Proposed Revision - 2009/10/25

USHPA Aerotowing Guidelines

This document serves as a supplement to and expansion of the USHPA Standard Operating Procedures pertaining to aerotowing.

Contents

- Glider
  - Assistant - Optional
    - Dolly Adjustment
    - Preflight Check
    - Connection
    - Release Check
    - Dolly
    - Launch
- Procedures
  - Tug
    - General
      - Multiple Pilots
      - Engine
      - Tow Line
      - Taxiing
      - Power
      - Traffic
    - Preflight
      - Fuel
      - Parachute
      - Warm-Up
      - Bridle
      - Mirror
      - Slack
      - Weather
      - Airfield
      - Emergency Options
      - Traffic
    - Takeoff
      - Signal
      - Power
      - Transition
      - Climb
      - Speed
      - Turns
      - Landing Options
      - Premature Separation
    - Tow
      - LZ
      - Correction
      - Oscillation
      - Separation
    - Landing
      - Engine
      - Tow Line
      - Right Of Way
    - Emergencies
      - Engine
        - Out
          - Low
          - High
        - Compromised
      - Structure
  - Glider
    - Preflight
      - Glider
      - Dolly
      - Harness
      - Lines
      - Release
      - Bridles
      - Instruments
      - Emergency Procedures
    - Takeoff
      - Dolly
      - Hold-Down
      - Slack
        - Dolly
        - Foot
      - Signal
      - Lift Off
    - Tow
      - Airspeed
      - LZ
    - Release
  - Emergencies
    - Stalls
      - Level
      - Tip
    - Yawing
    - Oscillation
    - Lockout
    - Snagged Dolly
    - Tug
- AT Accidents
  - Severity
    - Minor
    - Major
  - Tension
  - Contributing Factors
    - Launch Method
      - Foot
      - Dolly
    - Air
    - Pilot Performance
      - Glider

Equipment

Aerotowing equipment must meet standards which afford both pilots the means to launch, climb, and separate safely and reliably and with as much control as possible.

Tug

Power

The tug must have a minimum 50 horsepower engine.

Maximum Stall Speed

The stall speed during tow must not exceed 30 knots (35 mph).

Minimum Tow Speed

The tug must be able to tow the hang glider with a speed of at least 21 knots (24 mph).

Minimum Climb Rates

A climb rate during tow of 300 or, if used for foot launching to shorten the takeoff run, 500 fpm is required.

Gauges

The tug should have a visible translucent fuel tank, exhaust gas and cylinder head temperature gauges, and an airspeed indicator.

Seat Belt

Four-point seat belt restraint is strongly recommended.

Protection

A helmet and eye and ear protection should be worn.

Mirror

The mirror must be adequately sized and firmly attached (so multiples of the glider do not appear).

Weak Links

Weak links must be of sufficient strength to ensure that the glider is not left with the tow line in the event of failure.

Swivel

When a tow line is routed through a propeller shaft a possibility of a bearing seizure and resultant rapid and dangerous twisting of the tow line exists and a swivel must be installed near the tug end of the line to minimize the likelihood of releases and weak links being disabled.

Logs

Logs of hours and maintenance and repairs must be maintained and checked.

Ground Launch Vehicle (Dolly)

Stability

Pitch

By ensuring that the glider's basetube is supported at least three inches aft of the vertical plane defined by the ground contact points of the front wheels the dolly remains pitch stable enough to compensate for the normal drag of the wheels and the lifting of the keel from its support.

Roll

Roll stability is a function of the separation of the front wheels which must be a minimum of five feet.

Yaw

Yaw stability is determined by the distance between the line defined by the front wheels and the rear wheel. A minimum of six feet must separate the basetube support and the base of the rear support.

Wheels

Minimum Diameter

Wheels must have minimum ten inch diameter. The larger the wheels, the smoother the rollout and the less drag over uneven ground.

