Pitch profiles and change the pitch of propeller blade or turbine

The pitch of the profiles is, by default, automatically calculated by Heliciel software. but the possibility to manually choose the pitch of each blade element is still useful , to control the performance strategy of the propeller. Une troisième solution consiste a faire varier simultanément le calage de tous les élément de la pale sans modifier le vrillage de la pale pour simuler un système de variation de pas. Nous allons voir ici comment utiliser ces trois méthodes de contrôle du calage de notre pale d'hélice avec le logiciel HELICIEL:

1. **Optimum pitch automatically**: (default option Heliciel)

   When you click "Rebuild  ", after you have changed the operating point or geometry, Heliciel adjusts the pitch of the blade profiles on the angle of incidence generating the best lift / drag ratio. The induced velocities are of course taken into account in determining the pitch. This method provides the theoretical optimum performance for the geometry and the operating point set.

2. **Forcing Manual, the impact of the blade profiles**:

   You can fully control the pitch of the blade profiles, forcing the incidence angle of the profiles. The twisting of the blade is thus controlled manually. Profile whose angle of incidence is forced: pitch will be calculated using the apparent velocity and induced according to the angle of incidence imposed. It is important to differentiate pitch angle and incidence angle. When forcing (for example) incidence angle 20 °, we say to the software that the pitch angle (angle between the plane of rotation and the chord of the profile), will be one that will generate the induced velocities resulting in an angle of incidence of 20 °(angle between the chord of the profile and the actual direction of fluid calculated by aggregating apparent speeds and induced).**See: Manual override the incidence of the blade profiles**

3. **General change in the pitch of the blade.**

   The blade is rotatable about its axis by a selected angle. This does not change the twist of the blade because it is the whole of profiles that have their pitch changed with the same value. This simulates a system for varying the pitch and calculate the performance of a variable pitch propeller following different angles .see:**General change in the pitch of the blade.**

Manual override the incidence of the blade profiles

- In the 3d model, select a blade element and open the context menu by right-clicking on the element for which you want to change the angle of incidence (and therefore the pitch angle).

Modeling aerial propeller in heliciel

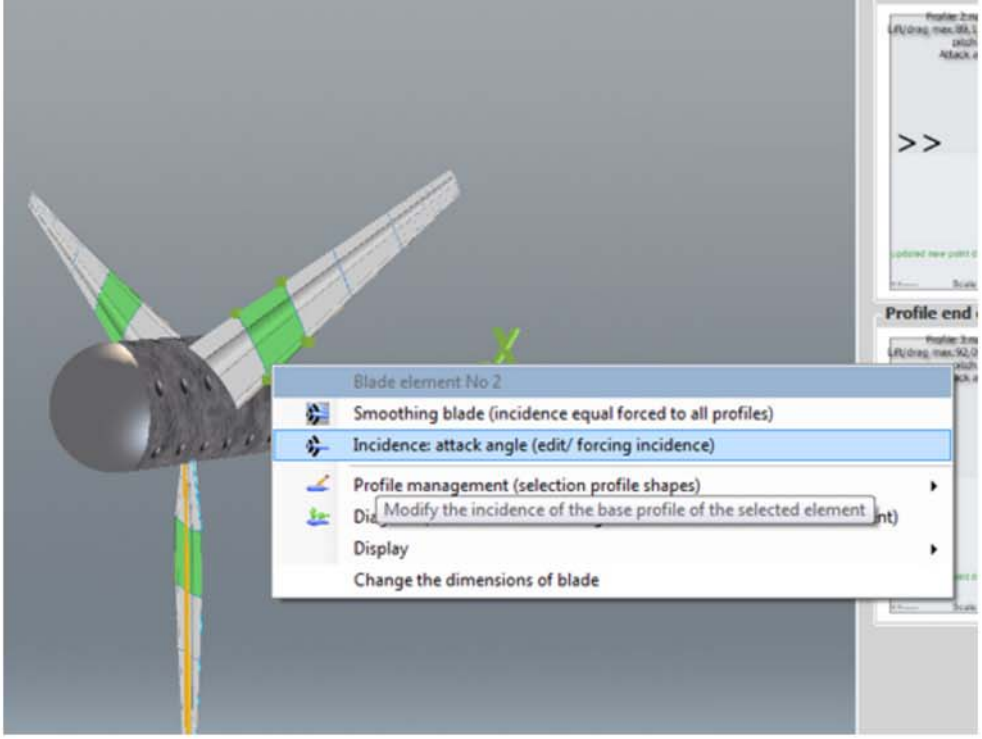
Modeling boat marine propeller ineliciel

