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## **Influence of the thrust bearing on natural frequencies of a 72 MW hydropower rotor**

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The thrust bearing of a hydropower machine is an essential element. Not only does it carry the total axial load, but it also introduces stiffness and damping properties in the system. The focus of this study is on the influence of the thrust bearing on the lateral vibrations of the shaft of a 72 MW propeller turbine. The thrust bearing has a non conventional design with a large radius and two rows of thrust pads. A numerical model is developed to estimate natural frequencies. Numerical results are analysed and related to experimental measurements of a runaway test. The results show the necessity to include the thrust bearing in the model. Indeed, the vibration modes are substantially increased towards higher frequencies with the added properties from the thrust bearing. The 2nd mode of vibration has been identified in the experimental measurements. Its frequency and mode shape compares well with numerical results.

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