

CDS Complete User Guide

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This guide follows the work of preparing, running and reviewing a connected CDS study. Use CREATE to prepare a starting recipe, DISCOVER to explore its behaviour and SIMULATE to inspect the linked records and solver outputs. The chapters explain how to keep material choices, model selections, loads and results consistent as the study changes.

Preface

This guide is written for an engineer or researcher who needs to prepare and maintain a CDS study. You do not need to read every theory derivation before using the interface, but you should understand the physical question you are asking and the units of its inputs. The chapters explain the controls in the order in which those controls contribute to a study.

Begin with the workspace and the relationship between records. Continue through material preparation and laminate definition before choosing a process or structural analysis. CREATE and DISCOVER help you explore candidates; the resulting selection still needs a compatible analysis and a review of its assumptions. Keep a baseline so that you can separate a deliberate design change from an unintended edit to a shared record.

How to use this manual

Read the assumptions before choosing a model. Keep units consistent, inspect solver notices and use the recorded checks to distinguish a completed calculation from a validated result. Chapter links lead to the interactive website; exercise links open the Workbench. Account-controlled database downloads and classroom materials remain subject to their existing access rules.

Equations are editable Word mathematics. This PDF is exported from the same Word document. Historical reference chapters retain their stated scope; the current workflow and exercise chapters describe the available CDS implementation.

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1 Understand the workspace

Online chapter

The workspace stores an engineering description as connected records. A material defines properties, while a laminate describes how those properties are arranged. A case adds the conditions under which the structure or process is evaluated. Learning these distinctions first makes the controls easier to understand: selecting a record changes what you inspect, whereas editing it can affect several dependent studies.

1.1 Explore the Workbench from model setup to results

04 / Workbench guide

Choose a stage, inspect its Workbench view and follow the linked guide or exercise. Keep the input records and assumptions behind each result visible.

CREATE · DISCOVER · SIMULATE

Start learning the CDS curriculum

Follow connected exercises from your first laminate to process, loading and structural studies. Choose a topic or model, then work through the setup, tasks and checkpoints.

[Explore the complete curriculum →](#)

[First time? Start here →](#)

Select a block to explore its inputs, results and theory. Run the engineering solvers in Workbench.

Materials

Traceable constituent properties

Start with source-aware elastic, strength, density and transport data. Teaching records help you explore; qualified design requires appropriate allowables.

Input Fiber, matrix and core → Result Traceable constituent properties

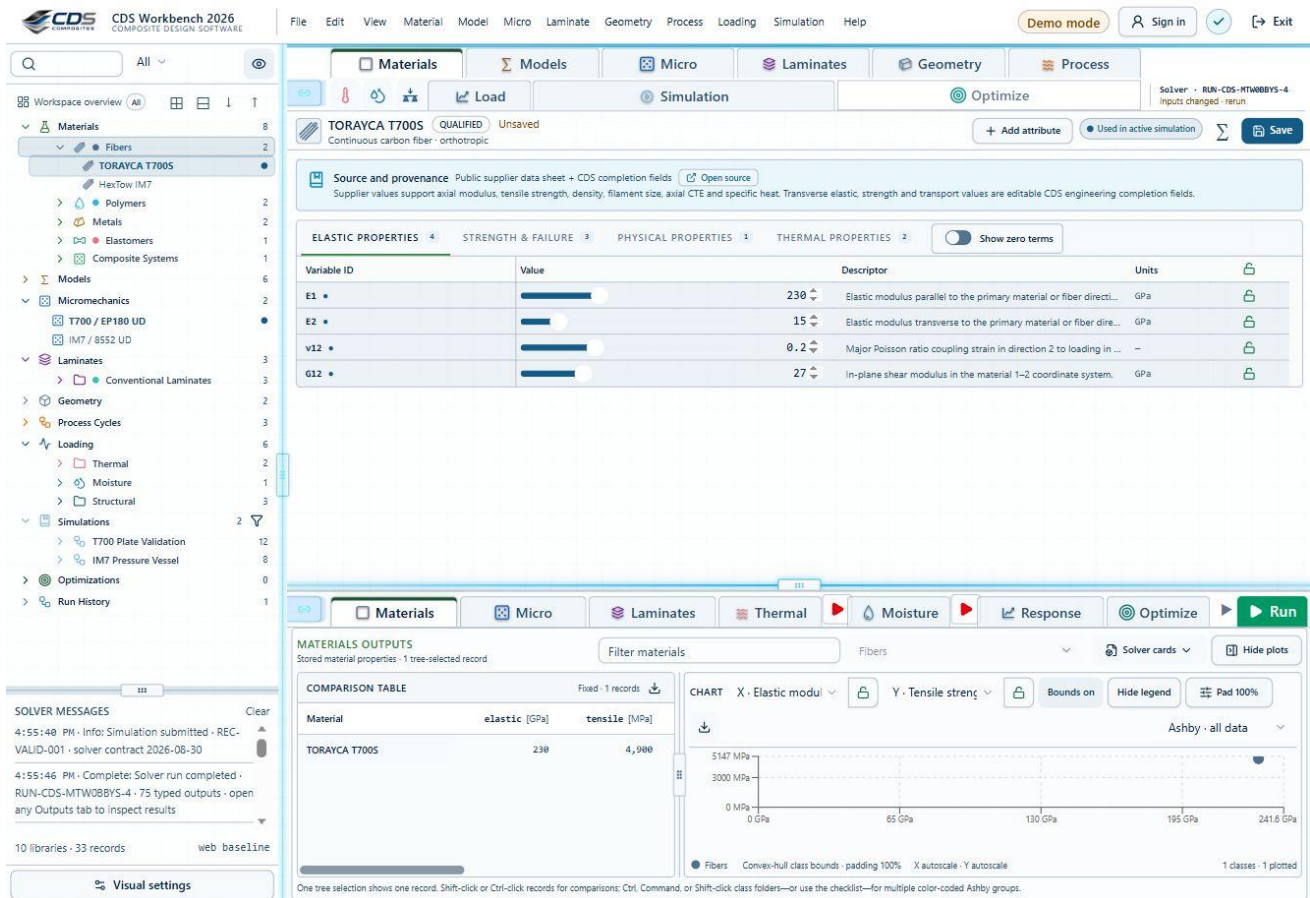


Figure 1. Materials Workbench view

Fatigue is optional and separate from progressive failure. An S-N life prediction is not a stiffness or strength reduction. Finite-plate CLT/FSDT and thick-wall cylinder studies have their own limits; they do not automatically include every process or failure model.

[Prefer a book? Open the complete PDF and Word manuals](#)

Explore this section

9 destinations

04.1

Getting Started

Sign in, open the Workbench, understand the project tree, and make your first safe GUI edit.

Refer to Figure 1 for the interface or model view used in this procedure.

04.2

Workspace Navigation

Learn the compact Project Manager tree, run controls, result views, editors, and live simulation summary.

Refer to Figure 1 for the interface or model view used in this procedure.

04.3

Materials

Add, edit, duplicate, move, classify, lock, unlock, and delete material records.

