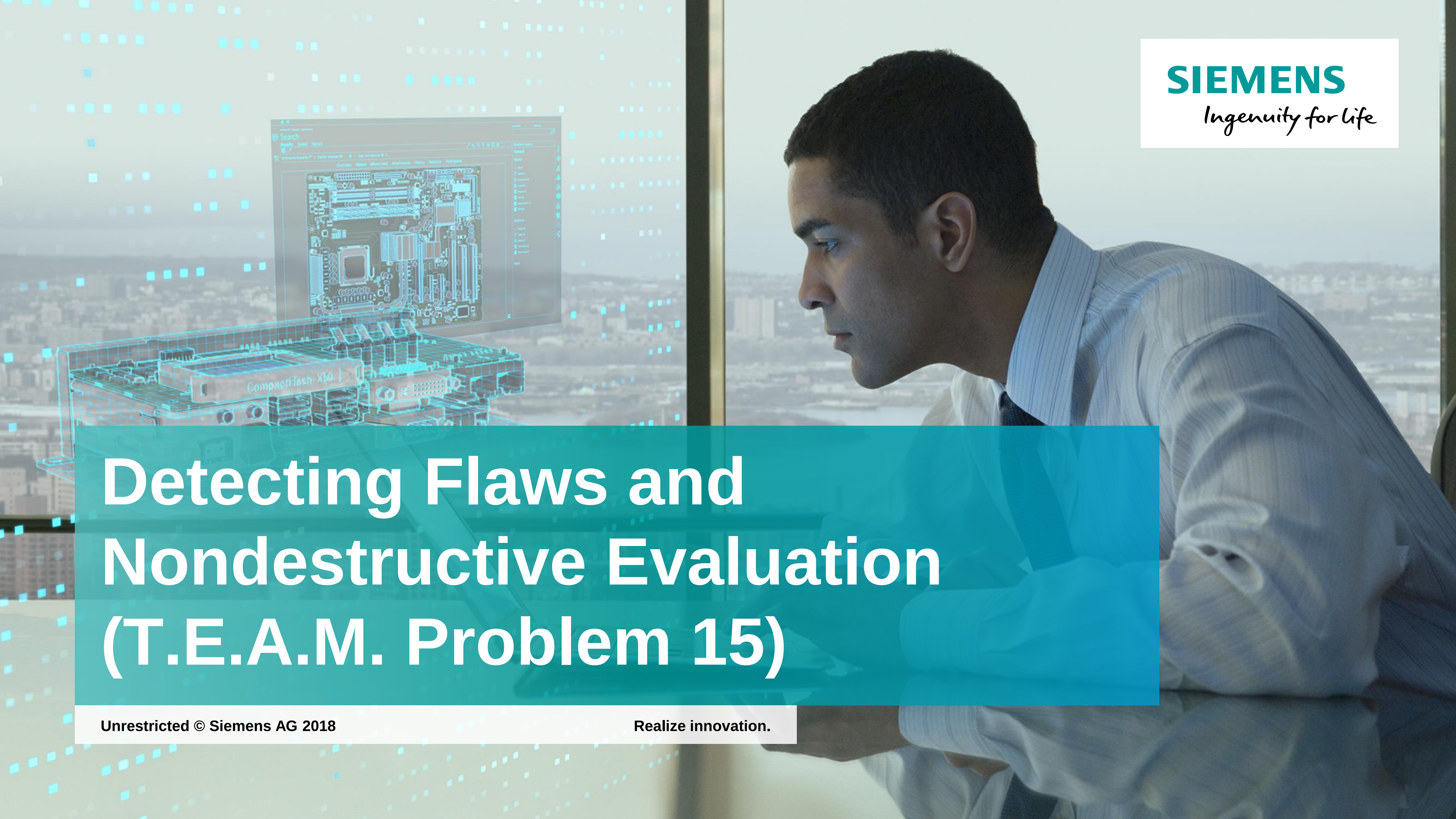

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Detecting Flaws and Nondestructive Evaluation (T.E.A.M. Problem 15)

