

# Nanchang CJ-6 Mishap and Incident Summary

*The following is a compilation of mishaps and incidents that have occurred in the Nanchang CJ-6 aircraft in the U.S. The CJ-6 is a marvelous aircraft, but like other similar types has experienced some problems. In fact, several incidents are not at all related to the aircraft type, but may be chalked up to deficiencies in pilot judgment, training, or maintenance issues. It is hoped that a summary of the incidents will benefit all CJ pilots.*

*This list is compiled from various sources and individuals. As such, it may contain information based on hearsay or rumor. The purpose of this summary is not to determine a cause, or assign blame or guilt in any particular situation, but to present information so that CJ pilots may prevent reoccurrence of these mishaps. At the end of the mishap listings is a list of operational and mechanical service difficulties that have been reported, which, although have not resulted in incidents, could contribute to future mishaps.*

*Thank you to those who submitted this information for the benefit of the CJ pilot group. Please send any additional information, comments, or corrections to Jeff Linebaugh, linedog@peoplepc.com. Thanks!*

## **Collision With Ground, Low Level Aerobatics**

**Damage/Injuries:** Aircraft Destroyed, two fatalities

**Findings:** After executing a low pass, the aircraft pulled up and began a right aileron roll. An accelerated stall developed during the roll and the aircraft impacted in a nose low attitude.

## **Collision With Ground, Low Level Maneuvering**

**Damage/Injuries:** Aircraft destroyed, two fatalities

**Findings:** A pilot-rated witness stated that he saw the airplane maneuvering at about 300 feet, when he heard the engine sound stop. He heard the airplane impact trees and then the ground. The airplane and engine were examined and no pre-impact failure or malfunction was noted.

## **Collision with Obstacle**

**Damage/Injuries:** Aircraft destroyed, two fatalities

**Findings:** Aircraft struck guy-wires from an antenna severing a portion of the wing. Aircraft subsequently impacted the ground.

## **Engine Failure, Collision With Ground During Forced Landing**

**Damage/Injuries:** Aircraft Destroyed, two fatalities

**Findings:** The engine lost power due to a failure of the pressure carburetor diaphragm which led to restricted fuel flow through the carburetor and eventual fuel starvation. During an attempted forced landing the aircraft stalled and impacted the ground in a wings-level nose low attitude. Factors in the accident were unsuitable terrain and tall trees that contributed to the pilot's inadvertent stall during the attempted forced landing.

## **Engine Failure, Forced Landing**

**Damage/Injuries:** Substantial damage with injuries.

**Findings:** The aircraft suffered a catastrophic engine failure. While attempting to clear trees during the forced landing, the aircraft stalled and impacted the ground nose low. The pilot was not wearing the installed shoulder harness. The #9 cylinder was found

separated from the engine and the auxiliary rod piston pin hole was elongated.

## **Engine Failure, Collision with Trees During**

**Forced Landing:** (Yak 18T with M-14P engine)

**Damage/Injuries:** Substantial damage, two fatal, one serious.

**Findings:** The aircraft suffered a catastrophic engine failure shortly after takeoff. The aircraft impacted trees during the attempted forced landing.

Examination of the engine revealed 3 broken connecting rods and a shattered #5 piston. Probable Cause: Inadequate preflight-failing to avoid a hydraulic lock, which resulted in a bent connecting rod, subsequent failure of the #5 piston, and loss of engine power. Also causal was the flight crew's failure to maintain adequate control of the aircraft and/or clearance from trees, while maneuvering for an emergency landing.

**Comments:** This accident, while in a Yak 18T, has direct implications to CJ pilots. There has been at least one hydraulic lock induced engine failure in a stock CJ-6A. The M-14P, the stock Chinese engine, and in fact all radial engines tend to have oil seep into the bottom cylinders while at rest on the ground. It is essential to ensure there is no oil or fluid trapped in the bottom cylinders prior to start. If a hydraulic lock is indicated or suspected, drain fluids from the cylinders by removing the intake manifold drains and/or the bottom spark plugs. Failure to do so could be catastrophic, as can be seen above.

## **Inadvertent Engine Start On Ground**

**Injuries:** Serious Injuries.

**Findings:** An experienced pilot attempted to pull the prop through with the magnetos inadvertently left on. The engine started with very little movement of the prop. The prop struck the pilot causing injuries.

**Comments:** There have been at least two other very similar incidents without injuries. Always double check that the magnetos are off before touching the prop for any reason. Always treat the prop as if the mags are on. Note for transitioning pilots: the "both" position on the mag switch is full *counterclockwise*.

This is opposite of most general aviation aircraft. Use caution when positioning the mag switch.

