

# Rudders and preparation under the surface – Pac Cup 2018



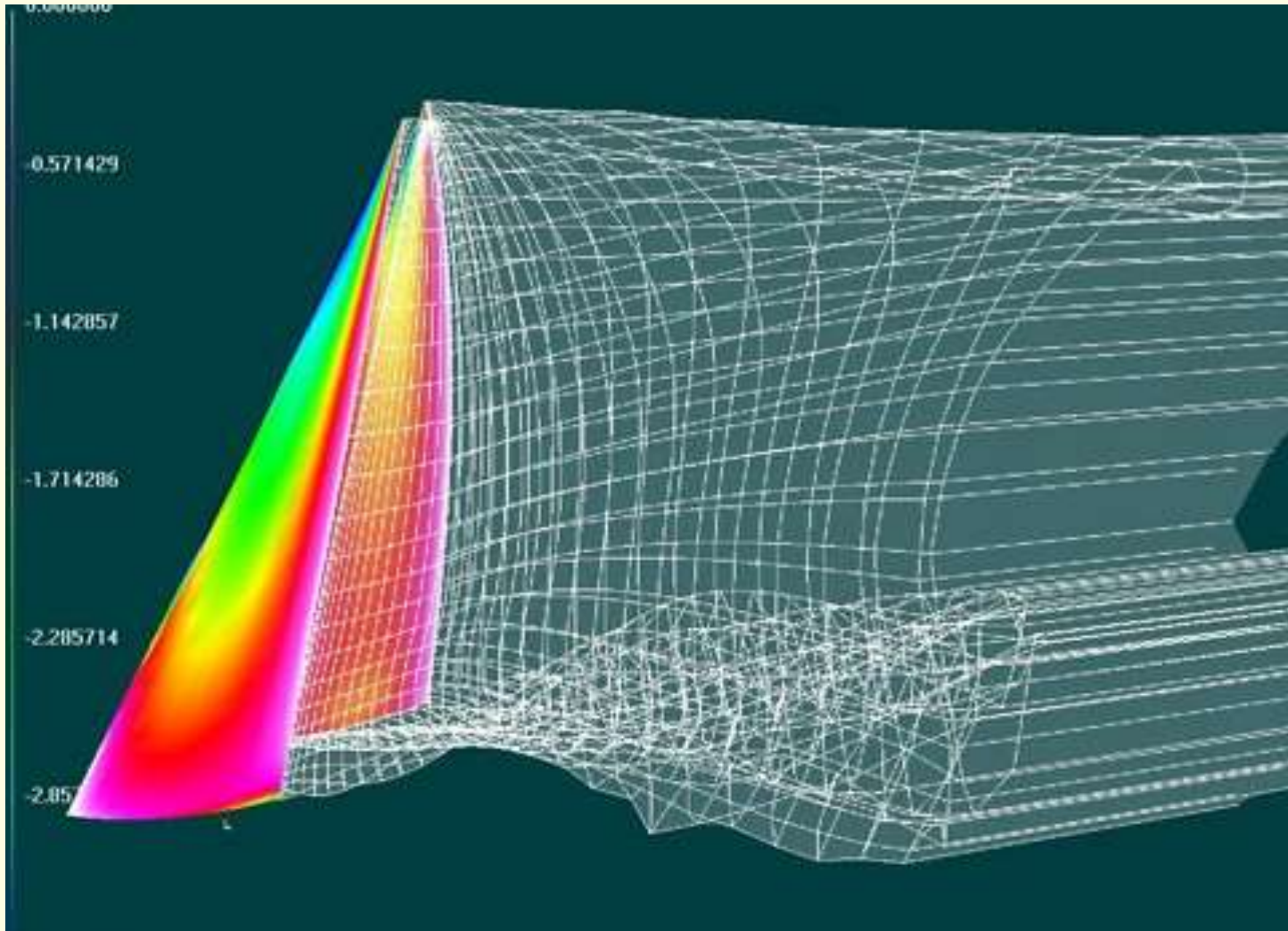
**OWEN CLARKE**  
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YACHT DESIGN - NAVAL ARCHITECTS

