

Insert a New Rigid Body

base model: models/Material.mdl


final model: models/RigidBody.mdl

Insert a Rigid Body

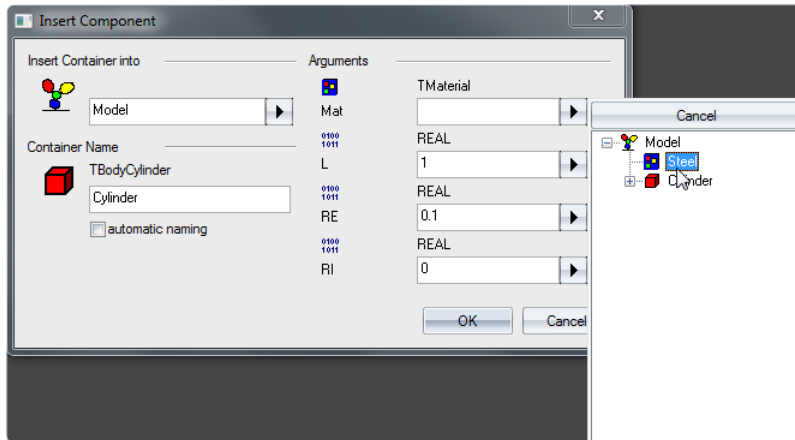
- ▶ It is explained how to insert a new rigid body to the model
- ▶ There are several templates for rigid bodies, which can be described via geometrical properties
- ▶ To calculate all mass properties from the geometric properties a density is needed
- ▶ The density is defined using an assigned material

Open the base model `Material.mdl` in alaska/ModellerStudio

Insert a Cylinder

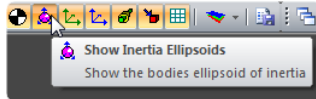
- 1 Use the "Short Cut Tree" to drag a **Cylinder** into the "Model"
Location within the tree *Bodies* → *Body* → *Cylinder*
- 2 (alternatively you can use **F6** and use the location within the template hierarchy:
TMBSBasicBody → *CT_BasicBody* → *CT_Body* → *TBody* → *TBodyMPrimitive* → *TBodyCylinder*)
- 3 Keep the default "Model" at parent container and change the name to "Cylinder"
- 4 Use the black triangle  to select the material *Steel* in the model
(left-click triangle, select *Steel* by double-click)
- 5 Enter the following numbers for the geometric properties:
 - ▶ $L = 1$ (length)
 - ▶ $RE = 0.1$ (external radius)
 - ▶ $RI = 0$ (internal radius)
- 6 Click on **OK** to insert the Cylinder

Screenshot



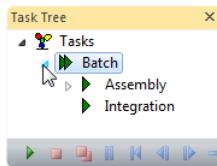
Check – Viewer

- ▶ To check the rigid body, we can use the 3-dimensional graphical visualization and simulations
- ▶ First we have a look on the graphics:
 - ① Double-click the **Viewer** at the “Model Tree”
 - ② The **Viewer** window will open and we can see the cylinder with its inertia ellipsoid
 - ③ To toggle off the inertia ellipsoid first activate the Viewer-window by clicking it; then deselect the ellipsoid using the icon in the toolbar:



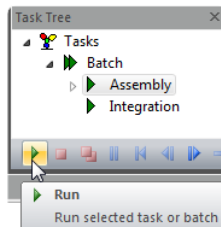
Check – Simulation

- ▶ Any analysis of the model in alaska is called “task”
 - ▶ All tasks in alaska are again model elements and derived from templates
 - ▶ Tasks can be added using function key **F7**
 - ▶ All tasks of the model can be found in the “Task Tree”
 - ▶ Tasks can be grouped, any group is called a “Batch”
- ① Unfold the Batch within the “Task Tree” using the triangle in front of it:



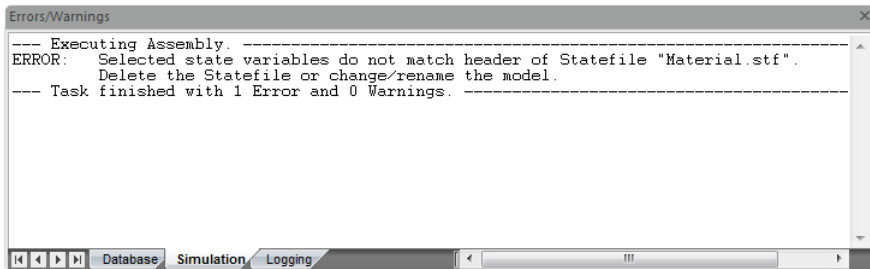
Check – Simulation

- ▶ The `Batch` contains two tasks: `Assembly` and `Integration`
 - ▶ `Assembly` will assemble the model and set all initial conditions
 - ▶ `Integration` will perform a numerical time integration of the automatically generated equations of motion starting with the given initial conditions
- ② Select the `Assembly` task by left-click and run it by clicking the symbol “Run”

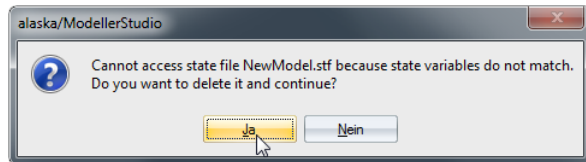


Check – Simulation

- ▶ The first time a task is run after inserting a new body, an error may occur:

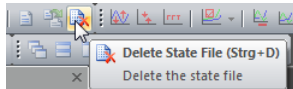


- ▶ The new body introduces new state variables and new equations of motion
- ▶ The state file, which contains tables with all states, has to be deleted
- ③ Delete the state file by clicking **Yes** in the following dialog



Check – Simulation

- ▶ Alternatively you can use the corresponding icon in the toolbar or Ctrl+D



- 4 Run the task *Assembly* again
 - 5 Now the task *Integration* can be run
- ▶ The Cylinder will fall in the $-z$ -direction due to gravity

Next tutorial

Next tutorial: [Insert a General Rigid Body](#)

Or skip the general body and jump to [Insert a Fixed Joint](#)