

Simulations are highly reliable

Through simulation, tank hot spot areas are predicted and located with high reliability. In fact the simulations show a very good match with the measured temperature values.

Case Study 6: Tank temperature rise verification

1. Summary

The coupled magnetic–thermal simulation of a rectifier transformer has been performed. The presence of a complex LV busbars system makes the localization of the hot spots not trivial.

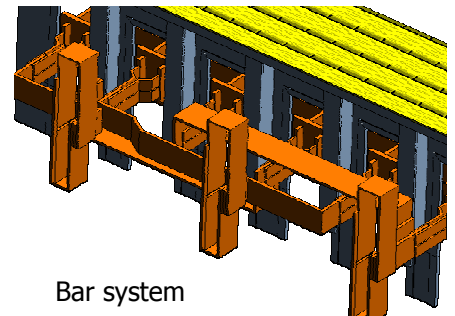
The simulation provided a very good match with the measured tank temperature value and localization.

2. Description

50 MVA rectifier transformer.

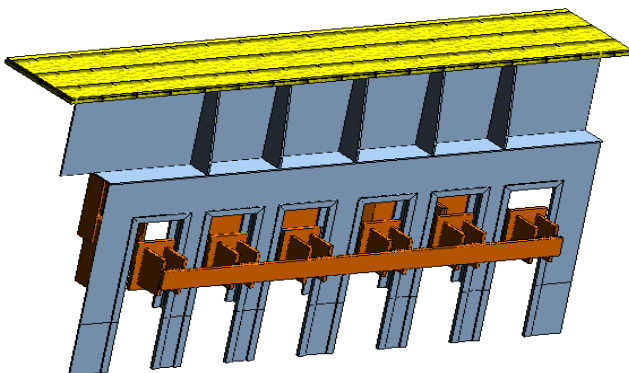
3. Technical Challenge

- Complex LV bars system.
- A coupled 3-dimensional magnetic-thermal simulation.
- Complex coil building and circuit.
- Mild steel tank wall and non magnetic steel parts had to be taken into account.

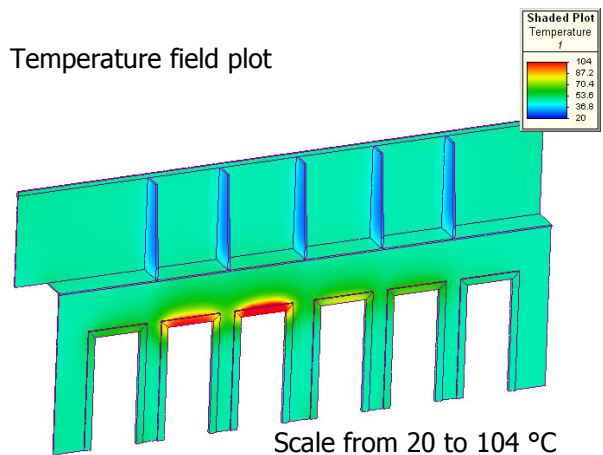


4. Results

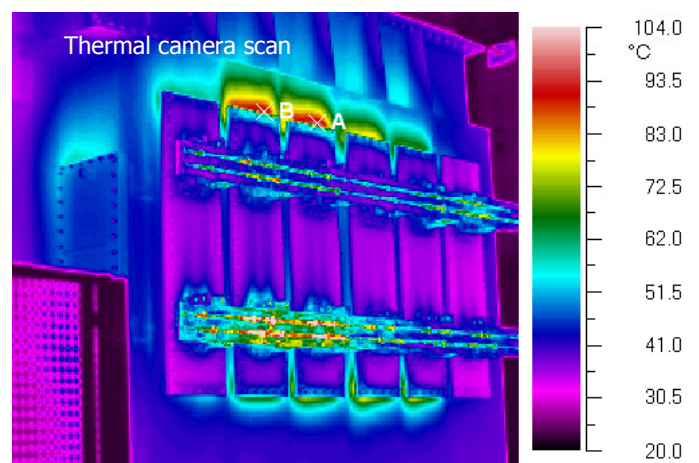
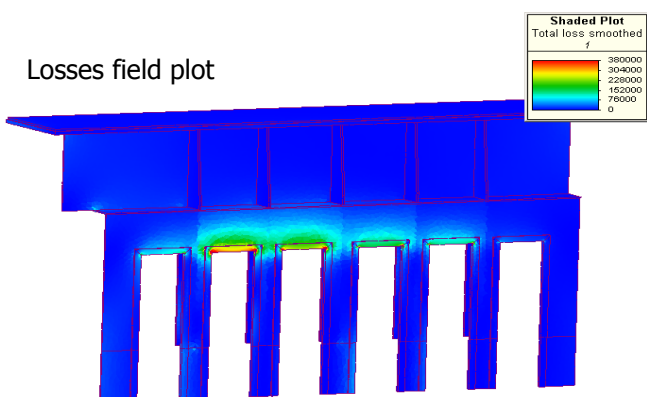
3D geometry



Temperature field plot



Losses field plot



5. Conclusions

Good match between simulations and measurements. Simulations may be used to predict and prevent failures. In this way alternative solution can be studied at a design stage if the results of the simulations are not the ones expected.