Front

The front wheels of dolly must caster to allow the dolly to follow the tug. Up to launch speed the wheels must not wobble as this action creates drag that can delay liftoff or result in a nose-over.

Rear

The rear wheel is fixed and must be aft enough to clear the harness.

Supports

Basetube

Basetube supports must be laterally adjustable and set as widely as possible to increase stability and decrease stress on the basetube while allowing safe clearance for the glider's wheels.

Rear

The rear support must be height and rake adjustable to set proper pitch attitude for gliders with different upright lengths and geometries.

Hold-Down

Hold-down lines or analogous structures are necessary to prevent premature and/or asymmetrical liftoff and must accommodate different gliders and wheel arrangements.

Tow Line

Length

Length must be between 100 and 250 feet.

Short

Short lines require fast reactions, are more conducive to lockouts, and increase the likelihood of subjecting the glider to prop wash on takeoff.

Long

Long lines may result in vertical position oscillations between the tug and glider in thermal conditions and eat into available runway length.

Material

Stretch

A low stretch line (e.g., Spectra) is required as surging is minimized and the efficiency of the tow is maximized. High stretch materials are dangerous as tow components may recoil into the propeller or the face of the glider pilot upon rear or front end release or weak link failure respectively.

Construction

Hollow braid material is recommended due to the ease with which splices are formed. The weave of the tow line and bridle extensions must be tight so as to minimize snag potential. Line of twisted construction is not acceptable as it is very likely to cause problems with the bridles and release systems at both ends.

Knots

The tow line must be kept free of deliberate and self tied knots as they weaken the line and can promote tangling.

Tow Ring

The tow ring must be selected with respect to its weight and the danger it poses to the glider in the event of a tow line failure or tug release. A carabiner is often employed due to the convenience with which it may be connected to a bridle already engaged by its release but this device must treated as a potential hazard in that it has the capability to connect to a nose wire after release and has been known to connect to a basetube during one point towing. Due to this latter phenomenon it is mandatory that a carabiner be connected to a one point bridle gate up.

Drag Device

A drag device may be employed on the end of the tow line to help keep it out of ground obstructions and reduce flailing. A parachute must not be used as it presents a danger of tangling the glider in the event of the tow line breaking or separating from the tug.

Bridles

Type

Closed

Both ends of a closed bridle remain attached to their mountings following release by means of a mechanism engaged between the bridle's apex and the tow line.

Opening

An opening bridle functions by having an end released to allow the free half of the bridle to pay through a tow ring. It has the advantage of nearly halving the tension to which the releases are subjected. It should be constructed with relatively large (3/16 inch) even or tapering diameter and stiffness and of low stretch material to reduce its likelihood of wrapping at a tow ring and must have releases at both ends to cope with that possibility. Any weak link incorporated in the top end must be configured to minimize the probability of a wrap (i.e., its bulk and loop size must be kept to a minimum).

Two Point

If the bridle is long enough to span the upper and lower attachment points of a glider towing in two point configuration it is - by definition - long enough to tie itself to the tow ring and therefore must be releasable from both ends.

One Point

A one point bridle assembly spans the releases mounted on the pilot's shoulders and can and must be short enough to preclude the possibility of wrapping.

Two Point

A two point (pilot and glider) bridle is connected to the pilot's one point (shoulder to shoulder) bridle at the bottom and usually anchored at the carabiner, control frame apex, or keel at the top. For reasons which should be obvious, under no conditions is it acceptable to configure the carabiner with its gate aft if, as is virtually always the case, the parachute bridle is anchored at that connector.

Control

It facilitates comfortable trim of the glider and allows the pilot to be properly positioned with respect to the control frame.

Length

It must be long enough such that the loading of the releases and/or mounting points does not rise much above half the tow tension. Ten feet is a good rule of thumb. Excessively long bridles present more of a problem with stowing after release.

