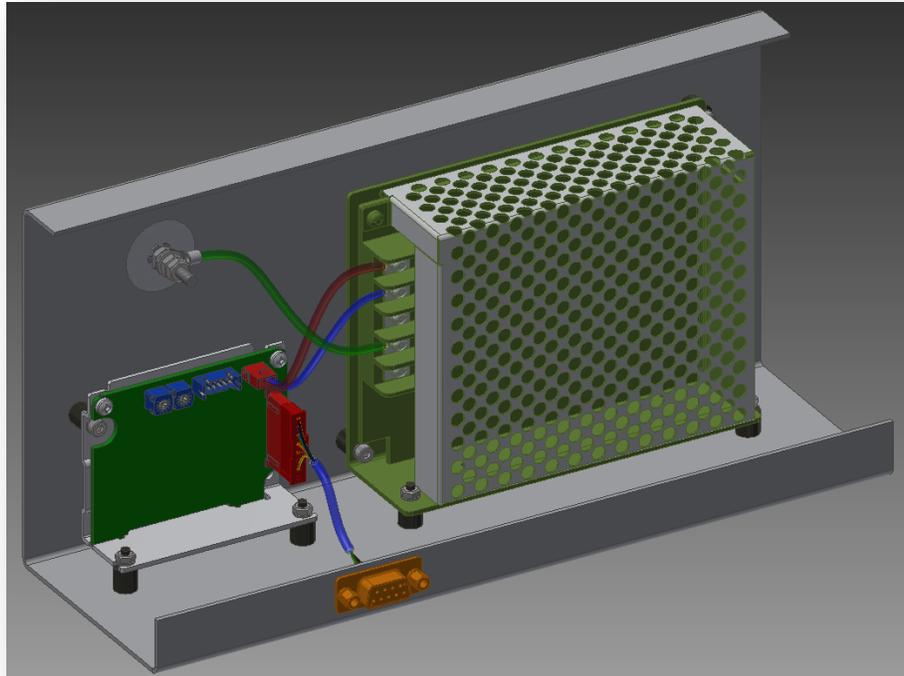


CREATING ROUTED SYSTEMS



Objective

The aim of this short paper is to introduce 3D Routed Systems and to show how by using them we can save both time and money.

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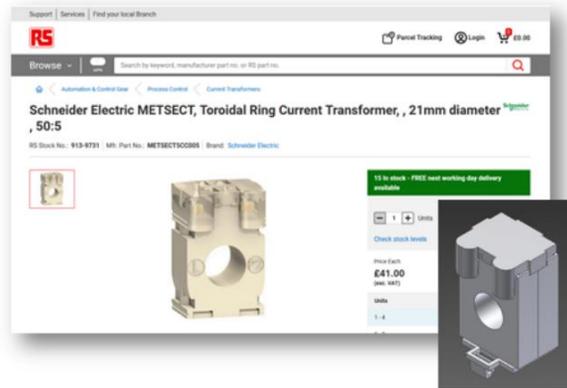


