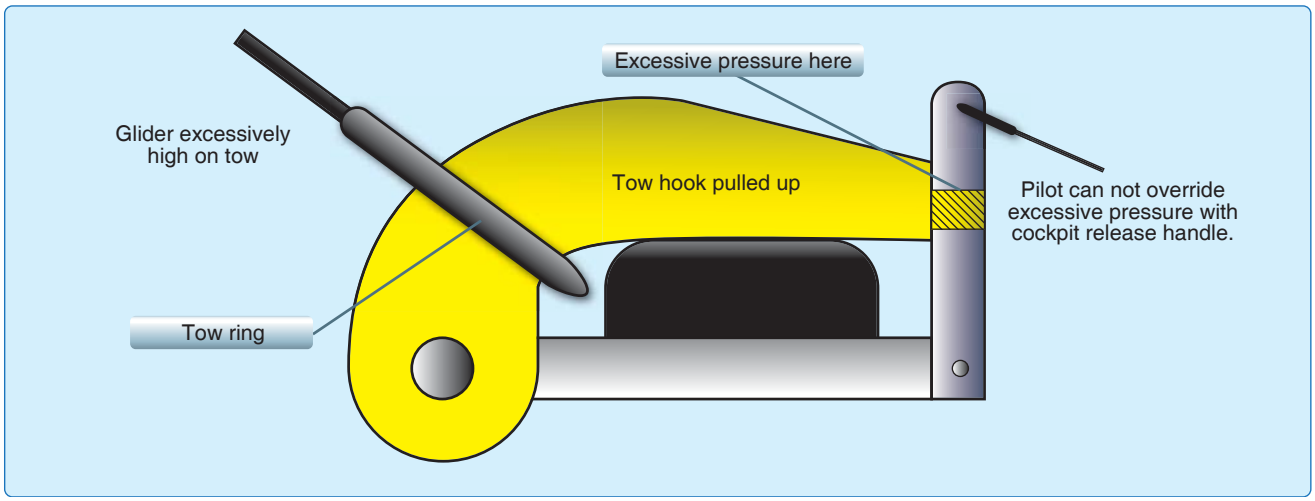

Figure 8-11 *A Schweizer tow hitch.*

once the descent has started to the gliderport/airport. The glider pilot needs to use spoilers/dive brakes to maintain the low tow position and to avoid overtaking the towplane. The tow pilot should plan the approach to avoid obstacles. The approach should be shallow enough for the glider to touch down first. The glider pilot should use the spoilers/dive brakes to stay on the runway, and use the wheel brake as necessary to avoid overtaking the towplane. Excessive use of the glider wheel brake may result in a hard landing for the towplane because the towline could slow the towplane below flying speed. Another valid method would be to stay on tow until well within gliding distance of the airport and then breaking the towline. The best experience to date suggests the procedure to break the towline would be by climbing above and diving down to develop slackline, then fully extending the dive brakes and/or spoilers to set up the overload condition as the towplane begins to accelerate without the load of the glider and the glider is decelerating due to the increase in drag. Once the towline breaks, the glider lands using the procedures of having the line attached, in case the line did not break at the gliders weak link.

Environmental factors for terminating the tow include encountering clouds, mountain rotors (area of turbulence created by wind and mountainous terrain), or restricted visibility. Any of these factors may require the glider pilot to release from the aerotow. During the aerotow, each pilot is responsible for avoiding situations that would place the other pilot at risk.

For the towplane pilot, examples of pilot error include deliberately starting the takeoff before the glider pilot has signaled the glider is ready for launch, using steep banks during the aerotow without prior consent of the glider pilot, or frivolous use of aerotow signals, such as “release immediately!” For the glider pilot, examples of pilot error include rising high above the towplane during takeoff and climb or leaving air brakes open during takeoff and climb.

The glider pilot may choose to deliberately terminate the tow/launch anytime it may appear to be a safer course of action. For example, the pilot discovers control binding once air pressure builds on the surfaces, releasing the towline is the better alternative than getting too high to stop and too low to bailout.

Towing Failures

Premature terminations of the tow have been a leading cause of glider accidents and incidents according to the Soaring Safety Foundation. Towing failure incidents related to rope breaks are not as common as other distractions in the glider cockpit. Extension of spoilers/dive brakes, unlocked canopies, and other distractions are major causes of the tow failure incidents leading to a towline break. Prevention is achieved with the proper use checklists and proper prelaunch discipline. There are five planning situations regarding in-motion towline breaks, uncommanded release, or power loss of the towplane and are listed below. While the best course of action depends on many variables, such as runway length, airport environment, density altitude, and wind, all tow failures or emergency release have one thing in common: the need to maintain control of the glider. Two possibilities are stalling the glider or dragging a wingtip on the ground during a low altitude turn.

