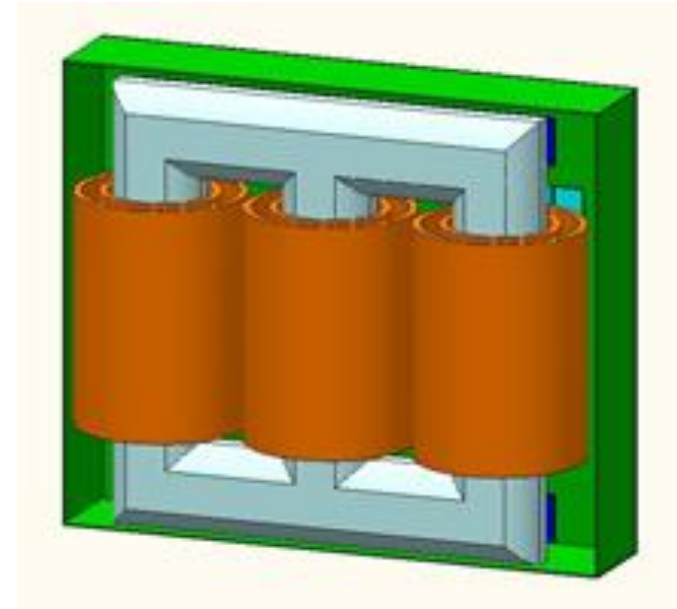


# Stray loss reduction of a power transformer by employing wall shunts

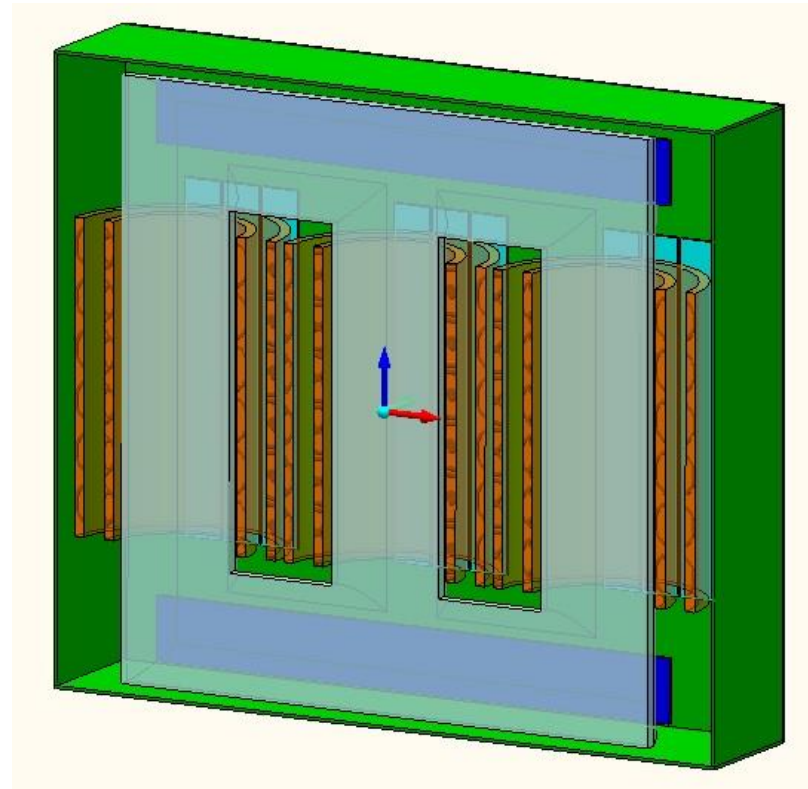
# Stray loss reduction of a power transformer by employing wall shunts

With growing transformer ratings, the stray loss problem becomes increasingly important. In large rating transformers, the stray losses in structural components constitute about 10-40% of the total load losses. This can result in substantial increase in tank hot spots. In large units, a common method used for controlling and reducing the stray losses caused by the leakage field, is the use of magnetic wall shunts. In this study, courtesy of Trafoexperts GmbH, the stray losses in the tank and frame are investigated by comparing the case with and without wall shunts.