### **Runway Excursion on Landing**

**Damage:** Substantial

**Findings:** The aircraft landed long on a short wet grass runway after the pilot perceived an engine problem. The aircraft was unable to stop on the runway. The FAA noted flat spots and melted treads on both new main tires. No other mechanical malfunctions were found.

### **Forced Landing, Fuel Starvation, Fuel System**

#### **Modifications**

**Damage:** Substantial

**Findings:** Fuel pressure dropped to zero and the engine quit. The fuel tanks contained fuel and the fuel vent system was clear. The aircraft had a modified fuel system with an extra fuel tank and a selector valve. The pilot reported the selector valve was difficult to operate and determine proper position.

### **Forced Landing, Fuel Exhaustion**

**Damage:** Substantial

**Findings:** Experienced pilot new to the aircraft ran out of fuel while flying his new purchase home. The pilot executed a forced landing to a field with the gear up.

### **Forced Landing, Fuel Exhaustion, Uneven Fuel**

#### **Feeding**

**Damage:** None

**Findings:** A pilot experienced uneven fuel feed out of the wing tanks. Eventual fuel exhaustion led to a forced landing on a beach.

### **Gear Collapse on Landing**

**Damage:** Substantial

**Findings:** After takeoff with minimum air pressure, the gear did not fully retract. The pilot unsuccessfully re-attempted gear retraction. The pilot then returned for landing with the gear indicating down but low air pressure. It was reported the Emergency Air System was not used. One main gear collapsed on landing. The aircraft departed the runway and went into a ditch.

### **Gear Up Landing**

**Damage:** Minor structural damage

**Findings:** An experienced pilot landed with the gear up. The pilot was distracted by the inadvertent opening of the rear canopy, and also an aircraft conflict while attempting to land.

**Comments:** There have been at least three other reports of similar incidents of gear up landings.

### **Inadvertent Gear Retraction on Ground**

**Damage:** Minor structural damage

**Findings:** An experienced pilot raised the gear handle while taxiing back from landing. The pilot was distracted by other landing aircraft and other duties.

**Comments:** There has been at least one other case of an inadvertent gear retraction on the ground. It is strongly recommended that the gear handle lock be used whenever the gear handle is in the down position.

### **Ground Collision, No Air in Brake System**

**Damage:** Minor

**Findings:** Aircraft lost braking while taxiing and struck a fence. The Main air valve was in the off/closed position during start and initial taxi.

**Comments:** There have been several similar reports. It is quite possible to start the aircraft with the main air valve closed with just residual air in the system. A loss of air pressure while taxiing or after airborne could be catastrophic. The main air valve must be double checked open before aircraft movement.

### **Runaway Aircraft During Hand Propping**

**Damage/Injuries:** None.

**Findings:** An experienced pilot hand started the engine because of no air pressure in the system. The aircraft was not chocked nor tied down. The aircraft started moving with no brakes but was diverted from striking nearby aircraft by a bystander who grabbed the wing tip, turning the aircraft toward an open field.

### **Brake Failure on the Ground**

**Damage:** None

**Findings:** During a before takeoff engine run-up, the brake handle cable end failed in the belly causing the aircraft to jolt forward. The magnetos were quickly turned off and the aircraft came to a stop, averting a ground collision. Note: There have been at least three other reported cases of brake cable failures.

### **Partial Power Loss, Fuel Line Blockage**

**Damage/Injuries:** None

**Findings:** Engine lost power while performing aerobatics during flight test regiment. Engine restarted but only sustained partial power. Partial blockages were found in the wing tank fuel lines resulting in center (header) tank starvation. Blockage was difficult to detect in a 90 degree elbow on newly replaced fuel lines. The problem was not detected on earlier, short test flights.

### **Partial Power Loss**

**Damage/Injuries:** None

**Findings:** Engine lost power after the mixture was leaned. The mixture control was unresponsive. The engine surged drastically until the throttle was moved full forward where it produced some power and surged less. The engine lost power when the throttle was retarded for landing. The mixture control was

found separated from the carburetor, which resulted in an excessively rich mixture. Suspect an improperly installed or failed cotter pin in mixture control connector.

**Comments:** There have been at least two other reports of similar damaged or missing cotter pins on control connectors.

#### **Partial Power Loss**

**Damage/Injuries:** None

**Findings:** Engine suddenly ran rough and lost power while in formation cruise flight. Wingman reported seeing gray exhaust smoke start at the same time. Engine ran rough at higher power settings, and ran better when the throttle was reduced to low cruise settings. After landing found an intake manifold drain plug was missing.