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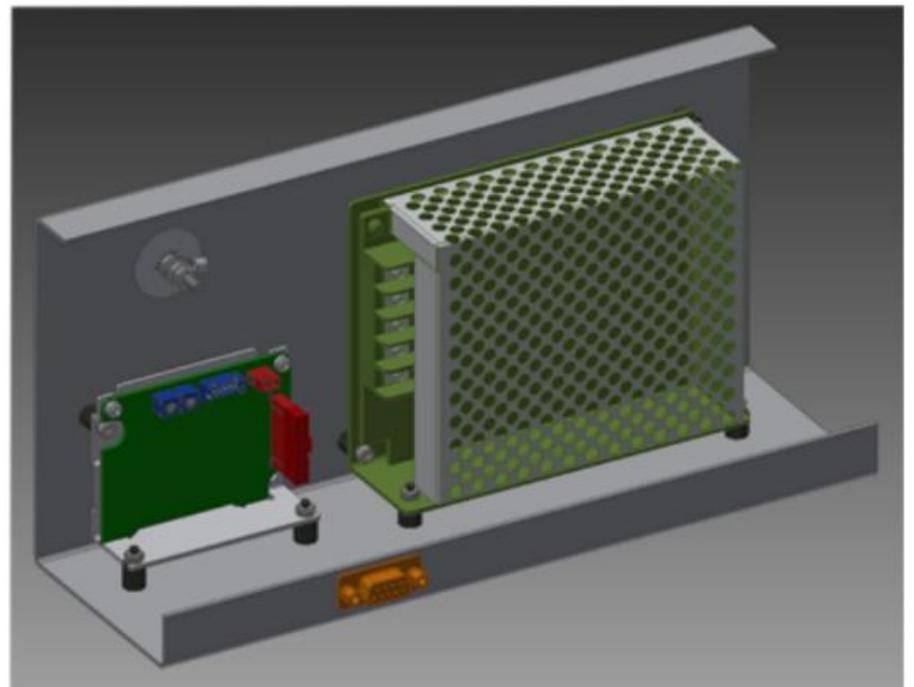
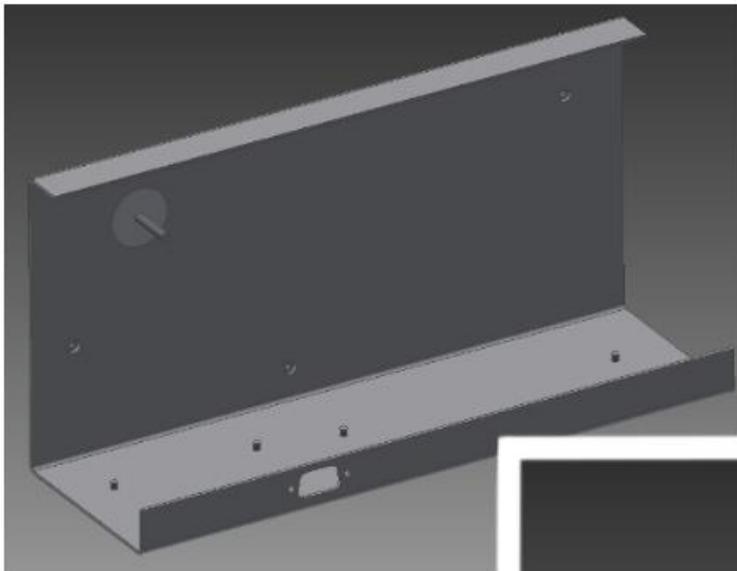