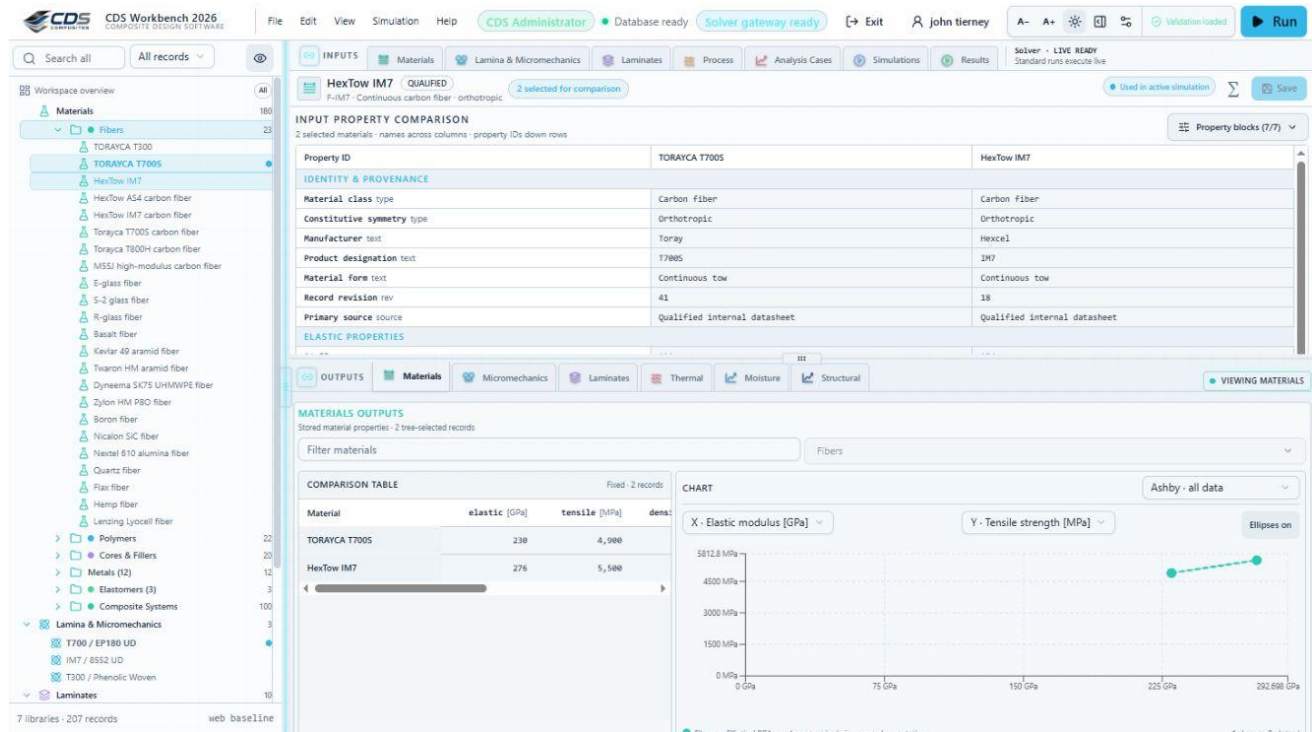


Figure 2. CDS Workbench materials Ashby plot and material class controls

04.4

Laminas Laminates

Connect constituents, build ply stacks, review effective results, and create reusable materials from predictions.

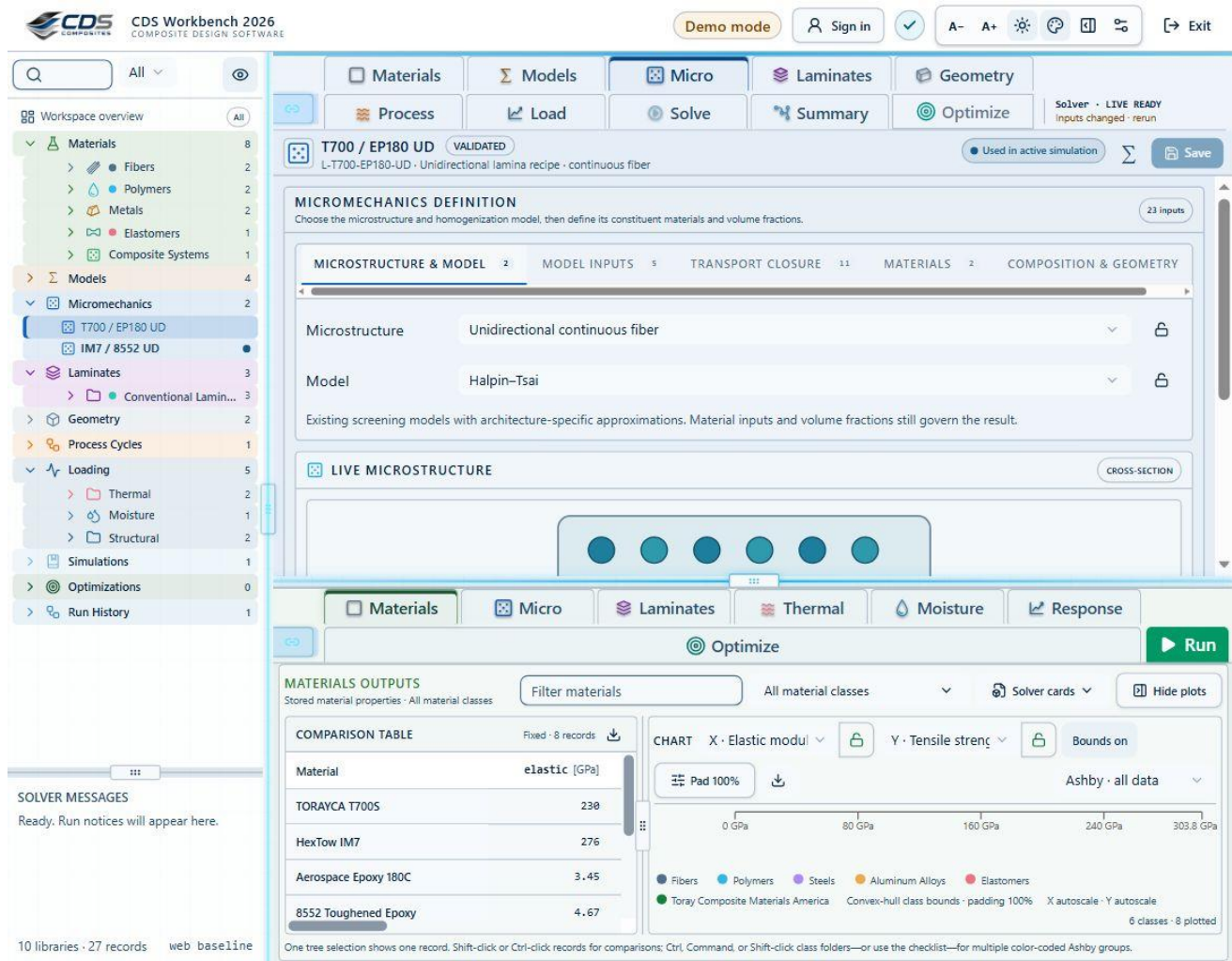


Figure 3. Microstructure & Model selects the architecture and compatible model. Materials and Composition & Geometry are separate input tabs.

