Magnetic Modelling
04/06/2013

I've continued running through the standard set of models on OPERA 16 over the last week and this is now a few hours away from completion. 4 out of the 6 sets of auto-generated plots have been created, so these too will also be completed and (auto)posted in the next couple of days. (Models 91 to 96)

Models 92 and 94 are Step IV with return yoke but it is based on quite an old design of return yoke. Results should be taken as a guide only.

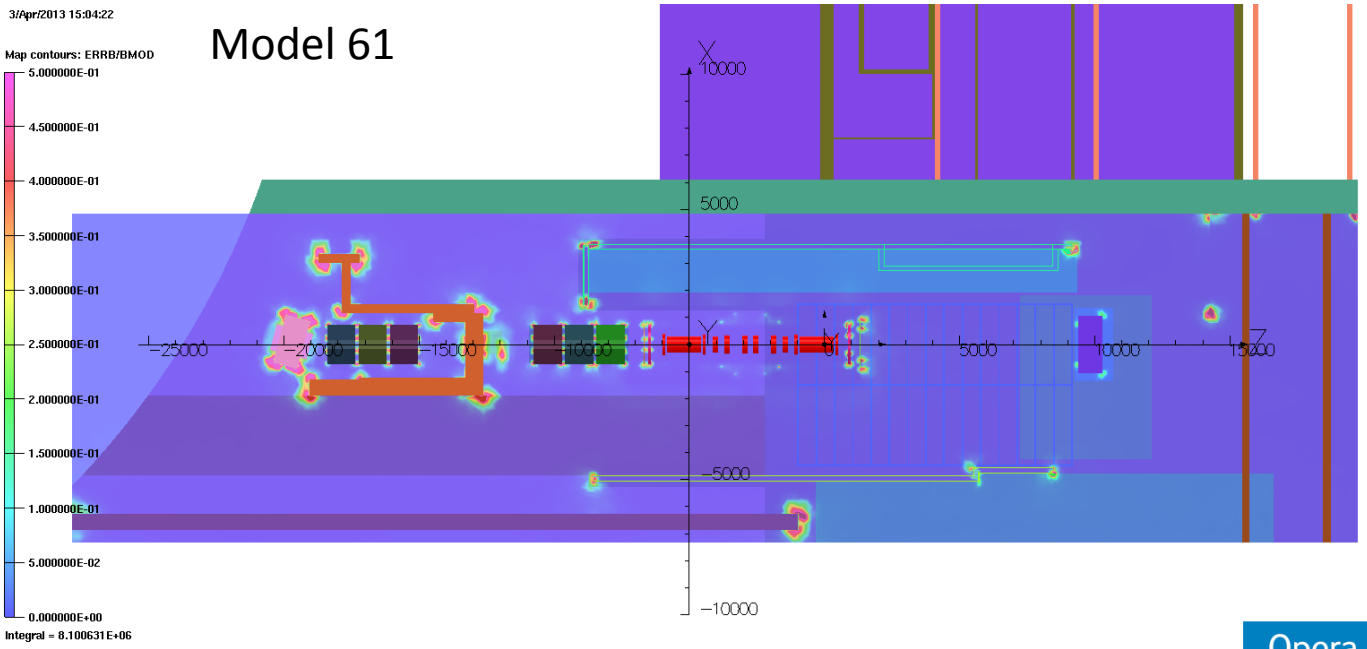
OPERA 16 has been posting a number of meshing warnings with each model that I've run. I've been going through these warning lists and iteratively improving the meshing to remove these warnings. This has been frustratingly time-consuming Most of these warnings have now gone but a few single stubborn warnings remain – in the latter case I can't see any issues so I will take these warnings as an indication of an over-zealous mesher. These are warnings and not errors.

