Evaluation of Dynamic Sealing Performance

- Overview -

eSeal can predict deformation of contact parts as well as changes in sliding resistance and contact pressure distribution during assembly and sliding.
It can be used for design to improve efficiency of rubber seals.
eSeal can express the seal made of several materials (e.g. resin coating and metal insert). These body boundaries can be represented as both the contact boundary and the assembly one. It is useful to review design when you need to consider replacing with other material properties because of factors such as electrification.
The result of analysis can also be seamlessly applied to lubrication calculation tools to evaluate the leakage amount.

- Examples of use -

Lip Seals, Stem Seals, and Piston Seals
You will receive feedback on design on the trade-off between efficiency and sealing performance (contact force) in sliding seals. CAE allows you to evaluate material selection and the suitability of shapes, even when you are required to change material due to environmental issues.

Lip Seals

Stem Seals

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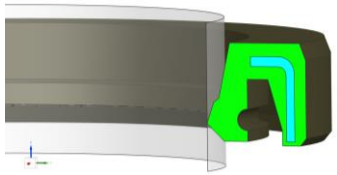
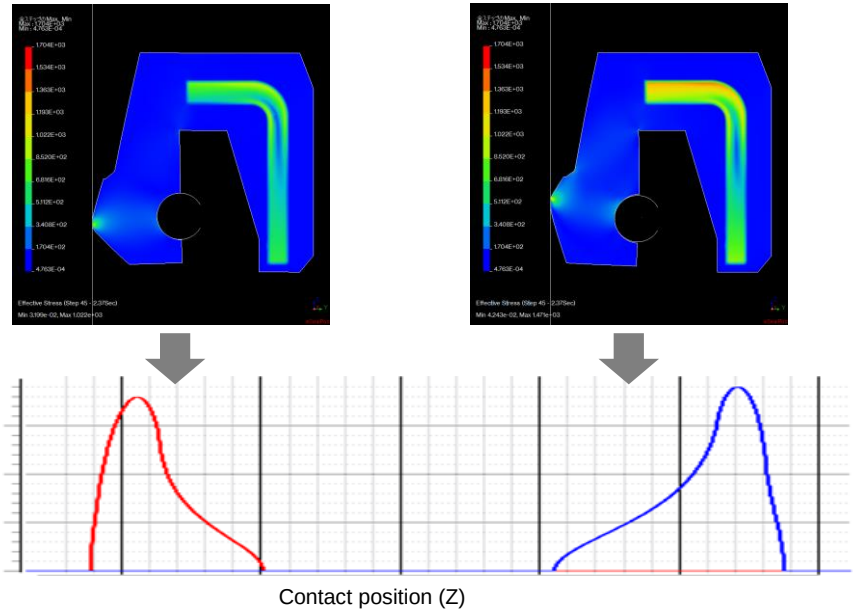
- Lip seals assembly and sliding -

- **Deformation shape and stress**
  - An example of changing the angle of the lip tip. (See the graph below)
  - Use maximum contact pressure and gradient to estimate the sealing performance of oil seal.

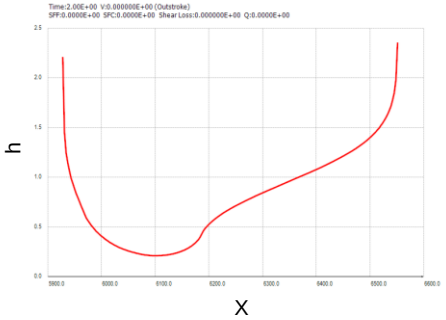




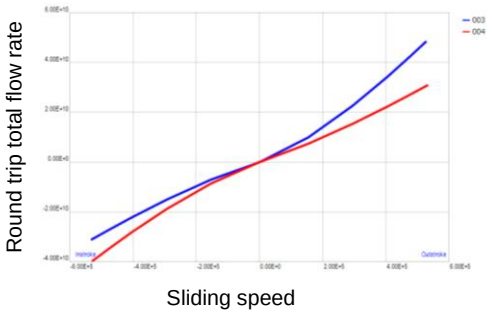
- **Contact pressure Distribution**
  - PostTool enables you to compare the quality of the shape immediately by displaying the results side by side.

- **Sliding resistance vs. reciprocating motion**
  - Estimate the history of sliding resistance against the movement of the shaft.
  - Also caluculate the force that pushes the shaft out by the lip section deformation when the direction of sliding changes.

- **Application to lubrication calculation** (NewtonSuite-RSCalc)
  - Use the data of contact pressure distribution and seal surface rigidity.
  - Calculate the fluid pressure generated by sliding, the corresponding changes in oil film thickness, leakage amount, and sliding resistance.



Oil film thickness variation



Sliding speed and leakage amount