



Read First: Simulation Ready Geometries- Automotive Collection

Developed and curated by the Ansys Academic Development Team

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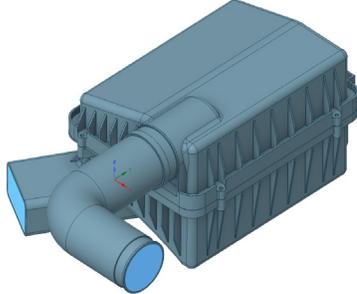
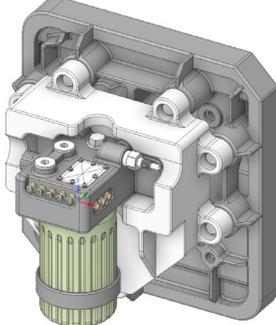
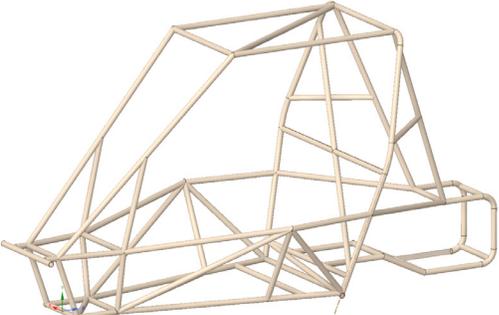
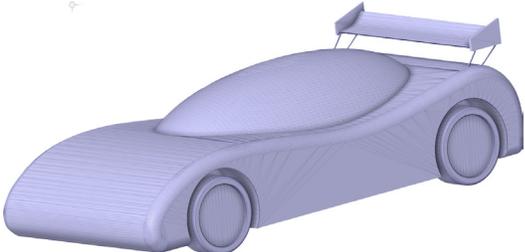
Summary

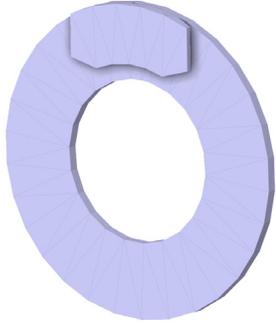
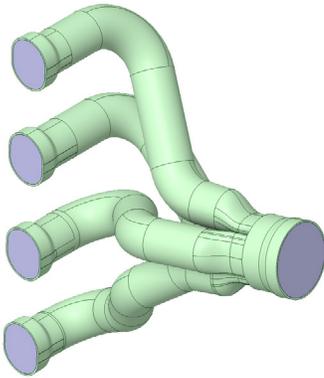
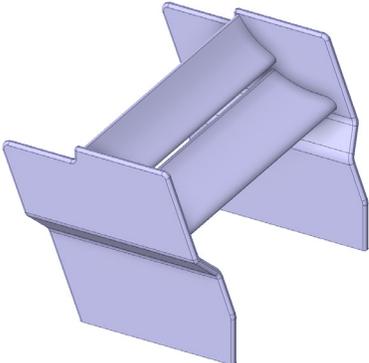
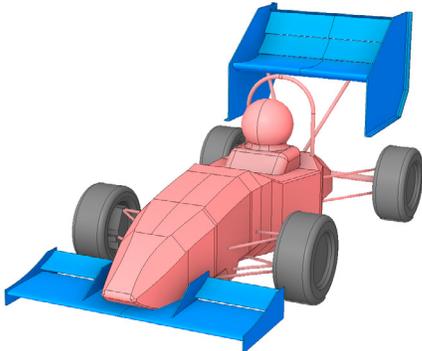
This resource is a collection of Ansys Discovery CAD models, focused on automotive applications. The goal of this resource is to provide a variety of ready-made CAD models for use in the classroom. Details of the models available, using the Ansys Discovery file format with other Ansys products such as Ansys Workbench, and additional information can be found in this document.