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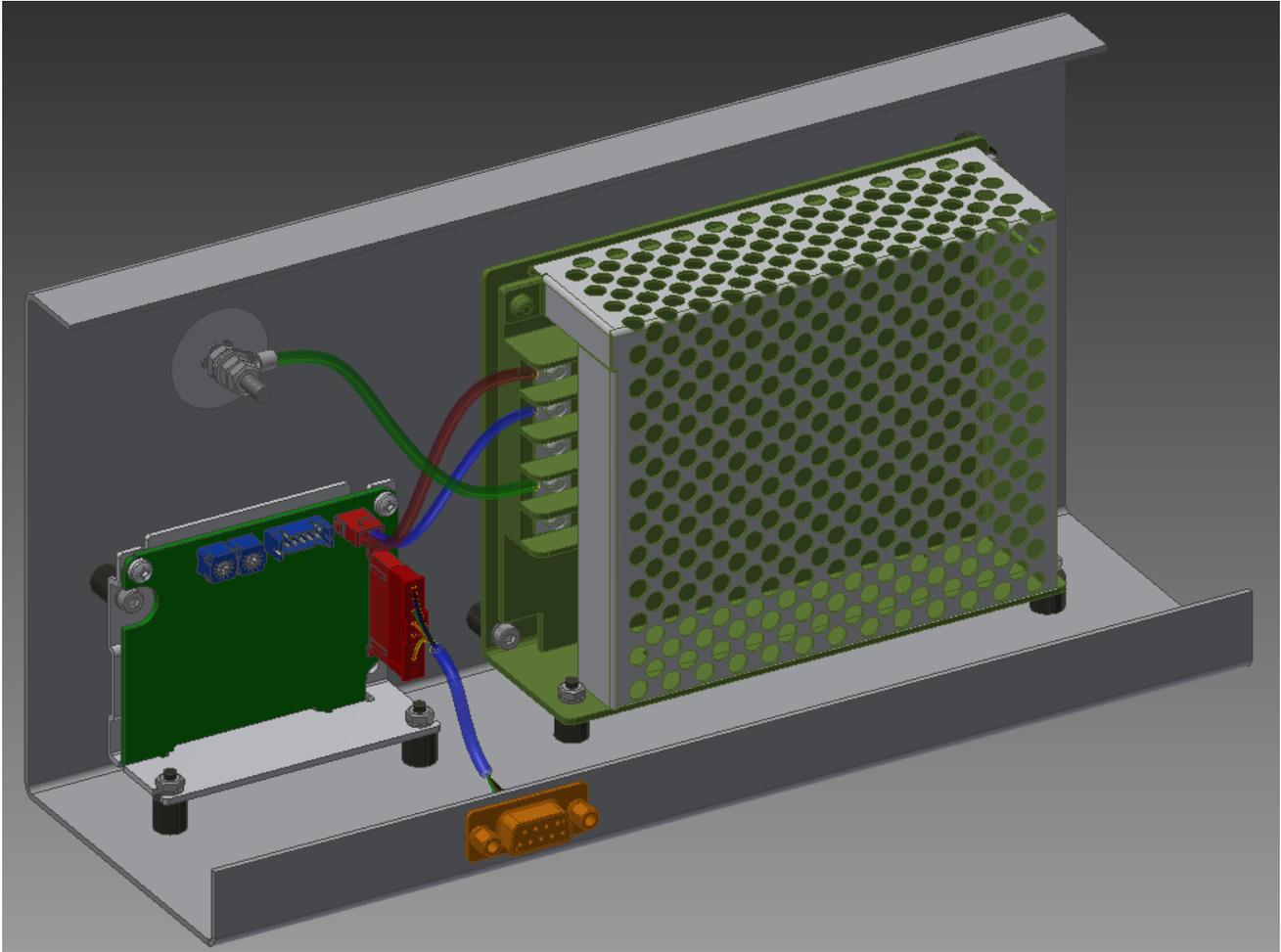
Once I have an approved circuit diagram I can go off and source 3D models for each of the electrical components that have been specified.



Then I can place the electrical components into my mechanical assembly along with all of their associated fasteners.

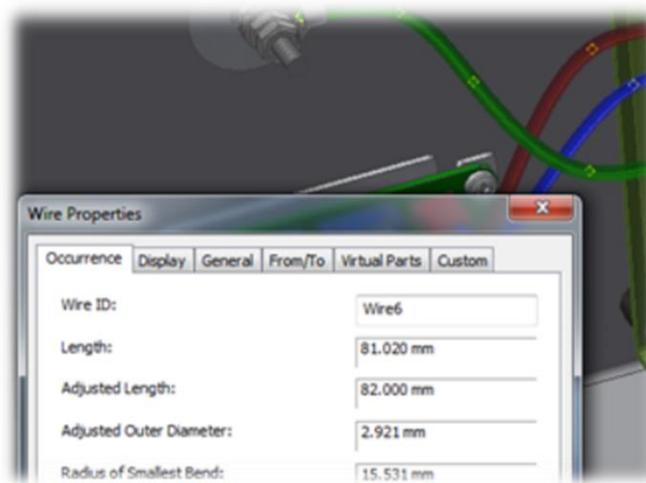


Once the layout of the components has been approved by the electrical engineer I can create the electrical routing that is specified on the circuit diagram.



