

## ABOUT THE AUTHOR

Thomas Knauff is one of the most respected flight instructors in the world. He was the Federal Aviation Administration Eastern Region Flight Instructor of the Year, and inducted into the Soaring Society Hall of Fame. Tom and his wife, Doris, operate Ridge Soaring Gliderport in Pennsylvania.

He earned his Diamond badge in a Schweizer 1-26 and is the first person in the United States to fly 750 kilometer, 1000 kilometer and 1250 kilometer triangles and the first person to fly 1000 kilometers in a two-place sailplane.

Tom's list of records include a world record 1647 kilometer (1023 miles) out and return flight, and the first person to fly faster than 200 kilometer per hour on a 300 kilometer out and return speed run at 201.3 kph. He has flown the longest distance during any world championships (766 km, Uvalde, Texas 1992.) Tom has set more than fifty US world and national soaring records.

He is the author of several popular glider flight training manuals including, *Glider Basics From First Flight To Solo*, *After Solo*, *Transition To Gliders*, *The Glider Flight Instructor Manual*, and a highly modified version of *The Glider Flying Handbook*

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## PREVENTING LAUNCHING ACCIDENTS

Accidents whose causes can be traced to events before and during the launch account for approximately 40% of all fatal glider accidents.

There is a fundamental difference between takeoff and landing accidents. Landing accidents most often involve only the pilot. Before a launching accident, there are several people involved, including the wing runner, tow pilot and bystanders.

This article reviews causes of launching accidents, how to avoid them, and what to do in case you experience one of the many problems.

Accident statistics reveals glider flying is dangerous.

One of the ironies is the kind of people who fly gliders. They tend to be above average intelligence, well educated, with above average income.

Unlike typical automobile accident statistics, glider pilots are not dying because of alcohol, teenage invulnerability, late Saturday night partying, or falling asleep at the wheel. These things dominate the horrific highway statistics.

## **Flying gliders is dangerous.**

Fortunately, it is known why gliding accidents occur, and we know how to greatly reduce the risks.

We do not know how to make each pilot (you) do what is necessary to fly safely.

Studies about glider accidents show the problem is a fundamental lack of knowledge, training and adhering to common, safe practices.

Flying gliders is especially unforgiving of ignorance, errors or foolish behavior.

Alexander Pope, (1688-1744) said, "A little learning is a dangerous thing."

## **Launching Emergencies**

Focusing on launching emergencies can have the desirable side effect of reducing accidents in landings, as well as other high-risk areas of glider flying. Creating a safe mental attitude, getting others involved in "safety of flight" environment, and educating pilots, flight crews, and even bystanders, can have a profound effect on flight safety.

Launching has easily identifiable risks. Injuries should rarely occur and deaths are absolutely avoidable.

Pilots (both ends of the tow rope) should expect things to go wrong and have a plan of action when things go wrong.

The odds are 50/50 of something bad happening on each launch. Either it will, or it won't! With this attitude, a pilot would be alert to something happening, and execute the plan of action immediately.

## **What can go wrong?**

A large group of experienced pilots was asked this question and most wrote down only 8 to 10 possibilities. Here is a compiled list:

### **TAKEOFF EMERGENCIES**

1. Rope Break.
2. Canopy not latched.
3. A control not connected.
4. Wing drop (groundloop).
5. Air brakes opening.
6. Flaps in wrong position.
7. Tow plane power failure.
8. Tow speed too slow or fast.
9. Being towed too far downwind.
10. Controls hooked up backwards.

11. Tire blow out.
12. Tow rope will not release.
13. Glider becomes too high.
14. Someone or something moves onto runway.
15. Incorrectly installed component.
16. PIO.
17. Frozen or jammed controls.
18. Turbulence.
19. IMC (Icing)
20. Inability to recover from low tow position.
21. Knot in Tow rope catches on something at beginning of launch.
22. Slack rope / rope wrapping around glider.
23. Improper rope.
24. Over running the tow rope.
25. Traffic conflict / mid-air collision.
26. Wing runner error.
27. Airspeed indicator not working.
28. Altimeter not adjusted properly.
29. Tail chute opens.
30. Water ballast disconnects and spills into cockpit.
31. Snake / Bee / Wasp in cockpit.
32. Unbalanced water ballast in wings.
33. Seat belts undone.
34. Pitot / Static ports clogged.
35. Smoke in cockpit.
36. Panicky passenger.
37. Pillows / seat ballast moves.
38. Controls restricted (control locks, rudder pedals too far forward.)
39. Tail dolly on.
40. Canopy fogs up.
41. Bird Strike.
42. CG out of limits – maybe due to water or ice collected in the tail.
43. Shoe laces caught in Rudder Pedal mechanism
44. Shirt sleeve trapped in canopy when it is closed.
45. Glove catching on canopy opening mechanism, etc.

