

Abstract

The simulated pressure-time, recorded at several **monitoring points** through the components of a small **Francis turbine**, show that the rotor - **stator** interactions (RSI) cause strong **pressure fluctuations** and torque oscillations even for the best efficiency **operating point**(BEP). The pressure fluctuations frequency and the mode shape and their sequence are predicted. At the low discharge operating point the significant drop in the **static pressure** is distinguishable at the inlet of the runner. The **amplitude** of the dominant frequencies at the low discharge operating point are larger than at BEP, in addition to other captured frequencies related to the occurrence of the vortex rope in the **draft tube**. The pressure fluctuations occurring in the vaneless space tend to propagate beyond the runner outlet and are influenced by the interactions between the runner and the draft tube. At most unstable **operating conditions** the **pressure pulses** within the runner passages are mainly related to RSI and channel vortices.