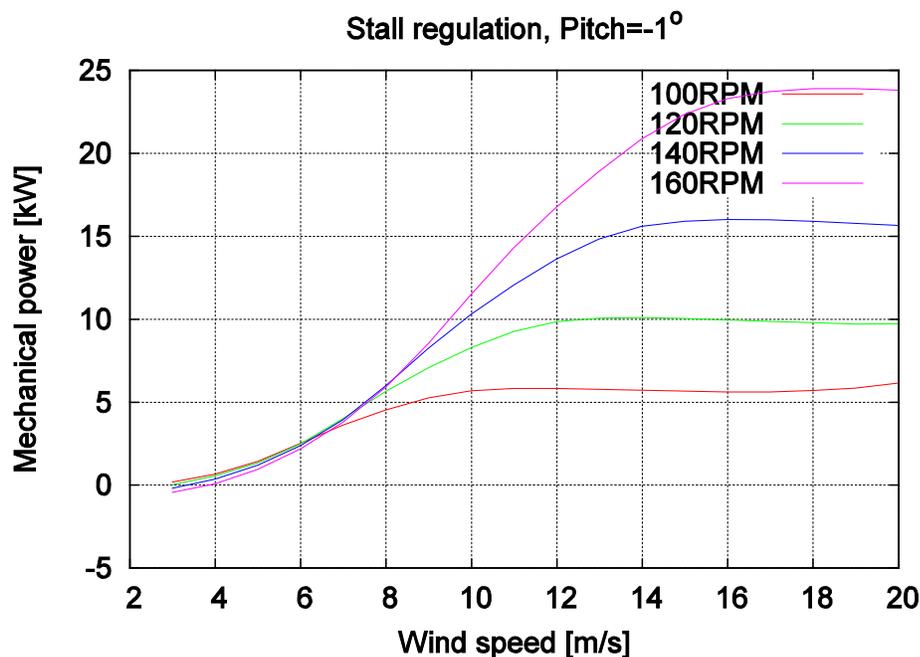


# Performance of the 3.4m Olsen Wing

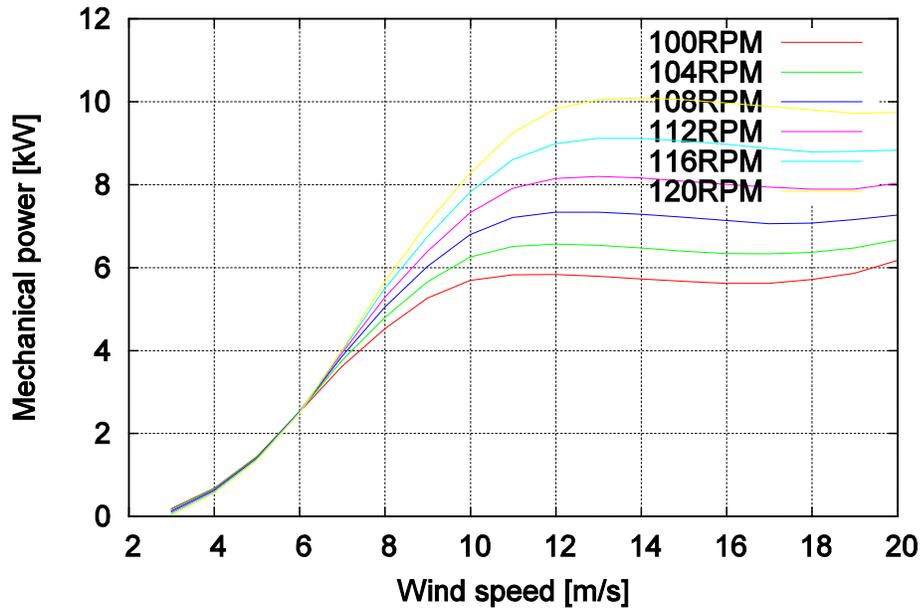
Christian Bak 10. March 2011

This note shows the performance of the 3.4m Olsen Wing. Based on the original 6.2 m blade a directly downscaled blade is investigated. This blade corresponds to the size limits within the certification of a turbine: 3.568m rotor radius corresponding to a rotor area of  $40\text{m}^2$ , which is a limit in the certification of small wind turbines at least in Denmark. Below several plots are shown for the blade used on rotors controlled in different ways. The plots should give an overview of how to control the rotor and furthermore to give an impression of the expected power performance. Please