Safety Notice Compilation

All Pilots and Operators are required to read the enclosed Safety Notices prior to any flight or operation of WACO YMF-5 or 2T-1A-2 series aircraft

Master Document Revision: 8 September 25, 2019

WACO Classic Aircraft Corp.
15955 South Airport Road
Battle Creek, MI 49015
(269) 565-1000 | flywaco@wacoclassic.com

Safety Notice SN-001

EXCESSIVE USE OF BRAKES CAUSES ACCIDENTS

Applicable Aircraft: All Waco YMF series and Great Lakes 2T series

Issued April 6, 2011
Revised September 29, 2011

Tail wheel (conventional gear) aircraft are much more subject to "nose-over" accidents, due to main wheels becoming stuck in holes or injudicious application of brakes by the pilot or passenger. As a general rule, brakes should not be used while in the runway environment, except in case of emergency.

Tail Wheel aircraft are much more susceptible to ground looping. A ground loop occurs when directional control is lost on the ground and the tail of the aircraft passes the nose, in some cases completing a full circle. This event can result in damage to the aircraft's undercarriage, tires, wingtips, propeller and serious injury or death of occupants. Avoiding ground loops and nose over accidents requires increased pilot training and skill. Suitable training from Factory authorized instructors will help avoid this type of accident.

For a list of factory authorized instruct pilots, please contact Waco Classic at the number below.

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Safety Notice SN-002
Revised September 25, 2019

PASSENGERS INADVERTENTLY BLOCKING OR ACTIVATING FLIGHT CONTROLS CAN LEAD TO ACCIDENTS AND DEATH

Applicable Aircraft: All Waco YMF series and Great Lakes 2T series

Issued April 6, 2011

Front cockpit passengers can block or activate critical flight controls. This includes: rudder pedals, brakes, control stick, and throttle. If this action happens during any phase of flight, loss of control could occur, leading to an accident including collision with persons or objects, resulting in death, injury or damage. The pilot should carefully instruct passengers to stay clear of the flight controls prior to engine start, and authoritatively instruct them again to remain clear of the flight controls just prior to, taxi, takeoff and landing activities.

Passenger loading and unloading should never occur with the engine running or during the start up or shut down sequence. It is very possible for a passenger to inadvertently press the throttle during loading or unloading, leading to a collision with persons or objects that results in death, injury or damage.

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Safety Notice SN-003

PASSENGERS HEADS CAN BLOCK FORWARD VISIBILITY

Applicable Aircraft: All Waco YMF series and Great Lakes 2T series

Issued April 6, 2011

Heads, blowing hair, hats, and helmets worn by passengers may limit or completely obstruct forward visibility. Loss of forward visibility greatly increased the opportunity to not see traffic, obstructions, or runway centerline. Loss of visibility could lead to an accident causing serious injury and death. Passengers should be instructed to sit low in the seat, keep hair and hats secured and under control.

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Safety Notice SN-004

CROSSWINDS HAZARDS

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 6, 2011
Revised September 29, 2011
Revised September 30, 2011

Crosswinds of any speed may add to landing and takeoff difficulty. Waco Classic does not provide a cross wind limitation for aircraft; this limitation should be established by each pilot based on his or her operating experience with the aircraft. Poor decision-making regarding crosswinds could lead to an accident causing serious injury and death.

Tail wheel aircraft (Conventional landing gear) are more difficult to taxi during high wind conditions, due to the higher angle of attack on the wings. They also suffer from lower crosswind capability and in some wind conditions may be unable to use crosswind runways or single-runway airports. Careful flight planning should be undertaken to avoid landing and takeoff conditions that exceed the pilot's skill level.

Tail wheel aircraft require more training time for student pilots to master. Failure to receive proper training and maintain a high level of proficiency may lead to accidents and death of pilot and passengers.

Recurrent training is offered by WACO Classic Aircraft, and can be arranged by calling WACO Classic at (269) 565-1000

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Safety Notice SN-005

LOW ALTITUDE OPERATIONS

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 6, 2011
Revised April 22, 2016

At low altitudes, there are many obstacles to avoid and there is a lower margin for error. Recognizing the risks and hazards of low-level flying is critical of safe flight. For most private pilots, there is generally no reason to fly at low levels, except during takeoff and landing.

Collisions with towers, building, balloons or other structures can happen while operating at low altitudes leading to serious injury and death.

Pilots are required to follow applicable FAA regulations regarding altitudes and obstruction clearances.

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Safety Notice SN-006

Securing Baggage Door

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 6, 2011

If the rear baggage door is not properly closed and locked, it could open in flight and it, along with the contents of the baggage compartment, could depart the aircraft, potentially jamming, damaging or disabling flight controls that could lead to a fatal accident.

Verify that the baggage door is closed, locked, and secure before each flight.

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Safety Notice SN-007

Smoke System Operations

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 6, 2011

Many Waco aircraft have been fitted with Smoke Systems for visual identification or air show purposes. As a general rule smoke oil should only be applied to the exhaust stack with the engine running at full throttle. Operations at lower throttle settings could result in incomplete smoke oil combustion, leading to a fire, severe burns to the aircraft and occupants, and death.

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Safety Notice SN-008

Hot and High Operations

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 6, 2011

In aviation, hot and high refers to high ambient temperature combined with a high airport elevation that may compromise an aircraft's ability to operate safely. Air density decreases with increasing temperature and altitude. Lower air density reduces the amount of lift generated by the wings of an airplane, which may hamper an aircraft's performance, or in some cases, prevent it from becoming airborne at all. The reduced air density also harms the performance of the airplane's engine, compounding the effect. These conditions may so greatly impact the aircraft performance that an accident may occur leading to death, injury or damage.

