

Pilots should become familiar with all the operating limitations of each glider being flown. *Figure 5-18* shows four different possible conditions and the basic flight envelope for a high performance glider.

## Weight and Balance

### Center of Gravity

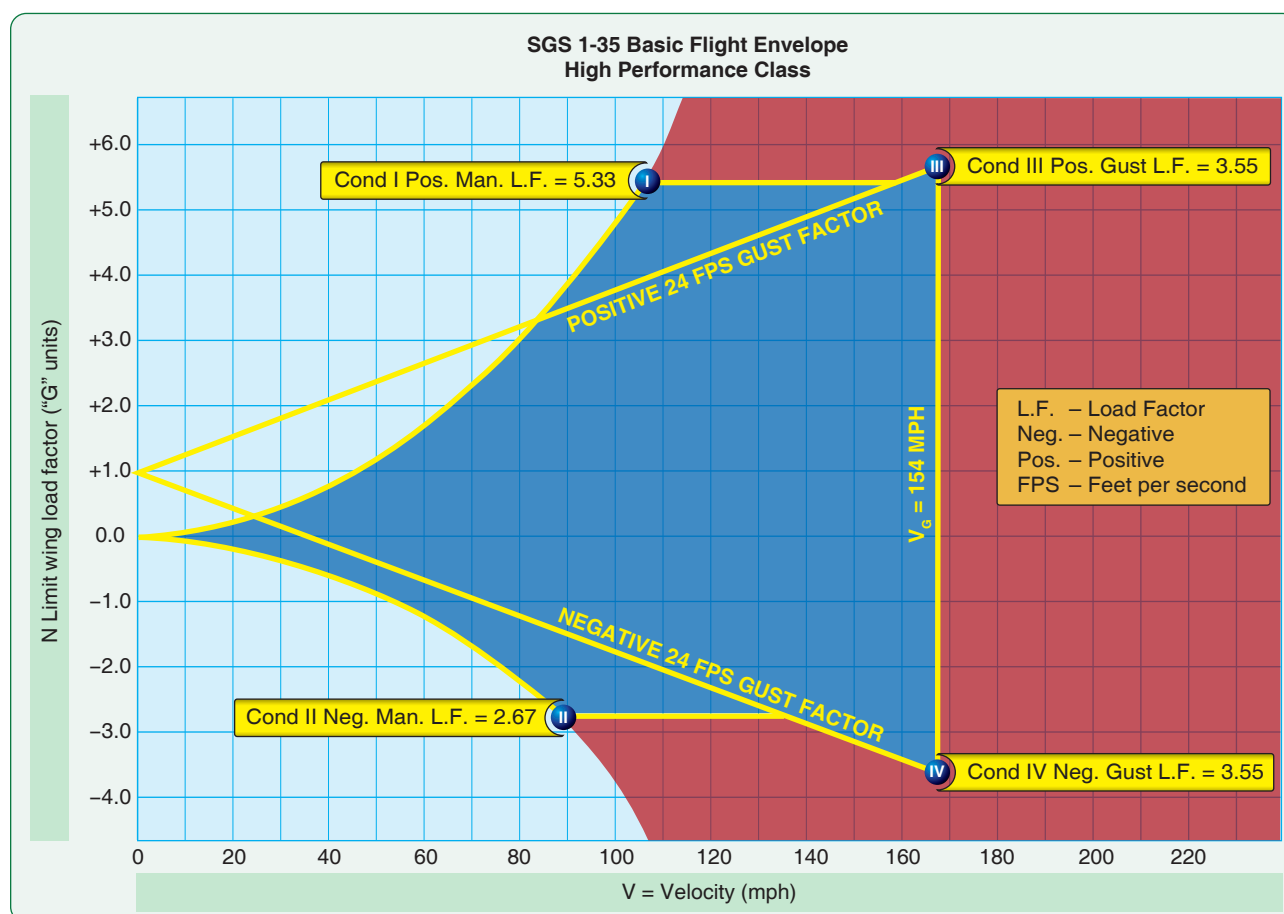
Longitudinal balance affects the stability of the longitudinal axis of the glider. To achieve satisfactory pitch attitude handling in a glider, the CG of the properly loaded glider is forward of the center of pressure (CP). When a glider is produced, the manufacturer provides glider CG limitations, which require compliance. These limitations are generally found in the GFM/POH and may also be found in the glider airframe logbook. Addition or removal of equipment, such as radios, batteries, or flight instruments, or airframe repairs can have an effect on the CG position. Aviation maintenance technicians (AMTs) must record any changes in the weight and balance data in the GFM/POH or glider airframe logbook. Weight and balance placards in the cockpit must also be updated.

### Problems Associated With CG Forward of Forward Limit

If the CG is within limits, pitch attitude control stays within acceptable limits. However, if the glider is loaded so the CG is forward of the forward limit, handling is compromised. The glider is said to be nose heavy. Nose heaviness makes it difficult to raise the nose on takeoff and considerable back pressure on the control stick is required to control the pitch attitude. Tail stalls occur at airspeeds higher than normal and are followed by a rapid nose-down pitch tendency. Restoring a normal flight attitude during stall recoveries takes longer. The landing flare is more difficult than normal, or perhaps even impossible, due to nose heaviness. Inability to flare could result in a hard nose-first landing.

The following are the most common reasons for CG forward of forward limit:

- Pilot weight exceeds the maximum permitted pilot weight.
- Seat or nose ballast weights are installed but are not required due to the weight of the pilot.



**Figure 5-18.** Typical example of basic flight envelope for a high-performance glider.