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Introduction

Draft Angle Analysis plug-in allows the user to analyze one or more parts in an assembly for draft. The plug-in provides visual feedback on what level of draft angle has been applied to the selected surfaces when compared to a 'pull direction', with different color shades for the drafts.

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Overview

The Draft Angle Analysis plug-in allows the user to select a face parallel to the pull direction and set a minimum draft angle.

A Draft Angle describes the amount of taper for molded or cast parts perpendicular to the parting line.
To access the Draft Angle Analysis (DAA) plug-in, select icon from the Tool bar.
Note: Draft Angle Analysis is generated only for 3D documents. An active 3D workspace is required to initiate the Draft Angle Analysis plug-in. If a 2D drawing or image document is active, the Draft Angle Analysis plug-in is disabled.
Draft Angle Analysis panel opens.
Contains the icons for the following commands:
• icon: The toggle switch when clicked Draft Angle Analysis dialog box will stay on top of any windows on the screen.
 icon: Cancels the current operation in the DAA. icon: Opens up help document for DAA plug-in.

To create a Draft Angle Analysis for any 3D file, the user need to:

- Select **Pull Direction**
- Select the **Draft Angle**
- Select Parts/ Surfaces

Select Pull Direction

The Pull Direction is defined as the axis against which the angular values specified in the dialog box will be evaluated. By default the Reference Frame selects the World Reference Frame and positive Z direction as the default.

- The user can also select the different direction on the world reference frame by simply using the Direction drop-down and choosing the desired direction.
- If another reference frame has been created, the user can also select any direction against that reference frame by using the Reference Frame Pull drop-down and then making the appropriate Direction selection, if required.
- Select any vertex point and click **Define Pull Direction** button.

Note: When the user clicks Define Pull Direction button, the dialog box changes to **'Pick on a Surface'**.

• Select any vertex point on any surface. At that point a reference frame will be created with the positive Z direction being normal to the surface at that point.

Select Draft Angle

The three options are as follows.

• **Delta:**The user can select the Draft Angle, Upper and Lower limits of tolerances.

The user can select the desired draft angle to be used for analysis. The default Draft Angle is 2.00 degrees. The draft angle can be changed (increased/ decreased) in increments of tenths of a degree with the help of buttons, or by typing a value inside the text box.

Note: If a new value is selected for the Draft Angle, the scale below the parameter settings changes accordingly.

• **Llimit:** Defines the Minimum Value and Maximum Value of draft angle extremes.

Min value: This is the lower boundary of the analysis, expressed in degrees of variation from the pull direction, and can be a positive number, negative number, or zero.

Max value: This is the upper boundary of the analysis, expressed in degrees of variation from the pull direction, and can be a positive number, negative number, or zero.

Note: There is no "tolerance" in this specification as there is in the basic mode.

Gradient: Selection of Gradient specifies a range of deviation from the pull direction, and have the analysis report the results. This option is useful where the effects of a compound surface or a set of surface transitions (such as seen in the blends of a boss with a side wall and a floor of a pocket) need to be analyzed.

• **Parting Line Visualization:** Sets the analysis tolerance to zero. Any surface with non negative (zero or greater) draft will be green while

surfaces with negative draft will be red. The partying line is represented by the transition between red and green. Also if there is any red surrounded by green, then there must be some tooling allowance made to accommodate it through the use of slides, lifters or core pins. No geometry is created representing the parting line.

Note: When Parting Line Visualization is selected, Gradient option will be grayed out.

Preview Bar:

Preview Bar displays the colors depending upon the value selected in the draft angle, min value and the max value.

Note: To change the color scale double-click on the color component, this displays the dialog box. Choose the desired color and the scale will change accordingly.

Select Part

This option allows the user to select the Parts or Surfaces.
Select Part supports two options:
 Select Parts: The user can select a part or a set of parts for any single analysis. The default mode is Select Parts. Pick a vertex point on the part in the active workspace. Pick the part by selecting on the appropriate node in the assembly tree. Select Surfaces: The user can select a surface or a set of surfaces for any single analysis.
Entity Count: The test box displays the total number of entities selected (parts/surfaces).
Views
• Click Create View to save the view for further reference.
This displays a pop-up.
 Enter the View Name. Click OK to save the view name. Click Restore View to restore the view without saving the result.
• Analyze / Apply : This button will kick start the analysis based on the user selected "Draft Angle", "Select Part" options on the selected individual Part(s) or Surface(s). Apply button would initiate the analysis which will

change surface colors of the selected parts or surfaces to communicate the

Draft Angle Analysis results.