Negative effects of high and / or hot conditions

- Airplanes require a longer takeoff run, potentially exceeding the amount of available runway.
- Low air density hampers an aircraft's ability to climb. In some cases, an aircraft may be unable to climb rapidly enough to clear terrain surrounding a mountain airport.
- Some aircraft, particularly light general aviation airplanes, have service ceilings so low that they may stall simply trying to maintain level flight. In some cases, aircraft have landed at high-altitude airports by taking advantage of cold temperatures only to become stranded as temperatures warmed and air density decreased.

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Safety Notice SN-009

Cold Weather Operations

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 6, 2011
Revised December 2, 2011
Revised April 22, 2016

Operation in very cold weather may be detrimental to both aircraft and occupants. As the Waco is an open cockpit airplane, cockpit temperatures and wind may cause frost bite or other injuries that could compromise the pilot's abilities to safely fly the aircraft, or subsequently cause serious injury to pilot or occupants. Care should be taken to ensure that all occupants are properly protected from the effects of cold weather.

It is recommended that aircraft use lower viscosity oil in colder weather. Many of our Waco YMF-5 owners use Aeroshell 100W in summer months, and then switch to Aeroshell 80W for cold weather operations. Another option is to use multi-grade oil, like Phillips XC 25W/60.

Great Lakes by WACO owners please reference manual for proper oil selection.

On a maintenance note, it is NOT recommended to start and run the airplane for only a few minutes then shut it down and put it away. It is best to fly the airplane at operational temperatures for at least 20 minutes. The engine oil temperatures must be within the green operation temperature range to perform any flight activates. Reference Safety Notice: SN-035

Keep those batteries charged! Use of a high-quality charger like the 'Battery MINDer" (available from WACO) is recommended to keep the battery topped off. DO NOT USE charging systems that are not specifically designed for charging aircraft batteries. A battery that is not kept at a full state of charge will shorten battery life. Also, a fully charged battery will improve starting performance during cold temperatures. A fully charged battery will reduce wear and tear on the starter and alternator.

Flight below 32 degrees Fahrenheit is not recommended.

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Safety Notice SN-010

Post Crash Fires

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 6, 2011
Revised April 22, 2016

There have been a number of cases where general aviation aircraft occupants have survived an accident only to be severely burned by fire following the accident. To reduce the risk of injury in a post crash fire, it is strongly recommended that a fire-retardant Nomex flight suit, gloves and hood or helmet be worn by all occupants.

Nomex flight suits and accessories are available from a number of sources, including:

- Gibson & Barnes www.flightsuits.com
- Aureus International www.aureusinternational.com
- BDU www.bdu.com
- Advantage Gear www.advantagegear.com

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Safety Notice SN-011

POOR MAINTENANCE

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 6, 2011

Numerous aviation accidents have been traced to poor maintenance performed by improperly or poorly trained mechanics or service technicians. Waco Classic recommends that all mechanics servicing Waco Aircraft receive training from Waco Classic service personnel.

Training is available at the factory in Battle Creek or other locations and can be scheduled by calling the Waco Classic service manger at the number below.

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Safety Notice SN-012

NIGHT FLIGHT AND/OR BAD WEATHER CAN BE DEADLY

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 6, 2011

Flying into bad weather caused the greatest number of aircraft accidents deaths. Weather accidents usually have three phases, and these three problems combined create a deadly situation. First the pilot flies into bad weather or deteriorating weather. Second, the pilot loses control of the airplane or descends too low in an attempt to fly under the clouds. Third, the airplane strikes an object or the ground at a high rate of speed. At night the possibility of accident greatly increases as visual clues are further degraded by the lack of light.

Flight into any poor weather conditions is best avoided. The Waco is not certified for flight into icing conditions. The Waco should never be flown in any hazardous weather including snow, freezing rain and thunderstorms.

Fatal accidents have occurred at night when the pilot attempted to fly in marginal weather after dark. The fatal accident rate during night flight is greater than during daylight hours.

When it is dark, the pilot cannot see wires or obstructions near the bottom of clouds, nor low hanging scud or fog. Even when he does see it, he is unable to judge its altitude because there is no horizon for reference. He doesn't realize it is there until he has actually flown into it and suddenly loses his outside visual references and his ability to control the attitude of the aircraft.

Be sure you NEVER fly at night unless you have clear weather with unlimited or very high ceilings and plenty of celestial or ground lights for reference.

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Safety Notice SN-013

FLIGHT CURRENCY and TAIL (Conventional) WHEEL AIRCRAFT

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 6, 2011
Revised September 29, 2011
Revised September 30, 2011

Pilots of tail wheel aircraft need to maintain a high level of currency in Tail wheel aircraft flying. Flight in tricycle gear aircraft is not sufficient to maintain the skills necessary for Tail Wheel competency.

Tail wheel aircraft are much more subject to "nose-over" accidents, due to main wheels becoming stuck in holes or injudicious application of brakes by the pilot.

Tail wheel geared aircraft are much more susceptible to ground looping. A ground loop occurs when directional control is lost on the ground and the tail of the aircraft passes the nose, in some cases completing a full circle. This event can result in damage to the aircraft's undercarriage, tires, wingtips, propeller, injury to occupants and bystanders. Avoiding ground loops requires increased pilot training and skill.

Tail wheel aircraft generally suffer from poorer forward visibility on the ground, compared to nose wheel aircraft. In some cases this necessitates "S" turning on the ground to allow the pilot to see while taxiing.

Tail wheel aircraft are more difficult to taxi during high wind conditions, due to the higher angle of attack on the wings. They also suffer from lower crosswind capability and in some wind conditions may be unable to use crosswind runways or single-runway airports.

Tail wheel geared aircraft require more training time for student pilots to master. Failure to receive proper training and maintain a high level of proficiency may lead to accidents and death of pilot and passengers.

Recurrent training is offered by WACO Classic Aircraft, and can be arranged by calling WACO Classic at (269) 565-1000.

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Safety Notice SN-014

LOOSE OBJECTS CAN BE FATAL

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 6, 2011
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No objects can be stored or secured in the front cockpit. Even items secured by the seat belts may become unsecured and potentially block flight controls, leading to a fatal accident.