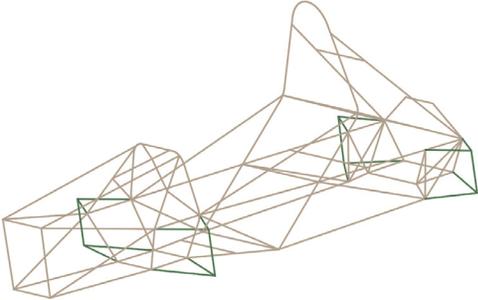
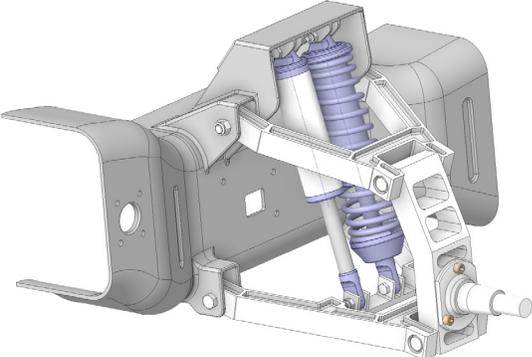
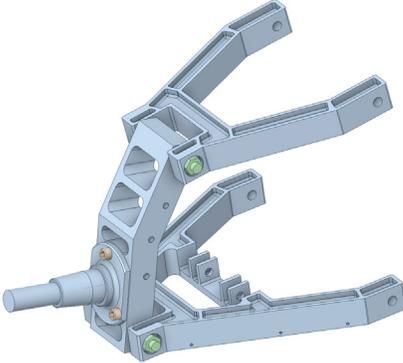
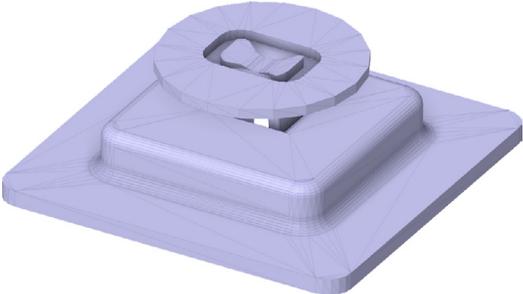
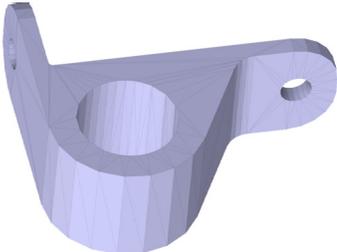
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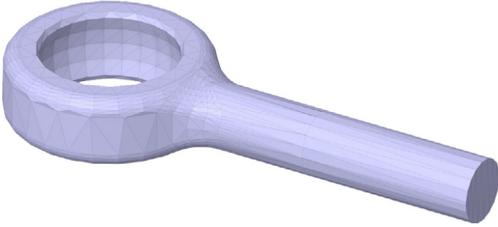
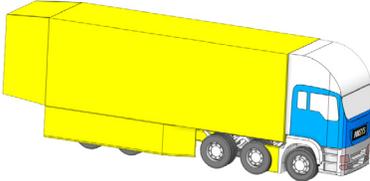
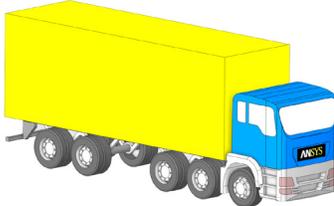
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1. Geometries available in this collection

Geometry Name	CAD Image
Air intake	
Automotive bracket housing	
BAJA SAE chassis	
Bell crank	
Concept car	

Geometry Name	CAD Image
Disc brake	
Exhaust manifold with fluid	
F1 rear wing- DRS	
FSAE car	