Interface

A sailmaker's thimble must be installed in the bottom eye of the two point bridle to eliminate abrasion between it and the secondary (one point) bridle and facilitate the latter's clearance should the former wrap. In the absence of the thimble the two components constantly saw into each other during tow, their capacities become unknown quantities, and the glider becomes vulnerable to a potentially dangerous bottom end separation.

One Point

One point (pilot only) bridle assemblies span attachment points on the pilot's shoulders and may engage the tow ring or bridle apex mounted release or serve as a secondary bridle anchoring the bottom end of a two point bridle.

Control

Routing all of the tow tension directly to the pilot pulls him fore with respect to the rest of the glider and diverts nothing to aid in trim. Thus he will find himself positioned considerably fore of proper position with respect to the basetube and deprived of a substantial and potentially critical range of aft bar travel and top end speed range. As he is pulled fore when properly lined up so will he be pulled further to the leading side when yawed away from a proper track. Fast modern gliders with light pitch pressures can handle one point connections reasonably well but the pilot should be aware that the tow will be somewhat less comfortable and more difficult to keep under control.

Length

As its attachment points are so narrowly separated there is virtually no advantage in terms of load reduction in extending its length beyond 25 centimeters and thus introducing a potential for it to wrap after the release of an end (giving enough rope to hang oneself, so to speak). It is centered using a matched pair of shoulder mounted releases which themselves should extend about 35 centimeters fore from the shoulders.

Weak Links

Function

The sole function is to limit the tow force to prevent damage to the vehicle. Practically speaking, it is most important in ensuring that release mechanisms are not overloaded. It is not a device which does or can ensure that the glider remains within limits of safe control, compensate for inadequate release systems or pilot competencies, prevent a lockout and/or impact, be depended upon to keep the pilot(s) safe, or substitute for timely release actuation or decision making. Just as the reason a pilot was killed is never because his parachute didn't open, the reason a pilot was killed in a towing accident is never because his weak link was too strong.

Placement

Weak links are required at both ends of the tow line. Where bridles are considered extensions of the tow line weak links installed at both ends of the bridles satisfy this requirement.

Relative Strengths

Tow Line

For reasons of safety and convenience it is mandatory that the aft weak link(s) fail first so that the glider is not left with the tow line. A 250 foot tow line with the fore end tow ring trailing from a bridle routed over the basetube presents an absolutely lethal threat to a low flying glider.

Bridles

For the reason given below in the discussion of release actuation sequencing, when weak links are installed at the ends of two point bridles the lower must be at least 20 percent stronger than the upper. For example, when used in conjunction with a 1.4 G upper weak link one of a minimum of 1.68 Gs be employed below the tow ring. In the event that the bridle wraps the then directly loaded lower weak link will translate to slightly less than 1.0 Gs (0.97) and the glider will almost certainly separate even if the starting tension were no greater than normal.

Loading

The loading to which a weak link is subjected is dependent upon its placement.

Tow Line

A weak link installed on an end of the tow line proper will, obviously, be subjected to the full tension.

Bridles

A weak link installed on a bridle end however, is subjected to more than half of the full tension.

One Point

If the apex angle formed by the bridle is acute, as is the case with respect to a one point bridle, the increase over the halfway mark is negligible.

Two Point

Due to their widely separated attachment points, two point glider bridles should and generally do form apex angles of about 60 degrees and the bridle tension is significantly greater than half of what is transmitted by the tow line. This increase is calculated by multiplying half the tow line tension by the secant of half of the apex angle. For the purposes of the glider and as an example, a tow line tension of 400 pounds translates to 200 pounds multiplied by the factor of 1.15 and results in 230 pounds of bridle (weak link) tension. Working backwards, a 200 pound weak link will fail at a tow line tension of 348 pounds which is calculated by dividing the weak link strength by 1.15 and doubling the result.

w=t*1.15/2

and

t=w/1.15*2

where t and w are tow line and weak link tensions respectively.