**Comments:** Ensure drain plugs are reinstalled and safetied when used to drain oil/fuel from the bottom cylinders.

#### **Partial Power Loss**

**Damage/Injuries:** None

**Findings:** Engine lost power in flight. Engine restarted and an on airport landing was made. A blockage in the fuel vent line was found which evidently prevented proper fuel flow to the engine.

**Comments:** Safety wire is normally used to span the vent tube through holes in the mast. This is to keep bugs or other debris from blocking the vent tube.

# Nanchang CJ-6 Operational and Maintenance Service Difficulties

*The CJ-6 is a wonderful aircraft, but like other similar aircraft has experienced some problems. The following difficulties have been reported that could have caused substantial damage to the aircraft. It is hoped that making the CJ community aware of these difficulties can reduce the chances of reoccurrence. This is a partial list and is not all-inclusive. Recommendations should not be a substitute for proper training and maintenance. Thank you to those who submitted this information for the benefit of the CJ pilot group. Please send any additional information, comments, or corrections to Jeff Linebaugh, linedog@peoplepc.com. Thanks!*

**Horizontal Stabilizer Cracks:** Horizontal stabilizer cracks have been reported in the center spar section. This problem has been found in newly overhauled aircraft from China, in addition to aircraft in service. These cracks could be from control overload or just time in service. A horizontal stabilizer failure could be catastrophic. This area should be closely inspected and repaired as necessary.

**Engine Hydraulic Lock:** Radial engines are prone to hydraulic lock and the CJ is no exception. It is absolutely necessary to pull the prop through (always verify the magnetos are off first) numerous blades to check for a hydraulic lock just before start. Again, it is essential to ensure there is no oil or trapped fluid in the bottom cylinders prior to start. If a hydraulic lock is indicated or suspected, drain fluids from the cylinders by removing the intake manifold drains and/or the bottom spark plugs. "Clean Kits" are available from various sources that might reduce chances of a problem. Failure to clear a hydraulic lock could result in bent or failed connecting rods and probable catastrophic engine failure.

**Exhaust System Failures:** There have been at least two cases of exhaust system leaks and failures with the standard Chinese exhaust system. One failure at the bottom left exhaust "y" resulted in hot exhaust gases melting a large portion of the carburetor heat muff in flight. This area is directly in front of the firewall fuel filter and shutoff valve and could have caused more serious problems.

The standard Chinese exhaust system is made of steel and is prone to rust, especially in humid climates. The system tends to corrode from the inside out and is not easily apparent. At a minimum, this system must be carefully inspected at close intervals. There are various alternatives available including ceramic coatings to the stock system or new stainless steel systems.

**Brake Handle Failures:** There have been reports of brake handle failures in at least two aircraft. The stock Chinese brake handles are cast aluminum and may crack at the base of the handle rendering it useless. This could result in a serious ground mishap due to the inability to stop. Back seat pilots should be

briefed on the use of the brakes in such an emergency. Billet aluminum handles, which are a direct replacement for the stock handles, are available. However, one major reseller reports they have not seen problems with brake handles on the aircraft they have imported and have not experienced this difficulty.

**Aileron Control Loss:** There was one report of an aileron connection failure due to a missing cotter pin. The aileron did not respond to control inputs during the before takeoff check. Recommend careful attention to control connections and fittings.

**Uneven Wing Tank Feeding:** This tendency has been with the aircraft since discovered on its initial test flight in China. As with any aircraft, fuel balance should be closely monitored. Rectify fuel imbalances using the procedure given in the aircraft flight training manual, namely raise the wing of the tank with the higher level and use crossed controls to attempt to start proper feeding. There have been reports that modified vented fuel caps have reduced the tendency towards uneven fuel burn.

**Fuel Exhaustion:** The aircraft was designed with a goal of shorter training missions. As such it does not have the copious quantity of fuel that most U.S. general aviation aircraft have. This fact must be taken into account with proper training and flight planning. As with any aircraft, know your typical fuel burn at different power settings, determine how much fuel is on board before flight and keep track of time airborne.

**Wing Walk and Skin Cracks:** Skin cracks have been reported under the wing walk panel. The wing area in front of the forward spar is not well supported; there is only a false rib to support our weight. When the pilot gets in or out of the cockpit and steps on the wing, the skin will flex, especially if exiting off the front of the wing. Also there have been problems with excessive loads on the trailing edge step assembly. Recommend checking these areas, repair as necessary and consider strengthening the wing walk panel. As a side note, the wing walk can be extremely slippery when wet and/or oily. Consider coating with wing walk compound, truck bed liner coating or similar material.