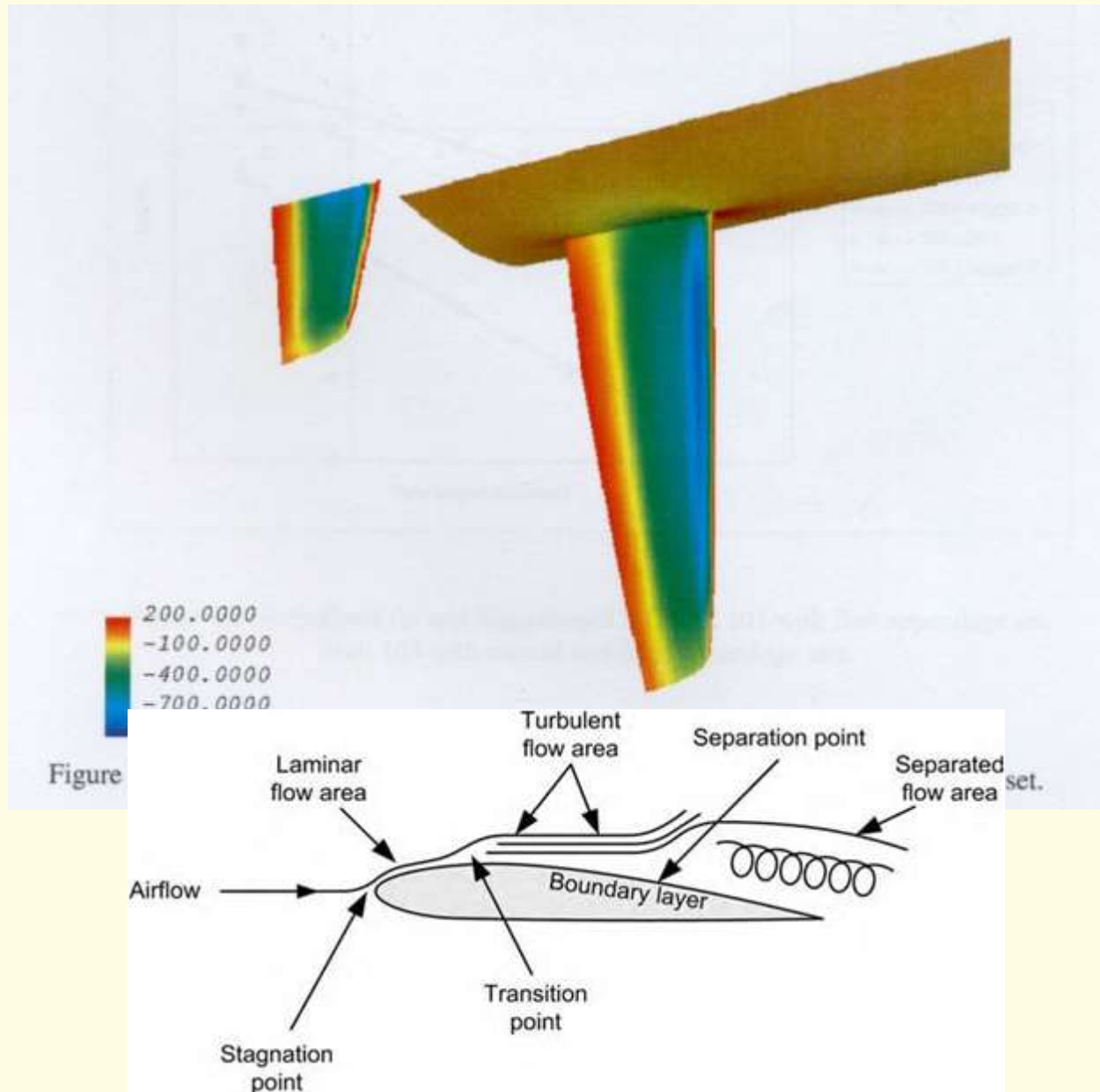
Hopefully this is not your rudder because sailboat rudders are hydrofoils