Tug

Tug bridles normally remained attached at both ends, need and can not be stowed when an end is separated, and thus can be and generally are long enough to form an apex angle acute enough to make the increased loading issue fairly negligible.

Glider Rating Recommendations

1.4 Gs is recognized as the "sweet spot" for weak links. At much below that figure the probability of dangerous and expensive premature breaks increases. Above that releases and other equipment may be loaded and stressed unnecessarily. Small gliders tend to be able to handle G loading better than larger ones and, hence, could handle higher weak link ratings.

Releases

Load Range

A release must be effective at tension ranging from zero to one and a half times the point at which an appropriate weak link will fail.

Tow Deviation

A release must be effective with the tow pulling 60 degrees laterally and vertically.

Actuator

Glider Control

Any release system whose actuation requires that a hand be moved from the normal control position is as dangerous and unacceptable as would be a motorcycle braking system which would require relinquishment of a grip on the handlebars for the same obvious reason. However, because of the difficulty and tradeoffs involved in designing one point glider releases with slack line, hands free capability, the rare frequency of slack line events, the even rarer frequency of occurrences in which these events are dangerous, and the greatly reduced likelihood of a momentary sacrifice of grip resulting in a significant control compromise in the absence of line tension, it is acceptable for one hand to be briefly moved from control position to assist in effecting release in a slack line situation.

Security

It is not acceptable to configure an actuator such that it causes an automatic release as there are many circumstances in which being involuntary separation will be lethally dangerous. Separation within a safe loading range must only occur as consequence of pilot judgment and action.

Interference

A lever mounted on the basetube in such a manner that it can snag a bridle is dangerous and unacceptable.

Configuration

Two Point

Two point releases have been developed which are actuated by means of a control frame mounted loop around a hand and a button held between the fingers.

One Point

One point releases have been developed which are actuated by means of a mechanism, lanyard, or trigger line held between the teeth or loop mounted on the basetube.

Actuation Sequence

Releases at the bottom end of a two point bridle are SECONDARY releases designed to cope with a bridle wrap and should never be considered BACKUP releases which one might expect to use to compensate for an unreliable primary (upper) release. Viewing them as such and/or deliberately releasing from the bottom end first is a dangerous practice which has resulted in fatal instances of gliders tucking and failing under negative loading following bridle wraps. Should the glider pilot experience a primary release failure he should respond as follows.

Tug Release

If the situation is not time critical continue the climb to a safe altitude if necessary, signal the tug to release, and drop the tow line after actuating the secondary release.

Weak Link

If locking out at a safe altitude altitude take no action and allow the weak link to fail.

Secondary Release

If time, altitude, and circumstances permit no other options actuate a secondary release and hope that the bridle clears the tow ring or the weak link fails or the tug reacts quickly enough if it doesn't.

Personnel

Signals

In addition to the relevant FAA standardized glider towing signals, all personnel must be familiar with the following conventions.

Takeoff

Wag rudder, elevator, or trike wing.

Release

Wave left arm up and down.

Pilots

Tug

Turn Requirements

Practice engine outs to determine your most efficient 180 degree recovery. At altitude (2000 feet or above), climb at 600 fpm, throttle back to idle, descend, actuate the release, turn 180 degrees, and note altitude loss. Know what your minimum requirements are BEFORE you must perform one in an emergency.

Control

Practice for loss of control options, if applicable. Fly and, in smooth conditions, land with rudder only and ailerons only.

Glider Pilots

Only experienced tug pilots should tow inexperienced glider pilots. The latter and any pilot on a glider to which he is unaccustomed are more prone to oscillation at launch. While it is not the responsibility of a tug pilot to evaluate glider pilots, it is in the best interest of all to use discretion.

Glider

Pilots below Advanced skill level should learn by first towing tandem, then with a novice glider in calm conditions. Advanced pilots should learn on an intermediate glider in smooth conditions, then progress to more challenging gliders and conditions.