be aware that the power output might be somewhat optimistic due to e.g. the lack of knowledge of the airfoil performance on the inner part of the rotor i.e. airfoils with thickness greater than appr. 18%. It is assumed that the airfoils perform similar from relative thickness' from 15% to 33%. Furthermore, the Reynolds number, which is one of the parameters that describes the flow conditions, is between 200,000 and 500,000 and is lower than for the known 6.2m blade. This is another reason that the power output probably is somewhat optimistic. Thus, there is no guarantee that the blade will perform as shown in the power curves.

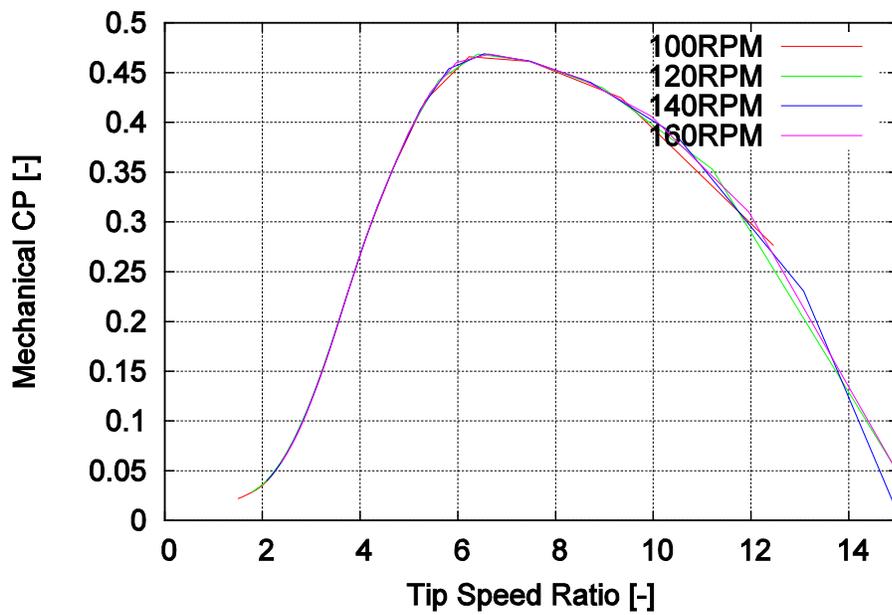
## Stall regulated rotor, different rotational speeds