04.5

Processes Simulations

Solve steady-state or transient cases, include cure exotherm and cure-dependent modulus, optimize process cycles, preview LiveLoad vectors, and inspect result provenance.

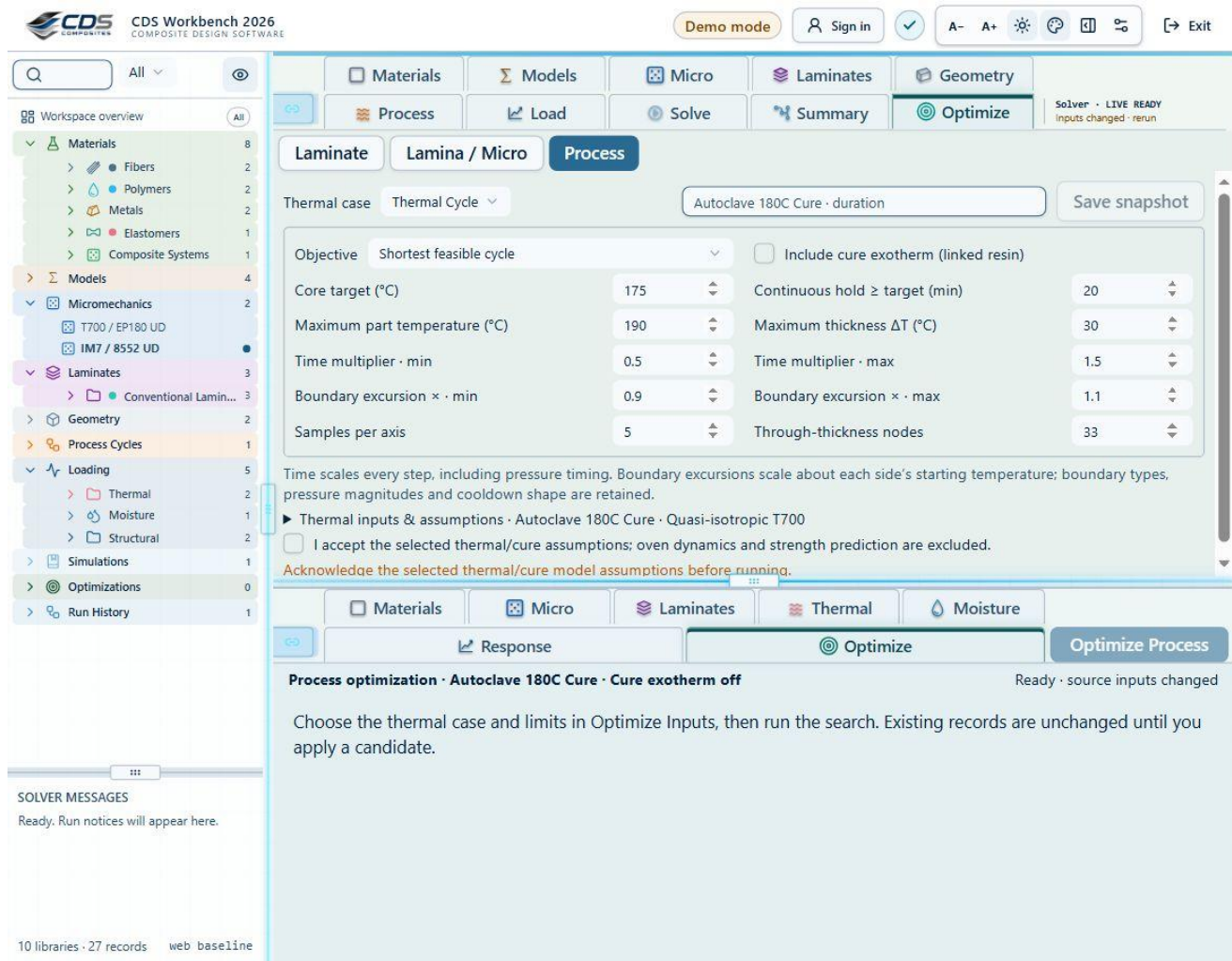


Figure 4. Choose Process in Optimize, select the thermal case, then set the core target, hold time, temperature limits and bounded time/boundary multipliers. Review assumptions before running.

04.6

Interface Effective Use

Use responsive navigation, locally saved settings, scrollable tables, 2D/3D plot controls, exports, record actions, and local data tools efficiently.

