



FLARED PUMP-TURBINE

An efficient design to reduce S-shape

CONTEXT

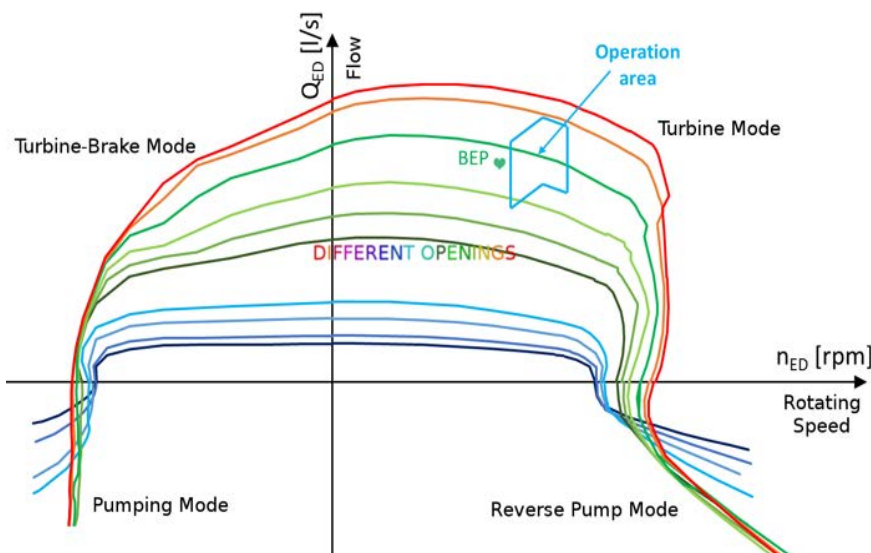
With the increase of intermittent renewable energy sources in the electrical network, the Pumped Storage Powerplant (PSP) is already a key solution for providing stability and ensuring peak regulation, frequency control or voltage support for the electrical grid.

PSP technology is well positioned in terms of power output capacity but it still has a high potential for improvement in terms of response time to increase its capacity for operation in ancillary services markets. Faster and more frequent changes between pumping and generating modes are thus requested, together with a greater operation of the machine under off-design conditions.

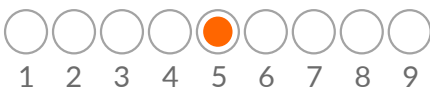
In turbine mode, their characteristic curves can have an S-shape where the water flowing through the runner is highly unsteady, generating high pressure fluctuations and strong dynamic loads on mechanical parts.

TECHNOLOGY DESCRIPTION

Using an innovative design method, the runner SGI-TP001 was designed from an initial runner already in use. This new pump-turbine runner has a much less pronounced S-shape than the initial runner and the efficiency remains similar. This runner has been tested on the hydraulic platform TM1. Tests on the 4 quadrants have been performed.



TRL SCALE



Tests on Platform TM1

APPLICATION DOMAIN

Pump-turbine runner

ADVANTAGES



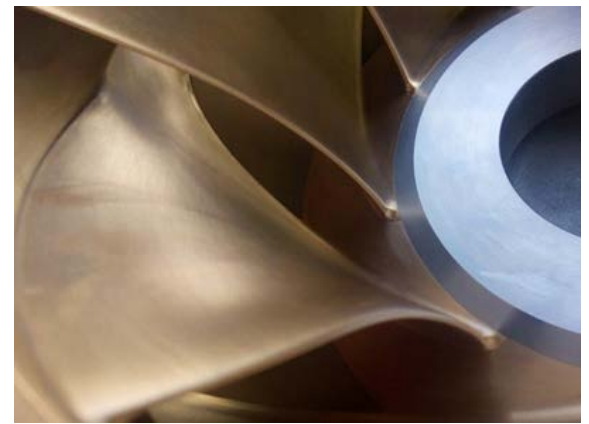
Reduced S-shape
Runner



Efficient Runner



Innovative Design
Method



DELIVERABLES

Drawing and Creo model of SGI-TP001 Runner
Test report: 4 Quadrant
Technical report: runner design method
Patent application FR1909861