Number 46 would be, “Anything I didn’t think of.”

Recently, a tow pilot waved off a glider at the beginning of the tow at a very low altitude because he had not tightened the fuel cap and fuel was syphoning onto the windshield.

How many of the list can be attributed to an improper assembly, improper preflight inspection or improperly conducted pre-takeoff checklist?

About half.

How many could be prevented by a trained observer, wing runner, tow pilot or observant bystander?

Again, about half.

Few accidents occur when a flight instructor is in the glider. Why? Because there is someone who knows proper procedures and enforces good practices and intently watches for errors.

Each of us participating as pilot, wing runner, tow pilot or bystander can play a role by simply being observant and watching for proper practices and errors.

Many accidents occur because the pilot did not assemble the glider properly. The Critical Assembly Check has become common practice. After assembly, the pilot has another person check to see if the glider was assembled properly.

Wing runners can be trained to look for common error items such as the tail dolly being removed, dive brakes locked, flaps set in an appropriate position, canopy closed and locked, asking the pilot if a positive control check was accomplished. Check the condition of the tow rope, obstructions in the tow path and conflicting traffic. The wing runner can even be trained to observe the tow plane for evidence of oil leaks, flat tire, control locks installed, and fuel filler caps on.

An important role for the wing runner is to keep distractions from occurring while the pilot is performing the pre-takeoff checklist. Other people should be kept away and be made to be quiet.

Everyone needs to be involved in safe flight operations.

### **The Emergency**

During the launch, a pilot might perceive some anomaly. There is a strong temptation to do nothing because of the fear of embarrassment, or believing nothing bad will happen.

A pilot might have a macho reaction, believing they can handle the emergency. Or, perhaps a pilot might have a resignation reaction believing there is nothing that can be done.

An accident happened when a pilot failed to assemble the glider properly resulting in the tow plane pulling the glider nearly 2,600 feet along the ground before the glider (CG tow hook,) was literally pulled into the air by the climbing tow plane, just 400 feet from the end of the runway.

The elevator was installed in such a fashion there was no elevator control. The pilot must have had the control stick in the full aft position – far further aft than normal, and must have perceived there was something very wrong, but did not release.

After the glider was pulled into the air by the tow plane, without elevator control, the glider crashed and the pilot died. The only reason the tow pilot was also not killed was due to a legal-strength towrope, which broke. (Using an overly-strong tow rope is common practice.)

This pilot had assistance assembling his glider. He actually did an improperly performed, positive control check. Several people could have noticed the peculiar elevator position if they had only looked.

### **Plans of Action**

Pilots *must* have a prepared plan of action for any emergency.

In most cases, there are three plans of action depending on the phase of flight.

#### **Plan of Action One:**

There remains lots of runway ahead.

The plan of action when a problem is perceived early in the launch is to simply release and roll/land straight ahead. Care must be taken to stop the glider in a controlled fashion. There is a very strong tendency (fear of embarrassment?) to continue the launch rather than releasing, and investigating the problem.

#### **Plan of Action Two:**

The glider is too high to land on the remaining runway.

This plan of action will be to land in a suitable area, planned in advance, in anticipation of a possible problem. This might include an intersecting runway, farmer's field or even a planned, controlled crash into a tree row, lake or whatever. Done properly, injuries should be minimal if any.

#### **Plan of Action Three:**

The glider is high enough to return to the runway.

Performing a 180-degree turn back to the runway. (Should be practiced at least every year.) The minimum altitude should be planned before launch considering wind, glider, tow plane performance, terrain, available emergency landing areas, etc. This minimum altitude is announced aloud as the glider passes through the critical altitude.

### **The Left Hand**

Glider pilots fly with their right hand. The left hand is ready for three or four possibilities:

1. Ready to pull the release knob. General practice is to have the left hand near, but not on the release knob during the first phases of flight in case of an emergency.