Assistant - Optional

Dolly Adjustment

Check glider pitch attitude.

Preflight Check

Assist the pilot with a preflight check.

Connection

Connect the glider to the tow line.

Release Check

Inspect the release and, if applicable, ensure the pilot can move through the full control range without triggering it.

Dolly

Ensure the dolly and its front wheels are properly aligned with the tow line.

Launch

Push the dolly on initial rollout if ground resistance or inertia warrant.

Procedures

Tug

General

Multiple Pilots

Preflight upon taking control of a tug rather than trust the quality of the preflight and landings of your predecessor.

Engine

Frequently monitor gauges the entire time the engine is running, particularly during warm up. An abrupt loss of power is usually an indication that this procedure was not followed.

Tow Line

Maintain contact with the release actuator at any time the tug is moving on the ground at significant speed or aloft - keep two fingers on the lever or the toe of your shoe over the pedal, as applicable.

Taxiing

Avoid subjecting gliders to prop wash.

Power

Do not reduce power when low, regardless of the situation of the glider.

Traffic

Divide your attention between the mirror and your heading. Do not become dangerously distracted by a problem at the other end of the line. Maintain a minimum 200 feet clearance from other aircraft.

Preflight

Fuel

Check for sufficient fuel reserve. Use caution when filling in operations involving 4 and 2 cycle engines.

Parachute

Remove the safety pin. Place your hand on the deployment handle to refamiliarize yourself with its location.

Warm-Up

Bring the engine to full operating temperature.

Bridle

If applicable, check to ensure the bridle has not wrapped around the horizontal stabilizer or tail wheel. This is most likely to occur while taxiing with a long bridle during execution of a tight 180 degree turn.

Mirror

Check mirror adjustment.

Slack

Take up slack carefully when signaled.

Weather

Be alert to deteriorating conditions.

Airfield

Evaluate the airfield in terms of size, slope, condition, presence of obstacles, and bailout options.

Emergency Options

Establish a flight plan with options for emergencies.

Traffic

Verify traffic is clear.

Takeoff

Signal

Signal by wagging the rudder, elevator, or trike wing.

Power

When signaled accelerate at appropriate power.

Transition

Lift three wheels simultaneously to minimize prop wash.

Climb

Establish proper climb speed and control, if necessary, to compensate for glider position.

Speed

Do not allow the glider to get low. Increase power if any reserve remains and dive to level with or below the glider to bring it up to safe airspeed.

Turns

Turns should be avoided and shallow.

Landing Options

Keep a bailout field in range.

Premature Separation

If the glider separates leave it the remaining runway and continue climbing.

Tow

LZ

Stay within a 4:1 glide of the field. Drop the glider upwind.

Correction

Maneuver in front of the glider to help it maintain position.

Oscillation

At safe altitude reduce power to allow the glider to recover from oscillation.

Separation

Turn left after a normal release.

Landing

Engine

Plan your approach as if the engine were out.

Tow Line

Avoid approaches over people, aircraft, or any obstacles and turning low over trees such that the tow line becomes perpendicular to the tug as release may be compromised by a side load in the event of a snag.

Right Of Way

Yield to landing gliders.

Emergencies

At the first sign of a problem with the tug release or wave off the glider as your safety demands. Do not compromise your safety by looking back.

Engine

Out

Low

If landing straight ahead is the best option, stop as near the side of the field as possible to allow clearance for the glider.

High

If you are not certain you have sufficient altitude to safely turn 180 degrees, then land straight ahead or take your best option requiring the least amount of bank.

Compromised

Continue to climb, if necessary and able, to a level which will allow a safe landing.

Structure

Shut off the engine if at all possible prior to parachute deployment.

Glider

Preflight

Glider

Preflight the glider.

Dolly

Check tire pressure and otherwise preflight the dolly, load the glider, and ensure proper basetube cradles and pitch attitude adjustments.