Modelisation helice ventilation dans heliciel

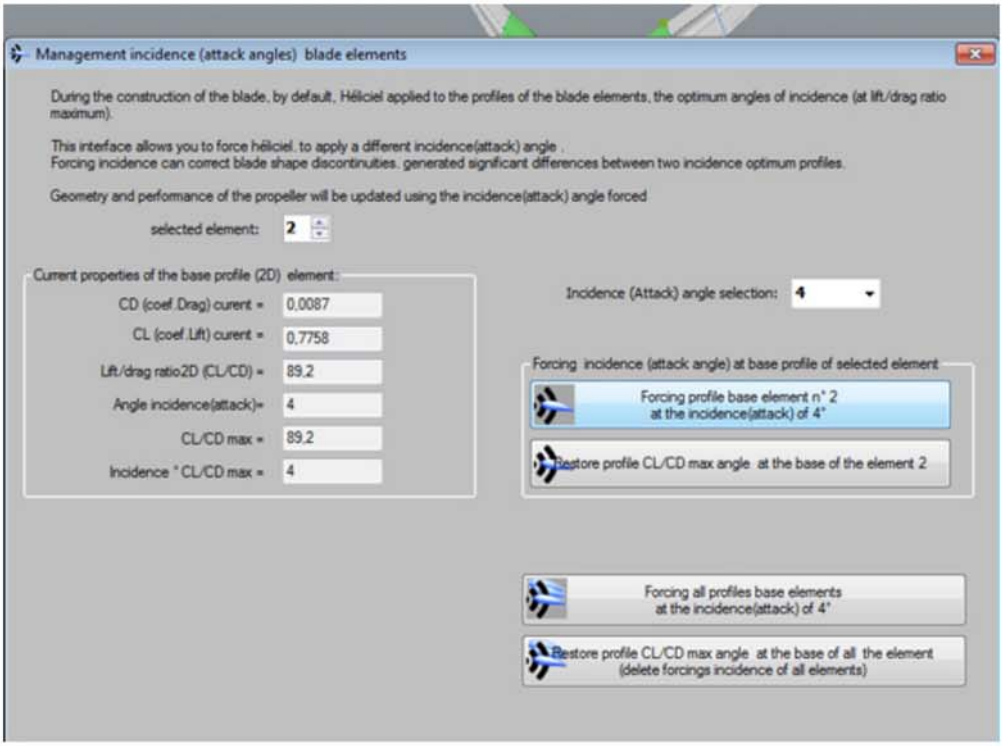
Modeling propeller ventilation in heliciel