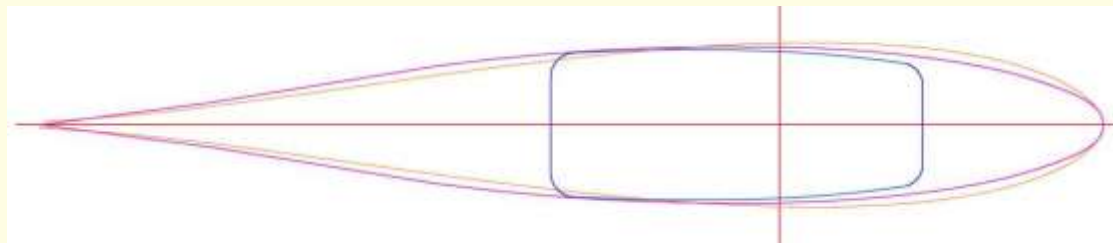
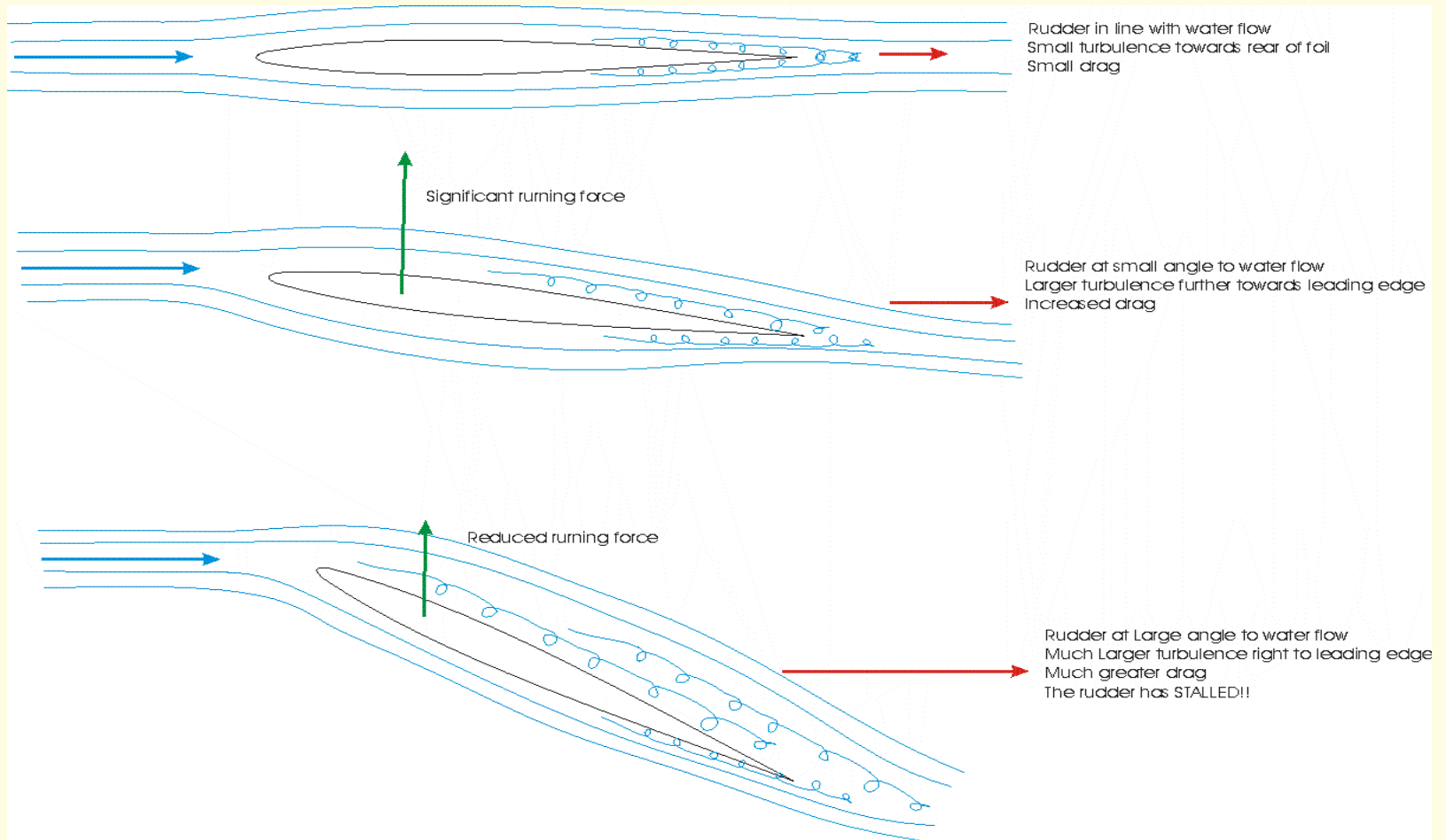
Your appendages are the 'ying' to the sail wardrobes 'yang'.  
They deserve the same level of respect and attention.



