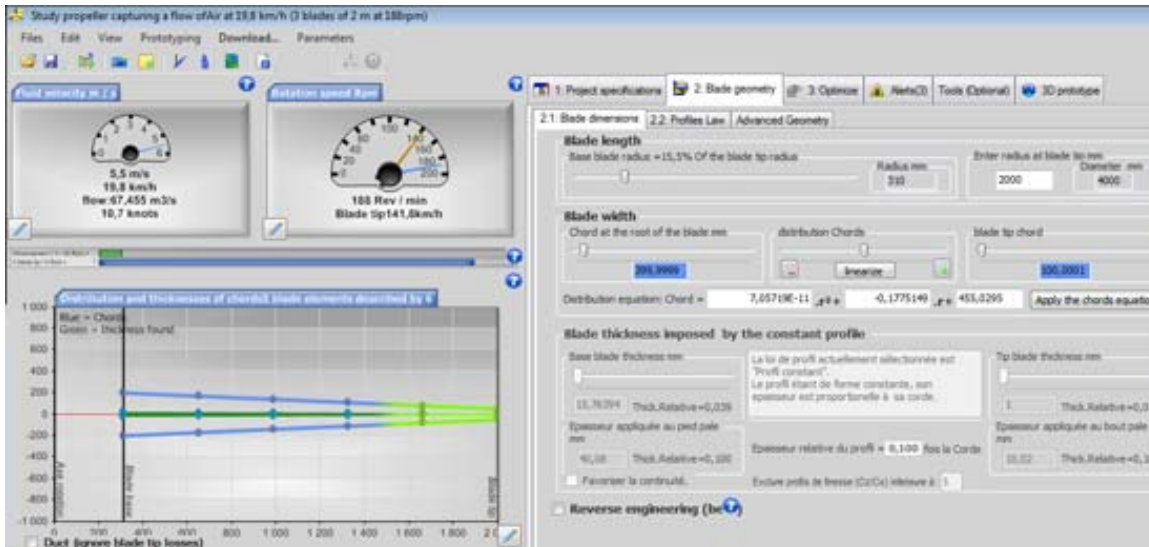


# Propeller diameter and blade length

The diameter of the propeller corresponds to the double of the radius at the blade tip. The diameter of the propeller determines the rotor swept area. Choosing the right diameter, and therefore the right blade length implies a knowledge of the role played by the surface of the propeller in the system.

In the software HELICIEL The blade length is determined by the user in blade geometry tab > blade dimensions



To make it simple, we could say that longer the propeller is, the better it is! But why, and upto which limit.?

- see: The role of length of blade or wing and the blade tip leakage
- see: The role of the length of blade wind turbines, water turbines and other turbine
- see: The role of the length of Propeller blade boat propellers of aircraft propellers and other propellers.
  - the propulsion propellers page brings the notion of leakage at the blade tip recalling the origin of the propulsive force.
  - the propulsive efficiency of the propeller is determined by the diameter of the propeller, before construction and during construction, the parameter of propulsive efficiency, should be monitored.

We usually come to the conclusion that longer the propeller is, better is the efficiency, but the length of the blade generates stresses that must be taken into account.

- Longer is the blade, higher is the speed at its tip. We will therefore stay below the speed of sound (about 330 m / sec). For propellers operating in air, the speed of sound mean a limit which can not be exceeded without destroying the propeller performance.
- The centrifugal force may become considerable at the blade tip. An evaluation of the resistance as a function of the rotating mass is to be taken into account.
- For operating in the water propeller, cavitation is relative to the lift, which is function of the speed received by the blade element, so that to the tangential velocity which can be important, at the large diameter blade, tip. Cavitation and ventilation appear easier to shallow depths. To avoid the blades cavitate or ventilate, as they approach the surface the shaft will be deeply immersed. A large blade length can therefore present difficulties of implementation.