Unsecured items in the pilot cockpit may potentially block rudder pedals, brakes or the flight controls, leading to a fatal accident.

Before each flight perform the following:

1) Carefully inspect the front cockpit, including under the seat, for any loose objects that could block flight controls
2) Carefully inspect the rear cockpit, including under the seat, for any loose objects that could block flight controls
3) Verify the front seat belts are fastened, tight and secure against the seats, thus preventing a seat cushion from becoming dislocated and blocking controls.
4) Firmly Latch Door
5) Verify that front cockpit cover, if installed, is completely secured to the coaming.

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Safety Notice SN-015

HIGH WINDS and TURBULENCE

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 6, 2011

Flying in high winds or turbulence should be avoided, but if unexpended turbulence is encountered, the following procedures are recommended.

1) Reduce airspeed to 70 to 80 MPH Indicated Airspeed or higher to avoid stalls.
2) Tighten primary and secondary seat belts
3) Do not over control. Avoid large or abrupt control movements. Allow the aircraft to go with the turbulence, and then restore level flight with smooth gentle control inputs.
4) Do not chase airspeed, airspeed excursions are to be expected.
5) Avoid flying on the downwind side of hills, ridges or tall buildings where the turbulence will likely be the most severe.
6) Never fly into a blind or box canyon during high winds.

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Safety Notice SN-016

Flying near Broadcast Towers

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 6, 2011

Electrical system malfunctions have occurred in aircraft when flying near high intensity broadcast towers. While transmission tower location and height are marked on aeronautical charts, transmitter power is not.

Early indications of a high power radio field include strong interference in the intercom system and aircraft radio receivers. Increasing field strength may cause random illumination of warning lights and tachometer operation.

The following precautions should be taken to reduce the risk from high power radio transmitters:

- Do not fly near broadcast towers.
- Do not become distracted trying to adjust the radio or intercom to reduce interference.
- Although permanent damage is unlikely, check electrical system thoroughly following a flight through a high-power radio field.

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Safety Notice SN-017

Aerial Survey and Photo Flights – Very High Risk

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 6, 2011

There is a misconception that aerial survey and photo flights can be flown safely by low time pilots. However, there have been numerous fatal accidents during aerial survey and photo flight.

Often, to please the observer or photographer, an inexperienced pilot will slow the aircraft to an unsafe speed, resulting in a stall.

Aerial survey and photo flights should only be conducted by ell trained, experienced pilots who:

- Have at least 1000 hours pilot-in-command in aircraft, and over 250 hours in the model being flown.
- Have extensive training in low speed operation.
- Are willing to say NO to the observer or photographer, and only fly the aircraft at speeds, altitudes and wind angles that are safe and allow good escape routes.

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Safety Notice SN-018

Unusual Vibration Can Indicate Propeller / Engine Problem

Applicable Aircraft: All Waco YMF series

Issued April 6, 2011

A catastrophic propeller failure can be averted if pilots and mechanics are alert to early indications of a fatigue crack or improperly torqued prop bolts. Propeller bolts should be checked in accordance with the propeller manufactures recommendations, and whenever a change in weather occurs, i.e. hot weather to cold weather, high humidity to low humidity.

Waco Classic recommends that prior to every flight; the pilot manually checks each prop bolt as part if his/her preflight check:

1) Use an appropriately sized box wrench and attempt to move the prop bolt head (not nut) using a medium amount of force.
2) If the bolt moves, DO NOT START the engine, but have a properly trained mechanic check the propeller torque to the manufactures specifications.
3) Inspect spinner if installed, it should be tight and well secured.

If a propeller or engine is smooth on one flight but vibrates on subsequent flight, both should be considered suspect and examined by a qualified mechanic before further flight.

If a pilot senses a change in the vibrations characteristics of an airplane in flight, make an immediate safe landing. Do not attempt to continue a flight to a convenient destination.

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Safety Notice SN-019

Do Not Attach Items to Aircraft / Airframe

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 6, 2011
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Revised September 30, 2011

No items should ever be affixed to the airframe, either temporarily or permanently, without approval from Waco Classic Aircraft. This includes cameras, streamers, lights, stickers, labels, flags, bicycles, or any other items.

For engineering assistance please contact Waco Classic at: (269) 565-1000

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Safety Notice SN-020

Inadvertent Actuation of Mixture Control in Flight

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 6, 2011
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Cases have been reported where a pilot inadvertently pulled the mixture control instead of another control, resulting in sudden and complete engine stoppage. Care should be taken to properly identify the proper lever to actuate for each phase of flight. If the engine were to stop at a low altitude, sufficient time may not be available to affect a restart, resulting in a crash that could lead to injury or death.

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Safety Notice SN-021

Fuel Exhaustion Can Be Fatal

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

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Many pilots underestimate the seriousness of fuel exhaustion. Running out of fuel is the same as a sudden total engine failure.

To ensure this does not happen to you, observe the following precautions:

1. Never rely solely on the fuel gauge or the electronic fuel totalizer. These electromechanical devices have questionable reliability in any aircraft. Always record the hour meter reading each time the fuel tanks are filled.

2. During your preflight:
   a. Check the fuel level in the tanks visually by removing the fuel cap.
   b. Be sure the fuel caps are tight.
   c. Ensure that the fuel valves are full ON.
   d. Drain one cup or more of fuel from the gascolator using a clear inspection receptacle to check for fuel flow, water or other contaminants.
3. Before takeoff:
   a. Ensure that the fuel valves are full ON.
   b. Plan your next fuel stop so you will have at least 60 minutes of fuel remaining.

In flight:

4. Continually check both hour meter and fuel gauges. If either indicates low fuel, LAND.
5. Always land to refuel before the main tank fuel gauge reads less than ¼ full.
6. NEVER allow the fuel quantity to become so low in flight that the reaching an airport is not possible.