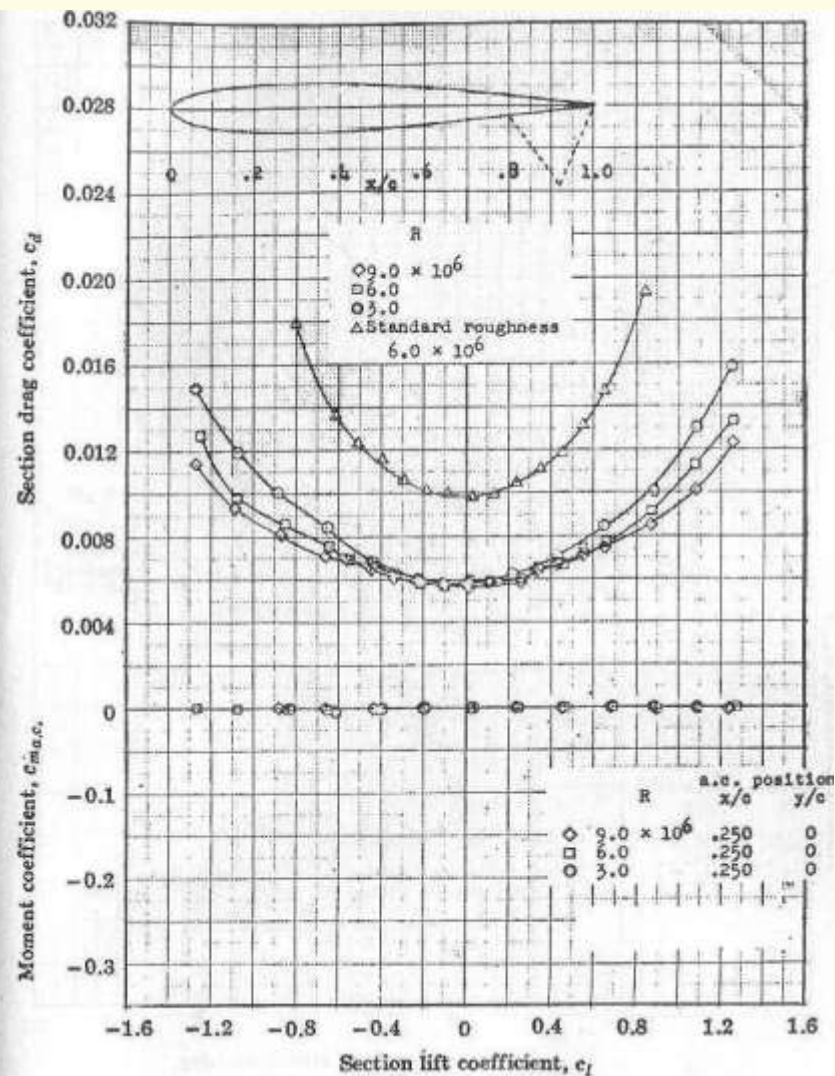
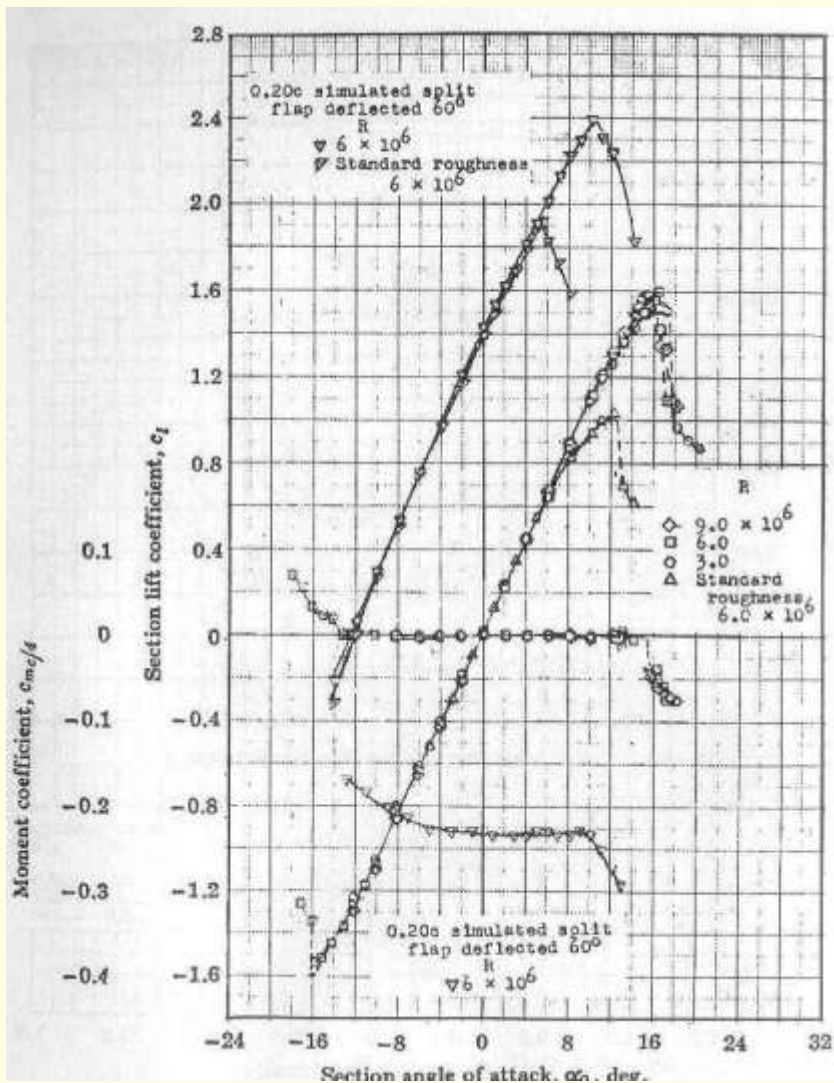
# How rudders work and quick intro to basic theory behind problems