Simcenter MAGNET's 3D time-harmonic solver is used to evaluate the stray losses.



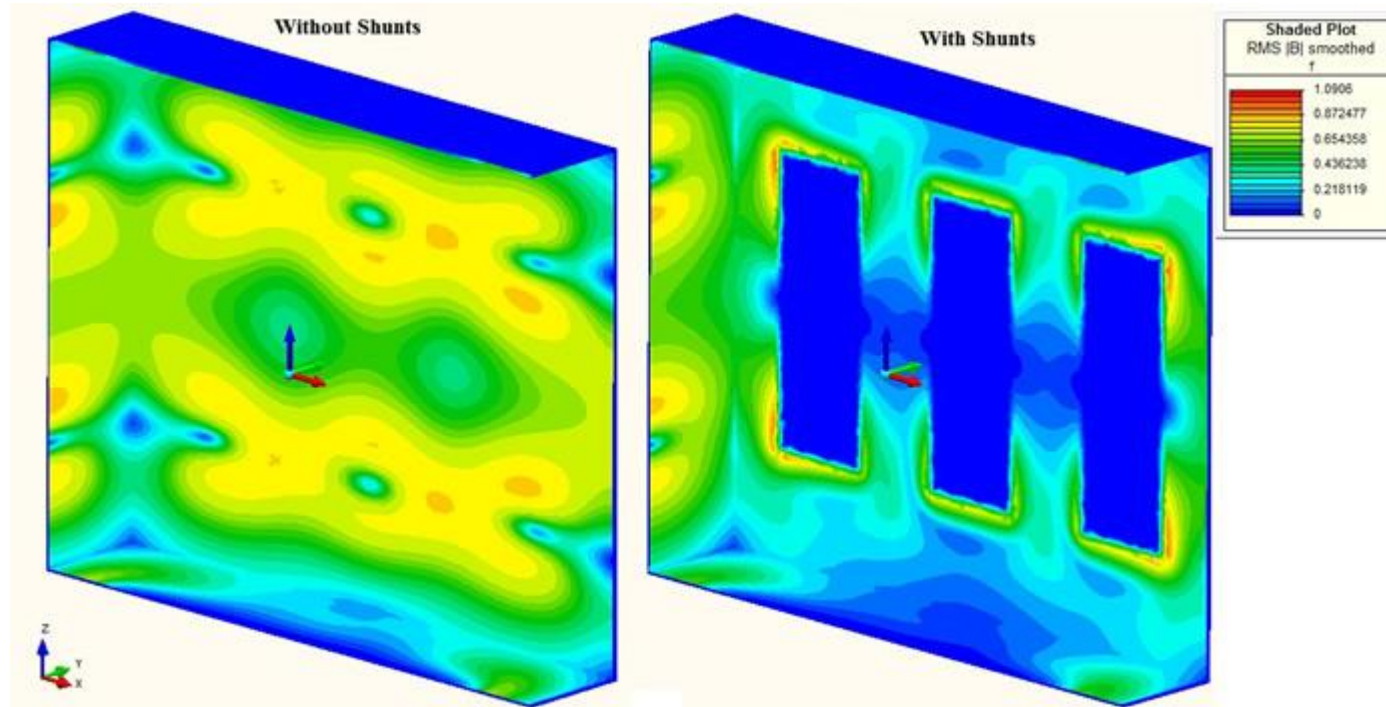
# TRANSFORMER WITH WALL SHUNTS



In this case study, a 100 MVA, 230/132 kV power transformer, with wall shunts, is modelled. The core and windings are set to transparent so that the wall shunts (light blue) can be seen. There are 9 pieces of wall shunts, in groupings of 3 on the long wall. The 3D time-harmonic solver is used to calculate the stray losses.