Stall regulation, Pitch=-1°

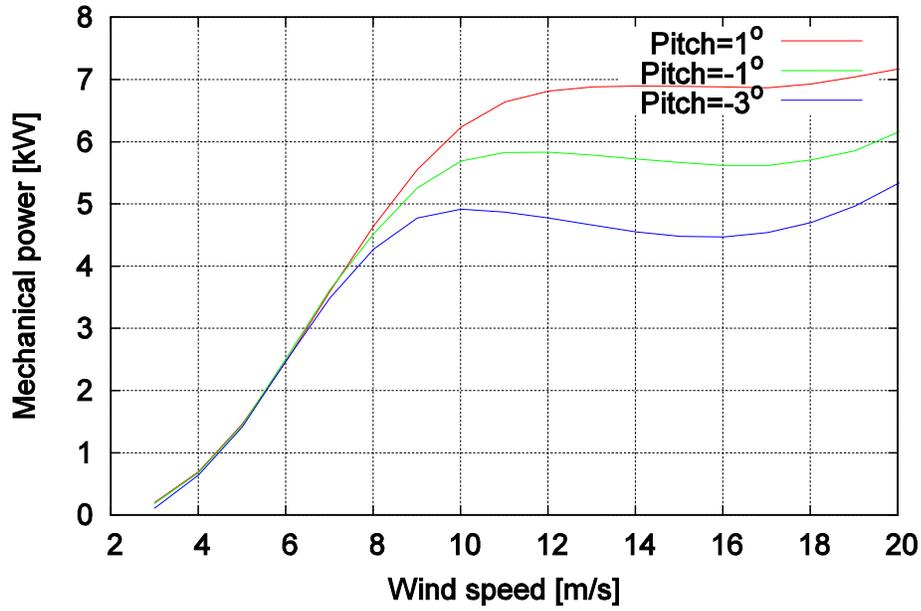


Stall regulation

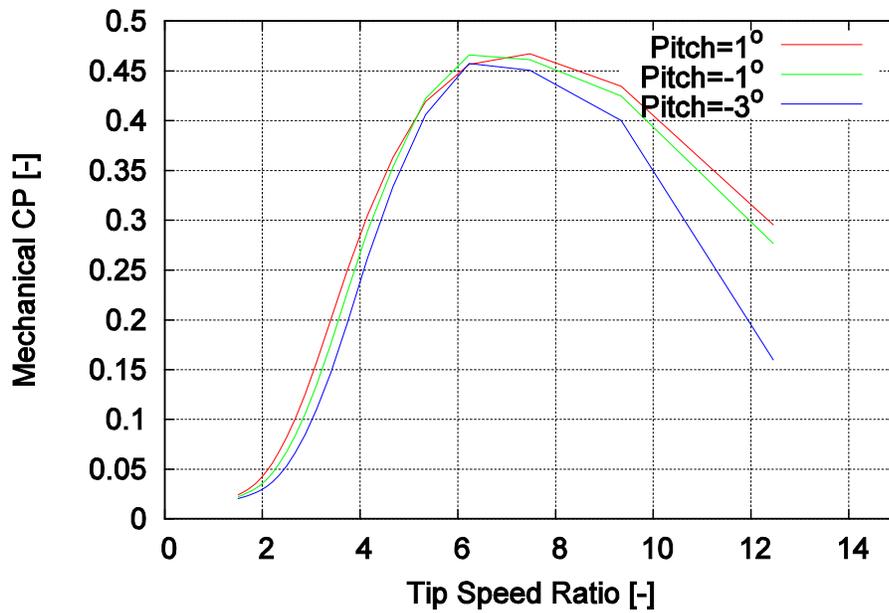


## Stall regulated rotor, different pitch settings

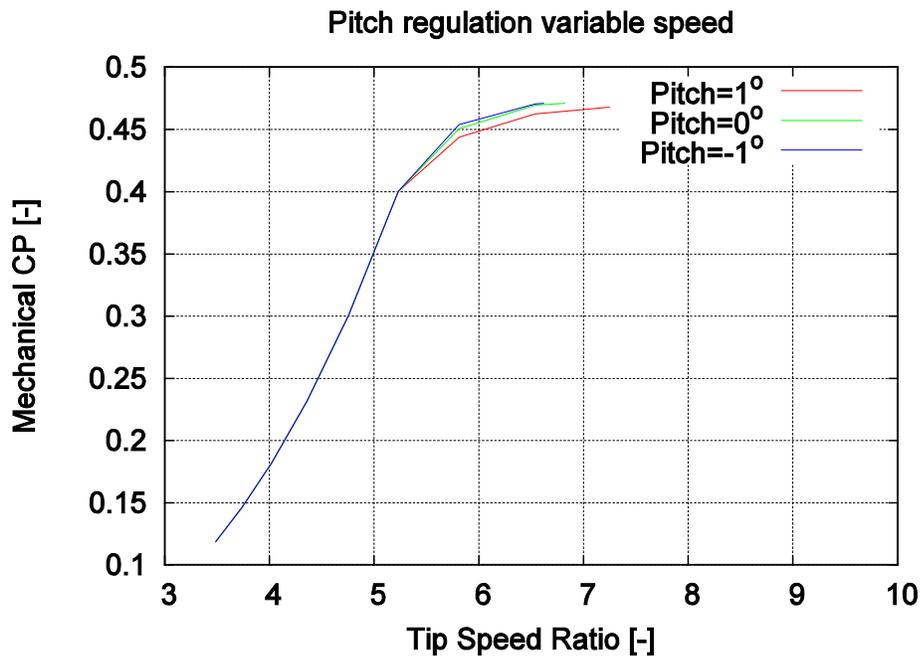
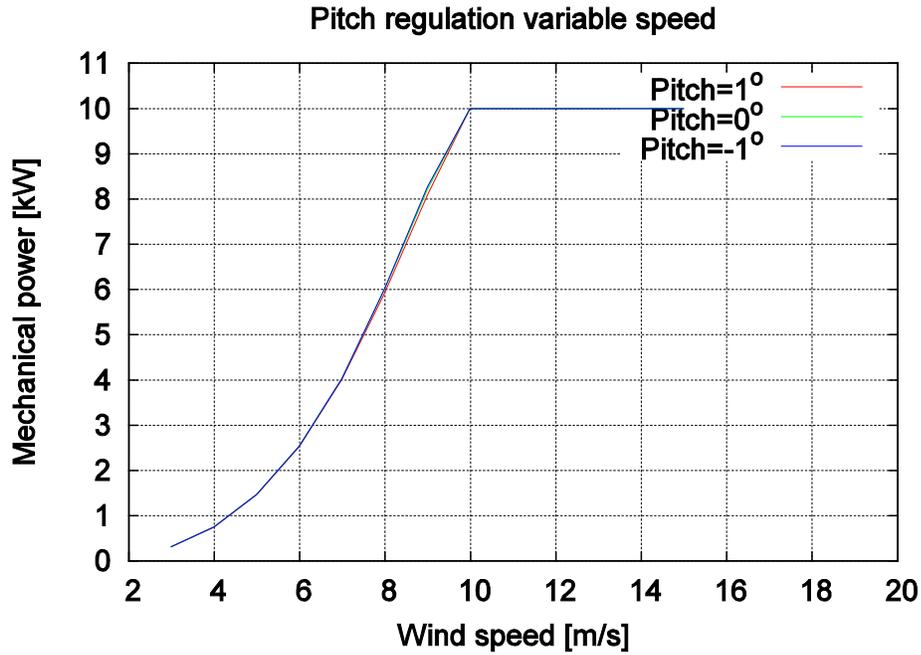