Off field landing can result in injury, property damage and death.

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Safety Notice SN-022

Power Lines are Deadly

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 6, 2011

Flying into wires, cables, and other objects can be fatal. Pilots must be on the alert for this very real hazard.

- Watch for the towers; you will not see the wires in time.
- Fly directly over the towers when crossing power lines.
- Allow for the smaller, usually invisible grounding wire(s) which are well above the larger, more visible wires.
- Constantly scan the higher terrain on either side of your flight path for towers.
- Always maintain at least 1000 feet AGL except during take-off and landing. By always flying 500 feet above the safe sector altitude (aka: Minimum Sector Altitude [MSA]), you can virtually eliminate this cause of fatal accidents.

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Safety Notice SN-023

Never Exit Aircraft with Engine Running

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 6, 2011

Accidents can occur when a pilot leaves the aircraft unattended with the engine running and the prop turning. The parking brake is not intended to be used with the engine running.

Passenger loading and unloading should never occur with the engine running or during the start up or shut down sequence. It is very possible for a passenger to inadvertently press the throttle during loading or unloading, leading to a collision with persons or objects, leading to death, injury or damage.

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Safety Notice SN-024

Flying Low Over Water is Very Hazardous

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 6, 2011

Accidents can occur while flying low over water. Many pilots do not realize their loss of depth perception when flying over water. Flying over calm glassy water is particularly dangerous, but even choppy water, with its constantly varying surface, interferes with normal depth perception and may cause a pilot to misjudge his height above the water.

MAINTAIN 1000 FEET AGL WHENEVER POSSIBLE AND AVOID MANEUVERS OVER WATER BELOW 500 FEET AGL.

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Safety Notice SN-025

Be Aware During Demo or Training Flights

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 6, 2011

Accidents may occur during demonstration or training flights when individuals other than the pilot can manipulate the controls without being properly trained and prepared.

If a student begins to lose control of the aircraft, an experienced flight instructor can easily regain control provided the student does not make any large or abrupt control movements. If, however, the student becomes momentarily confused and makes a sudden large control input in the wrong direction, even the most experienced instructor may not be able to recover control. Instructors are usually prepared to handle the situation where the student loses control and does nothing, but they are seldom prepared for the student who loses control and does the wrong thing.

Before allowing someone to touch the controls of the aircraft, they must be thoroughly trained concerning the extreme sensitivity of the controls. They must be firmly instructed to never make a large or sudden movement with the controls.

The pilot-in-command must be prepared to take control of the aircraft should the student start to make a wrong move.

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Safety Notice SN-026

Walking Into Propeller Can Be Fatal

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 6, 2011

Walking into a rotating propeller can cause serious injury or death. Every possible precaution must be taken to prevent this type of accident. The following rules should always be observed:

- Never allow anyone to approach the aircraft unless they are escorted or have been properly instructed. Shut down and stop propeller before boarding passengers.
- Always yell “CLEAR”, wait and look for persons near or approaching the propeller prior to starting.
- Once started, be aware of persons or objects near the propeller.
- Always have strobe light flashing when propeller is turning.
- Instruct passengers to establish and maintain eye contact with pilot when approaching the aircraft. This will force passengers to approach only from the side, never the nose of the aircraft.
- Instruct passengers to leave the aircraft in full view of the pilot.
- Be especially careful when landing off airports, as unseen children or adults might approach the aircraft outside of the pilot’s field of view.

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Safety Notice SN-027

Carburetor Ice

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 6, 2011

Carburetor ice can cause engine stoppage and is most likely to occur when there is high humidity or visible moisture and air temperature is below 70° F (21° C). When these conditions exist, the following precautions must be taken:

During Flight: if a drop in manifold pressure or RPM is noted apply FULL carburetor heat.

During Climb or Cruise: Apply FULL carburetor heat as required to keep CAT gauge out of yellow arc.

During Descent: Apply FULL carburetor heat as required to keep CAT gauge out of yellow arc.

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Safety Notice SN-028

Dangerous Aerobatics

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 6, 2011

All aerobatic maneuvers demand training and practice to avoid accidents. Such accidents can result in fatalities. Low-level aerobatics are extremely dangerous and should not be conducted in Waco Classic Aircraft.

Aerobatics or other abrupt flight maneuvers can also damage the engine by subjecting it to an over speed condition, depriving it of oil, or fuel, causing an engine failure and fatal crash landing.

No aerobatics should be performed in Waco Classic Aircraft without first receiving suitable training in the same aircraft by a properly qualified and rated aerobatics instructor approved by Waco Classic Aircraft.

Training is offered by WACO Classic Aircraft, and can be arranged by calling WACO Classic at (269) 565-1000.

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Safety Notice SN-029

Hydraulic Lock

Applicable Aircraft: All Waco YMF series

Issued April 6, 2011

By the very nature of its design the radial engine finds itself prone to the dreaded hydraulic or liquid lock. By gravity oil is drawn into the lower two cylinders (#4 & #5 on a seven-cylinder engine) where it pools in the combustion chamber awaiting the next start up. If the quantity of oil is small, it will not affect the start up and will either be burned in the start up (blue smoke) or be expelled as oil droplets (wet start). If, however, there is enough oil in the cylinder to contact the piston as it reaches top center, a liquid lock will occur. The piston will attempt to compress the oil which cannot be compressed, and one of several engine parts will fail. Most common is the bent link rod, but piston pins can bend, and cylinder heads have been known to crack or even separate completely from the barrel.

