TAIL AERODYNAMICS

Mumbo Jumbo # 122 from the Glue Guru, as printed in the September/October issue of the Flying Aces Club News, Lin Reichel, Editor

The unending stability trauma we struggle with raises the question: does the tail do its thing properly? Does it really create enough lift to jack up the tail end of the fuselage, preventing wing stall? Or does it simply stall itself, once some small angle of incidence is passed? And in stalling, does it shrug off its stabilizing chore, thus contributing to the general chaos?

As for generating enough force, we have each learned that it's necessary to increase the tail area until it equals at least 25% of the wing area. Actually, 35% works a lot better but tends to look a bit outlandish. Still more area is rare - appearance does count and we seem to draw the line at 35%.

But even with plenty of area, and each square inch of it busy generating a corrective force, why is stall so rampant? What about tail aerodynamics?

Most of us use tail construction of the "flat plate" type - a rounded nose, no camber, and a tapered trailing edge. Exactly this section has been wind tunnel tested by F.W. Schmitz. His results (below) show a straight line response through 6 Deg. and then a fall-off of lift generation as the section stalls. However, no matter what the angle (through 18 Deg) lift never falters or declines. In short. the tail does its thing through any reasonable angle of attack. Our stability problems are not the tail's fault.

There are the usual sneaky provisos to be added here. Schmitz did his testing at a scale that is too high (Le., Reynolds number of 42,000). Perhaps our small models act differently. Yet, I rather doubt it. I believe that whatever woes we experience don't arise from failure of tail action. We must seek other villains.