2. Ready to close the dive brakes in case they are not locked before the launch commences, or accidentally open because of a rough runway surface.
3. Ready to grab the canopy in case it opens in flight.

There is often a very slight warning before the canopy suddenly opens. An alert pilot might grab the canopy frame or press on the appropriate rudder to slightly side-slip the glider through the air keeping the canopy closed. If it does open, no attempt should be made to close it until after reaching a safe tow height.

4. Moving the flap handle in case the flaps are placed in, or inadvertently move to, an incorrect setting.

When the glider is more than a few feet above the ground, in case of a PT3, it will almost always be necessary to lower the nose to a normal gliding attitude to maintain airspeed and avoid a stall. A stall from even a few feet above the ground can result in serious damage.

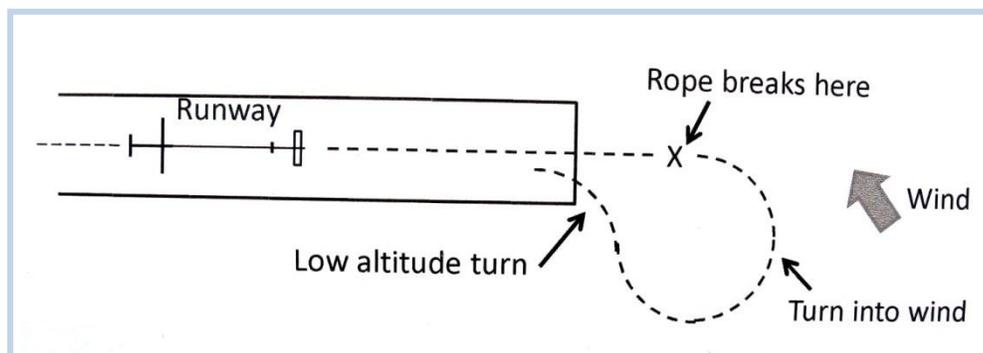
Being prepared means having a plan of action for each phase of flight. Upon reaching the critical altitude where it is safe to perform a 180-degree turn back to the runway, it is very important to announce this critical altitude aloud. Some pilots announce “200 feet” others say “Decision point.” In either case, this minimum altitude must be determined before the launch begins considering all conditions.

Pilots need to practice this low altitude emergency each year, during biennial flight reviews and club check rides.

### **The tow pilot can help.**

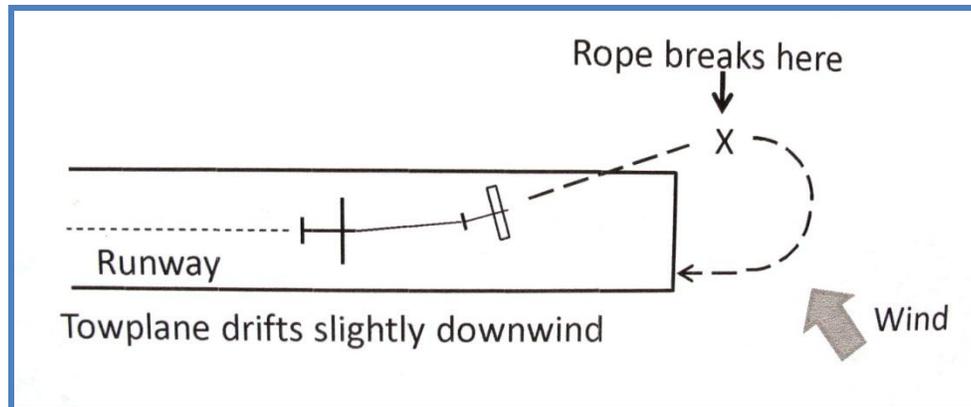
Most tows proceed along the centerline of the runway. If an emergency occurs, the glider pilot must perform more than a 180-degree turn followed by a reversing turn to align with the runway.

### **NORMAL TOW PATH**



If the tow pilot would simply allow the tow to drift downwind of the centerline of the runway, the glider would only need to make a safer, 180 degree turn.

### A BETTER WAY



Allowing the aircraft to drift downwind while on tow may not be practical at all airport environments, but even a slight drift will enhance safety.