tidal turbine modeling in heliciel

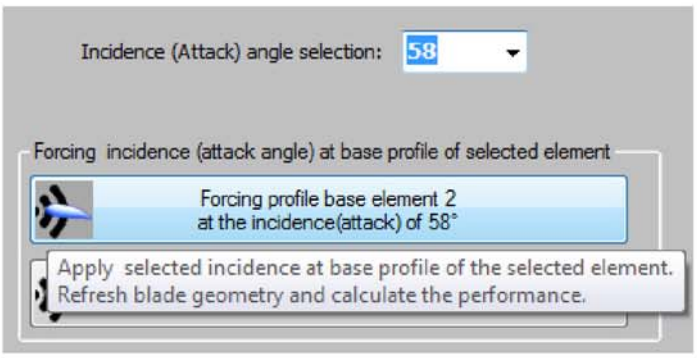
Kaplan propeller modeling in heliciel



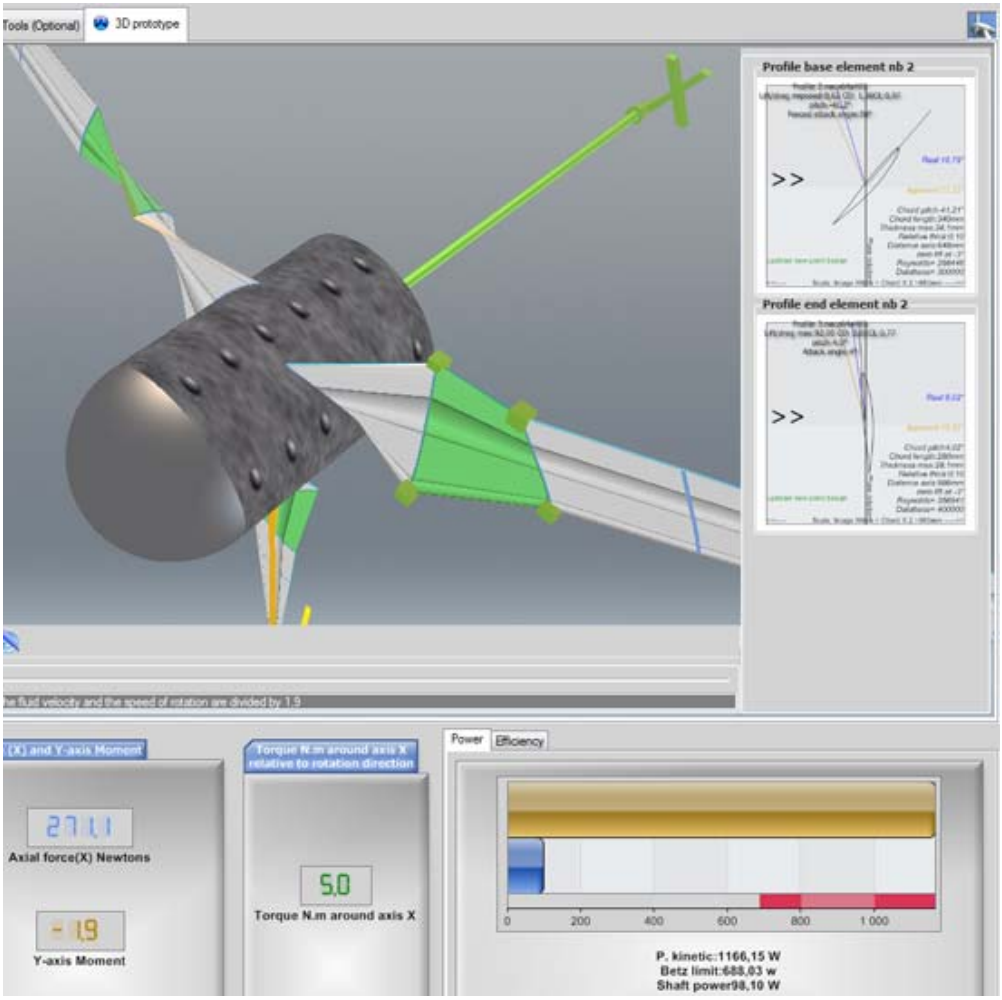
Select "Incidence (Incidence Management angles)" to open the manual control of the incidence of profiles:



Heliciel has a data base of profiles containing performance profiles on 360 ° (after stall angles are extrapolated according to the theories of performance flat plates). So you can choose the angle of incidence at the base of the selected element, and rebuild the propeller and the calculation of performance by integrating a forced angle of incidence. For example, here this wind turbine has the basic profile of the third element was forced to the incidence of 58 °.



There is little doubt that the result is not going to give a great performance but rather destroy the propeller performance:



General change in the pitch of the blade..

In the toolbar of the 3d model, the last button on the right launches pitch variator..

The variable pitch allows you to calculate the performance of your variable pitch propeller has a selected angle. The geometry of your blade, and twist remains the same because it is the whole of the blade that rotates on its axis. Choose your angle with the cursor and Launch calculation performance. This tool is ideal for simulating a system of propellers pitch variation.

Here we see an example of pitch variation where our wind turbine propeller is on braking torque.