On takeoff, all towplanes may plan to drift downwind if there is a wind present. If there is no wind or traffic, then the tow pilot should select an area on the take path/profile that has the fewest obstacles for both the towplane and glider. The tow pilot should plan to drift in that direction. This downwind drift does a few things for the glider pilot, the most important of which is that it ensures the glider has maneuverability if a

tow failure occurs. This downwind drift allows the glider pilot to complete the course reversal without the need of extensive lower altitude turns to line up on the runway, reducing the possibility of dragging a glider wingtip on the ground during a low altitude turn. The tow pilot must initiate this drift. Remember, tow pilots need to know wind direction and plan accordingly to allow the glider pilot maneuverability options.

If the towplane proceeds straight out, the glider pilot may need to make the last alignment turn at a low altitude. The first turn is the course reversal; a second turn aligns the glider with the landing area. As mentioned, the low altitude turn may be difficult or impossible to complete. Winds may compound the situation if the turn is not planned properly. Pilots under these high-stress conditions sometimes cross-control the glider, compounding the issue. Remember, keep the yaw string or ball centered.

Tow Failure With Runway To Land and Stop

If a tow failure occurs or is inadvertently or deliberately released prior to towplane liftoff, the standard procedure is for the towplane either to continue the takeoff and clear the runway or abort the takeoff and remain on the left side of the runway. If the towplane loses power during the takeoff, the tow pilot should maneuver the towplane to the left side of the runway. If the glider is still on the runway, the glider pilot should pull the release, decelerate using the wheel brake, and be prepared to maneuver to the right side of the runway. If the line breaks, is inadvertently released, or the towplane loses power after the glider is airborne, the glider pilot should pull the towline release, land ahead, and be prepared to maneuver to the right side of the runway. *[Figure 8-12, panel 1]* Pulling the towline release in either case ensures that the rope is clear of the glider. Since local procedures vary, both glider pilot and tow pilot must be familiar with the specific gliderport/airport procedures.

Tow Failure Without Runway To Land Below Returning Altitude

If an inadvertent release, towline break, or a signal to release from the towplane occurs at a point at which the glider has insufficient runway directly ahead and has insufficient altitude (200 feet above ground level AGL) to make a safe turn, the best course of action is to land the glider ahead. *[Figure 8-12, panel 2]* When flying at higher elevations, a higher altitude return may be necessary to return to the runway due to increased ground speed and air density. After touchdown, use the wheel brake to slow and stop as conditions permit. Attempting to turn at low altitude prior to landing is very risky because of the likelihood of dragging a wingtip on the ground or stalling the glider. Landing ahead and slowing the glider as much as possible prior to touching down and rolling onto unknown terrain is usually the safest course of action. Low speed means low impact forces, which reduce both the likelihood of injury and risk of significant damage to the glider. Gliders pilots should always be looking on both sides and ahead trying to plan for the best area to land in the event of a premature landing. The greater amount of altitude the glider pilot has the greater number of options that are open to them during an emergency. Landing under control is always preferable to the "perfect" landing area almost within glide distance.

Tow Failure Above Return to Runway Altitude

A downwind landing on the departure runway may be attempted if an inadvertent release, towline break, or signal to release from the towplane occurs after the towplane and glider are airborne, and the glider possesses sufficient altitude to make a course reversal, which is determined by wind crab angle, wind velocity, and glider groundspeed. *[Figure 8-12, panel 3]*

The course reversal and downwind landing option should be used only if the glider is within gliding distance of the airport or landing area. In ideal conditions, a minimum altitude of 200 feet above ground level (AGL) is required to complete this maneuver safely. Such factors as a hot day, weak towplane, strong wind, or other traffic may require a greater altitude to make a return to the airport a viable option.

The responsibility of the glider pilot is to avoid the towplane, if the tow is terminated due to a towplane emergency; the tow pilot is also dealing with an emergency situation and may maneuver the aircraft abruptly. The glider pilot should never follow the towplane down if the towplane is experiencing engine problems or engine failure.

After releasing from the towplane at low altitude, if the glider pilot chooses to make a turn of approximately 180° and a downwind landing, the first responsibility is to maintain flying speed. The pilot must immediately lower the nose to achieve the proper pitch attitude necessary to maintain the appropriate approach airspeed. If a rope break occurred in the process, the glider pilot should release the rope portion still attached to the glider to avoid any entanglement on landing with the glider.

Make the initial turn into the wind. Use a 45° to 60° bank angle as necessary to make the course reversal to the departure. This provides a safe margin above stall speed and allows a course reversal turn to be completed in a timely manner. Using a bank angle that is too shallow may not allow enough time for the glider to align with the landing area. An excessively steep bank angle may result in an accelerated stall or wingtip ground contact. If the turn is made into the wind, only minor course corrections should be necessary to align the glider with the intended landing area