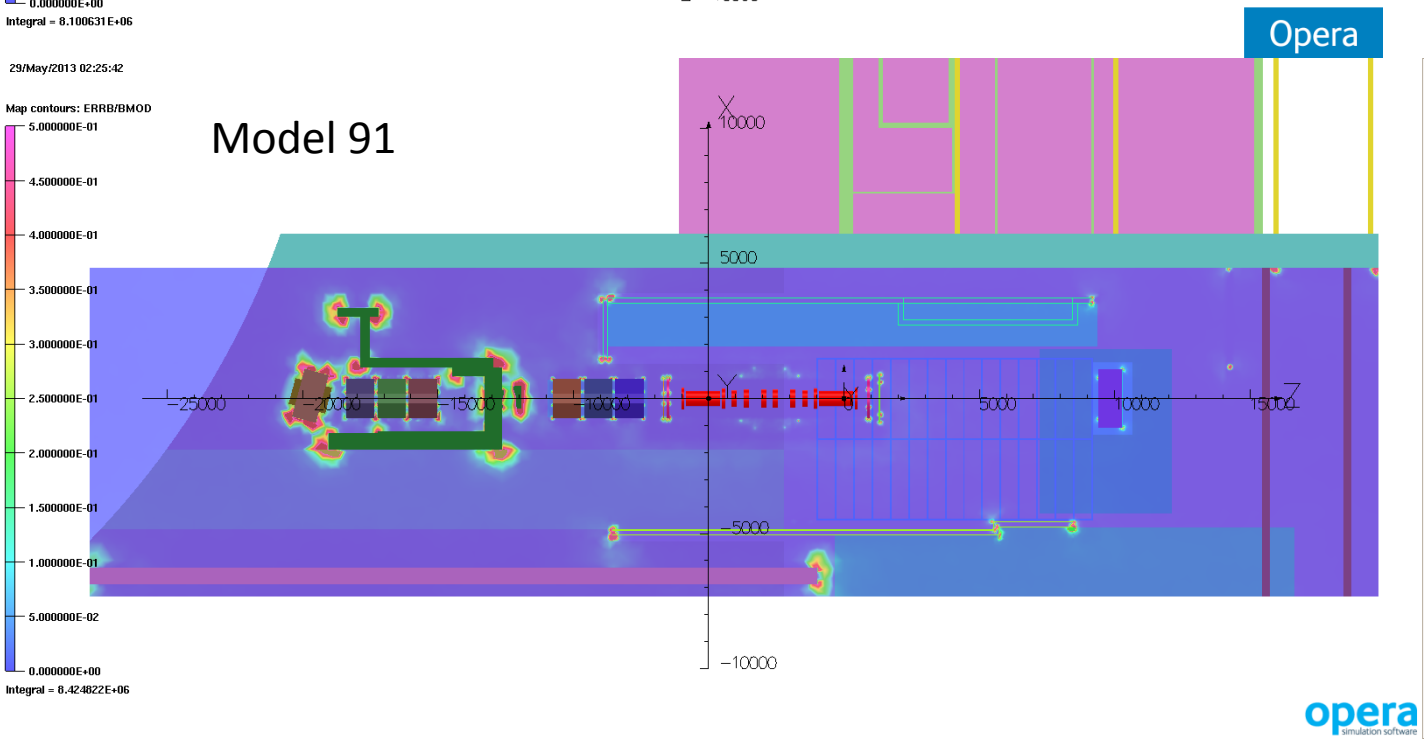
As far as I'm concerned I have for now finished with development of the Hall model. This means that I can return to looking at some other problem – I'll return to this shortly.

Several weeks ago I started improving the mesh in the hall model to try and reduce the ErrB/B in certain regions of the model. This was done as I was concerned about the level of ErrB/B in some regions of the Quad Sub Model.

From this it became clear that the model boundary was not far enough out –so it was extended and then the increase in meshing resolution brought to a head the problem with the tenten BH curve that took a few weeks to get to the bottom of.

How does the Hall model compare now?





ErrB/B 50%.

Improvements around Quads Q9-Q7, End of solenoids and SSW are visible.

I will now try and rerun a quad model which should pick up the improvements to the meshing.

There still remains the question of whether we have mesh convergence.

opera simulation software

As soon as the auto-generated plots have finished I will run the code that compares model 61 with 91 to try and establish if there are any changes between the two models that are noteworthy. By eye on the y=0 plane it doesn't look like there is anything significant.

If there is little difference between the plots then I will claim that we have mesh convergence. (Technically proving mesh convergence is a lot more challenging but I have to draw the line somewhere based upon reasonable indication). Assuming that there is no significant difference between the hall models then I will to be return to the quad sub model again with the recent mesh changes to try and finish off the study at the end of Q9. On the assumption that everything is ok I have run the Quad Sub Model through the modeller this morning.

I spoke to Craig and we do agree that we need more information on the location of the items on the Fry List. Once I have this information I think continuing the comparison of this list with the Hall Model should be a high priority.

What other modelling do we want to look at? – Is there a desire to take another look at the area around the substation – to discuss this afternoon.

I have started to prepare the CM talk and I now have an outline. I will try and have something for next week. I will also try and include a couple of slides from Melissa if possible.