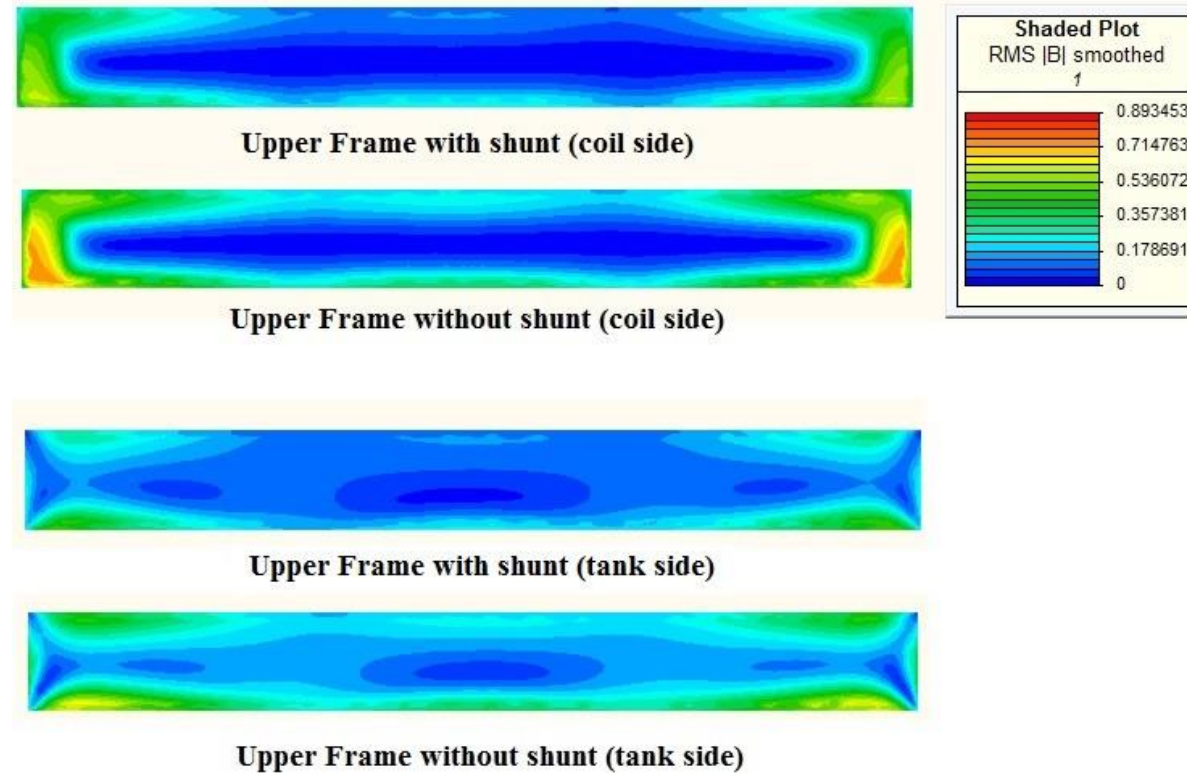


# POWER TRANSFORMER TANK FLUX DENSITY



The magnetic wall shunts offer a low reluctance path to the leakage flux and shield structural components from the leakage field. The flux density plots are obtained for both (without, and with, wall shunts). It can be seen that the case with the wall shunts (image on the right) has a significant reduction of the flux density distribution.

# POWER TRANSFORMER FRAME FLUX DENSITY



The flux density plots of the frame indicate that the coil side has larger flux than that of the tank side, and that the case with a shunt has a smaller flux density distribution, when compared to the case without.

## STRAY LOSS REDUCTION

The table shows the total stray losses for both the tank and the frame without, and with, wall shunts. When you compare the results, it can be seen that the losses in the two components show a significant improvement with the wall shunts.

	Tank stray losses (W)	Frame stray losses (W)
Without Wall shunts	26158	1332
With Wall Shunts	10780	492
Stray Loss Reduction	58%	63%