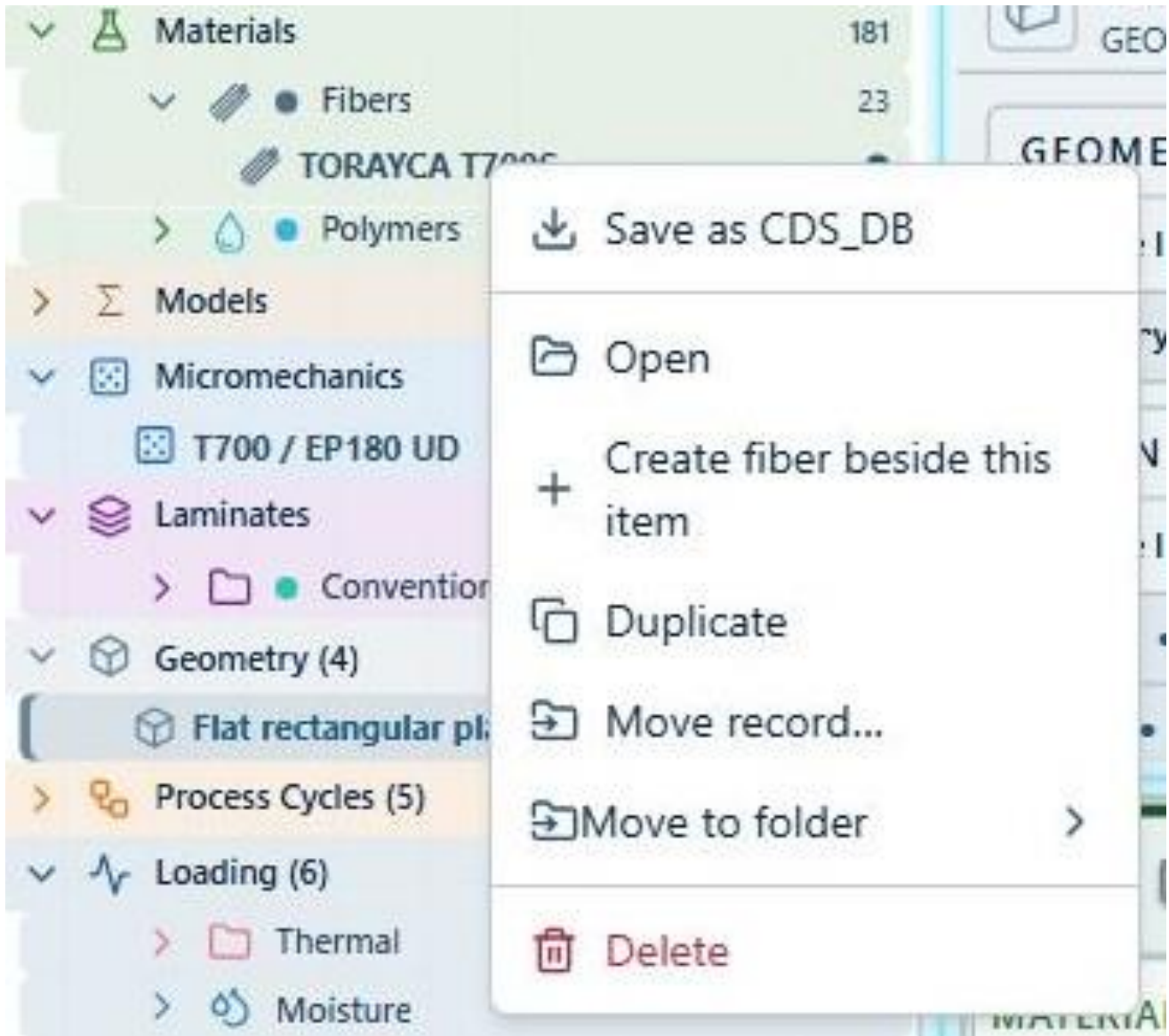


Figure 5. The record context menu exposes Open, Create, Duplicate, Move, Save and Delete actions for the selected record.

04.10

Connected Workbench Live Sync

Follow model dependencies, live and saved results, source-aware material records, grouped tree moves, multi-count duplication, boundary histories and comparison workflows.

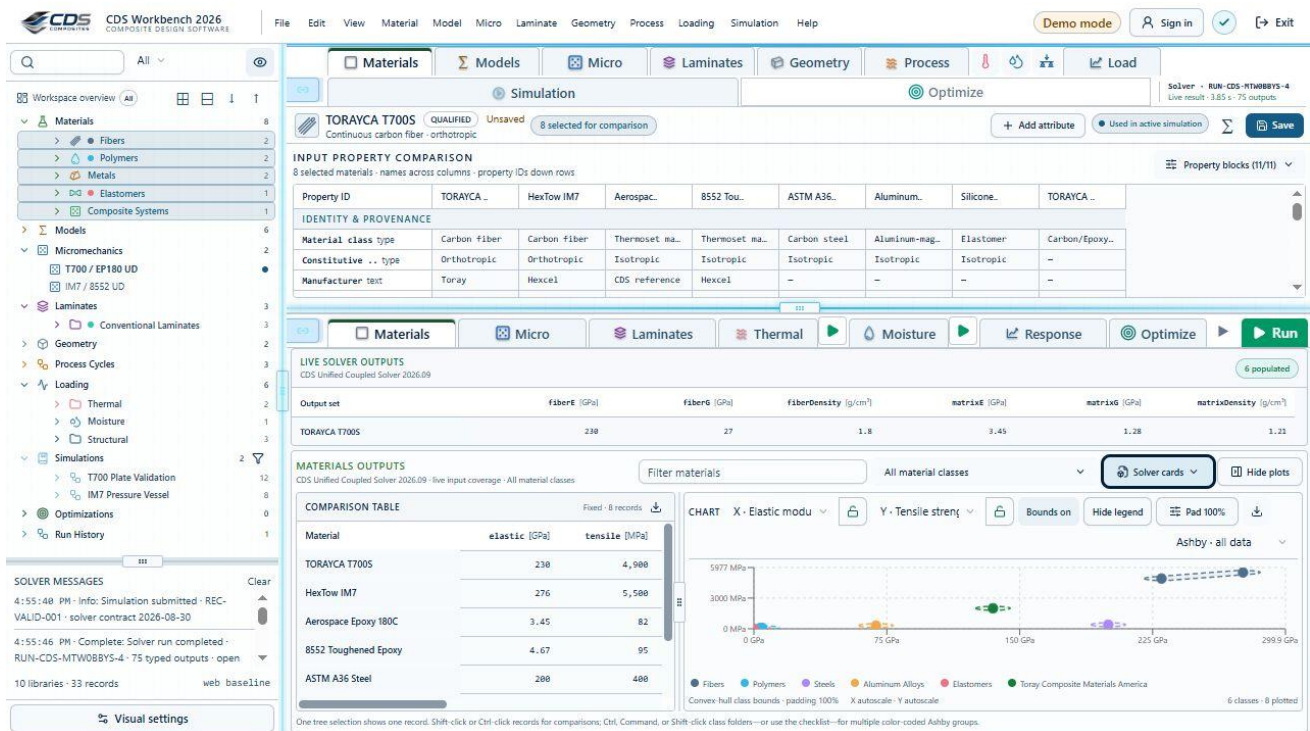


Figure 6. Current CDS Workbench materials and Ashby comparison workspace

04.11

Failure Design Maps Optimization

Set up failure envelopes and progressive analysis, explore 2D/3D carpet and microstructure maps, run laminate searches, save snapshots and compare studies.

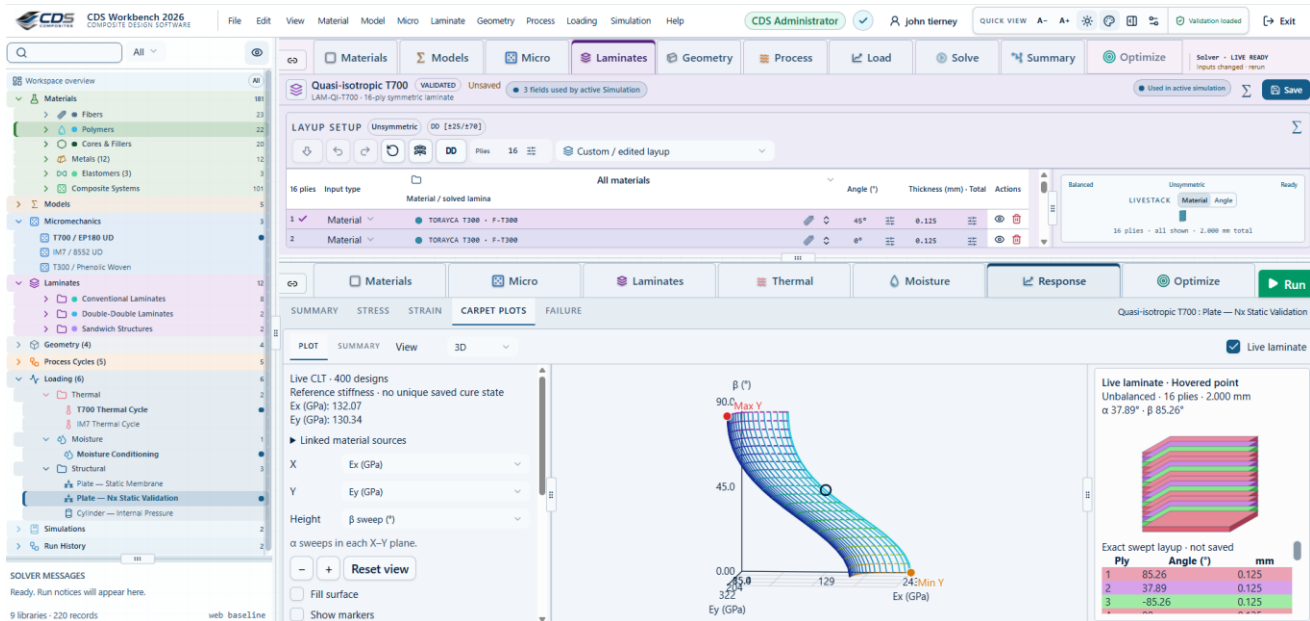


Figure 7. Current CDS Workbench three-dimensional carpet plot and live laminate

04.7

Videos

Explore videos.