The owner is often unaware that a problem exists, but such an engine is headed for a catastrophic failure when the bent link rod finally flexes in two. Avoiding liquid lock is critical to safe engine operation. The first line of defense in preventing this problem is to always pull the propeller through prior to starting the engine (verify the magnetos and distributor are OFF). Even if the engine has not run for only 30 minutes, pulling the engine through is good insurance against liquid lock. Two complete revolutions of the crankshaft will take each cylinder through all of its cycles and insure that the cylinders are clear of excess oil. If, as the engine is pulled through, hard resistance is felt, STOP. NEVER pull the engine backwards (opposite to the direction of normal rotation) to clear a liquid lock. Though this procedure will often clear the oil from the combustion chamber, it merely moves the oil to the intake pipe where it is much more difficult to get rid of. The oil will sit in the intake pipe until it is drawn back into the combustion chamber by the vacuum created when the engine starts. Then you not only have a liquid lock, but also the inertia of the spinning propeller which will pull the engine through the lock and bend or break the link rod.

If Hydraulic Lock is suspected, have a qualified mechanic remove the oil and inspect the engine before the engine is run and aircraft flown. An engine failure in flight may lead to an off field leading, resulting in injury, deaths and damage. Technical assistance is available from Waco Classic at the number below.

WACO Classic Aircraft Corp.
15955 South Airport Road
Battle Creek, MI 49015
(269) 565-1000 | flywaco@wacoclassic.com

Safety Notice SN-030

Inadvertent loss of items

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 6, 2011

Passengers and Pilots alike should take extreme care when introducing any items to the airstream outside of the windscreen protected area. It is highly probable that any item (cameras, hats, video systems, cell phones, ect...) may depart the pilots or passengers grip and depart the aircraft.

Loss of an object from either cockpit may pose a hazard to both the aircraft, by blocking or jamming flight controls, and to persons or property on the ground or aircraft in trail.

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Safety Notice SN-031

Activation of Parking Brake in Flight is Dangerous

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 11, 2011

Accidents have occurred in tail wheel aircraft when a pilot activated the parking brake in flight and was unable to de-activate it prior to landing, leading to an immediate nose over accident at touchdown.

Landing or take-off accidents can lead to serious injuries and fatalities. Pilots should never activate the parking brake during any flight activity. If used on the ground (not recommended), care should be exercised to verify that it has been completely disengaged prior to any flight activity.

If the parking brakes are activated in flight and cannot be deactivated, a full stall three-point landing on a long and wide wet grass runway, into the wind, is the best scenario for limiting damage or injury. Prior to attempting to land notify emergency personnel.

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Safety Notice SN-032

PROPER TIRE PRESSURE CRITICAL

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued April 11, 2011

Accidents have occurred in aircraft when tires fail, or control is lost due to low pressure. Loss of control accidents can result in injuries or fatalities.

Recommended tire pressure for Waco YMF-5 aircraft tires:

Main Wheels (using 7.50 x 10 Air Trac): 30 psi
Tail Wheel: 60 psi

Great Lakes by WACO 2T-1A-2
Main Wheels: Check Manual
Tail Wheel: Check Manual

Tire pressure should be checked prior to each flight.

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(269) 565-1000 | flywaco@wacoclassic.com

Safety Notice SN-033

Proper attachment of Engine Cowling is Critical to Safe Flight

Applicable Aircraft: All Waco YMF series

Issued May 19, 2011

Recently, Waco Classic received a report of an engine cowling that moved forward in flight and hit the trailing edge of the propeller, causing extensive damage to both the propeller and cowling. The damage was not discovered until after landing. While the failure mode was not conclusively determined, the prevailing theory is that over the course of time, one or more bolts attaching cowl rods to the rear of the cowling fell out, leading to the subsequent failure of other cowl rods or rod attachment brackets, possibly due to corrosion and/or overloading stresses (due to the unequal loads on the rods resulting from the missing bolts). This failure allowed the cowling to move forward. Improperly attached cowlings can lead to accidents that result in injuries and fatalities. The aircraft was produced in 1997.

Pilots and mechanics should take care in properly attaching the cowling to the engine and verify that the attachment hardware and related parts are in good condition. The cowling should be removed at every oil change for a complete inspection. Keep in mind that Nylock type nuts become infective with age and use and should be replaced frequently.

During pre-flight the pilot must verify that:

- All four (4) tie rods (the rods that extend from the rocker cover bracket to the trailing edge of the cowling) are secure and tight.
- All bolts and related Nylock nuts and washers are installed at the rear split seam of the cowling, the nut should be at the bottom and washers present above the nut and below the head of the bolt. (Reference: Safety Notice SN-034)
- Four (4) Camloc stud fasteners are installed in the diamond patches, two (2) on either side of the cowling and that the diamond plates are in good condition.
- That all alignment pins are properly engaged (the pins align the top and bottom cowl)
- The front leaver locks are in good condition, properly latched and double safety wired.
- That no cracks, dents or other defects exhibit themselves on the cowling.

Any time the cowling is removed the mechanic must verify:

- Airworthy condition of all hardware, brackets, and latches.
- That all felt pads are attached and are in good condition and that no cracks, dents or other defects exhibit themselves on the cowling.

In Flight, the pilot should be aware of the position of the cowling, and take note of a change in vibration, and smells of burning wood or other non-typical odors. If the pilot receives an indication of a problem, an immediate precautionary landing should be made at a suitable airfield.

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Safety Notice SN-034

Proper use of Nyloc style nuts

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued August 3, 2011

A nyloc (nylock) nut, also known nylon insert lock nut, polymer insert lock nut or elastic stop nut is a kind of nut that includes a nylon or urethane collar insert. They are used in many locations in nearly all general aviation aircraft, including Waco YMF-5 series and Great Lakes 2T series aircraft.

As no practical method exists to track the number of times a nyloc nut is removed and reinstalled, Waco Classic recommends that service technicians discard all nuts after removal and replace with a new nut of the same part. This will help ensure the quality of the locking properties of the nut and minimize any safety issues related to a worn-out locking insert.

Reference FAA document AC43-13-1B/2A for proper use of nyloc style nuts.