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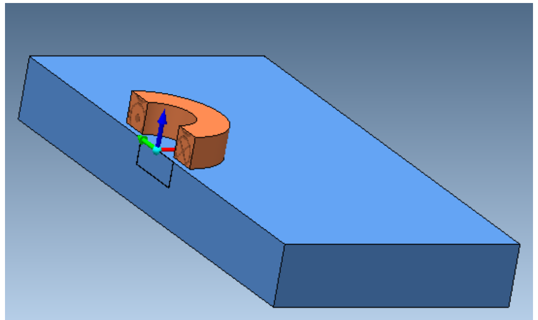

This example demonstrates how MagNet can be used for non-destructive testing/evaluation and sensor problems. A circular coil moves along an aluminum plate that contains a slot. The goal is to detect the slot by calculating the resistance and inductance of the driving coil at various positions.

In order to detect flaws, sensor problems require the accurate calculation of induced eddy currents. The AC Time Harmonic solver automatically calculates these eddy currents. The results presented compare published experimental results with MagNet's, thus demonstrating the accuracy of the software.

The following is based on the Testing Electromagnetic Analysis Methods (T.E.A.M.) problem #15: Rectangular Slot in a Thick Plate: a Problem In Nondestructive Evaluation. The benchmark can be found on the International Compumag Society's website.

Moving The Coil Along The Plate

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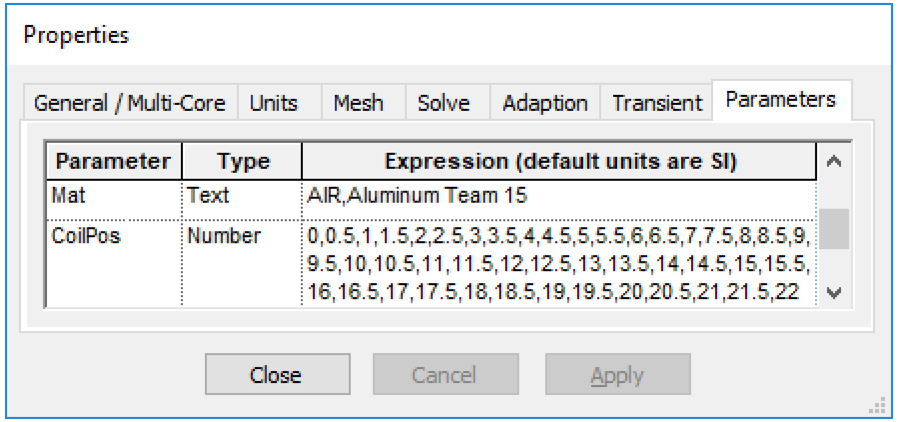
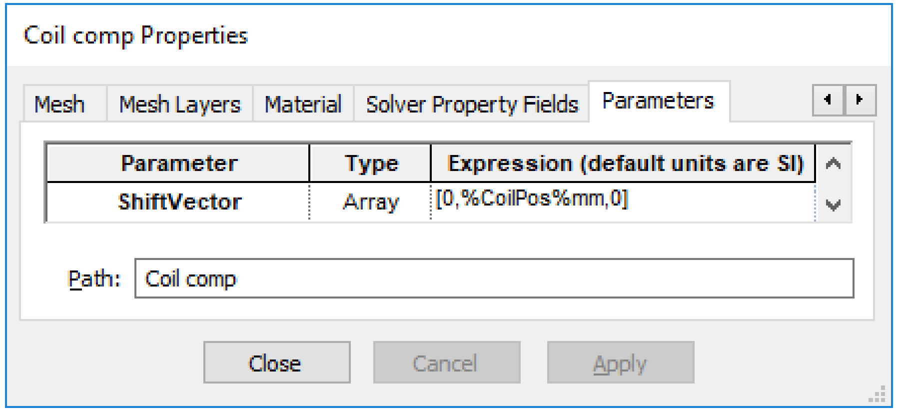
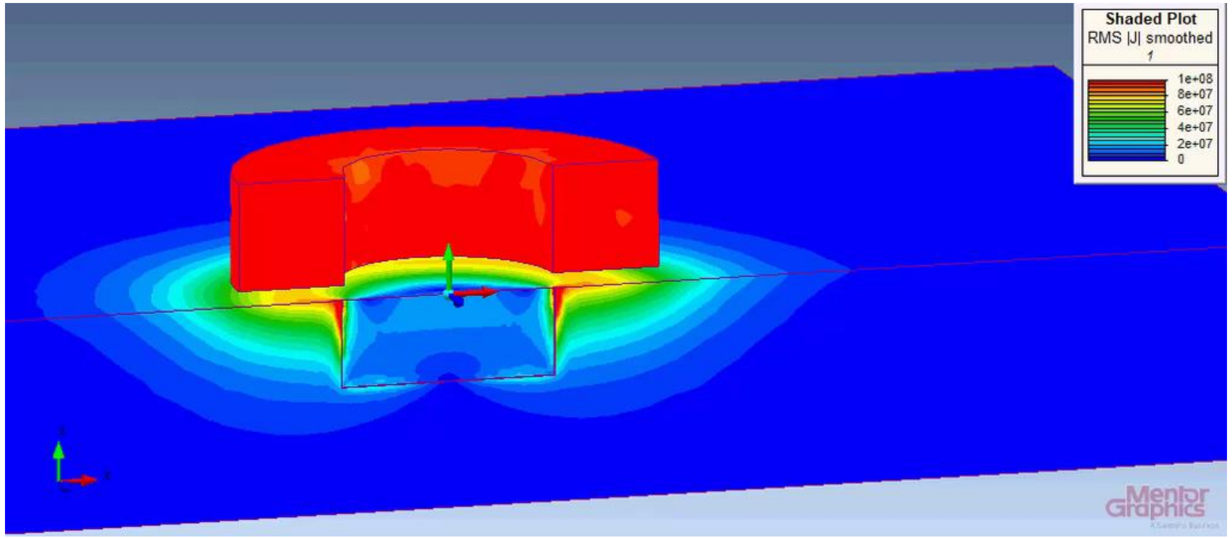
In T.E.A.M. problem 15, the driving coil is required to move along the aluminum plate to sense the flaw. This is done by setting a variable shift vector parameter. In applications where many solutions are required due to such variations, MagNet's parameterization feature makes it that much easier.





