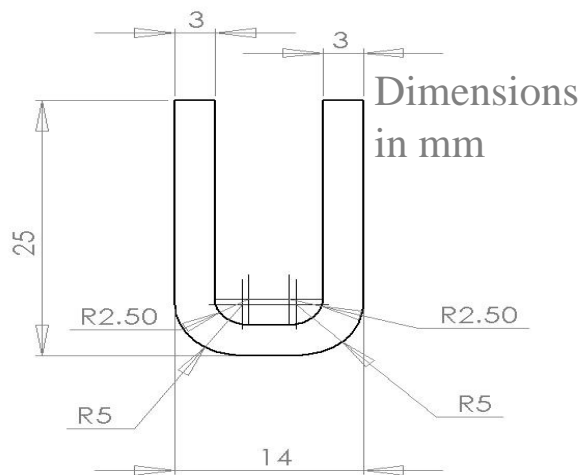


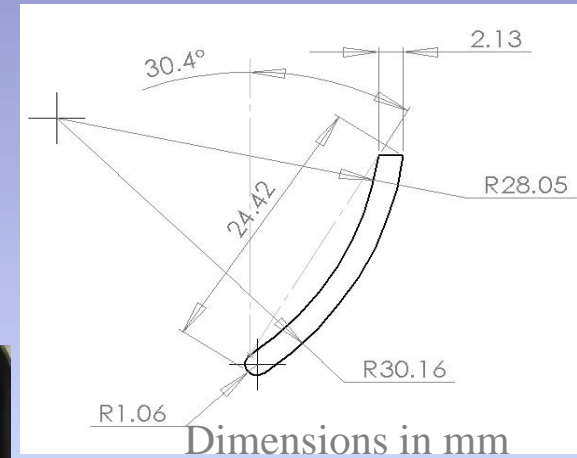
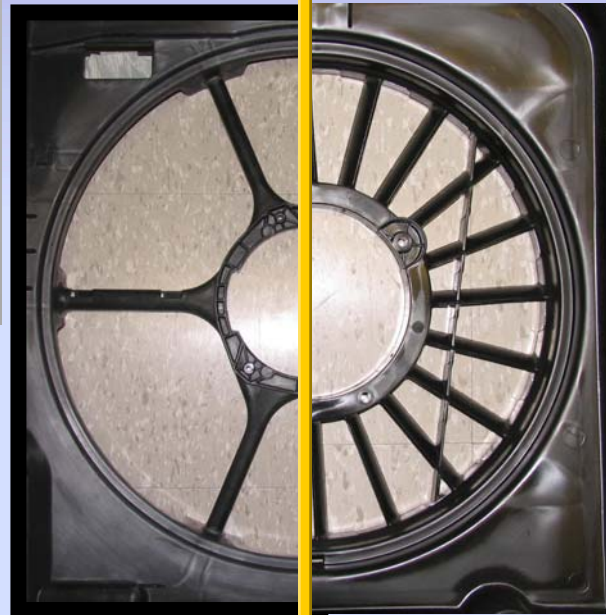
AXIAL FAN PERFORMANCE - STATORS VERSUS SUPPORT ARMS

Background

The fan and the motor are held in place by 3 to 5 support arms or many more stators. In theory, the stators should make the fan more efficient.



Typical support arm cross section



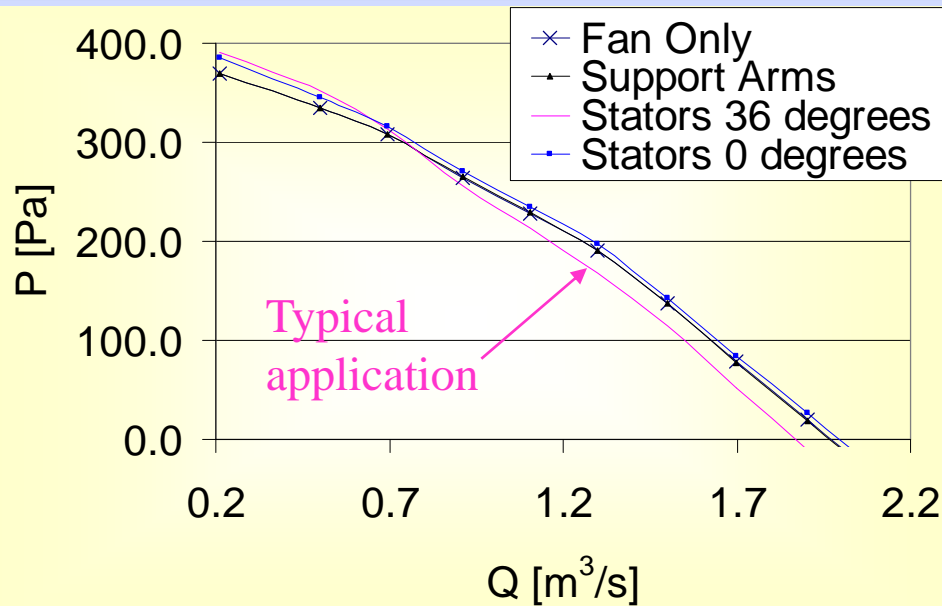
Typical stator cross section

Objective

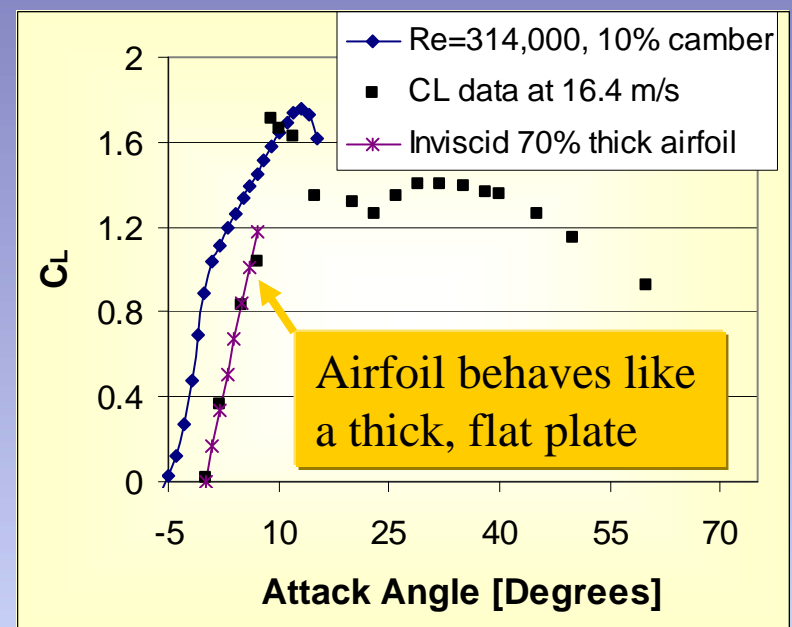
Develop models to predict the pressure gains or losses of stators and support arms.

Research Carried Out

Lift and drag of typical support arm and stator sections were found experimentally. The pressure effect of both options was simulated using realistic estimates of both the fan exit velocity and pressure.



Simulation results on a typical fan curve



Lift coefficient of the stator compared to other sources. (10% camber, Wallis)

Key Findings

Support arms have a lower pressure loss than stators in their typical installed position. The use of stators has a potential for slightly higher efficiency if correctly positioned.