

jeppesen guided flight discovery private pilot



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CG TOO FAR AFT

A CG located aft of the approved CG range is even more dangerous than a CG far too far forward. With an aft CG, the airplane becomes tail heavy and very unstable in pitch, regardless of speed.

CG limits are established during initial testing and airworthiness certification. One of the criteria for determining the CG range in light airplanes is spin recovery capability. If the CG is within limits, a normal category airplane must demonstrate that it can be recovered from a one-turn spin, and a utility category airplane that is approved for spins must be recoverable from a fully developed spin. The aft CG limit is the most critical factor. As the CG moves aft, stabilizer (or elevator) effectiveness decreases. When the CG is at the aft limit, stabilizer effectiveness is adequate; but, when the CG is beyond the aft limit, the stabilizer may be ineffective for stall or spin recovery. (Figure 3-34)

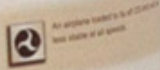
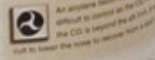


Figure 3-34. If the CG is too far aft, you will not be able to recover from a stall or spin. As a result, you will be unable to recover from a stall or spin.

As a pilot, there are certain actions you can take to prevent an aft CG position. First, make sure the heaviest passengers and baggage normally should be loaded in aft seats or compartments. The main thing you must do is follow the airplane manufacturer's loading recommendations in the POH. If you do this, your airplane will be loaded on the CG within the approved range where longitudinal stability is adequate and, at the same time, where you can control the airplane during all approved maneuvers. Two important points to remember are that CG beyond acceptable limits adversely affects longitudinal stability, and the aft CG condition is an extreme aft CG position. You will learn more about the relationship between loading to the system on weight and balance in Chapter 8.



HORIZONTAL STABILIZER

When the airplane is properly loaded, the CG remains forward of the center of pressure and the airplane is slightly nose heavy. The nose-heavy tendency is offset by the position of the horizontal stabilizer, which is designed with a negative angle of attack. This produces a downward force, or negative lift on the tail, to counteract the nose heaviness. The downward force is called the **tail-down force**, and is the balancing force in most flight conditions. (Figure 3-35)

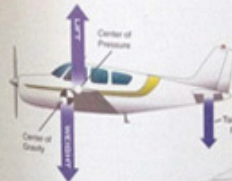
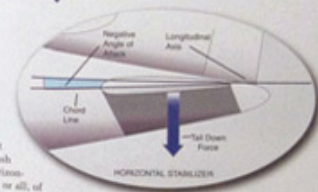


Figure 3-35. Longitudinal stability is also aided by the horizontal stabilizer which, due to a negative angle of attack, produces a downward force to counteract nose-down tendencies.



Additional forces are exerted on horizontal tail surfaces of most aircraft by downwash from the propeller and the wings. (Figure 3-36) V-tail designs are not subject to the same downwash effect, simply because the horizontal tail surface is above most, or all, of the downwash. With the exception of V-tail airplanes, the strength of the downward force on the horizontal stabilizer is related to angle of attack, speed of the airplane, and power setting in single engine propeller-driven airplanes. Any variance in the strength of the downwash, such as a power change, affects the horizontal tail's contribution to longitudinal stability.