**Propeller Blade Corrosion:** Intergranular corrosion has been found on some stock Chinese metal prop blades. First indications could be raised imperfections on the blade surface. The corrosion can appear as a “rash” likely near the trailing or leading edge, on the backside of the prop. The aluminum layers separate as a result of this corrosion, and flake off. This corrosion has been seen on “zero time” blades as well as blades previously in service. Causes could be improper storage or care, or could be the result of improper quenching in the manufacturing process. Check with a qualified prop shop for advice. Prop service data is available in the CJ-6 Overhaul Manual.

#### **M14P Oil Return Line Leaks**

There have been two cases where CJ-6A's modified with M14P engines have experienced oil starvation due to oil return lines, which became loose. In both cases the aircraft landed safely. The lines came loose at the engine case and may be a result of the geometry of the oil return line installation. The flexible hose is longer than in the stock configuration. Vibration may also have been a factor.

#### **Loose Cylinder Base Nuts**

Loose cylinder base nuts have been found on the stock Chinese Housai engine. Several possible causes have been identified: 1) Over tightening, 2) Vibration, 3) Loose studs, 4) Hydraulic lock or stress lengthening the cylinder base studs.

#### **Loose Carburetor Drain Plug**

An engine stoppage occurred on the ground due to a loose upper carburetor drain plug. When viewed from the left side of the engine, this plug is seated upright, directly behind the top of the carburetor diaphragm housing. It should be checked for tightness and safetied. The subject engine had 230 hours since new (an Aerostar M14P). A check after this occurrence found two other engines with loose plugs, one a Chinese Housai HS-6A and another M14P. If this plug backs out, the engine will stop. Use of the wobble pump or primer will not rectify the problem.

#### **Loose or Wrong Sized Wing Bolts**

An experienced mechanic reported finding several cases of loose or improper size wing bolts installed. Feeling for looseness or hearing “clunks” when applying vertical pressure at the wingtip can detect these. Wing bolt diameters may vary between aircraft. Possible causes: wing bolts unintentionally swapped (installed in a different position) during wing installation or reassembly, or wing bolts replaced with the wrong size bolt. Bolts are available in different size diameters, and can be machined if necessary for proper fit.

**Air System Lubrication:** The life expectancy of the actuators in the air system is shortened by lack of proper lubrication. The gear and flap actuators should be lubricated on a regular basis using a proper lubricant. Injecting a small amount of oil in the air lines adjacent to the actuators should greatly decrease wear, and keep seals in good condition.

**Primer Operation:** Should the primer be inadvertently left unlocked (or not correctly positioned perpendicular to the aircraft centerline), the engine will ingest raw fuel, will run rough and may not run on all cylinders. Include checking the primer properly locked in the after start check, and before takeoff.

**Fuel Line Chafing on Oil Cooler Door:** There has been a report of a fuel line chafing on the oil cooler door. The fuel line was running from the right wing tank to the header tank and was rubbing on the oil cooler exit door.

**Magneto Switch Position:** There have been several instances of improperly positioned Mag Switches. This can result in serious injury to people on the ground. Two factors may contribute to the problem. First, the “both” position on the mag switch is full *counterclockwise*...opposite of most general aviation aircraft. Second is the engine shutdown sequence. Most general aviation aircraft require that the mags be positioned full counterclockwise to off after the prop stops. At least twice, new CJ pilots with extensive general aviation time have shut down the engine with the mags, waited for the prop to stop then out of habit moved the mag switch counterclockwise back to the both position. Always verify that the magneto switch is truly in the correct position.

**Aircraft Towing:** The nose gear has been known to collapse while the aircraft was being towed. Proper adjustment of the nose gear is essential. Having the air system charged with positive air pressure on the down side of the gear actuators could help prevent collapse. Alternately, a brace can be fitted to assure the gear remains locked overcenter. Most important is to ensure the brace is overcenter while in the down position.

#### **Engine Failure to Start Problems:**

With a failure of the engine to turn over using the start button, first suspect and troubleshoot for a weak battery. The start valve solenoid requires proper voltage to open (and allow air to crank the engine). The start valve has proved to be reliable in general. There have been two individuals report they spent a great deal of effort trying to troubleshoot the start valve, when the only problem was a weak battery.

## **One Final Comment:**

In reviewing the information above, individuals might disagree with the findings or the causes listed or take exception to what was written. (That is fine, and I am receptive to constructive comments and suggestions.) However, the one thing I hope we can all agree on is that ***proper training and maintenance is essential*** for the safe operation of these (or any) aircraft.

We must all be proactive in requiring new pilots *and in challenging each other* to get thorough initial and recurrent training. We must also help each other to get the information we need to safely maintain our aircraft.

There is nothing more tragic than an avoidable accident: as we all know, nearly all accidents are avoidable. Nobody is above mistake, but proper training and maintenance can greatly reduce risk and allow us to enjoy this great airplane for many years to come.

Please....***Fly Safe!***