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Safety Notice SN-035

Exercising your Airplane

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued September 29, 2011
Revised September 30, 2011
Revised December 2, 2011

Much like people, exercise is good for an airplane. Through surveys of customers, WACO Classic has found that some aircraft sit without running for extended periods of time; weeks, months or even years in some extreme cases. Long term non-use of your airplane may contribute to maintenance problems and shorten the service life of some aircraft systems and instruments. If flight is not possible, then WACO Classic recommends to periodically run your airplane during down periods, for a sufficient amount of time to heat the oil to a normal operating temperature and sufficient RPM (after proper oil temperatures are obtained) to charge the electrical system for 20 minutes. WACO Classic recommends that aircraft are run as described above at a minimum of once a month.

Occasional running of your aircraft will help with the following;

- Minimize engine corrosion by circulating oil.
- Maximize gyroscopic instrument life.
- Distribute oil and lubricate systems and linkages.
- Charge electrical system.
- Identifying any squawks that may prevent a safe subsequent flight.

It is critical that the airplane engine is pulled through prior to start as described in SN-029 and that the person exercising the airplane is properly trained. A well maintained and exercised airplane is a safer and more reliable airplane.

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Safety Notice SN-036

Fuel Cap Safety

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued September April 20, 2012

Several times a year WACO receives orders for replacement fuel caps that have departed the airplane in flight. Each fuel cap is attached to the tank filler neck by a retainer chain. The retainer chain is only intended to keep the cap from sliding down the wing during refueling and not to secure the cap during flight. Unfortunately, this chain also contributes to damage to the top of the tank as a loose cap that becomes detached from the filler neck will often slap against the tank skin causing extensive damage. Due to the violent nature of the flailing cap, the retainer chain will not prevent the cap from departing the airplane. Loss of an object from the aircraft may pose a hazard to the aircraft, by blocking or jamming flight controls, and to persons or property on the ground or aircraft in trail

When fueling the aircraft, fueling persons should be especially diligent to confirm that the cap is firmly against the rotation stop. Additionally, the fit should be snug and unobstructed by the retainer chain.

Some owners have marked the proper stop location with a visual line on the filler cap and neck. This serves as a visual indicator for the cap closed position. While this visual indicator is a helpful aid, physically verifying the cap is against the stops is the best method to confirm good closure.

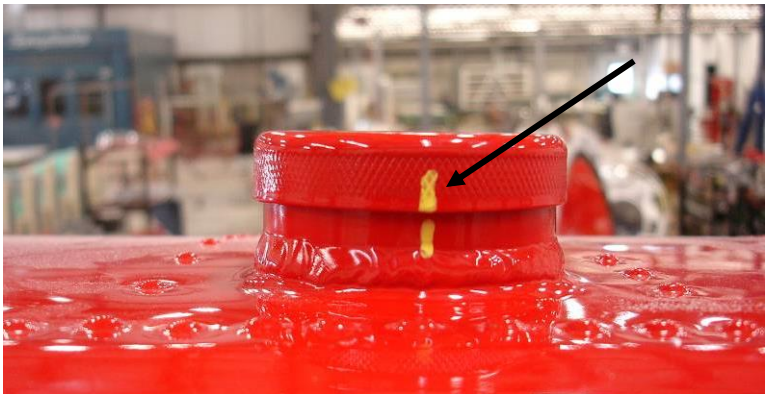

Photo above of line on fuel cap and neck at fully closed position

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Safety Notice SN-037

Obstructed Pitot and Static Systems

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued: May 11, 2012

Proper inspection of the Pitot tube is less likely to occur on the WACO YMF due to its installation location on the upper left wing. Preflight inspections should be performed to ensure that your Pitot tube and related static system are clear of obstructions and clean. Pitot tubes make cozy homes for spiders and other uninvited insects. Insects and other items can become lodged in the tube during taxi and flight causing an obstruction. An obstructed or partially obstructed tube may provide inaccurate airspeed data.

The Torpedo style tube on the Waco has static ports around the circumference of the tube body approximately 4 inches aft of the pitot tip. The Great Lakes uses a tube style pitot and static port, with the Pitot tube under the static tube. The Great Lakes Pitot tube and static port are installed on the right wing N strut. During preflight, an inspection of both the pitot and static ports should be performed.

The only factory approved pitot cover for the WACO-YMF can be found at the WACOGear.com webstore: http://www.wacogear.com/pitot-tube-cover/

Approved WACO pitot cover

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Safety Notice SN-038

Proper grounding of aircraft during refueling operations

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued: August 2, 2012

The generation of electrical static charge is a natural phenomenon that occurs to aircraft as they fly through the air. An arc produced in the presence of flammable vapors and liquids is a hazardous condition and may produce a dangerous fire or explosion resulting in serious injury and death. This may occur during the refueling process when an improperly grounded aircraft comes in contact with a refueling hose.

The only approved grounding locations on WACO Classic YMF and Waco Classic (Great Lakes) 2T-1A-2 series aircraft is the engine exhaust stacks. Care should be taken to ensure a proper electrical contact, corroded or coated exhaust stacks may not provide sufficient ground. Electrical conductivity between the exhaust stack and airframe should be periodically checked using a conductivity tester.

Under wing tie down lugs are not grounded to the airframe and should not be used for grounding purposes.

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Safety Notice SN-039

Brake System Check

Applicable Aircraft:
WACO Classic Aircraft Corp YMF series (all serial numbers)
WACO Classic Aircraft Corp (Great Lakes) 2T-1A-2 series (serial numbers: 1200 up)

Issued: May 14, 2014
Revised: May 16, 2014

A Low brake fluid level will be first noticed at the front cockpit brake pedals. The design of the system is such that low fluid levels will first manifest themselves as non-functioning front brake pedals. As fluid levels continue to decrease, the rear pedals will quickly cease to operate correctly.

A good safety check is to ask front seat passengers to check brake pressure prior to engine start. If the pedals are soft, engine start should be aborted, and no flight should occur until a comprehensive inspection and correction of the brake system is conducted by a qualified mechanic.

