

Worked Example 6

Seizure screening

The engineering question

Contact, mixed-load sharing and temperature are calculated first. The seizure stage classifies cells whose calculated condition exceeds the selected adhesive-transition threshold, producing a risk map rather than a deterministic prediction of failure time.

What the model represents

This example uses the production model selected by the supplied input. The governing theory and assumptions are described in the TriboSolver Manual; here the emphasis is on setting up, reproducing and interpreting one complete calculation.

Input or control	Reproducible value
Simulation type	Seizure
Normal load	5 N
Friction	COF = 0.50
Speeds	v1 = 1 m/s; v2 = 0
Critical temperature rise	23 K
Limiting shear stress	7 MPa
Grid	64 x 64

Supplied input: **seizure.tribo.json**

SHA-256: 2061ca4e3be8c3d19afe91285f116247639ba17063b5db584fd04121d93792e5

Set up and run the story

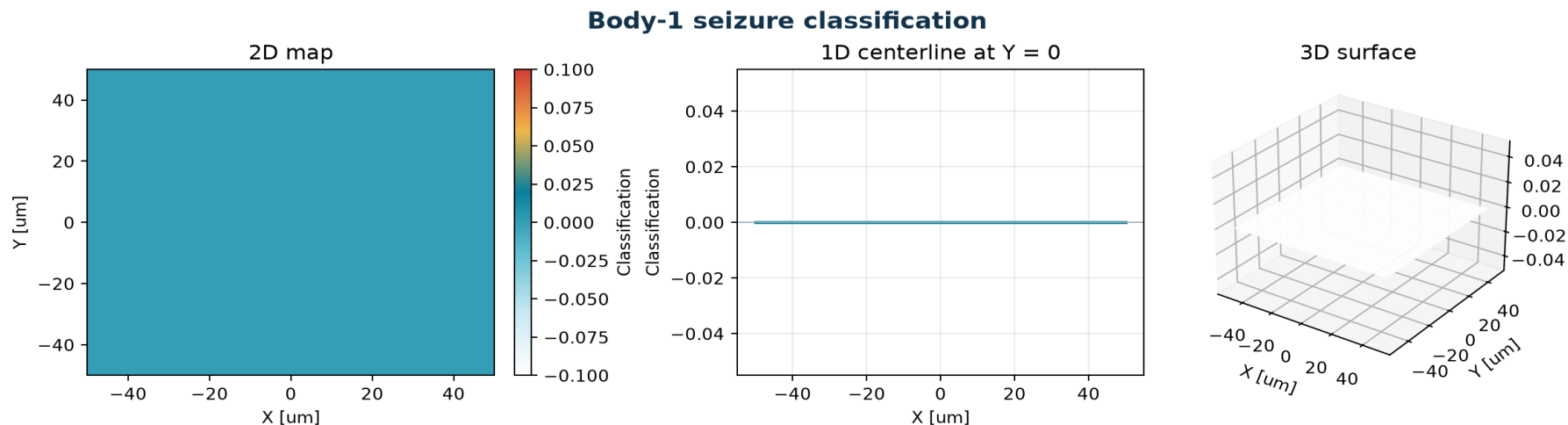
Step	Tab	What to do and why
1	Simulation Type	Choose Seizure. Point or line contact may be used; Flat is disabled.
2	Solid Material/Lubricant	Confirm mechanical, thermal and lubricant properties for both bodies.
3	Contact Conditions	Set Load = 5 N, COF = 0.50 and speeds 1/0 m/s.
4	Contact Grid and Geometry	Use 64 x 64 Point Contact and the supplied generated 50 nm RMS surface.
5	Seizure	Enter 23 K as the critical transition rise and 7 MPa limiting shear stress.
6	Run	Follow the contact, lubrication, thermal and seizure stages in the status bar.

Run checkpoint

Do not interpret a field until the status reports success. Compare the summary below with your run; it was read from the retained result set created from this exact input.

critical rise 23 K | adhesive area 0 %

Calculated result



Reproduced calculation: critical rise 23 K | adhesive area 0 %

The maximum calculated temperature rise is 4.67 K, below the selected 23 K transition rise, so the classified seizure area is 0%. This is a meaningful safe-side result rather than a missing output. A value of 1 would mark a cell above the criterion; 0 marks a cell below it. Inspect the temperature map and pressure footprint alongside the classification. A threshold map alone does not describe severity or time to failure.

Selected calculated scalar outputs

Output	Value	Unit
Calculated contact load	0.09346	N
Hydrodynamic load share	4.907	N
Boundary-contact load share	0.09346	N
hcl	110.2	nm
Coefficient of friction	0.03999	1
Friction force	0.1532	N
Contact area	4.102e-10	m ²

Output	Value	Unit
Rigid body motion	0	um

How to explore and explain the result

In 1D, start with the default center cross-section. Choose X or Y only when the engineering question requires a different direction, then move the location control. The grid and cursor readout give the plotted value and its unit. In 2D, use the colorbar to locate high and low regions and read the numerical X/Y axes. In 3D, rotate the same matrix to understand peak prominence and orientation; the X, Y and Z directions are references, not a different calculation.

View	Question it answers	Reading rule
1D	What happens along one selected line?	Start at the center; use the grid and cursor value to quantify peaks, widths and gradients.
2D	Where are high, low or active regions?	Read the colorbar and X/Y units; compare runs only with their numerical scales visible.
3D	How prominent and oriented are the features?	Rotate for shape and orientation; use 1D/2D or export for exact values.

What to report

State the input filename and hash, simulation type, material and geometry, grid and surface definition, prescribed load, solver status, iteration or balance measure, selected output name and unit, and the engineering meaning of the plotted pattern.

A useful engineering explanation states the prescribed load and geometry, identifies the active physical mechanism, checks convergence or force balance, and only then interprets the spatial field. Keep the supplied input and retained result together so a colleague can reproduce every number and plot.

Retained result: seizure-results.tribo-results.json
SHA-256: 542d5541f9ab67f27902bbb17b0445550ff93858583205dd46b7bcfc153ac8c1