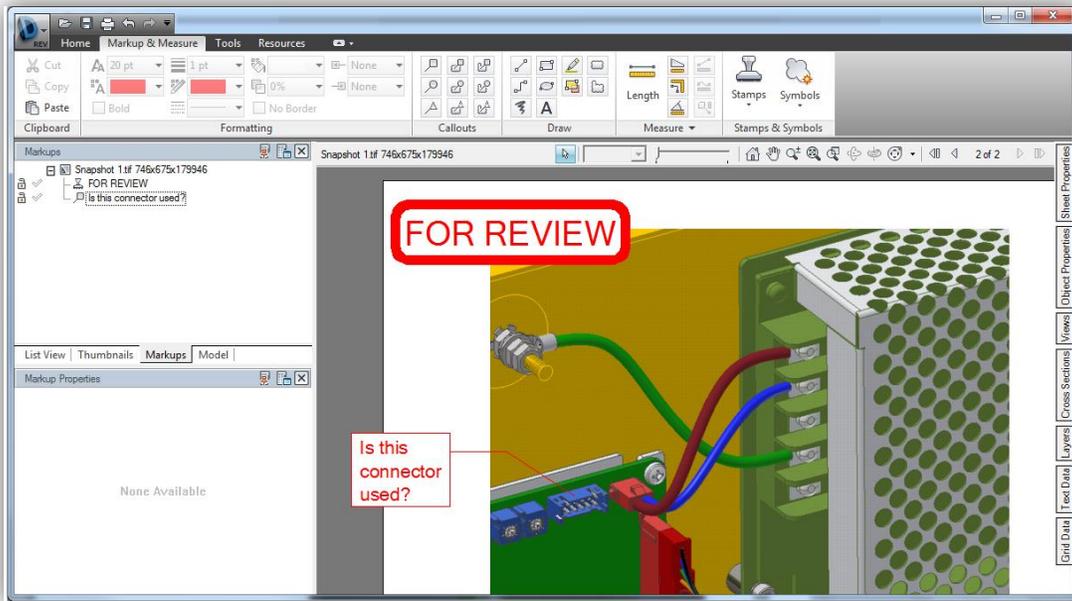
Each wire I create will precisely match both the gauge and colour picked by the electrical engineer.

I will double check that the bend radius of each wire is within limits and that the clearance with respect to neighboring objects is acceptable.



Once I have all of the routing in place I can send the 3D digital prototype on for its final approval.

Autodesk Design Review is a free program that is very helpful at this point as it allows non-CAD users to evaluate and markup a 3D design.

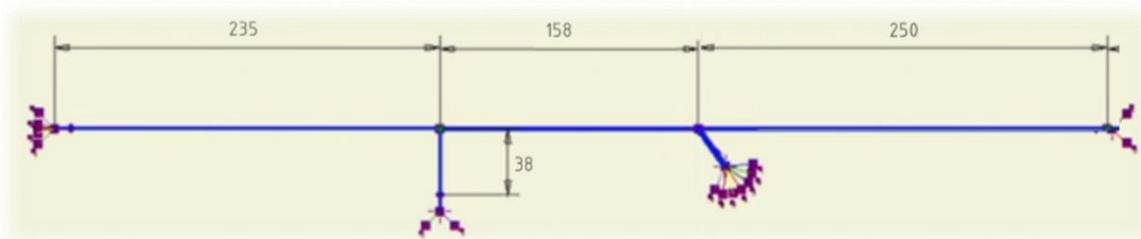


We typically conclude the routing process by flattening the 3D model down into some form of 2D manufacturing drawing.

The approach for wiring drawings varies but they typically comprise of; a 2D view, a bill of materials, images of the connectors used, pin numbers and any dimensions deemed essential.