Geometry Name	CAD Image
FSAE chassis	 <p>A wireframe CAD model of an FSAE chassis, showing the structural frame in a light brown color with some green highlights on the front and rear sections.</p>
Race truck suspension	 <p>A 3D CAD model of a race truck suspension assembly, showing various components like the coil spring, shock absorber, and control arms in a grey and blue color scheme.</p>
Race truck suspension simplified	 <p>A simplified 3D CAD model of a race truck suspension, showing the main structural components in a light blue color.</p>
Snap fit cap	 <p>A 3D CAD model of a snap fit cap, showing a square base with a circular top and a central hole, rendered in a light purple color.</p>
Sway bar bracket	 <p>A 3D CAD model of a sway bar bracket, showing a curved bracket with a central hole and a smaller hole on the side, rendered in a light purple color.</p>

Geometry Name	CAD Image
Tie rod end	
Truck - streamlined	
Truck - traditional	

2. The .dsco file format

In this collection you will find **18** CAD models related to the **automotive** field. Each model will be available in the **.dsco** file format.



Figure 1: Example CAD file (Disc brake) open in Ansys Discovery

This is the format of the new recommended tool (Ansys Discovery) for geometry editing and preliminary simulation (ready to simulate geometry). Models can be imported into workbench and used with any Ansys software of preference

3. How to use the .dsco file in Ansys Discovery

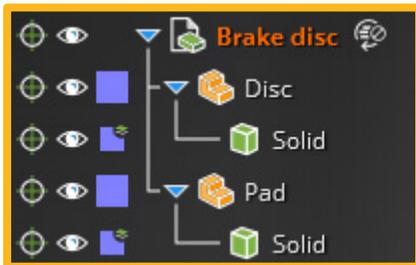


Figure 2: Model Tree in Ansys Discovery for the Disc brake

If any changes need to be made to the .dsco file, Ansys Discovery is the best tool to do this. There are two menus to highlight for quick model changes. We will use the Disc brake from Figure 1 for an example.

When open in Discovery, like in Figure 1, there is a **Model Tree** (Figure 2). This displays the individual parts of the model. For this example, there are two parts held within the containers called **Disc** and **Pad**.

The second drop down menu of importance is the **Physics Tree** (Figure 3). This is one of the places you can change the material used in the model. In this example, we can see cast iron EN GJL 100 is the material currently assigned to the disc brake.

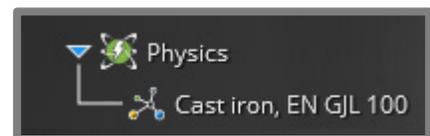


Figure 3: Physics Tree in Ansys Discovery for the Disc brake

4. How to open/insert and transfer .dsco files to Ansys Workbench

This section details how .dsco and other supported model formats can be opened in Ansys Discovery and then transferred to flagship Ansys products or Ansys Workbench.

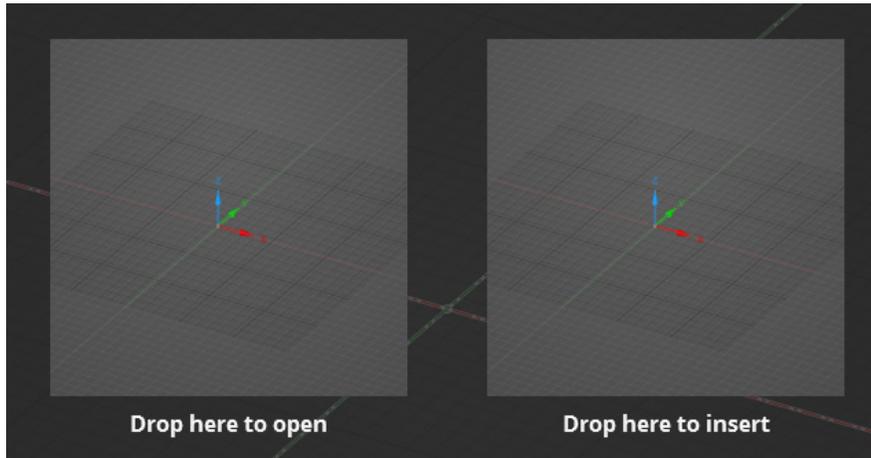


Figure 4: Insert window in Ansys Discovery

.dsco files and other supported model formats can be opened by dragging and dropping files into a blank Ansys Discovery space. Use the Insert window (Figure 4) to include multiple models in the same space.

