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VORTEX INDUCING DEVICES

Following some auxiliary vortex Inducing Devices

- **Wing Fences**
- **Stall Wedge**
- **Saw Tooth Leading Edge**
- **Winglets**
- **Vortex Generator**

WING FENCE / STALL FENCE

- A chord wise barrier on the upper surface of the wing, called a wing fence or stall fence, is used to halt the span wise flow of air along the wing.
- During low speed flight, this can maintain proper chord wise airflow reducing the tendency for the wing to stall.
- Usually made of aluminum, the fence is a fixed structure most common on swept wings, which have a natural span wise tending boundary air flow.



STALL WEDGES / STALL STRIP

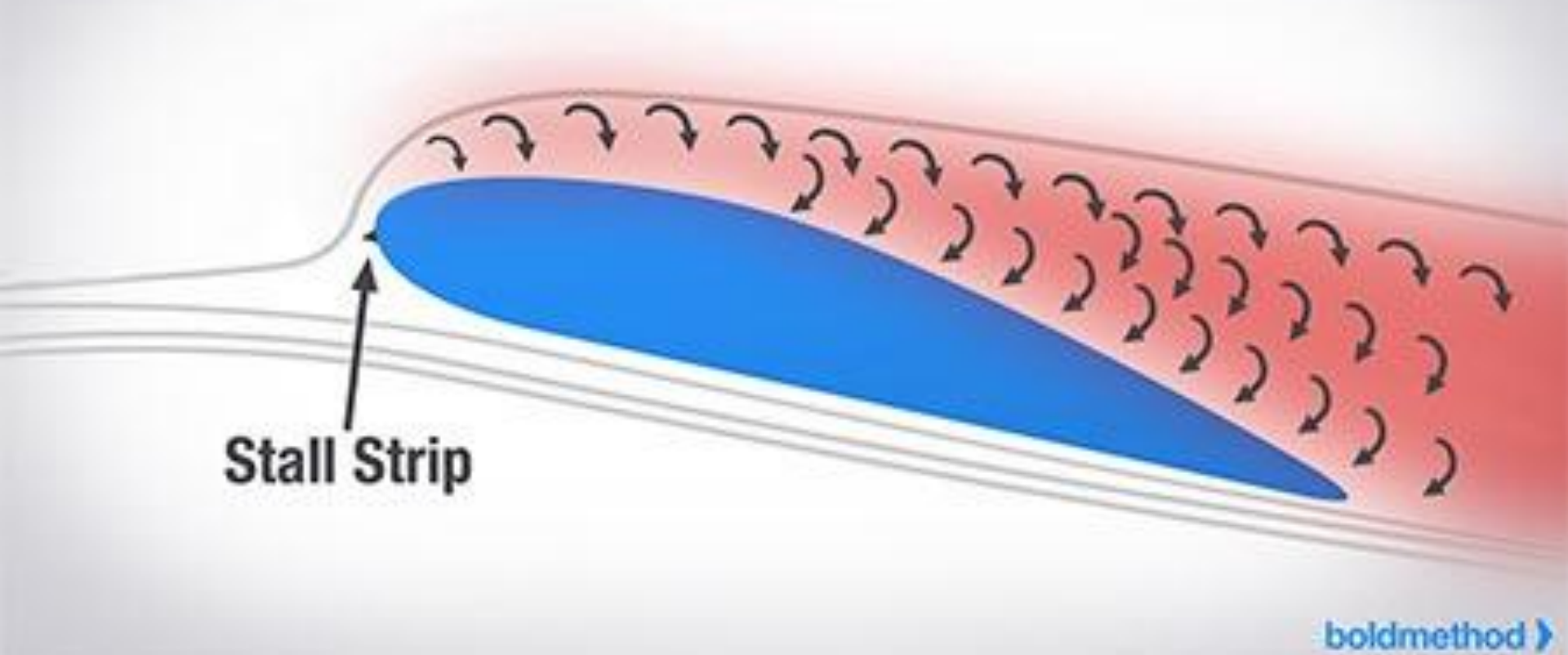
- A stall wedge or stall strip is a fixed wedge shaped strip attached span wise to the wing leading edge
- It is located on the inboard section of the wing at such a point that it causes the boundary airflow to become turbulent as the angle of attack increases to a certain point.
- This purposeful destruction of the boundary airflow as the angle of attack increases causes the root of the wing to stall first.
- Thus, airflow over the outboard wing section and over the ailerons is preserved during the stall making it easier to recover.



PLACE WEIGHT ON TAIL

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Airflow Separation With Stall Strip



SAW TOOTH LEADING EDGE

- A few aircraft have a saw tooth leading edge where, rather than being a smooth continuous surface, the leading edge juts out slightly at a point(s) determined to be beneficial by design engineers.
- The purpose of the saw tooth wing is to utilize the vortex created by an inboard section of the wing to improve boundary layer flow over an outboard section.
- This increases lift and resistance to stall. Saw tooth wing leading edges are most common on high performance military aircraft.



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WINGLET

- A winglet is an obvious vertical upturn of the wing's tip resembling a vertical stabilizer.
- It is an aerodynamic device designed to reduce the drag created by wing tip vortices in flight.
- Usually made from aluminum or composite materials, winglets can be designed to optimize performance at a desired speed.
- They use the flow of air from under the wing to create thrust thereby reducing induced drag. Significant fuel savings are also achieved.



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What is **WINGTIP VORTICES??**

- **Wing tip vortices are caused by the air beneath the wing, which is at the higher pressure, flowing over the wingtip and up toward the top of the wing.**
- **The end result is a spiral or vortex that trails behind the wingtip anytime lift is being produced.**
- **This vortex is also referred to as wake turbulence, and is a significant factor in determining how closely one aero plane can follow behind another on approach to land.**

Wingtip Vortex



Low Pressure

High Pressure

boldmethod

Wingtips reduce drag

Traditional wing

Large wake turbulence =
more drag

Wing with sharklet

Less wake turbulence =
less drag



Today's Amazing Fact

Did You
Know?

**Only 5% of Universe is made of Normal matter. 25% is
Matter & 70% Dark Energy**



धन्यवाद

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