

**Airfoil selection**

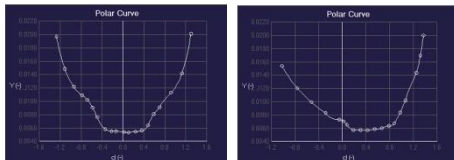
In selecting the airfoil sections the designer must give considerations to several general requirements. These requirements are related to:

1. Aerodynamics
2. Structural weight
3. Manufacturing
4. Safety

**Aerodynamics**

Maximum lift coefficient, as high as possible to minimize wing wetted area

Drag coefficient during the main flight condition (flight at a given lift coefficient and Reynolds Number) as low as possible to minimize required power



Drag coefficient during low speed flight (takeoff and climb) as low as possible to minimize required power

Pitching moment coefficient as low as possible to avoid high torsion loads and high trim drag

Critical Mach Number must be sufficiently high to ensure that critical compressibility effects are avoided in the case of aircraft flying at high speed (> Mach 0.7)

Sensitivity to contamination and dirt must be as low as possible

**Structural weight**

Relative thickness must be as high as possible in the interest of low structural weight

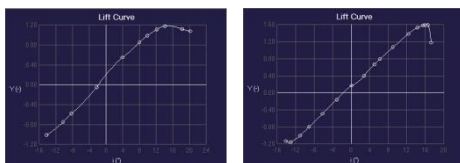
$\Delta(t/c)$	$\Delta W_w$	$W_w = fct\left(\left(t/c\right)_w^{-0.3}\right)$
-20%	6.9%	
-10%	3.2%	
10%	-2.8%	
20%	-5.3%	

**Manufacturing**

Sensitivity to manufacturing variations must be as low as possible

**Safety**

Stall characteristics must be as gentle as possible to warn the pilot that a loss of lift will occur and to minimize the loss of altitude during the stall



➔ Unfortunately all of these requirements cannot be satisfied at the same time and compromise must be done.