This short guide will show you how to begin to draw Fault Trees using Logidraw.

The diagram below describes the demands and protection failures that, when they occur, lead to a specific overpressure event.

Within seconds from now you will have learned how to draw this Fault Tree:

<table>
<thead>
<tr>
<th>Ref</th>
<th>Event / w</th>
<th>P / Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.58</td>
<td>0.29</td>
</tr>
<tr>
<td>2</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.040</td>
<td>0.20</td>
</tr>
<tr>
<td>n</td>
<td>n.20</td>
<td></td>
</tr>
</tbody>
</table>

Okay start LogiDraw.

1. Click **Start > Programs > PEL > Logidraw**. After the splash screen disappears, click **Create a Fault Tree** and when the Fault Tree Project window appears enter the title as **60 Second Guide** and click **OK**.

   The first thing to do is to display the logic and Project Toolbar.

2. Click the **View** menu and check **Project Toolbar**.

   We are now ready to create the first two demand inputs.

3. Click **Add Input** on the toolbar to open the "Inputs in Logidraw Fault Tree" window. Enter **Demand 1** in the Comment box, select the type **Frequency** using the radio buttons, and enter 0.5 in the Value field which corresponds to a demand rate of once in 2 years. Click **Add** to enter this data.

   When we clicked **Add**, Logidraw cleared the data ready for the next Input. So let's add the second demand input.

4. Enter **Demand 2** in the Comment box, select the type **Frequency** using the radio buttons, and enter 0.1 in the Value field which corresponds to a demand rate of once in 10 years. Click **Add** to enter this data.

   The risk from these two sources of demand is reduced by an alarm but what happens if the operator fails to respond?

5. Enter **Alarm 1 – no operator response** in the Comment box, leave the selected type as **Probability**, and enter 0.2 in the Value field which corresponds to a failure probability of 1 in 5. Click **Add** to enter this data and then click **Close** to close the window.

   We now have three inputs on the screen like this:

   We now need to draw some gates.

6. Select Demand 1 by clicking it, hold down the **Ctrl** key, and select Demand 2 by clicking that too. Release the Ctrl key and click **Connect as Gate** on the toolbar. When the Gate No 1 window opens, click **OK**.

   We now have the two demands connected into an OR Gate. Let’s add another gate to link in the third input.

7. Click the **OR** Gate and then the input **Alarm 1 – no operator response**. Again click **Connect as Gate**. When the Gate No 2 window opens, click **OK**.

   This will create another gate, an AND Gate this time. Now we need to create another demand, Demand 3, a trip input, and a Pressure Relief Valve input.

8. Click **Add Input** to open the "Inputs in LogiDraw Fault Tree" window. Enter **Demand 3** in the Comment box, select the type **Frequency** using the radio buttons, and enter 0.1 in the Value field which corresponds to a demand rate of once in 10 years; click **Add** to enter this data.

   Next, enter **Trip in failed state** in the Comment box, leave the selected type as **Probability**, and enter 0.04 in the Value field which corresponds to a failure probability of 1 in 25; click **Add** to enter this data.
Finally, enter **Pressure Relief Valve in failed state** in the Comment box, leave the selected type as **Probability**, and enter **0.02** in the Value field to correspond to a failure probability of 1 in 50; click **Add** to enter this data and then **Close** to close the window.

**We need to add three more gates.**

9. Click the **AND Gate**, then the input **Demand 3** and then **Connect as Gate** on the toolbar. When the Gate No 3 window appears, click **OK**. This creates a second OR Gate.

Now, click this second **OR Gate**, then the input **Trip in failed state**, and then **Connect as Gate**. When the Gate No 4 window appears, click **OK**. This creates a second AND Gate.

Finally, repeat the process for the second **AND Gate** and the input **Pressure Relief Valve in failed state** to create a third AND Gate.

There is a second identical system adjacent to the first that can also fail and cause the same overpressure event. We can provide for this simply by adding another input as a multiplier to the final AND gate.

10. Click **Add Input** to open the “Inputs in Logidraw Fault Tree” window. Enter **Second System Multiplier** in the Comment box, select the type **Multiplier** using the radio buttons, and enter **2** in the Value field. Click **Add** to enter this data and then **Close** to close the window. Now click this new input and drag the arrow icon to the final **AND gate** and drop the icon to connect the input to the gate.

**We need to add some gate output descriptions.**

11. Double-click the first **OR Gate**; in the “Detailed Comment” box enter **Demand on Pressure Alarm** and click **OK**. Repeat the above to add the descriptions detailed on the above diagram for the second **OR gate** and the **last two AND gates** to complete the fault tree.

To complete the exercise, let’s customise the display to look like the drawing at the beginning of the guide.

12. On the **File** menu, click **Customise**. When the Customise Options window appears, click the **Display** tab and then:

1. Remove the check mark from **Display ‘Short’ Gate Comment on Screen**;
2. Change **Max. No. of Characters to Display For Inputs** to **40**;
3. In the Default Drawing Orientation panel, check **Right to Left**.

13. Finally click **File > Print** to print the diagram, which should look like the image below.

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This program is developed, maintained and supported by PEL Support Services, ABB. We run a Hotline telephone and email service to answer any queries about the PEL products. You can contact us:

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