1.2 Navigate the Workbench workspace

04.2 / CDS User Guide

Understand the latest Project Manager, project tree, filters, record editor, and live connection summary.

Explore the connected input path below. The dated GUI captures in the instructions show record controls; the current Simulation tab combines the earlier Solve and Summary views.

Workbench exercise preview

Three-point bending span and stiffness

Level 3

Intermediate

Est. 25 min

Exercise workflow · [Open full-size map](#)

Only blocks on the exercise path are shown. This changes the view only, not the exercise records.

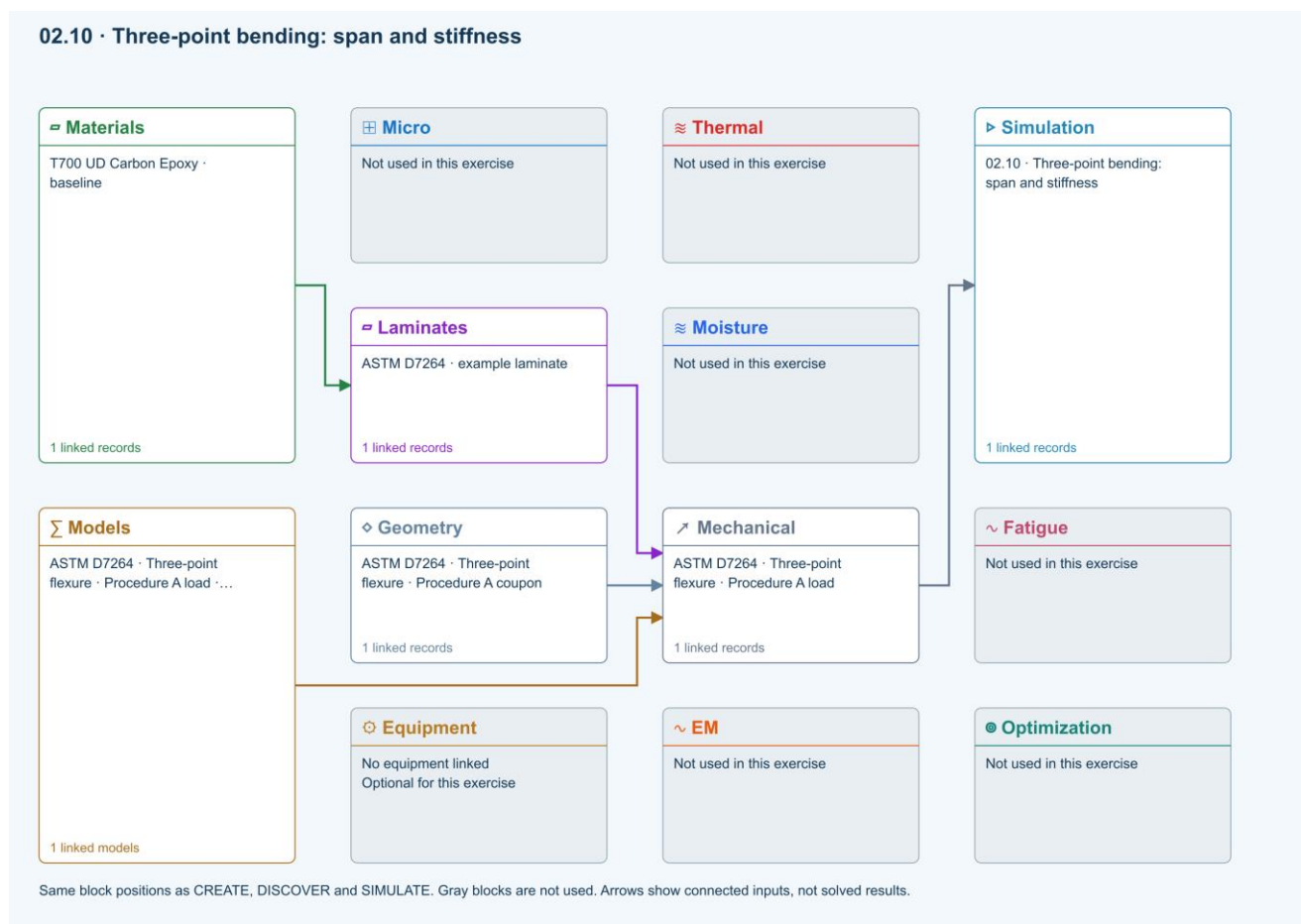


Figure 8. 02.10 · Three-point bending: span and stiffness · Fixed layout with all supplied blocks · not solved results

