

## **Introduction**

Philips Drachten has been the development and production center for Philips advanced electronic shavers since 1950, being one of the largest of such sites in Europe. Philips Drachten has 2,000 employees, including 600 developers drawn from among 35 nationalities. Recently, the Drachten site has been expanded to include an R&D department for Philips Oral Healthcare. This department works closely on oral healthcare innovations with the Philips Oral Healthcare R&D headquarters located in Bothell, USA.

## **Problem description**

Many of the Philips Personal Health products rely on moving components for proper functioning and delivering the claimed personal health benefits. Examples are moving blades in a trimmer and vibrating brush-head of an electric toothbrush. The design of such systems is very often guided by the use of mathematical models that describe the motion dynamics of interest. For many of such systems, the rotational motion is of interest and such dynamics are greatly influenced by the moment of inertia (Mol) of mechanical bodies. Like mass affects translational acceleration, Mol affects rotational acceleration. Mass can often be easily measured by a weighting scale, however, for the Mol this is not the case.

## **Relevance**

For proper modeling of rotational dynamics and/or for assessment if the Mol of components satisfy requirements, it is of importance to be able to measure this Mol. However, there is no known direct measurement technique for Mol. However, an indirect measurement approach can be applied to determine the Mol of a component. Such an indirect approach can be to use the dynamic behavior, i.e., the way the component moves or vibrates, to determine its Mol.

## **Aimed output**

- Determine the mathematical equations that describe the motion of a rotating component
- Determine an approach to use the motion of the rotating component to determine its Mol
- Develop a demo-setup to measure the Mol of a rotating component using the found approach

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This is an internship for around 10 weeks. Which also means it is only open for students studying at a Dutch educational institute.

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