Vibration Analysis of Laminated Stator and Motor Unit

NewtonWorks

Contact us!

- Overview -

The stator core, one of the components of the motor, has anisotropic elasticity due to its laminated structure of thin steel sheets.

Conventionally, testing was required to identify this anisotropy, but AVES has demonstrated the possibility of estimating anisotropy using CAE.

AVES can be used to analyze the vibration of not only the stator core alone, but also the motor unit as an assembly structure with coils and frames.
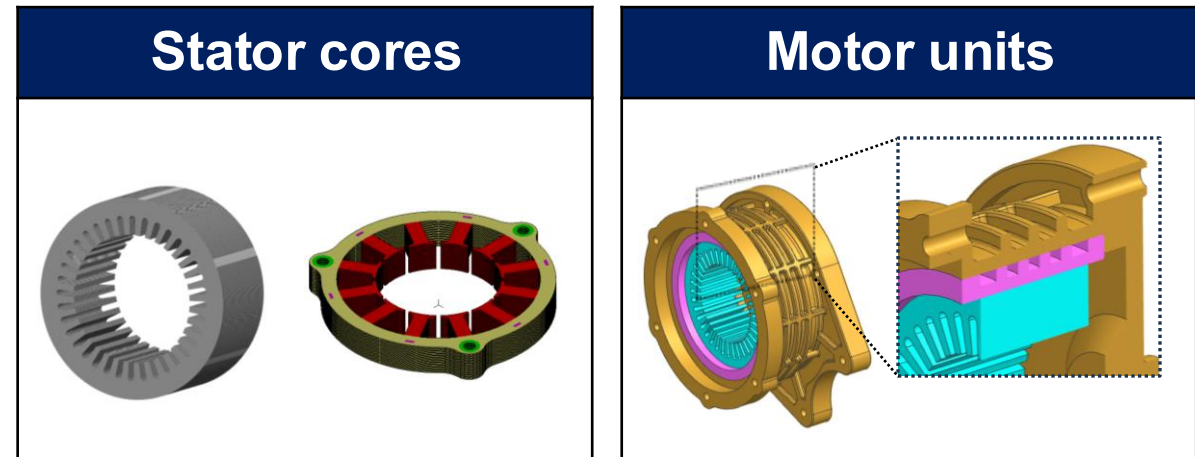
- Examples of use -

Welded stator cores

Interlocked stator cores

Bonded stator cores

Motor Unites (stator, coil, frame, bracket, etc.)

Stator cores	Motor units

NewtonWorks Corporation

Vibration Analysis of Laminated Stator and Motor Unit

## - Application of AVES to motor vibration analysis -

● **Vibration analysis of laminated stator core**

− Using a single-layer stator core mesh as input, a series of processes from creating a laminated model to eigenvalue analysis can be performed seamlessly.

Input

Thin steel plate
Surface stiffness

Single layer stator mesh   Laminated model generation   Contact analysis (if needed)   Contact pressure   Conversion of pressure to stiffness   Vibration analysis of laminated stator core

Preprocessor   **NewtonSuite-AVES (Motor option)**

● **Conversion to anisotropic continuum model**

− The laminated stator core model can be replaced with an approximately equivalent continuum model.

− Different anisotropic properties are assigned to each region depending on the surface pressure.

Pressure distribution on laminated steel   Different anisotropy in different regions

Anisotropic continuum model
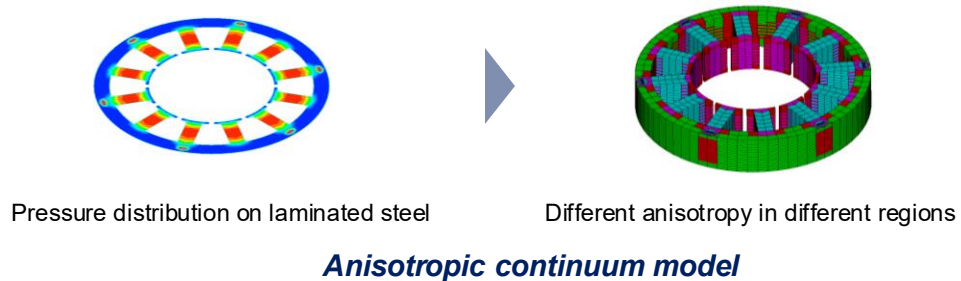
● **Boundary modeling of motor unit**

− Motor units have fitting parts and bolt fastening points, and AVES is effective for modeling these boundaries.

Frame

Stator core

Cover

Stator and frame fittings   *Bolted joints*