- **Reset:** It would clear any surface or part selections made by the user and would reset the "Entity Count" to zero. The surface analysis colors are reset.
- **Cancel:** It will close the DAA interface and bring the focus back to SpinFire Pro Window. The current view orientation will not change. The colors will be reset, unless the user had saved the view.

Related topics

Select Pull Direction

Select Part

Select Draft Angle

Select Pull Direction

The Pull Direction is defined as the axis against which the angular values specified in the dialog box will be evaluated. By default the Reference Frame selects the World Reference Frame and positive Z direction as the default.

• The user can also select the different direction on the world reference frame by simply using the Direction drop-down and choosing the desired direction.

Note: The user can create Coordinate System and can select any direction against that reference frame.

- If another reference frame has been created, the user can also select any direction against that reference frame by using the Reference Frame dropdown and then making the appropriate Direction selection, if required.
- Select any vertex point and click **Define Pull Direction** button.

Note: When the user clicks **Define Pull Direction** button, the dialog box changes to **'Pick on a Surface'**.

• Select any vertex point on any surface. A reference frame is created with the positive Z direction being normal to the surface at that point.

Related topics

Select Draft Angle

Select Part

Select Draft Angle

Selecting Draft Angle involves three options:

• **Delta:** The user can select the Draft Angle, Upper and Lower limits of tolerances.

The user can select the desired draft angle to be used for analysis. The default Draft Angle is 2.00 degrees. The draft angle can be changed (increased/ decreased) in increments of tenths of a degree with the help of buttons, or by typing a value inside the text box.

Note: If a new value is selected for the Draft Angle, the scale below the parameter settings changes accordingly.

The coloring of the analysis will apply to any surface evaluated based on the draft angle and tolerances.

- Eg., In the figure shown above, it means that any surface which has its orientation at 2.85 degrees to the pull direction, plus or minus twotenths of a degree, will be green. The default tolerance is 0.2 tenths of a degree, and is balanced, meaning that it is applied equally in both directions (plus and minus). The value can be changed in an identical fashion to the Draft Angle as described above, with identical effects to the scale.
- Limit: Defines the Minimum Value and Maximum Value of draft angle extremes.

Min value: This is the lower boundary of the analysis, expressed in degrees of variation from the pull direction, and can be a positive number, negative number, or zero.

Max value: This is the upper boundary of the analysis, expressed in degrees of variation from the pull direction, and can be a positive number, negative number, or zero.

Note: There is no "tolerance" in this specification as there is in the basic mode.

Gradient: Selection of Gradient specifies a range of deviation from the pull direction, and have the analysis report the results. This option is useful where the effects of a compound surface or a set of surface transitions (such as seen in the blends of a boss with a sidewall and a floor of a pocket) need to be analyzed.

• **Parting Line Visualization:** Sets the analysis tolerance to zero. Any surface with non negative (zero or greater) draft will be green while surfaces with negative draft will be red. The partying line is represented by the transition between red and green. Also if there is any red surrounded by green, then there must be some tooling allowance made to accommodate it through the use of slides, lifters or core pins. No geometry is created representing the parting line.

Note: When Parting Line Visualization is selected, Gradient option will be grayed out.

Preview:

Preview Bar displays the colors depending upon the value selected in the draft angle.

Note: To change the color scale double-click on the color component, this displays the dialog box. Choose the desired color and the scale will change accordingly.

Related topics

Select Pull Direction

Select Part

Select Part

Select Part supports two options:

- **Select Parts:** The user can select a part or a set of parts for any single analysis. The default mode is Select Parts.
 - Pick a vertex point on the part in the active workspace.
 - Pick the part by selecting on the appropriate node in the assembly tree.
- **Select Surfaces:** The user can select a surface or a set of surfaces for any single analysis.

Entity Count: The test box displays the total number of entities selected (parts/surfaces).

Related topics

Select Draft Anglet

Select Pull Direction

Views

View option facilitates the user to **Create View** or to **Restore View**.

• Click **Create View** to save the view for further reference.

This displays a pop-up.

- Enter the **View Name**.
- Click **OK** to save the view name.
- Click **Restore View** to restore the view without saving the result.
- **Analyze**/ **Apply**: This button will kick start the analysis based on the user selected "Draft Angle", "Select Part" options on the selected individual Part(s) or Surface(s). Apply button would initiate the analysis which will change surface colors of the selected parts or surfaces to communicate the Draft Angle Analysis results.
- **Reset:** It would clear any surface or part selections made by the user and would reset the "Entity Count" to zero. The surface analysis colors are reset.
- **Cancel:** It will close the DAA interface and bring the focus back to SpinFire Pro Window. The current view orientation will not change. The colors will be reset, unless the user had saved the view.

Related topics

Select Pull Direction

Select Draft Angle

Select Part