The Effect of Sweep Angle on a Wing's Lift Force

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Today, commercial jets burn considerable amounts of fuel when taking off. A possible solution was seen in altering the shape of an airliner's wing so it produces more lift and therefore makes the plane more fuel-efficient. The hypothesis was if the sweep angle of the inner half of a standard 25-degree swept wing was reduced to 0 degrees, the wing would create more lift than the original wing. This was because more air would flow over the chord of the 0-degree sweep section than over the inward half of a swept wing, giving the new design a greater lift force. Foam wings were designed, mounted on bases, placed on a scale, and air was blown over them with a fan. The wings produced lift while on the scale, and the force they exerted on the scale would thus lessen. The difference between the initial weight of each wing and its weight as air flowed over it was measured as its lift force. The experiment showed that the 0 degree swept wing generated less lift (.0389 Newtons) than the traditional wing (.0499 Newtons). As the hypothesis was contradicted, future use of this design is not probable. Possible errors included slight differences in the span and surface area of the wings, suggesting that more testing is necessary to determine the true aerodynamic performance of the new wing design in creating lift.

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