

# NYU DBF Flight Performance Study

## Cruise Calculations

References Used:

RC Plane Drag Research

Top 3 Design Reports (2024–25)

Top 3 Proposals (2024–25)

General Aviation Aircraft Design Textbook

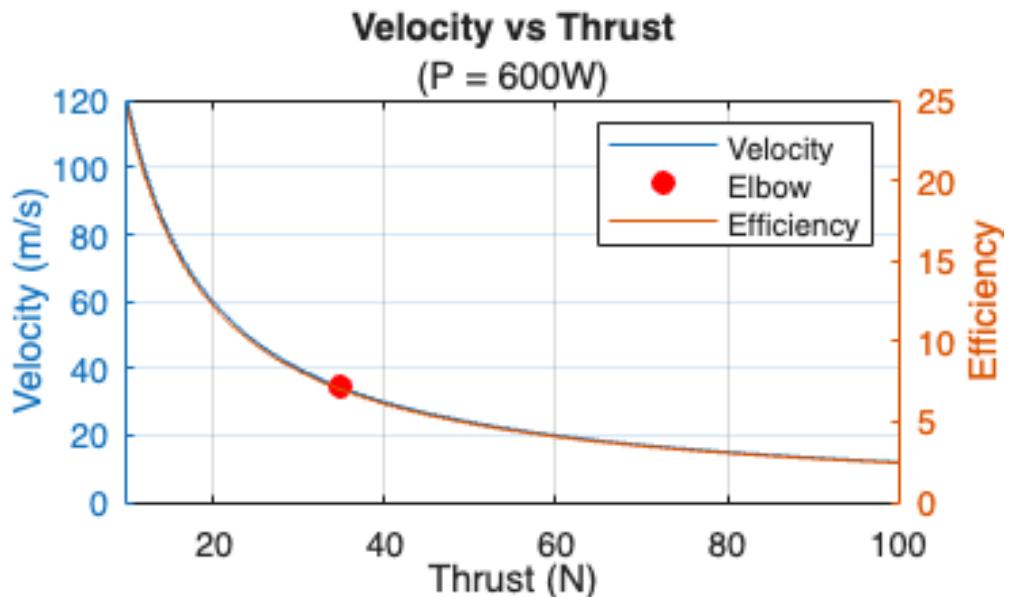
NACA-4412 Optimum Slat & Flap Paper

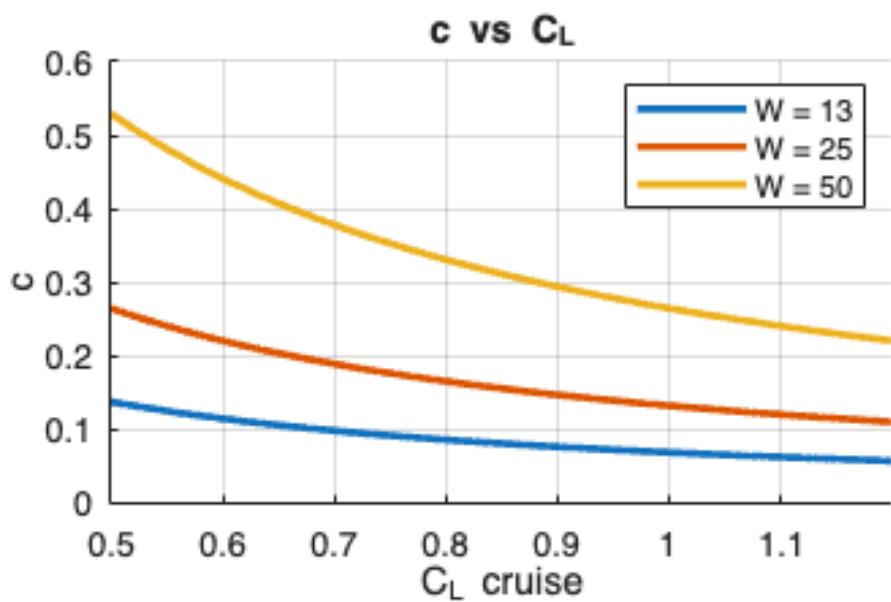
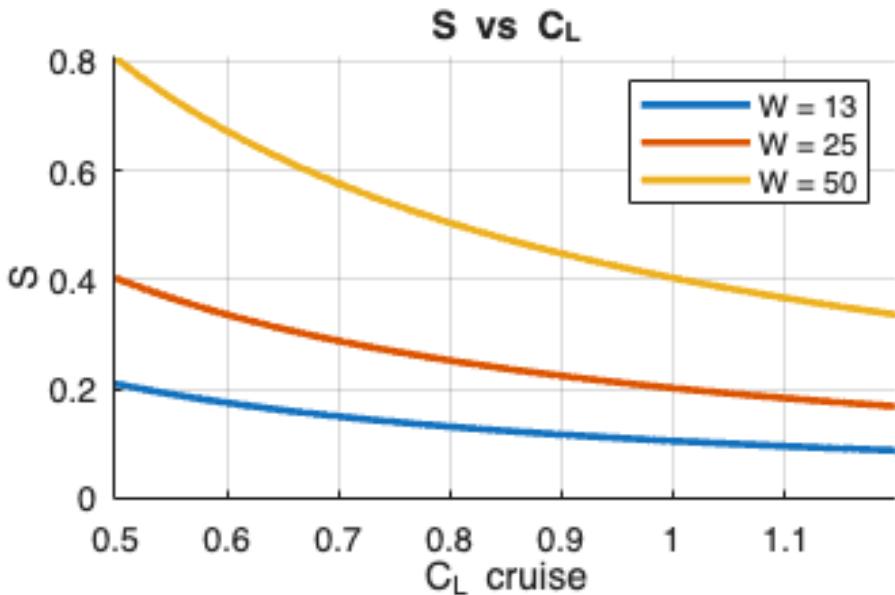
NACA-4412 Flap CFD Study