# What flow looks like at different angles of helm and why it matters



# The secrets of the 'drag bucket' and what it means in practical terms



Poor leading edge detail = drag and early separation



Excessive gap between blade and hull = lower lift efficiency and  
Potentially exasperates ventilation issues. This is horrendous !





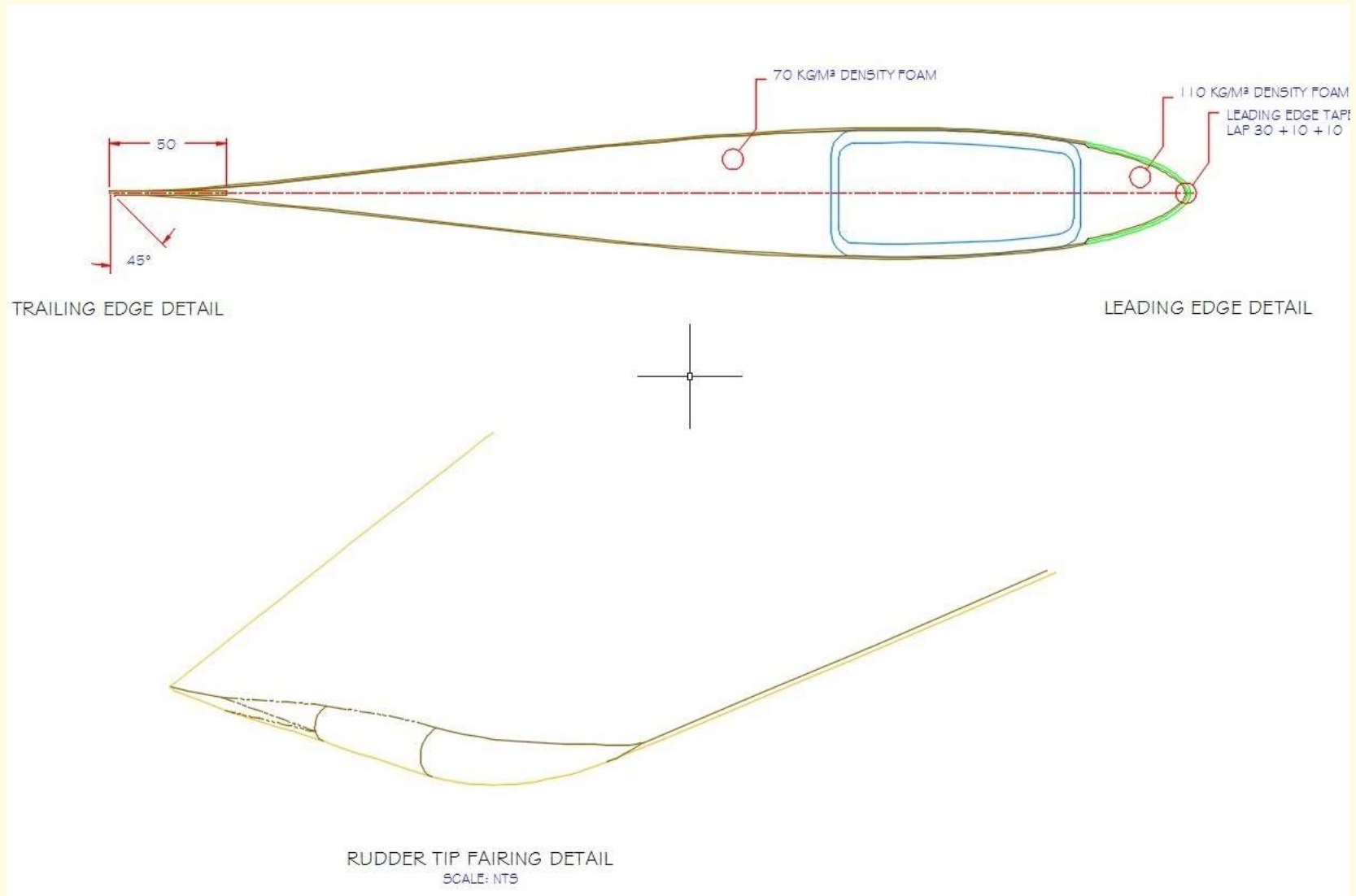
Poor surface finish leads to early onset  
of separation and additional viscous drag.



Well done ! Nice hull gap and detailing at lower bearing



# Some of the details we like to see on our boats



The only other lift appendage – for most of you.



Which is right and which is 'wrong' ?



Sail drives and P brackets are appendages too !



We all prep. our hulls – right?



A band aid for ventilation and relevant to emergency rudders





If it all goes wrong, increase drag and steer with sails



Thank you – questions now, or what other subjects should we touch on?

Have fun !

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