Cable ID	Wire ID	Part Number	Length	Pin 1	Strip Length	Pin 2	Strip Length
Cable 1	Wire1	20AWG-BLK	62	8	5	9	5
Cable 1	Wire2	20AWG-BLU	59	7	5	8	5
Cable 1	Wire3	20AWG-BRN	56	4	5	7	5
Cable 1	Wire4	20AWG-GRN	58	6	5	2	5
Cable 1	Wire5	20AWG-ORG	57	5	5	4	5
Cable 1	Wire6	20AWG-YEL	61	2	5	3	5
-	Wire7	10AWG-GRN	82	GND	10	1	10
-	Wire8	10AWG-BRN	72	1	10	L	10
-	Wire9	10AWG-BLU	62	N	10	2	10

Some clients at this point will also require 1:1 scale nail-board drawings for in-house harness fabrication.

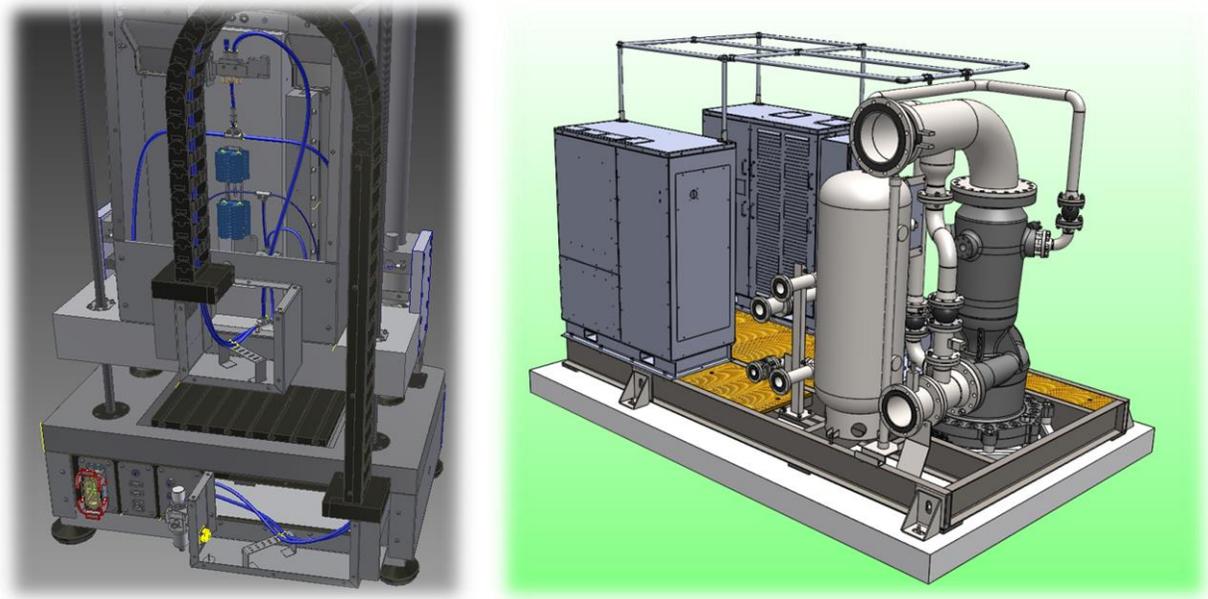


Now at this point it is important to point out that the 3D routing technique is not just limited to electrical systems...

Pneumatic and Hydraulic Routing

3D routing also works very well with mechanical designs that require any form of tubing or piping.

Below are pictures of two machines that I have designed in the past.



The machine on the left required a large number of pneumatic components whilst the machine on the right needed a complex arrangement of high pressure piping to transport the pentafluoropropane gas used in its operation.

Both machines had their routing successfully designed before any parts had been fabricated.

Conclusion

I hope that I have been able to demonstrate that 3D routing is a tool for efficiently and accurately routing wires, cables, pipes and hoses through and around obstacles within a design.

3D routing helps create a 3D prototype that can be used to spot problems before a physical prototype is commissioned.

In short... 3D routing saves both time and money.

If you have a mechanical design problem that you would like to discuss then get in touch today:

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