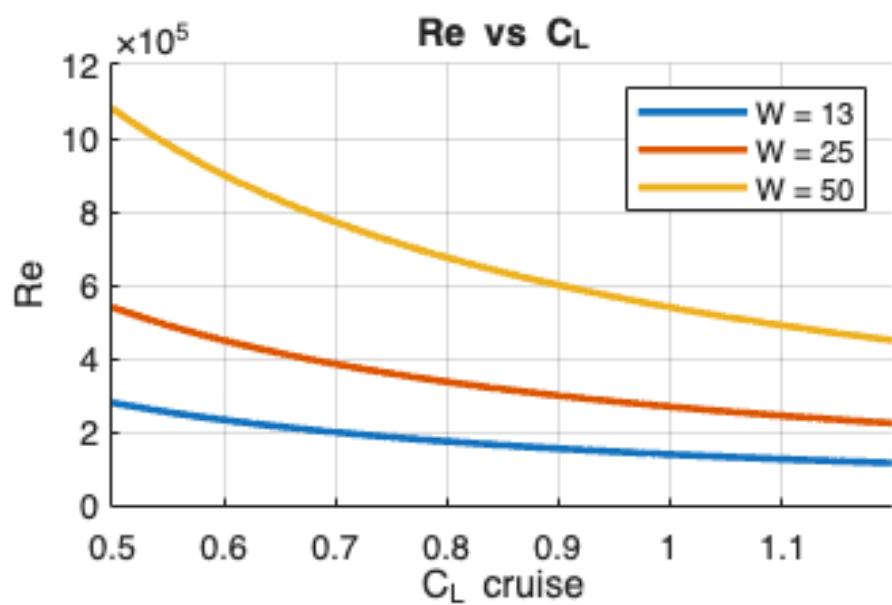
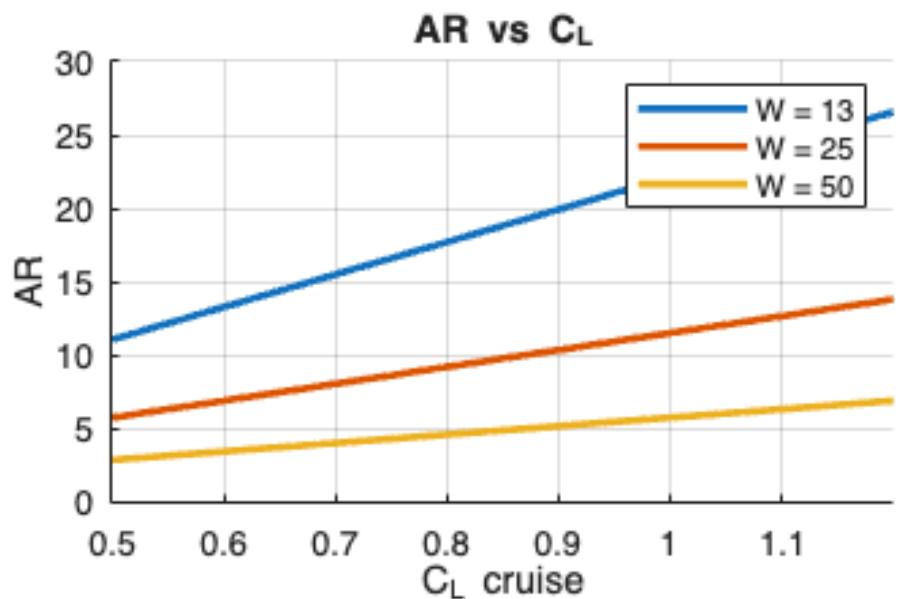
FAA Handbook