On the YMF, the brake fluid reservoir is located on the left side of the firewall and on the Great Lakes it's located on the right side for serial numbers 1200 and higher. The fluid level should be checked at every 100-hour inspection and every annual inspection.

As additional reference please see in the support section at the WACO Aircraft website:

Safety Notice SN-001
Safety Notice SN-002
Safety Notice SN-031
Safety Notice SN-040

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Safety Notice SN-040

Brake and Pedal Brief for Passengers

Applicable Aircraft: All Waco YMF series and Great Lakes 2T series

Issued: May 14, 2014

Accidents have occurred in aircraft when passengers have inadvertently pressed on the rudder pedals and/or brake pedals during taxi, takeoff and landing operations.

Pilots are encouraged to brief all passengers, including persons who frequently fly the airplane, to be clear of the pedals during all phases of flight and aircraft operation.

A good method to help avoid accidents is a proper pre-start, pre-takeoff and pre-landing brief.

Pre-start: After passenger(s) are loaded. Instruct passenger to check brakes (reference SN-039) then to remove his/her feet from the pedals and visually identify their location as clear of the pedal operation area.
Pre-takeoff: Instruct passenger(s) to visually verify that their feet are clear of the pedal operation area.
Pre-Landing at short final: Instruct passenger(s) to visually verify that their feet are clear of the pedal operation area.

As additional reference please see in the support section at the WACO Aircraft website:

Safety Notice SN-001
Safety Notice SN-002
Safety Notice SN-031
Safety Notice SN-039

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Safety Notice SN-041

Flying Wire Inspection

Applicable Aircraft: All Waco YMF series and Great Lakes 2T series

Issued: October 23, 2014

The name “Flying Wire” is often used as a general term used to described streamline wire rod or round rod that is used in the structural rigging of the aircraft. For clarity, “Flying Wires” (or Lift Wires) carry the load while in flight (the lifting loads). They are connected to the lower fuselage and extend upwards and outwards towards the lower outboard “N” struts of the upper wing. Whereas “Landing Wires” carry the load when on the ground, supporting the inertial loads during landing and loads during negative G maneuvers. Landing wires extend from the upper cabane (center section) strut to the top of the lower wing at the outboard “N” struts. The Flying and Landing wires are separated at their mid point by a “Flying Wire Separator Stick” sometimes called a “Javelin”. The upper center section is braced by “Center Section” wires often referred to as “Racking Wires”. On the tail, the lower wires are considered “Flying Wires” and the upper wires are considered “Landing Wires”.

Wires should be examined frequently as part of the pre-flight inspection. Careful attention should be paid to any sign of nicks or other defects. If a nick or defect is found, do not fly until a qualified mechanic has inspected and repaired the condition. There are no acceptable defects allowed on flying wires. Any nick, dent, kink, pit, discoloration or any type of defect renders the wire/rod non-airworthy.

Although rare, failures can occur. The prime cause of failure of wires is vibration due to improper tensioning. Please ensure that your wires are tensioned in accordance with the manufacturer's instructions. Another cause of failure is stress concentration from nicks, pits or similar defects leading to the propagation of cracks. Salt corrosion can occur even with stainless steel wires when the aircraft is exposed to salt spray in coastal areas. This corrosion appears as small grayish spots and can develop in to pitting which in turn can lead to a concentration of stresses and ultimately cracking and failure. However, application of a light oil or wax will help protect your wires from salt spray exposure.

Areas of special inspection:

Tail Wires: stones or FOD kicked up by the main gear can cause nicks in the wires leading to cracks and failures.

Separator Stick (Javelin) area: wires may come in contact with each other (not properly separated) causing a nick or dent that will lead to a failure.

If a wire failure occurs in flight, make an immediate safe landing taking care to minimize stress on the airframe. Do not attempt to continue a flight to a convenient destination.

Reference, WACO Support Documents (http://www.wacoaircraft.com/support/):

GI02271992 – Corrosion of Flying Wires (revised)

GI06031996 – Streamline Wire

GI11051990 – Corrosion of Flying Wires

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Safety Notice SN-042

Alternator Failure as a result of excessive water ingestion

Applicable Aircraft: All Waco YMF series

Issued: September 1, 2015

The failure of alternators has been reported in aircraft subsequent to large amounts of rain while on the ground. It is believed that rainwater accumulates in the cooling "scat" tube that feeds the alternator in sufficient quantities to short out the alternator when the airplane is under power and at flight level. In normal conditions and in flight a small amount of water entering the alternator is not an issue; however, when a large "slug" of water contacts the alternator, damage may occur.

Operators are encouraged to not leave the airplane out a hard rain facing the wind/rain. If the airplane is exposed to driving rain, perform an inspection of the scat tubes in the inner cowl for standing or trapped water. If water or a blockage in found, have a properly qualified mechanic take corrective action to remove the water or blockage.

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Safety Notice SN-043

Communication and Navigation Radio interference from mobile phone and other electrical charging devices

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued: September 1, 2015

Cases of radio and intercom interference have been reported to WACO Classic related to charging devices for various mobile phone, tablet computers, I Pad's, and other electrical devices that are powered through 12 Volt aircraft power plugs (cigarette lighters).

Thus far, the interference has been mostly related to the breaking of radio squelch, odd noises and other general interference over the intercom and/or radio systems. Customers are encouraged to verify the quality and safety of all charging or electrical devices that are connected to the aircraft power system prior to flight and to discontinue their use if any communication or other anomalies are noted during flight.

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Safety Notice SN-044

Hydraulic Landing Gear Safety

Applicable Aircraft: Waco YMF-5F
Serial numbers: 82, 154 and onward when equipped Amphibious Floats.

Issued: December 18, 2017

The WACO YMF-5F is equipped with an Electrohydraulic landing gear system.

