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Reduced model design of a pelton turbine rotor via 3d printer for educational use

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The impact of rapid prototyping on undergraduate engineering universities using a single machine or a wide variety of prototyping techniques is a lot discussed by many authors. In the past, manufacturing real models using a variety of model creation processes has enhanced graduate students' product design skills. The main advantage is the ability to verify different hypotheses research parameters and allow for improved project completion, reducing the costs of manufacturing instrumentation and test configurations, reducing the design-test-review cycle time, and presenting students with classes more practices and research problems. Thus, the experimental study through the reduced model of the rotor of a hydraulic turbine has its importance based on the fact that it is possible to analyze its behavior in the laboratory itself. The present work aimed to design, model and manufacture, through a 3D printer, a reduced model of the Pelton turbine rotor for didactic use. The turbine rotor was dimensioned based on the project input data such as: head drop, turbine power, engine speed, pressure coefficient and efficiency. The rotor disk diameter of 375.75 mm was obtained, where 25 shells will be assembled. The manufactured model will be printed to compose a didactic bench later built for use in practical classes. This bench will be a tool for experimental research studies, and also as a didactic resource in subjects such as fluid mechanics and flow machines, taught in the undergraduate course in Mechanical Engineering, as a way of internalizing the content learned in the classroom.

Keyword: prototipagem; turbina hidráulica; recurso didático.

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