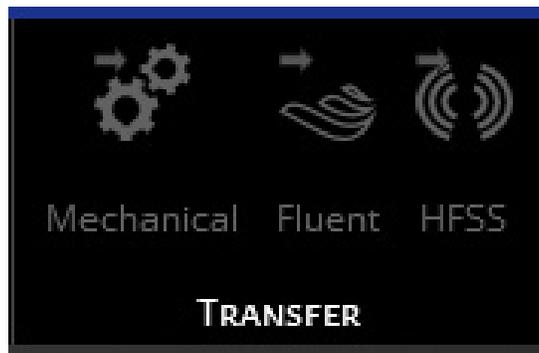


Figure 5: the Transfer Ribbon in Ansys Discovery

To bring .dsco models into the flagship products (Ansys Mechanical, Fluent, HFSS), simply use the Transfer ribbon in Ansys Discovery (Figure 5) and click the product of interest.

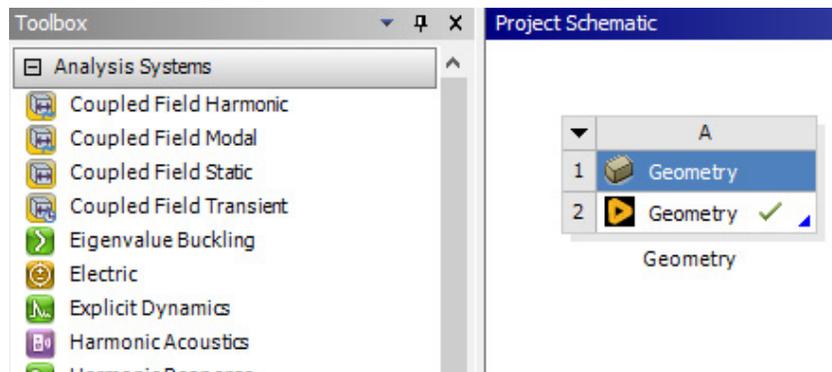


Figure 6: Ansys Workbench geometry file interface

Files can be opened in Ansys Discovery using the Geometry cell in Ansys Workbench (Figure 6).

5. Links to Automotive CAD models

Some of the CAD models included in this package come from sources across Ansys, such as Ansys Innovation Courses (AIC) or the Discovery forum. Links for those sources can be found here.

CAD Model Name	Link to Source
Air intake	Geometry Prep for Fluids AIC Porous Flow Simulation AIC Discovery Forum Online Learning CAD Models*
Automotive bracket housing	Discovery Forum Online Learning CAD Models*
BAJA SAE chassis	BAJA SAE Chassis Analysis AIC
Bell crank	Topology Optimization using Ansys Mechanical AIC
Exhaust manifold with Fluid	Discovery Forum Online Learning CAD Models*
F1 Rear Wing- DRS	Exploring Drag and Physics AIC Aerodynamics Discovery Day AIC
FSAE car	Aerodynamics of an FSAE Car AIC
FSAE chassis	Formula SAE Chassis Analysis AIC
Race truck suspension	Discovery Forum Online Learning CAD Models*
Race truck suspension simplified	Discovery Forum Online Learning CAD Models*

* To access these models, you must sign-up/login to the [Discovery Forum](#)

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Document Information

This CAD model collection is part of a set of teaching resources to help introduce students to structures, fluids, or heat transfer (physics areas supported by Ansys Discovery).

Ansys Education Resources

To access more undergraduate education resources, including lecture presentations with notes, exercises with worked solutions, microprojects, real life examples and more, visit www.ansys.com/education-resources.

Feedback

If you notice any errors in this resource or need to get in contact with the authors, please email us at education@ansys.com.

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