



The Basics of Flying a Glider in Aerotow

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When a pilot first learns to fly a glider during the aerotow, it can be quite intimidating. However, after only a few tows it becomes easier to determine the motion of the glider relative to the tow plane and maintain the normal tow position. This article details some of the important factors to remember during the towing procedure and a method to teach the art of flying the glider during the aerotow.

During this discussion I will refer to the "Tow Pilot Course" which can be found under "Flight Training Programs" on the soaringsafety.org website. This course is primarily for tow pilots but also has many useful tips and techniques for the glider pilot during the aerotow. Another good reference is chapter 7 of the Glider Handbook found on the faa.gov website. Other references are available and can be used to supplement the glider pilot's knowledge about aerotow procedures.

Before any aerotow can begin, FAR 91.309 (a) (5) requires that "The pilots of the towing aircraft and the glider have agreed upon a general course of action, including takeoff and release signals, airspeeds, and emergency procedures for each pilot." This briefing is somewhat generic but needs to include the minimum amount of information required by the regulation. This required briefing, along with the glider pilot's normal preflight activities, are important steps before a successful launch can begin.

The aerotow can be broken down into three phases: takeoff, climb and release.

The takeoff phase is the most critical since both the tow plane and glider are flying near the ground. This is one reason that we review the different takeoff scenarios (i.e. rope break or low altitude release) with an oral briefing on how we will fly should an emergency arise during this phase. This briefing should include scenarios both on the ground and in the air and is soaring site specific. After a low altitude release, if a return to the field using a 180° turn is used, it should be emphasized that the quality of the turn (i.e. pitch attitude and coordination) are THE most important factors when flying this maneuver. (Reference: SSF site, Flight Safety Programs, Flight Safety Videos, "Launch Failure (PT3)") It should be noted that I have not included an altitude at which this decision should be made since each launch is unique and the decision is determined by the PIC. A review of the SSA signals that may be used during this phase would be prudent. The use of a radio, if available, can also enhance the overall safety of the launch and tow. The use of a pre-takeoff checklist is imperative for the safe operation of the glider. Many takeoff accidents and incidents can be avoided when using a checklist.

It's very important to maintain the correct position during the takeoff phase to ensure the safety of both the glider and tow plane. If the glider "kites" above the normal position this may pull up on the tail of the tow plane such that the tow plane pilot may find it necessary to release the glider in order to maintain control of the tow plane. (Reference: SSF site, Flight Safety Programs, Flight Safety Videos, "The Kite") For this reason I delay teaching the takeoff until the student can maintain position during the climbing phase of the tow. This critical phase usually ends at about 300-500 feet AGL when we transition to the climbing phase. (Reference: Emergencies - page 9 and Takeoff and Climb – page 5 of the "Tow Pilot Course".)

The method that I teach during the climbing phase of the tow is for the student to recognize and react to the relative motion of the glider. If the glider is moving upward relative to the tow plane then the student needs to apply forward stick to stop that motion. If moving downward the student needs aft



stick to stop the downward motion. Likewise, if the glider is moving to the right relative to the tow plane, left stick, and coordinated rudder, is needed to level the wings and stop the movement to the right. Conversely, if the glider is moving to the left then coordinated right stick and rudder is needed to level the wings and stop that movement. The key point is to stop the relative motion first, then determine what control inputs are needed to return to the desired position.

I have found this method of recognizing the relative motion of the glider to the tow plane, and stopping that relative motion, rather than emphasizing the position of the glider, is an effective way to teach the climb phase of the tow. Once the student recognizes this relative motion then they can hold any position that they want. High tow, low tow, and boxing the wake simply become an exercise in using this relative motion concept to either maintain a different tow position or maneuver around the wake while on tow.

If you train the relative motion method then the input on the stick is always correct (i.e. if you're moving upward then forward on the stick). However, if you teach position, then half the time the input on the stick is wrong (i.e. you're low but moving upward). In this example, if the student is told to recognize the position of the glider (low) then the correct response is to pull back on the stick, when in reality they actually want to push forward on the stick to stop the upward motion. This also prevents "overshooting the position" which is sometimes perceived as "over controlling". Stopping the relative motion always results in the correct stick input. Reference: Other Airborne Non-emergency Signals – page 10, Tow Position Turn and Release page – 6

Another topic for consideration would be how to fly a cross country aerotow and the important items to review with the tow pilot before takeoff! Reference: Cross Country Aerotow – page 8.)

The last phase of the aerotow is the release phase. During this phase it is important to: 1) clear the area both to the left and right of the glider and tow plane prior to release and 2) Release with normal tension in the towrope and, after confirming that the rope has released, begin an immediate 90° climbing right turn to clear the tow plane and rope. This is a critical phase of the tow and unfortunately there have been mid-air collisions between the tow plane and glider after release because of not flying the correct procedure and not having a continuous awareness of the proximity of the tow plane after release.

This is a cursory review of the towing procedure from the glider end of the rope. This discussion is by no means a complete description of how to fly the tow. It is only meant to review some of the main concepts of flying the aerotow and pique the reader's interest in reviewing and continuing their education on this topic.