02.10 · Three-point bending: span and stiffness

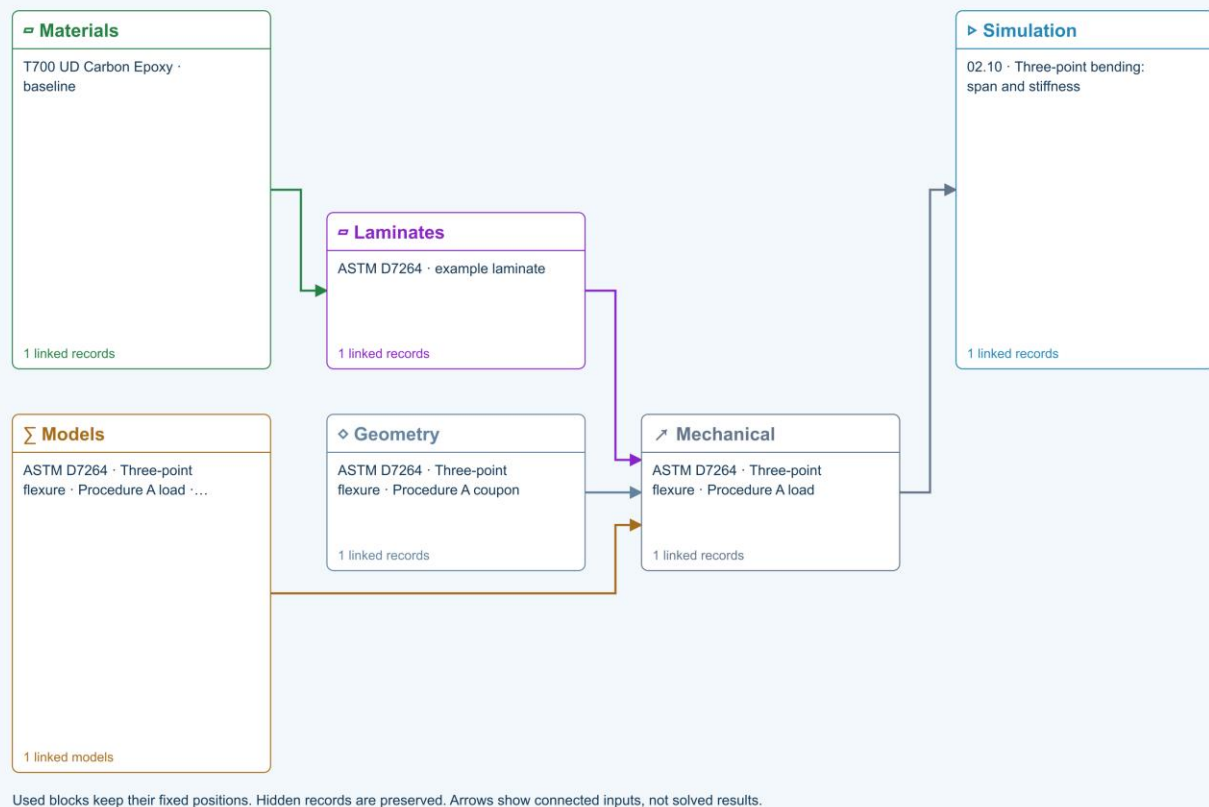


Figure 9. 02.10 · Three-point bending: span and stiffness · Used records in the universal fixed layout · not solved results

Σ Used models & submodels

Only models assigned to records used by this exercise are listed here. The full-layout option preserves the supplied starter records; no Workbench records are changed.

Euler–Bernoulli beam · Linear static · ASTM D7264 · Three-point flexure · Procedure A load

Beam bending uses effective laminate axial stiffness, the linked section geometry, support span and applied loading. Euler–Bernoulli deflection excludes transverse shear deformation, roller contact and indentation. Ply stress recovery for rectangular laminate coupons is separate from section-level beam stress recovery.

Σ Theory & assumptions

Data travelling between blocks

Materials → Laminates

Stored ply stiffness, strength, density and expansion properties.

Mechanical → Simulation

SIMULATION selects this case and its analysis model; the case owns its applicable cycle and input references.

Laminates → Mechanical

Ply angles and thicknesses, stiffness, mass and ply properties.

Geometry → Mechanical

Part shape and dimensions, thickness or section definition, and model-specific geometric inputs. Each selected case consumes only the dimensions its model supports.

Models → Mechanical

Applied model assignment: Euler–Bernoulli beam · Linear static. Model parameters and formulation are used by Mechanical.

Inspect specimen width, laminate thickness, support span and central force.

Models: Euler–Bernoulli beam · ASTM D7264-based

Study scope and limitations

Procedure A teaching setup. Transverse shear deformation, roller contact and indentation are excluded.

Inspect the selected model in Live Sim

SIMULATE provides Simulation flow, Live view, Connections and Connected inputs tabs. Keep the active simulation selector visible while inspecting its fixed blocks or scene. Live views follow the selected simulation; they are input previews until a current solved history is available.

Step-by-step instructions · 4 steps

- Select Geometry, Laminate, a constituent or a case to inspect the inputs that are actually used. Clicking a used block heading also opens its Live Sim inspection.
- Select a ply in the stack or geometry view to inspect its source. Micro-derived and stored-property plies are identified separately. Woven sources show the fabric unit-cell preview when applicable.
- Select the Thermal or Moisture case to inspect its surface boundary schedule. Move the step slider to compare prescribed conditions. This is not a solved internal temperature or moisture field.
- Use Edit input to open the source record. The scene follows the changed inputs; rerun the simulation before trusting previous results.

Geometry, ply bands and arrows are input illustrations, not a finite-element mesh or solved deformation. Display-only thickness enlargement and any model-specific visualization assumptions are identified in the preview.

Use the current CASES database format

This release reads and saves the current CASES database format only. Thermal and Moisture schedules are stored directly with their cases. There is no separate Process record or old-format migration on opening a file.

Step-by-step instructions · 3 steps

- Download a current starter or exercise database from the library. Older-format files are rejected with a clear message rather than converted silently.
- Save and reopen the current database to retain case selections, schedules, candidate records and editable names.
- Missing folders, duplicate identifiers and cycles attached to absent cases prevent saving or opening. Blank physical inputs remain editable and must be completed before Run.

This change concerns Workbench database files only. It does not erase account, licensing or payment history.

Choose the run in the SIMULATION block

SIMULATION is the control point for the run. Select a Thermal case, Moisture case, Mechanical case and EM case, or None in any slot. Each selected case shows its analysis model, laminate and applicable geometry.

Step-by-step instructions · 4 steps

- Keep candidate records in the surrounding blocks. Adding a candidate does not select it for execution.
- Select the required cases in SIMULATION and review their inputs before Run. At least one case is required.
- Use the same laminate for a supported combined run. Run standalone studies separately with the other selectors set to None.
- Run executes the selected combination. A connection or Used marker is not confirmation of a successful solve.

Selecting several cases does not add unsupported physics coupling. EM screening studies do not automatically heat the thermal case.

Review every downstream geometry dependency

A geometry record can be shared by several cases and simulations. Editing its dimensions or type affects all linked consumers, including studies that are not currently open. Unrelated records are unchanged.

Step-by-step instructions · 4 steps

- After editing geometry, open Solver messages and expand Review affected cases and simulations. Select a linked name to inspect that record.
- Check the selected model, load basis, dimensions and boundary conditions. Loads are not automatically replaced when the geometry changes.
- Resolve incompatible geometry and model combinations before running. An I-section does not turn a plate theory into a beam theory.
- Rerun affected simulations before relying on previous results. Inputs changed warnings indicate that stored results no longer match their connected inputs.

Geometry affects only dimensions consumed by the selected model. One-dimensional transport retains its through-thickness assumptions; standalone studies may own their dimensions. Under fixed total edge loads, changing plate width changes force per unit width. Under prescribed resultants, it does not.

Build the simulation from interactive blocks

Choose Block view above the left navigator for a vertical, editable workflow, or Blocks inside SIMULATE for the larger connection view. Live Sim inspects the selected model. Record dropdowns remain visible in Lite view.

Step-by-step instructions · 3 steps

- Choose the active simulation, then select compatible materials, Micro recipes, laminates, geometry and cases inside its blocks. Hybrid laminates can retain both stored-material and solved-Micro ply sources.
- Use the local Blocks Lite–Advanced switch for extra details without changing the rest of the workspace. Existing search and current-simulation filters still apply.
- Use the side connections to trace the input path. Hide connections or pause their animation locally; reduced-motion preferences are respected. Animation indicates connection direction, not solver progress.