Stall regulation, 100RPM



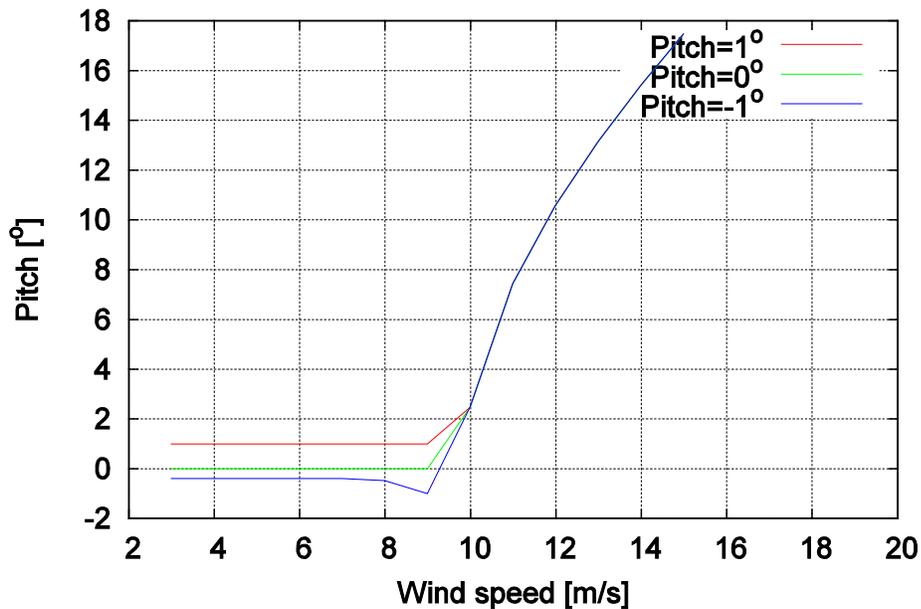
Stall regulation, 100RPM



## Pitch regulated variable speed rotor, different pitch settings



Pitch regulation variable speed



Pitch regulation variable speed