### What we did at Ridge Soaring Gliderport

After the recent launching fatality where the pilot only had to release when it was obvious something was wrong, I began to worry about the pilots who fly at our gliderport. A little introspection led me to believe many of them would have responded the same way. Would each and every one of them recognized the risks and have specific plans of action when an emergency occurred?

Every pilot must read a “Takeoff Emergency Procedure” document before flying at our gliderport. It basically reviews the possible emergencies when launching, and suggests the three common plans of action.

After reading this document, they sign a sheet.

They then have a briefing with one of our CFI’s who basically asks, “What is your plan of action in case of a launching emergency?” The CFI makes an entry in their logbook when they have had this emergency plan briefing.

We further make it clear we expect everyone to be involved in the safety of flight operations at our gliderport. Everyone is expected to be quiet while a pilot is assembling their glider, doing their preflight inspection or their pre-takeoff checklist.

We now see pilots telling others not to be causing distractions, casually looking at other's gliders after assembly, and doing a much more professional job as wing runners. They are helping us all be safer.

### **AVOIDING THE PT3 ACCIDENT**

Expect the emergency.  
Have a plan of action.  
React instantly.  
Get the nose down to a normal flying attitude.

### **Take Time**

We take time to have lunch, take time for a coffee break; take time for numerous things during the day. Taking a little extra time to perform a proper preflight inspection, proper pre-takeoff checklist, and perform a positive control check can make the difference between life and death.

Being prepared for a possible emergency during the launch can also affect the safety of flight because of a fundamental change in attitude.

Procedures and attitudes during launch can affect landing accidents, mid-air, etc. It can make all of us think, and act, in a safer manner.

### **TAKE MORE TIME**

- How much time is required to do a thorough preflight inspection?
- How much time to do a proper pre-takeoff checklist?
- How much time to ask if someone has performed a Positive Control Check?
- Obviously, it only takes a very few minutes to do all of these important actions.

### **SAFETY OFFICER & SAFETY COMMITTEE**

An individual should be assigned the position of Safety Committee Chairman who is responsible for the overall safety procedures for flight operations.

## **REACTING TO TOWPLANE EMERGENCY SIGNALS**

You are on tow, and the towplane rocks its wings. What should you do?

This is the signal for “Release now.” It might happen that the tow pilot has perceived an emergency of some type. You see nothing wrong.

Maybe the tow pilot simply bumped the stick with a leg, or their hand slipped off the control stick, or there was a bump in the air.

What should you do?

If there is no obvious emergency and no real reason to release, it is probably best to do nothing immediately. If there is a real emergency, the tow pilot can release the tow rope.

The danger is for the glider pilot to release at a low altitude, then botch the turn back to the runway, or botch the downwind landing, and make a real emergency out of a non-event.

Radios in both aircraft are a real bonus for this situation. Don't release immediately unless there is a clear and compelling reason.

If the towplane wags its rudder, it means there is something wrong with the glider.

Almost always, the dive brakes have opened. The tow plane pilot should not give this signal unless there is a threatening problem with the resulting climb rate. If at all possible, the tow pilot should wait until a safe altitude is gained before giving the rudder waggle signal.

Many glider pilots, as well as tow pilots have not learned the signals. Generally, when receiving either signal, the glider pilot should pause, and check the dive brakes. If there is a real emergency, and the tow plane is not able to climb, the towplane pilot has the option to release the glider.

In many documented cases, the glider pilot does not understand the signal, and releases with the dive brakes open. This has resulted in the glider not being able to make a safe turn or reach the landing area.

## **MAKE A TO-DO LIST.**

Do a Critical Assembly Check before flying any glider.

Do a thorough written, Preflight Inspection including a Positive Control Check

Do a thorough written, Pre-Takeoff check list.

Enlist the aid of others.

Confirm the tail dolly and control locks are removed.

Inspect the tow rope before it is attached to the glider.

Look at the towplane as it passes by for any obvious problems.

Develop specific plans of action for the common takeoff emergencies at your location.

In the most common, and popular glider flight training manuals, *After Solo*, and *Transition To Gliders*, there is a chapter on launching emergencies. Make it a habit to read this chapter at least once at the beginning of each soaring season.

Finally, enlist others around you to be actively involved in safety of flight issues at your gliderport. If there is evidence of a lack of anything less than a serious safety attitude, discuss it among those who are involved with the flying operation.