The current-simulation filter includes used dependencies and added candidate records, even when those candidates are not selected for the run. Show all to browse other allowed library records.

Read the blue Used marker

Used markers identify consumed records. Availability and connection state do not require a green glow around a block. Hover or focus the marker to see which downstream record and field uses that input.

Step-by-step instructions · 3 steps

- Check the marker before editing a shared input: more than one case can consume it.
- A Used marker means connected, not solved or validated. Review solver status and outdated-result warnings separately.
- Missing or incompatible selections need repair; do not interpret an empty result as zero response.

Add replace or disconnect a block input

The + control adds another available record to a block, excluding records already present. Use that record row dropdown to change the candidate, its link to open it, and – to remove it from the block. Library records are not deleted.

Step-by-step instructions · 4 steps

- Choose + and search for a compatible candidate not already in the block. Decide what actually runs with the four selectors in SIMULATION.
- If no compatible record exists, create one in Inputs. Each case owns its analysis model and applicable cycle. There is no separate Process block to connect.
- A used input must first be disconnected or changed at its consuming field. Review downstream warnings before confirming a removal; cancel to keep it.
- After removal, required missing inputs remain flagged and their selectors allow reconnection. Optional cases may stay disconnected. Rerun affected analyses before relying on their results.

Disconnecting a shared laminate input may affect several cases. Removing a ply-source connection preserves the other ply sources, angles and thicknesses; it does not delete the ply stack.

Keep starter laminates in one classification

Generated Standard starter Conventional Laminates folders are consolidated into the main Conventional Laminates folder. Distinct laminate record IDs and their simulation links are preserved; identical titles alone are not a reason to delete a record.

Custom folders and exercise collections remain separate. Save the workspace to retain its cleaned organization in your local database.

Project Manager

The Project Manager at the upper left combines navigation actions with the selected record's context menu. Use it for create, open, save, load, export, and settings actions.

Step-by-step instructions · 4 steps

- Select a tree item first.
- Open Project Manager.
- Confirm the action scope: selected record, subtree, or entire database.
- Choose the required action.

Compact project tree

The left tree follows the engineering data chain: Materials, Models, Micromechanics, Laminates, Geometry, Equipment, CASES and Simulations. CASES contains Thermal, Moisture, Mechanical and EM records, each with its own applicable cycle. Click a folder label to select its child records, including nested children that match the current tree filters. Inputs and Outputs independently follow this multi-selection when their Live sync is on; a panel with Live sync off stays pinned. Ctrl-click adds or removes a folder's records; Shift-click adds them. Use the chevron to expand or collapse without changing selection.

Refer to Figure 1 for the interface or model view used in this procedure.

The left tree organizes modeling records; its chevrons expand classes and its rows select records. [Open full size](#) GUI capture · September 10, 2026 . Control locations may differ in later releases; not benchmark validation data.

Selecting the Materials heading selects its eligible child materials for comparison. Materials, micromechanics and laminates use comparison views; simulation folders show selected summaries. Case outputs retain the multi-selection and offer Inspect to choose the result to view. Selecting records does not run the solver.

Search filter and visibility

Search locates records by title or descriptor. The All records dropdown and type filters narrow the visible records while preserving the primary tree. The eye control switches between the current simulation's records and all allowed records. Current simulation includes available candidates you added, even when they are not yet Used by the selected run.

Refer to Figure 1 for the interface or model view used in this procedure.

Steps 1, 4 · Search, the All filter and visibility control sit directly above the tree. [Open full size](#) GUI capture · September 10, 2026 . Control locations may differ in later releases; not benchmark validation data.

Step-by-step instructions · 4 steps

- Enter a search term or choose a type filter. [See screenshot](#)
- Look for the blue active-filter treatment.
- Review Workspace filtered result.
- Clear search and filter to restore the full tree. [See screenshot](#)

Expand or collapse the tree

Workspace overview and its tree controls remain above the scrolling records. The open-book icon expands all; the closed-book icon collapses all. The arrows expand or collapse one level.

Clear a text search before using the expansion controls. Structural models contain nested CLT/FSDT, cylinder, failure, fatigue and related submodels; nesting does not imply solver compatibility.

Selected record editor

Selecting an item opens its property editor. Compact tables show property names, descriptions, values, units and lock state. Predicted micromechanics and laminate properties remain read-only indicators; edit their connected source inputs instead.

Refer to Figure 1 for the interface or model view used in this procedure.

The selected record editor occupies the upper pane; units and locks are beside each value. [Open full size GUI capture](#) · September 10, 2026 . Control locations may differ in later releases; not benchmark validation data.

Simulation workflow and scene controls

The Simulation tab combines the connected inputs and model workflow. Use the detail slider to move from the fixed high-level arrangement to model and field details. Zoom and pan the canvas around controls; block positions stay familiar. Select a record to inspect its inputs and use the controls inside a block to add, replace or disconnect records.

