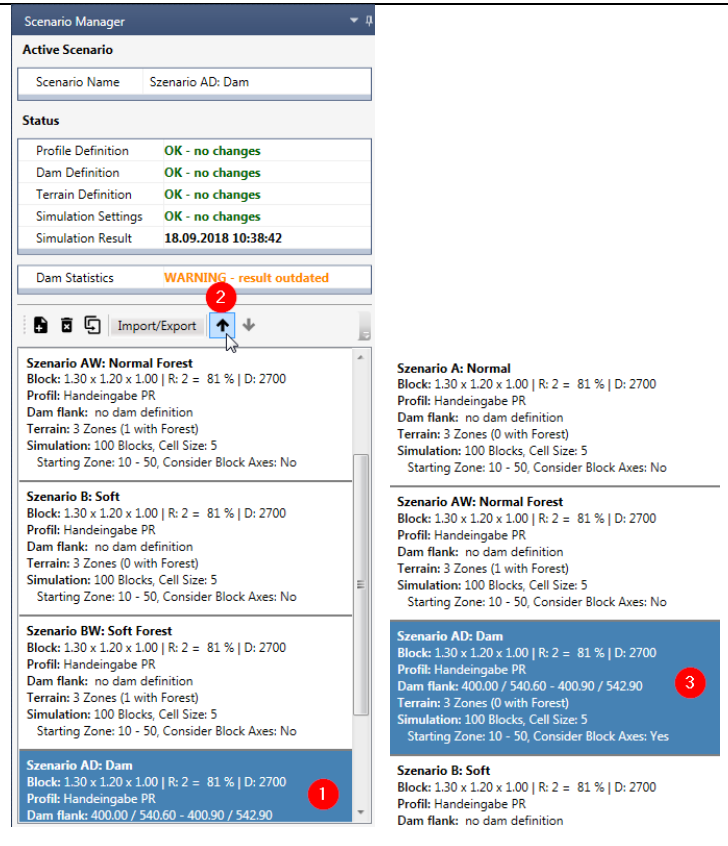
5.1 Copying the scenario

4. Select “Szenario A”.
5. Copy “Szenario A”. A copy of the scenario has been added to the scenario manager. “(Copy)” is automatically appended to the scenario name.
6. Change the scenario name to “Szenario AD: Dam”



5.2 Arrange scenarios

1. Select “Szenario AD”.
2. Click the up arrow twice.
3. “Szenario AD” is now correctly arranged.



5.3 Adding dam to profile

1. Enter the dam dimensions:
2.3, 6.9, 1.5,
68.7, 51.9,
400.0, 540.6
2. The dam preview is shown in green in the plot.
3. Click on "Save to Profile" to save the dam definition
4. The dam definition is saved and displayed on the right.
5. The dam was added to the profile.

The top screenshot shows the '1) Profile Definition' tab. The plot displays a 'Starting Zone' (yellow triangle), a 'Profile' (black line), a 'Dam Preview' (green line), and a 'Selected Point' (red X). The y-axis is labeled 'z (m a.s.l.)' with values from 535 to 555. The 'Dam Definition' panel on the right has the following values:

Mountain Side Height (m, vertical)	2.30
Valley Side Height (m, vertical)	6.90
Crest Width (m)	1.50
Slope on the Mountain Side (deg)	68.70
Slope on the Valley Side (deg)	51.90
Insertion Point on Profile: X value (m)	400.00
Insertion Point on Profile: Z value (m)	540.60

The bottom screenshot shows the '3) Rockfall Simulation' tab. The plot now includes the dam structure. The 'Dam Definition in Profile' panel shows the saved parameters:

2.30	2.30
6.90	6.90
1.50	1.50
8.70	68.70
1.90	51.90
0.00	400.00
0.60	540.60

The status bar at the bottom right indicates 'dam definition saved'.

5.4 Rockfall simulation

1. Activate "Consider Block Axes" in the simulation settings.
2. Run the rockfall simulation.

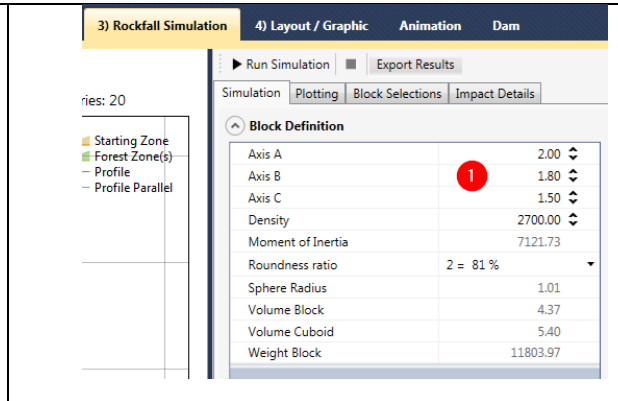
The screenshot shows the '3) Rockfall Simulation' tab. The 'Simulation Settings' panel is expanded to 'General'. The 'Consider Block Axes' checkbox is checked. The 'Run Simulation' button is highlighted with a red circle 2.

6. Try your own scenario (Optional task)

This task encourages you to create your own scenarios by varying the block size and starting zone. Choose a suitable scenario as the starting point for your experiments. "Scenario AW: Normal Forest" would be one option. After each change, examine how the range and energies of the blocks change.

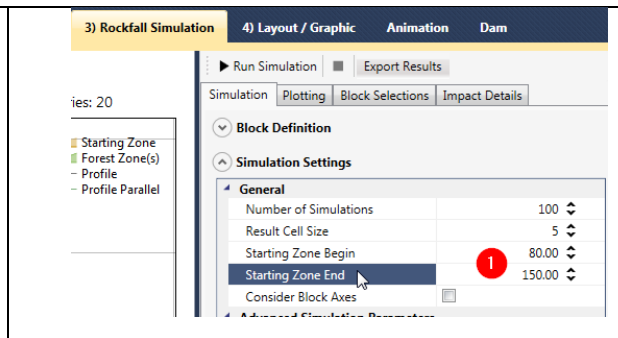
6.1 Suggestion: Vary block size

- Increase the block size to
A = 2.0, B = 1.8, C = 1.5



6.2 Suggestion: Change starting zone

- Change the starting zone limits to
begin = 80, end = 150



7. Load finished project (Optional task)

If you want to examine the finished project without going through all the steps, you can load the prepared project file.

- Click "Open" to open an existing project file.
- Confirm the dialog that warns you that the current project is lost with "Yes".

Open the project file "Tutorial2_Demo.pzip"