Harness

Check parachute security, connect harness to glider, climb in harness, and ensure that leg loops, zippers, and buckles are engaged, closed, and fastened. Check parachute handle clearance as required.

Lines

Ensure that VG and pod lanyard lines are stowed so as to preclude the possibility of fouling with the dolly.

Release

Perform release checks and ensure that all are securely engaged.

Bridles

Ensure that bridles are routed properly clear of the dolly and through the control frame.

Instruments

Basetube mounted instruments present hazards to the glider pilot in terms of potential interference with free bridle movement and impact in the event of a crash. If electing to so mount them take care not to engage the dolly hold-down.

Emergency Procedures

Review emergency procedures plans.

Takeoff

Dolly

Check wheel and dolly alignment.

Hold-Down

Grasp the hold-down.

Slack

Dolly

When operating without an assistant, signal to take up slack and drag a foot to prevent the dolly from rolling.

Foot

Back up.

Signal

Check conditions and signal when ready.

Lift Off

When the glider begins to lift off the dolly, release the hold-down and climb to and remain at 10 to 15 feet until the tug starts to climb.

Tow

Airspeed

Being low and slow behind the tug is extremely dangerous below a stall recovery altitude which may translate to hundreds of feet. Should the glider find himself in such a situation he must increase his airspeed to the point at which he will remain safely above stall in the event that tension is lost irrespective of the tug's response or lack thereof and release if the tug fails to take appropriate remedial action.

LZ

It is the glider's responsibility to stay within range of the runway or other safe landing area.

Release

Maintain bank angle if the tug signals release in a turn, otherwise turn right.

Emergencies

Stalls

Level

If the glider is slow and low relative to the surface and the tug and pushes out to climb to tug level his future is immediately taken out of his hands. His life is now dependent upon the tug pilot responding correctly, the tug's reliability and capacity to maintain or increase power, the security of as many as four releases, and the integrity of the tow line and all weak links under the resultant increased tension. When the glider finds itself in such circumstances the only safe option is to remain on tow, pull in to build up a safe margin of airspeed, and release when safe to do so. The tug should respond by dropping to below glider level and maintaining or applying full power.

Tip

Power must be maintained if the glider is low, rolled, and unresponsive.

Yawing

A glider can be yawed at a surprisingly large angle away from the tug and still in good shape as long as it remains level. The glider pilot should stay level and ready to release but allow the tow line to yaw the glider back into alignment.

Oscillation

If the glider is low and experiencing a worsening oscillation problem release must be effected only as the glider is coming back from the extremity of a cycle.

Lockout

A lockout will - by definition - eventually result in the separation of the two vehicles. While in some circumstances it may be imperative for the glider to release immediately to stand any chance of survival it is quite possible for the glider to be locked out but climbing and advantaged by delaying release.

Snagged Dolly

Launch dollies can taken aloft with the glider as consequences of a misrouted tow bridle, failure to secure harness or VG lines, and securing a hold-down line to the basetube along with an instrument. The tow should be continued to allow time and altitude for corrective action.

Tug

While in all situations the tug can do much better without the glider, when low it is virtually always much safer for a glider to remain on tow. For the vehicle at the back end premature loss of tension is analogous to engine failure and there have been many crashes resulting in glider damage and minor injures and a few resulting in major injuries and fatalities because of gliders being released prematurely or inappropriately and line tensions being insufficient to pull gliders out of stalls. It is the tug pilot's responsibility to release only when he is endangered by the glider and such circumstances are extremely rare. The glider pilot is always in a better position to assess his situation and respond appropriately. When in any doubt - maintain power, optimize relative positions, and continue the tow.

AT Accidents

Severity

Minor

Minor accidents - those usually resulting in no more than bent or broken downtubes - are quite common and almost always a consequence of using weak links a half or third of the strength they should be. Additional downsides of using weak links which fail for no reason include major delays of launch lines, subjection of pilots to unnecessary repetitions of the two most dangerous phases of flights (launches and landings) and providing them with more opportunities to botch preflight procedures, and leaving glider pilots vulnerable in situations in which their lives may depend upon tow tension.