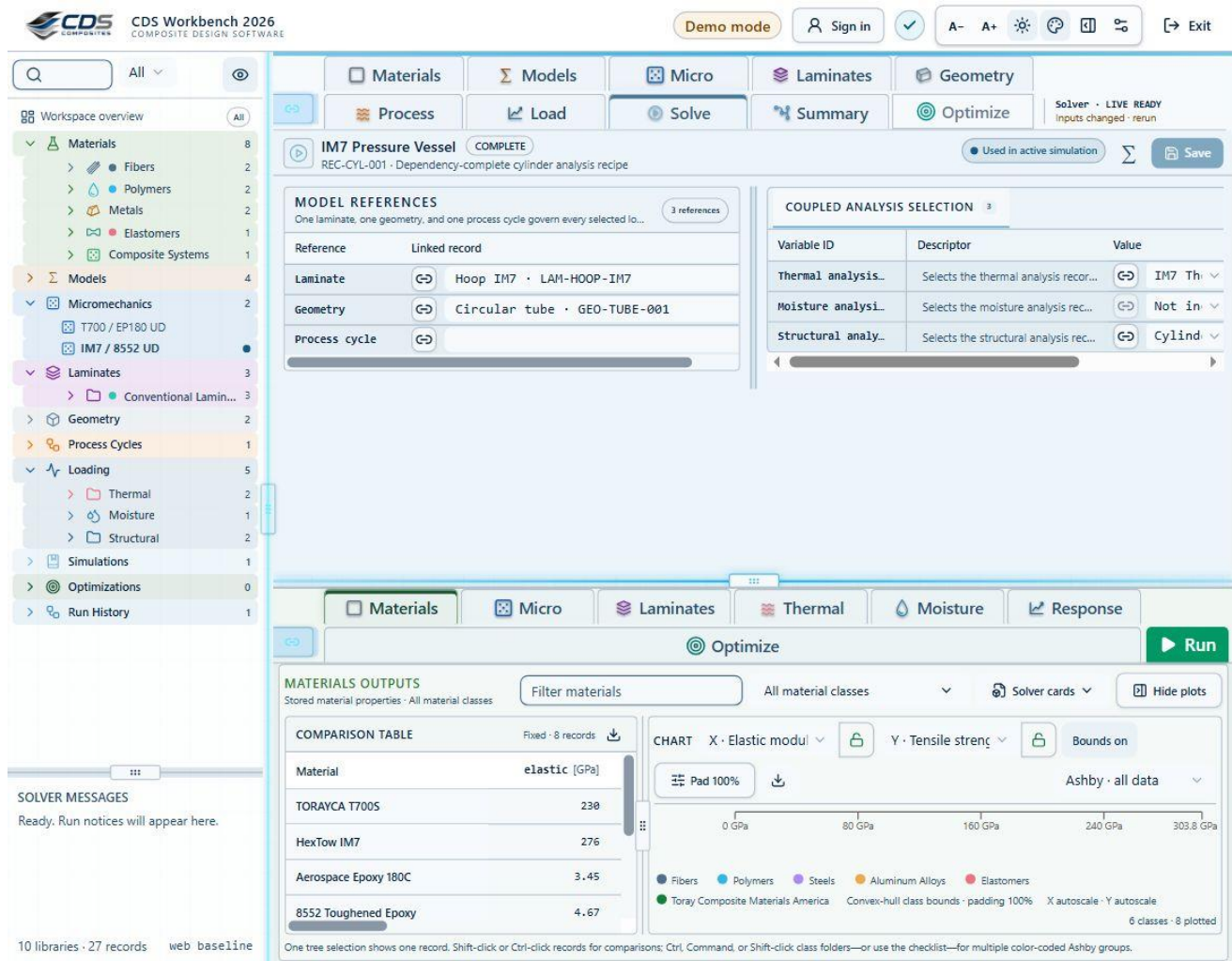


Figure 10. Review linked inputs in Simulation (shown as Solve in this capture) before using Run.

Review linked inputs in Simulation (shown as Solve in this capture) before using Run. [Open full size](#) GUI capture · September 7, 2026 . Control locations may differ in later releases; not benchmark validation data.

Step-by-step instructions · 4 steps

- Use the searchable simulation selector above the left tree to change the active case.
- Use the global Lite–Advanced switch for the workspace, or a local switch for one area.
- Inputs, Split and Outputs allocate pane space. Back and Forward revisit scenes, not previous data values.
- Use the visible Solver status to distinguish live updates, Run required and outdated results.

Results workspace

Materials, Micromechanics, and Laminates use the same four result views: Table, Ashby, Bar, and Line. The active tab is clearly highlighted. A single selected record shows its property view; multiple selected records use properties as rows and records as columns.

Refer to Figure 1 for the interface or model view used in this procedure.

The lower pane contains output selection, comparison table, chart controls and the plot. [Open full size](#) GUI capture · September 10, 2026 . Control locations may differ in later releases; not benchmark validation data.

Select the records you want to compare. Folder selection includes eligible child records under the current filters; verify the selected records and each pane's Live sync setting before interpreting its output.

Chapter review

Before proceeding, identify the active record and the simulation that consumes it. Explain which information belongs to each rather than relying on the position of a block in the diagram.

2 Use the interface and manage records

Online chapter

The tree, editor and output view are different views of the same study. Use the tree to identify a record, the editor to inspect its inputs and the output view to interpret a calculation. When moving between them, keep track of the selection and result status. A plot already on screen may belong to the previous input state until the required update has been run.

2.1 Use the interface deliberately and efficiently

04.6 / CDS User Guide

A practical operating pattern for compact navigation, model checks, result comparison, and portable data.

Right-click help throughout the Workbench

Right-click a record, input, workflow block, result plot or workspace area and choose its Help link. Existing edit, export and plotting actions remain in their menus; help opens the relevant manual section in a separate tab.

Step-by-step instructions · 4 steps

- Use the help item on the area you are working in: Inputs and Outputs have separate context, and workflow blocks use their own module.
- Press F1 for help on the focused control, or Shift+F10 to open its context menu using the keyboard.
- Use Shift+right-click when you need the browser's native menu, including text editing and link actions.
- Open the Exercise manual for the complete searchable curriculum, then use the user portal Database library to download current exercise copies.

Help links explain controls and model limitations; they do not validate your material data or mark a solution as passing.

Use Project Manager consistently

Project Manager mirrors record right-click operations. Use whichever access point is faster, but always verify the selected item and action scope first.

Refer to Figure 5 for the interface or model view used in this procedure.

The record context menu exposes Open, Create, Duplicate, Move, Save and Delete actions for the selected record. [Open full size](#) GUI capture · September 7, 2026 . Control locations may differ in later releases; not benchmark validation data.

Right-click and keyboard operations

Right-click opens actions for the item beneath the pointer. Record menus can open, rename, duplicate, move, favorite, save/export or delete; folder menus apply only the actions shown for that folder and can favorite or unfavorite its children. Plot and table menus expose their own display and export actions.

Step-by-step instructions · 4 steps

- Use Ctrl/Command-click or Shift-click before opening a record menu when an action should apply to several visible records.
- Filtered selections remain valid: favorite or unfavorite the selected filtered records without clearing the filter.
- Press Shift+F10 for the same context menu from the keyboard. Press Shift while right-clicking for the browser menu.
- Read delete warnings. If a deleted source supports reusable report snapshots, the named dependent snapshots are deleted with it.

The menu operates on the displayed selection and its stated scope. A folder action is not automatically a database-wide action.

Adjust and retain interface settings

Open Settings: Visual for font size and appearance. Settings: General is available from the top menu and the pop-up settings panel. Preferences are stored on the user's local system, including optional automatic simulation on opening when the connected model is complete. Choose a density that keeps descriptors readable without hiding the connection summary.

Use the lower-left Settings panel

Settings remains at the lower left of the Workbench. Visual contains application font size, theme, density, grid and input tint controls. General contains navigation response, dropdown scope, startup behavior, record identifiers, workflow display and database preferences.

Step-by-step instructions · 4 steps

- A–, percentage and A+ change the Workbench font scale; they do not change exported numerical values.
- Inputs and Outputs response controls decide whether each pane follows a tree selection.
- Dropdown selections can show only compatible records added to the current SIMULATE workflow or all relevant allowed records. Favorites remain promoted where they are valid.
- Restore defaults only when you intend to reset locally stored interface preferences.

Settings affect presentation and navigation. They do not change model equations, license permissions or solver accuracy.

Filter without losing context

Prefer the compact All records dropdown and virtual-folder filters over collapsing the entire tree manually. Filters retain the menu structure, highlight the active state, and change the heading to Workspace filtered result. Single-click selects; use the chevron or double-click to open child items.

Refer to Figure 1 for the interface or model view used in this procedure.

Search and filter controls sit above the project tree. [Open full size](#) GUI capture · September 10, 2026 . Control locations may differ in later releases; not benchmark validation data.

Use locks bounds and increments

Keep trusted properties locked. Unlock only the values being changed, use physically meaningful bounds, select an increment appropriate to the property scale, and relock after review.