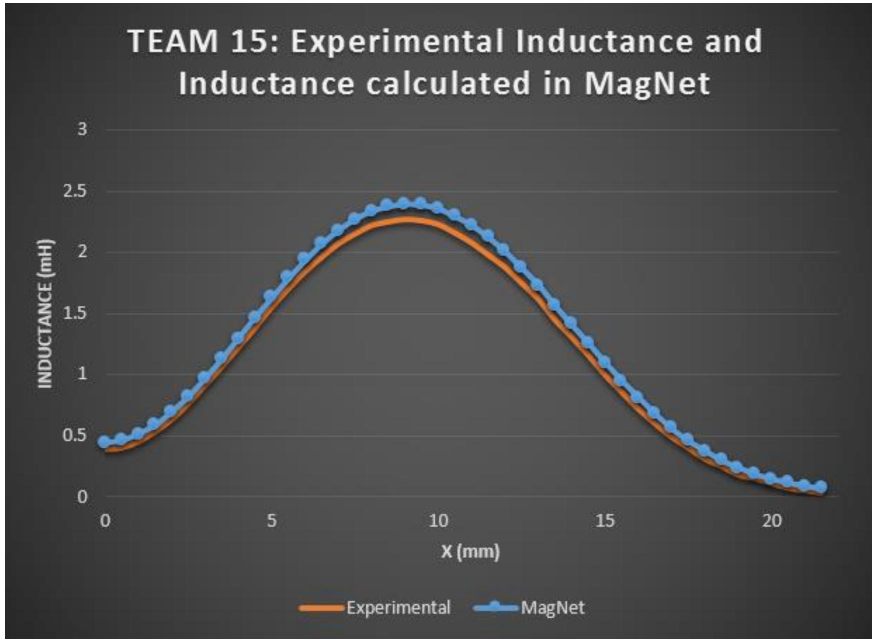
CHANGING CURRENT DENSITIES AS THE COIL MOVES

An animation of the current density as the driving coil moves across the aluminum plate.



