YAMAHA MOTOR ENGINEERING CO.: Brake Squeal DOE evaluation in ANSA and META

Challenge

- Automation and optimization of Brake squeal experiments generation and results post-processing, for multiple combinations of friction coefficients and rotational velocities.

- Determination of an evaluation criterion to quantify part contribution to brake squeal.

- Inclusion of eigenmodes evaluation in the tool, to avoid manual estimations and use of external spreadsheets.

Approach

- Combination of the ANSA Brake Squeal tool with A_PARAMETERS in a single database, to setup the DOE tool for several multiple experiments extraction.

- Post-processing of all experiments simultaneously and visualization of the results summary in a common instability plot by using the META Brake Squeal tool.

- Application of the CCF criterion to evaluate Part Contribution.

- Application of the CMCF criterion to evaluate the highest modal contributions of the most contributing parts.

Results - Benefits

- Man-hour reduction by ~50%.

- Simultaneous experiment evaluation with common Instability plot, CCF and CMCF criteria.
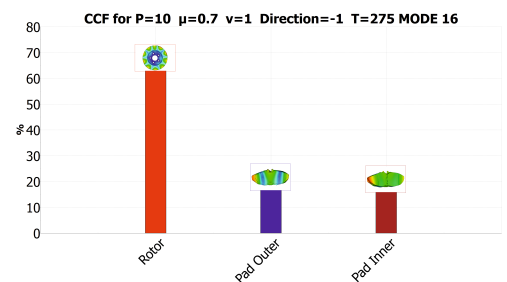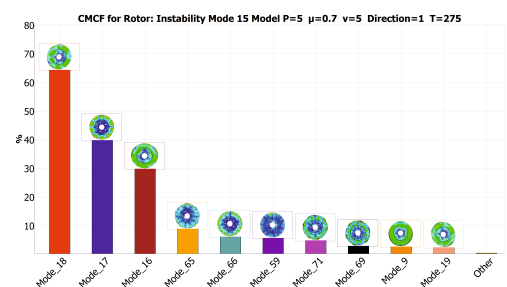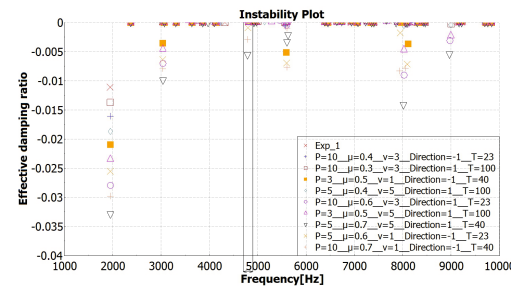
"By using ANSA/META Brake Squeal Plugin, it was possible to automate the modeling and post-processing work for brake squeal analysis.

This resulted in 50% man-hour reduction. In addition, more advanced and objective analysis can be performed than the conventional method, as well as more optimal design studies."

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