Major

Serious accidents are rare and almost always a consequence of a combination of loss of control at low altitude and the decision - usually made months or years before - to accept noncompliant equipment incapable of dealing with such a situation.

Tension

Fatal accidents can easily occur in scenarios in which the tension required to put the glider beyond the point of any possibility of recovery never exceeds the rating of a dangerously understrength weak link and pilots have died for want of tension. There is very little correlation between tow line tension and the severity of outcomes.

Contributing Factors

Launch Method

Foot

Foot launching is almost always magnitudes more dangerous than dolly launching and one should have a good reason for opting for that mode.

Dolly

Dolly launching is a virtual ironclad guarantee against launching unhooked and/or being dragged. The glider is held level, the angle of attack is limited to an appropriate range, and the commitment to becoming airborne may be delayed until a very healthy reserve of airspeed is accumulated. The pilot is at all times prone and engineering of appropriate release actuators is a simpler matter than in the analogous situation.

Air

Unlike the situation at the slopes, the decision to launch in marginal air is always a consensus of at least two people - at least one of whom is likely to be very experienced in making such assessments. Upper wind limits tend to be lower and dolly launches can handle a lot of latitude with respect to less than optimal directions, switching, and light tailwinds. The rare situations which are problematic usually involve unpredicted and violent thermal activity (monster thermals, invisible dust devils).

Pilot Performance

Glider

Glider pilots can put themselves in jeopardy by lacking the skill to control their launch and/or failing to recognize and appropriately respond to a dangerous situation or failing to properly configure and preflight the equipment.

Tug

Glider pilots can through no fault of their own can and have suffered serious consequences as a result of tug pilot actions taken and not.

Tension Loss

Premature loss of tension as a result of action taken by either pilot, a release malfunction, inadequate connection components, or understrength weak link failure can result a in serious accident. A glider in a borderline stalled condition will no longer be in a borderline stalled condition upon losing the tow.

Equipment

Through acceptance of inadequate equipment, low locked out gliders have been put in positions in which they are unable to access a release actuator without losing control. One is then left with the choice of letting go of the basetube to release and die immediately or continuing to resist and extend one's life a few more seconds while hoping that a tug release or weak link failure does the job in time. The record of success on those scores isn't very good.

Reporting

Reporting on high profile serious and fatal AT accidents has typically been abysmal with easily recorded elements critical to our understanding and ability to take remedial action regarded as irrelevant and completely omitted. Information which may be vital to the analysis is categorized as follows.

Air

wind direction, strength, gusts, temperature, relative humidity, barometric pressure, thermal activity

Tug

model, engine, propeller, functionality

Glider

model, size, hook-up weight (pilot, harness, glider (passenger)

Bridle

configuration (two or one point), attachment points, length

Release(s)

type, placement, operational load capacity, actuation device and location (port or starboard if applicable, evidence of attempted or successful use or failure, bridle wrap

Weak Links

types, strengths, ratings - glider AND tug, placements, status (intact or failed)

Tow

elapsed time, altitudes, relative positions, roll rates, directions, and degrees, oscillations, timing of release or weak link failure

Pilots

qualifications, experience, tandem positions

Incidents

MANY incidents which undoubtedly would be fatal shortly after takeoff are of no consequence because they occur well out of striking range of the surface. The bulk of these potentially lethal losses of control occur at altitude for three reasons: there tends to be a lot more vertical movement of air, the tow spends a much higher percentage of its time, and the pilots need be and are less attentive up high. Nevertheless, any such incident, regardless of its outcome, which was contributed to by anything other than rough air and pilot reaction time should be regarded as a potential fatality and reported to USHPA in order that problem equipment and/or procedural problems can be identified and remedied.

Tad Eareckson
TadErcksn
at
aoldotcom