



ANSYS® Emag™

## Overview

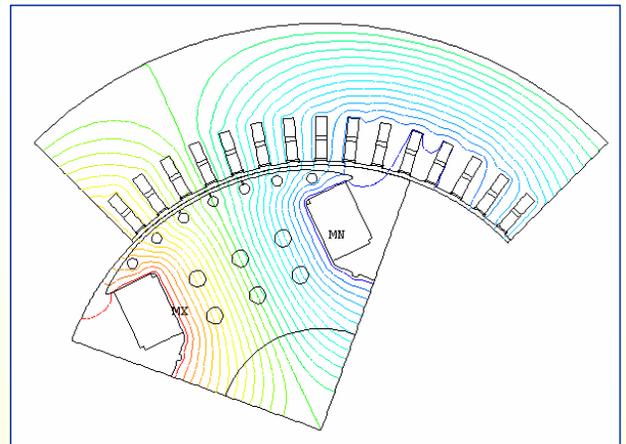
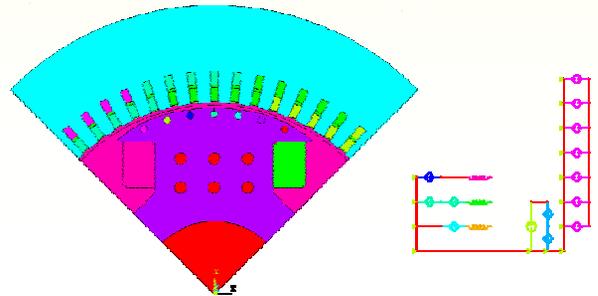
Kato Engineering designs and manufactures a complete line of precision-engineered, high quality AC generators, motor-generator sets and controls for prime, standby and peak-shaving power generation. Founded in 1926, Kato Engineering employs about 325 people in its design and manufacturing facility in North Mankato, Minnesota.

Kato generators supply power to tap the world's resources; oil, gas, coal, copper, iron ore and lumber are all extracted from the earth with the help of Kato generators. Kato furnishes the power to keep the world moving; ships, freighters, locomotives, aircrafts and mass transit systems all use Kato equipment. Any place where dependable, controllable electric power is needed; hospitals, computer centers and telecommunications stations all rely on Kato generators to supply clean power.

## Testimonial

“Certain key generator characteristics; the subtransient reactance, the open-circuit saturation curve, and the output voltage signal harmonic distortion can be difficult to predict and are typically determined from physical testing. Using ANSYS Emag enables us to determine these key generator characteristics and accurately predict generator performance before creating a physical prototype.”

Joshua Lorenz  
Kato Engineering



## Challenge

The subtransient reactance of an electrical generator is the generator internal impedance element that is effective during the first few cycles of a transient load event. The subtransient reactance is difficult to predict and is typically determined through factory testing of new generator designs after the design process is finished.

## Solution

ANSYS Emag was used to predict the subtransient reactance using two-dimensional transient circuit-coupled electromagnetic analysis. Other key generator characteristics such as the open-circuit saturation curve and output voltage signal harmonic distortion are evaluated as well. Custom macros using the ANSYS Parametric Design Language (APDL) were developed to model the four-pole generator.

## Benefits

By using ANSYS Emag, Kato Engineering is able to speed up new generator development. Using a transient circuit coupled model allows for the understanding of the key generator characteristics at an early stage in the design process before physical prototypes are created.