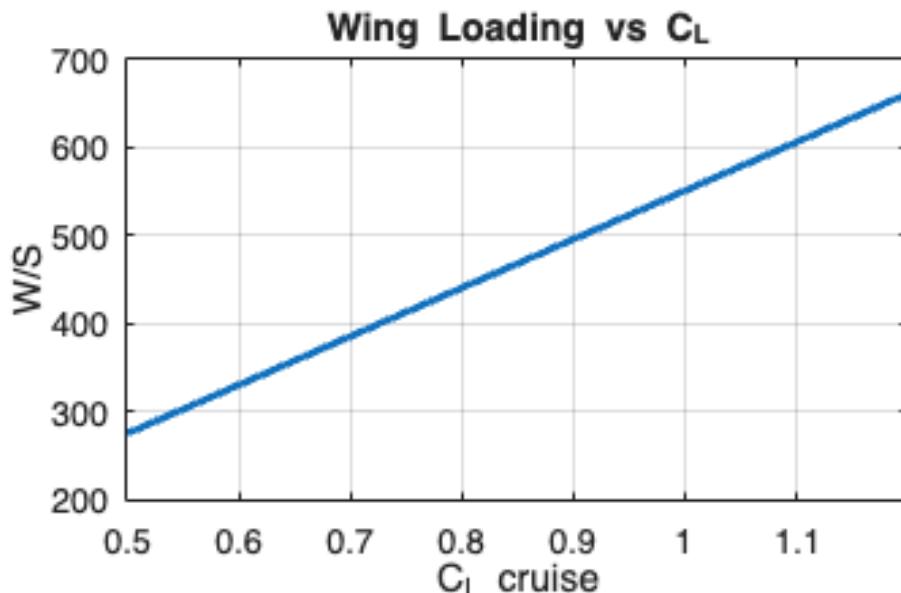
Page 488 for NACA-4412

Preliminary Calculations to Determine Chord Dimension:









## Take-Off Calculations

Take-Off Calculations:

13 (lbf) = 21.0183 ft @ 13.2516 m/s Lift Off  
 25 (lbf) = 135.0707 ft @ 18.3767 m/s Lift Off  
 Cannot Take Off at 50 lbf

## Climb Calculations

Climb Calculations:

13 (lbf) = 35 m/s RoC @ 2.6126 s to Altitude  
 25 (lbf) = 35 m/s RoC @ 2.6126 s to Altitude  
 50 (lbf) = 17.9386 m/s RoC @ 5.0974 s to Altitude

## Turn Calculations

Turn Calculations:

~ ~ ~ ~ ~  
 13 (lbf):  
 Bank Angle: 78.463 deg  
 Load Factor: 5 G's  
 Turn Radius: 61.4402 ft  
 Turn Time: 1.9611 s  
 ~ ~ ~ ~ ~  
 25 (lbf):  
 Bank Angle: 74.896 deg  
 Load Factor: 3.8377 G's  
 Turn Radius: 81.2374 ft  
 Turn Time: 2.593 s

~ ~ ~ ~ ~  
50 (lbf):  
Bank Angle: 58.5909 deg  
Load Factor: 1.9188 G's  
Turn Radius: 183.7936 ft  
Turn Time: 5.8664 s

## Lap Time

1 Lap Times:

13 (lbf): 25.1637 s  
25 (lbf): 34.7206 s  
50 (lbf): -110.0935 s

## Touchdown Calculations

Touchdown Calculations:

13 (lbf): 309.4263 ft till stop  
25 (lbf): 595.0505 ft till stop  
50 (lbf): 1190.101 ft till stop