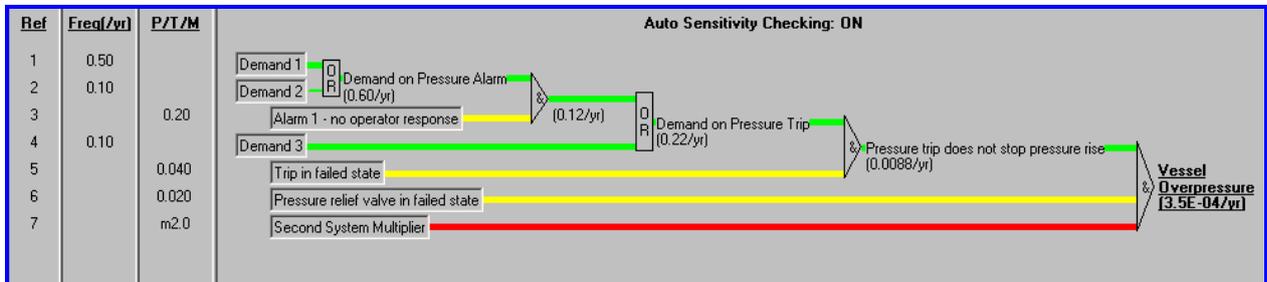This short guide will show you how to begin to draw Fault Trees using Logidraw.

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:



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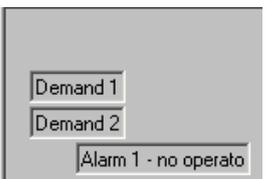
5. Enter **Alarm 1 – no operator response** in the Comment box, leave the selected type as **Probability**, and enter **0.2** in the Value field which corresponds to a failure probability of 1 in 5.  Click **Add** to enter this data and then click **Close** to close the window.

   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.

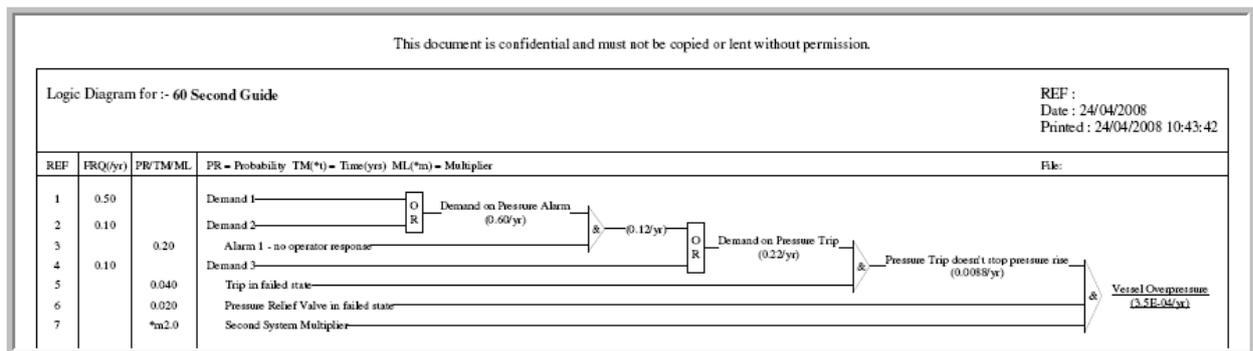    We need to add some gate output descriptions.

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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Logic Diagram for :- 60 Second Guide

REF :
Date : 24/04/2008
Printed : 24/04/2008 10:43:42

| REF | FRQ(/yr) | PR/TM/ML | PR = Probability  TM(*t) = Time(yrs)  ML(*m) = Multiplier | File: |
|---|---|---|---|---|
| 1 | 0.50 | | Demand 1 | |
| 2 | 0.10 | | Demand 2 | |
| 3 | | 0.20 | Alarm 1 - no operator response | |
| 4 | 0.10 | | Demand 3 | |
| 5 | | 0.040 | Trip in failed state | |
| 6 | | 0.020 | Pressure Relief Valve in failed state | |
| 7 | | *m2.0 | Second System Multiplier | |

Demand on Pressure Alarm (0.60/yr) — (0.12/yr) — Demand on Pressure Trip (0.22/yr) — Pressure Trip doesn't stop pressure rise (0.0088/yr) — Vessel Overpressure (3.5E-04/yr)

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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