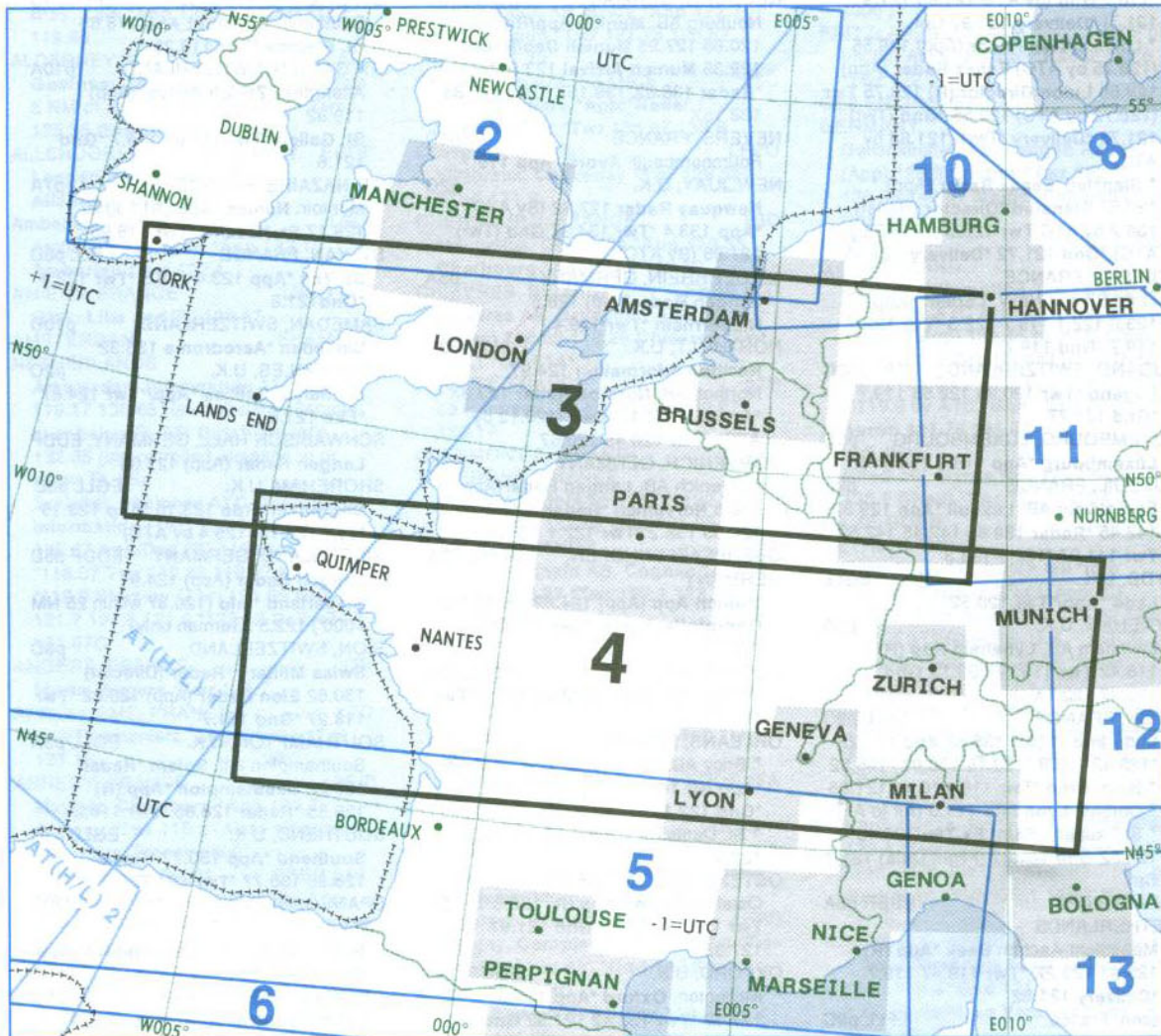


Figure 3-36. The downwash from the propeller and the wings passing over the horizontal stabilizer influences the longitudinal stability of the airplane.



**EUROPE
LOW ALTITUDE ENROUTE CHARTS**

EFFECTIVE UPON RECEIPT	
REVISION	1 OCT 10
Consult current NOTAMs and Chart Change Notices for latest information	



AIRWAYS/ROUTES/CONTROLLED AIRSPACE shown on these charts are generally effective up to the upper limits of the low airspace of each country tabulated below. U.K. lower and lateral limits of airways and controlled airspace are depicted on chart E(LO)-1, Panel 1. For Domestic ATS Routes within Switzerland refer to page ENROUTE E-29. Refer to HIGH ALTITUDE charts for operations above the upper limits of low airspace.

CHANGES

E(LO) 3 Caen VOR 'CEN' commissioned and VOR 'CAN' decommissioned, France. ATS system modified within France, Germany and United Kingdom.

E(LO) 4 Caen VOR 'CEN' commissioned and VOR 'CAN' decommissioned, France. Linate VORDME, Italy decommissioned. ATS system modified within France, Germany and Switzerland.

References. Willits, Pat. Guided Flight Discovery Private Pilot. Englewood: Jeppesen, 2007. U.S. Department of Transportation. FAR/AIM 2009. Newcastle: Aviation.

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