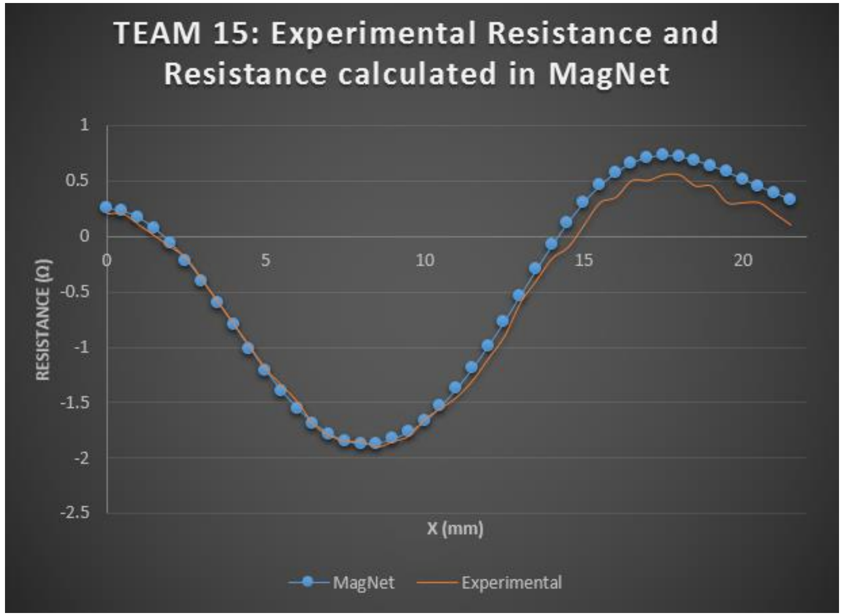
Comparison of Inductances

This graph compares the inductances calculated in MagNet with the experimental values.



Calculation of Resistances

The resistances calculated at the various coil positions are compared to the published experimental results.



Specifying Mesh Sizes

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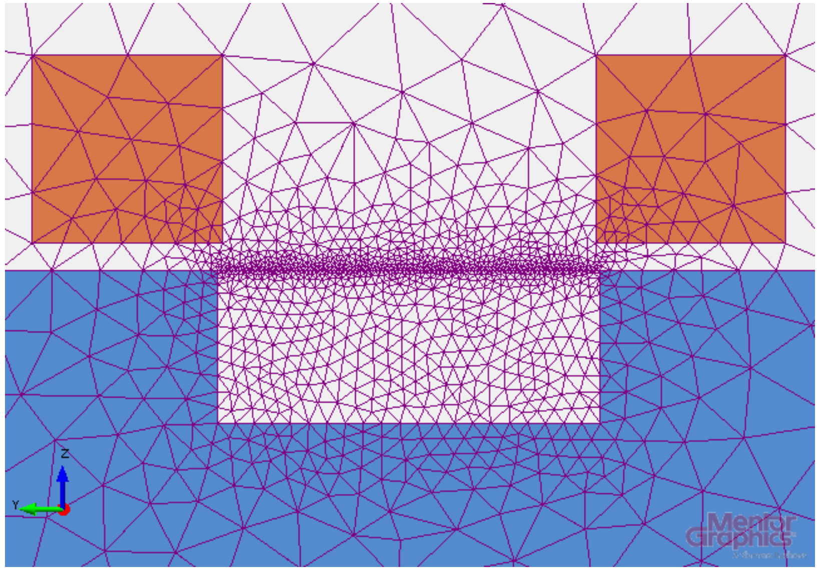
For quick and easy meshing, MagNet allows for mesh sizes to be set specifically on any body, surface, edge or vertex.



Voltage In The Driving Coil

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MagNet's post-processing allows the user to immediately retrieve important results for further analysis. In the snapshot on the right, after the Time Harmonic simulation has completed, the user can instantly find out what the voltage is in the driving coil.