Pilots are encouraged to visually inspect the integrity of the hydraulic system prior to each flight and be on the lookout for fluid leaks or unusual operation of the system. If a leak or unusual function is noted, contact a properly qualified mechanic to investigate and take corrective action.

While in flight, if it is ascertained that a mechanical failure has occurred, and the gear will not achieve either a Gear Up or a Gear Down position with visual confirmation, the best course of action will be dependent upon the nature of the failure and the choices of landing surfaces available.

In the extremely unlikely event that a landing gear has failed in an intermediate position and cannot be moved to either a Gear Up or Gear Down position, the amphibian should be landed on land only, optimally on a grass runway, into the wind, with emergency services at the ready.

WARNING - DO NOT land in the water with the wheels either partially or fully extended. If the landing MUST be accomplished on water and the gear is partially or fully extended, it is suggested that a power-on full stall landing would be the best procedure. During deceleration after touchdown, with the gear extended, the float bows will submerge and there is a high probability of flipping the amphibian onto its back causing either fatal or serious injury.

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Safety Notice SN-045

USE EXTRA CAUTION DURING POST MAINTENANCE FLIGHTS

Applicable Aircraft: all Waco YMF series & 2T-1A-1/2 series

Issued: June 19, 2018

Several fatal aviation accidents have occurred during flights immediately following aircraft maintenance. In several cases, the cause was incorrect or incomplete reassembly of the aircraft, and the error would have been detectable during a careful preflight inspection.

Even the best maintenance personnel can become distracted and make a mistake. Pilots should conduct an especially thorough preflight inspection after maintenance has been performed. If possible, speak with the technicians who performed the work and find out exactly what was done, paying special attention to those areas. Professional maintenance personnel will appreciate the pilot's commitment to safety and will welcome an additional check of their work.

Any work done on the flight control system deserves special attention, because a flight control disconnect is almost always catastrophic. NEVER RUSH OR SKIP PREFLIGHT STEPS.

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Safety Notice SN-046

Approved Aerobatics

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued November 7, 2018

The only approved aerobatic maneuvers for each aircraft type are listed in the relevant Aircraft Flight Manual (AFM). These maneuvers must be conducted as described in the AFM, and should only be performed by an appropriately trained, current and competent pilot.

Any aerobatic maneuver not specifically identified as approved in the AFM is considered prohibited.

No aerobatics should be performed in aircraft manufactured by Waco Classic Aircraft without first receiving suitable training in the same aircraft by a properly qualified and rated aerobatics instructor approved by Waco Classic Aircraft.

Parachutes should always be worn by all occupants of the aircraft during aerobatic maneuvers.

Ref:

WACO Safety Notice: SN-028

WACO 2T-1A-2 AFM (Aircraft Flight Manual)

WACO YMF-5 AFM (Aircraft Flight Manual)

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Safety Notice SN-047

A HAZARD IN AEROBATICS EFFECTS OF G-FORCES ON PILOTS

Applicable Aircraft: All Waco YMF series and Great Lakes by WACO 2T-1A series

Issued November 12, 2018

Because aerobatic flying subjects a pilot to gravitational effects (G's) that can impair their ability to safely operate the aircraft, pilots who engage in aerobatics, or those who would take up such activity, should understand G's and some of their physiological effects. FAA AC 91-61 Advisory Circular provides background information on G's, their effect on the human body, and their role in safe flying. Suggestions are offered for avoiding problems caused by accelerations encountered in aerobatic maneuvers.

Aerobatic flying is a beautiful coordination of pilot and aircraft. It requires a well-engineered aircraft and a highly-skilled pilot. Many pilots believe the restricting factors in aerobatics to be the load limits of the aircraft. For the exceptional pilot this may be so; but for some, it is the ability of the pilot to withstand the accelerations of the maneuvers. The truly skilled pilot will know his or her limitations, will train to extend them, and will avoid conditions that lower tolerance and jeopardize safety.

The physiological dangers and risks to pilots can not be understated. Pilots must be in excellent physical condition to safely endure the rigors and risks of aerobatics.

Ref:
FAA Advisory Circular AC 91-61
https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC%2091-61.pdf

WACO Safety Notice: SN-028

WACO 2T-1A-2 AFM (Aircraft Flight Manual)

WACO YMF-5 AFM (Aircraft Flight Manual)

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Safety Notice SN-048

Aircraft Operation in Corrosive Environments

Applicable Aircraft: all Waco YMF series & 2T-1A-1/2 series

Operating any aircraft in a corrosive environment will lead to corrosion, decay and cosmetic degradation of the aircraft, which may lead to a shortened service life and frequent maintenance issues.

Corrosive environments include near or over saltwater (oceans and inland seas), areas of volcanic activity and areas of high rain and humidity. Salt will cause metals to corrode. Volcanic ash or volcanic chemicals will erode protective coatings and propellers, and severely damage engines. It takes very little salt or volcanic chemicals on a metal surface to increase the chances of corrosion. Removing salt and chemicals from the surface reduces the chance of corrosion.

If the aircraft operates in these environments, care must be taken to insure proper corrosion protection of metal surfaces, fabric and structure. Once clear of this environment, care must be taken to properly clean and inspect the aircraft.

Various sprays and lubricants can be applied to metal and others surfaces to help protect from corrosion, including LPS-3, and various waxes and light oils.

For flights near and over the ocean and after saltwater float operations, all aircraft surfaces should be washed with clean fresh water and treated with a salt conversion product like Salt-Away, SaltOff or similar. Plain water alone will not remove all the salt.

Salt-Away type products dissolve and remove salt from any surface. They are water based, nonhazardous and biodegradable. They protect metals from corrosion by removing the salt that promotes corrosion, and contains rust inhibitors that help protect the surface once the salt has been removed. These products can be safely used on metal, paint, fiberglass, glass, rubber, plastic, chrome and many other surfaces. They do not contain solvents, so will not remove wax or other surface protections.

Reference: SN-041

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