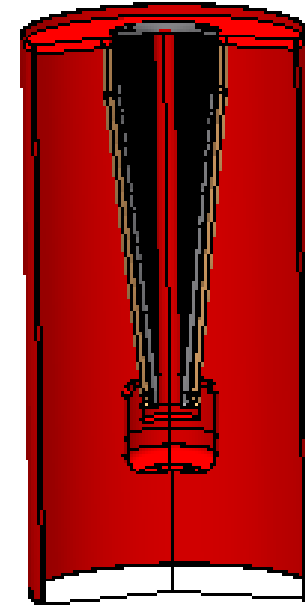


# Transformer bushings

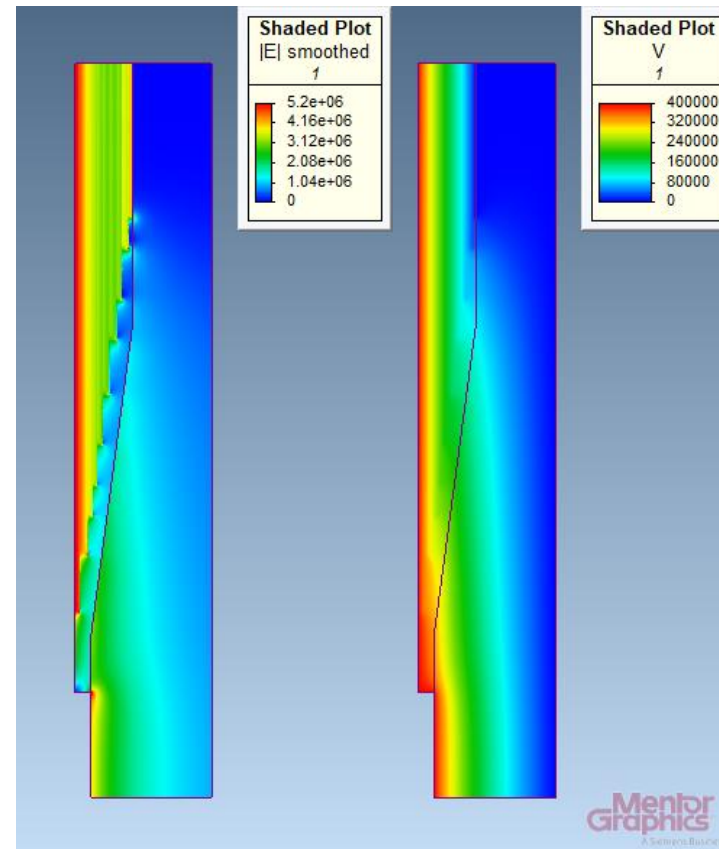
## 2D MODEL AND MESH

Capacitive bushings are often used to improve the field distribution inside of transformers. They can be used to grade the voltage down gradually from high voltage conductors. The design and simulation of transformer bushings have always been challenging because modeling these structures has been computationally quite expensive, especially in 3D, due to the fine mesh required for the long and very thin pieces of foil present in these devices. Presented here is a 2D ElecNet model of capacitive bushings placed inside of an oil-insulated transformer. The model uses floating electrodes on component surfaces to readily solve the computational time aspect of the problem.

In this example, the transformer bushings consist of nine foils of various lengths that are placed inside of epoxy-resin impregnated paper (ERIP) at specific locations in order to minimize the maximum electric field,  $E$ .

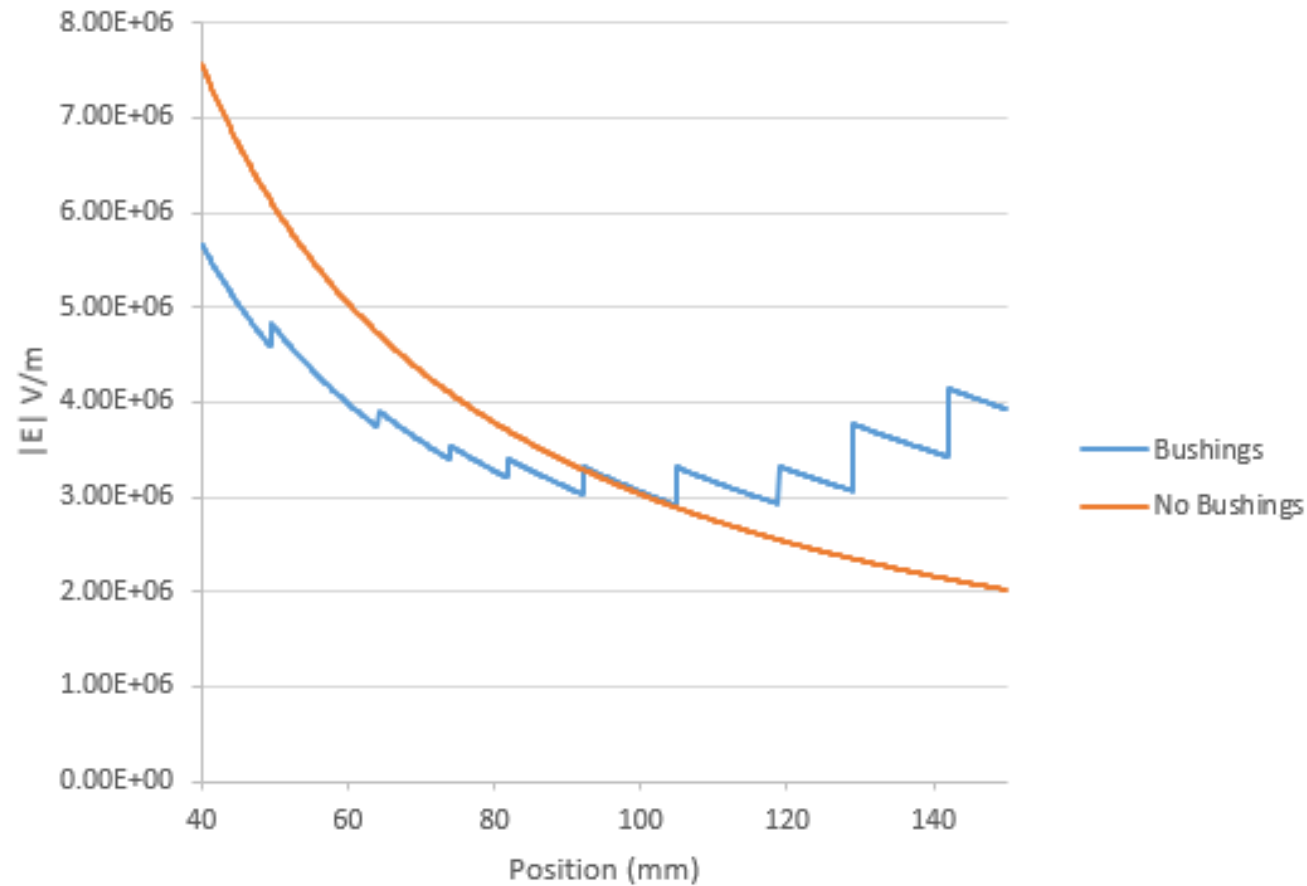


# RESULTING FIELDS



Presented above are two shaded field plots -- the electric field  $|E|$  in units of volts/m, and the voltage distribution in the model. The displayed field plot was restricted to values between 0 and  $5.2e6$  V/m.

# EFFECTS OF BUSHING - COMPARATIVE GRAPH



The graph above is of  $|E|$  along a line through the ERIP at the top of the model. Data for a transformer with no bushings is also plotted to act as a reference.