Aviamilano Falco F8L Series 2, G-OCDS, 2 March 1996

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Aircraft Type and Registration: Aviamilano Falco F8L Series 2, G-OCDS

No & Type of Engines:1 Lycoming O-320-A3A piston engine

Year of Manufacture:1958

Date & Time (UTC):2 March 1996 at 1359 hrs

Location: Fairoaks Airport, Surrey

Type of Flight: Private

Persons on Board: Crew - 1 Passengers - None

Injuries: Crew - None Passengers - N/A

Nature of Damage: Damage to nose landing gear, cowling and propeller

Commander's Licence: Private Pilot's Licence

Commander's Age:37 years

Commander's Flying Experience:2,004 hours (of which 26 were on type)

Last 90 days - 1 hour

Last 28 days - 1 hour

Information Source:AAIB Field Investigation

The following statement was provided to AAIB by the owner/pilotof G-OCDS. The statement was both extremely comprehensive anddetailed and the decision was made to publish it essentially vebatim:-

Events

I prepared the aircraft for general flying by filling the mainfuel tank with 12.5 gallons and left the wing tanks empty. Duringthe warm-up checks I noticed that the undercarriage up red lightwas not functioning, but the undercarriage down green indicatorwas fully serviceable. Given that the Falco has visual, mechanicallyoperated indicators on which I mostly rely, I decided that thisdid not represent a reason to snag and ground the aircraft.

I carried one passenger.

I took off on Runway 06 at Fairoaks with 8 octas cloud at 1500ft and visibility around 5 to 8 miles. After take off the undercarriagecycled up successfully and all indications were within limits. Due to visibility below VFR minima, I decided to return to theairfield when I reach Guildford and conduct circuits and landingsinstead. I joined normally for runway 06 and requested a touchand go which was approved. On downwind I selected undercarriagedown at 110 kt. The undercarriage did not cycle down. I checkedall levers and circuit breakers and found that the undercarriagecircuit breaker had tripped. I moved the undercarriage leverto the full up position. I pressed in the circuit breaker andselected undercarriage down.

The aircraft yawed strongly to the right, but the undercarriagecycled down successfully. My initial reaction was that the wheelshad lowered asymmetrically. Upon consideration (after landing),I realised that this was impossible and wondered whether my passengerhad inadvertently put weight on the rudder pedals, given thathe had earlier fouled the control column with his knees.

I cancelled the touch and go, requested a full stop landingand landed softly and successfully. I then taxyed back to theapron and informed the tower that I would be going out again,pending a visual undercarriage inspection. I conducted a thoroughvisual inspection of the undercarriage, the main gear and thenose gear. I could see no indications that there was any failure,no oil leaks, all connections were sound and bolts and lock nutwere in order.

I decided that I would report the incident and seek advicefrom the aircraft maintainer later , but as I believed that theaircraft was in a serviceable, flyable condition. I decided tocontinue the circuit and landing exercise solo.

Second Flight

I requested taxi and was instructed to proceed to 06. I completedall power and pre-flight checks and when ready to depart was advisedof a runway change and therefore backtracked down 06 and tookoff on 24, requesting 2 circuits and landings.

After takeoff, at 100 ft I selected undercarriage up. I didnot expect to see a red undercarriage up light as it was unserviceable,but I watched the mechanical indicators carefully and front andleft indicators cycled normally. However, just before the cyclewas complete there was a slight bump/bang from the area of thenosewheel. However the indicator showed the undercarriage up. I proceeded to downwind and dropped the speed to 85 kt beforeselecting the undercarriage down. The undercarriage appearedto cycle normally whilst I maintained a wary watch on the mainundercarriage indicators. The wing indicators on the left showedthe undercarriage down, the aircraft was well balanced and I concludedthat the right wheel was also down and I awaited the green undercarriagedown light as it is triggered by the nosewheel completing itscycle. No green light showed and I noticed that the nosewheelmechanical indicator showed the nosewheel had not cycled at all. I then noticed that the undercarriage circuit breaker had poppedout again. I realised that whilst I had main undercarriage down,I could not confirm that it was locked down and I knew that thenosewheel was not down.

I informed the tower that I could not confirm the status ofthe undercarriage and requested a low level flight past the towerto confirm the status. I flew past at 200 ft and waggled thewings. The tower informed me that the main wheels appeared downand locked but that the nosewheel was only partly extended. Ithen requested to leave the circuit before declaring an emergency. I intended to attempt to either recycle the undercarriage orcrank it down. I flew to an open area, south of Woking, changedto Farnborough radar for radar information at the suggestion ofthe tower and

then orbited whilst I worked out a strategy forchecking the wheels. I firstly opened the manual crank and attemptedto crank the wheels further. It was not possible to crank anyfurther. I then selected the circuit breaker to close and selectedundercarriage up. The main gear cycled up successfully. I thenselected undercarriage down and watched the circuit breaker. The main wheels cycled down successfully and the circuit breakerpopped only after the main wheels were down. I concluded thereforethat there must be a mechanical failure on the nosewheel or somekind of electrical fault which trips the electric motor whenthe nosewheel begins to cycle. I flew around for a further 5minutes, considering what I needed to do in order to land safely. I advised Farnborough that I wished to change to Fairoaks andhad failed to secure the landing gear. I then requested a secondflight past the tower to confirm that following the successfulrotation of the gear, that the nosewheel position had not changed The tower confirmed that the nosewheel was still partly down. I requested confirmation of the precise position and was informedthat it was one third down. I then requested permission to land.

The tower asked where I wished to land. I confirmed that Iwished to land on the tarmac. The tower advised me that the airportmanager requested that I landed to the north of centre line andsteer the aircraft onto the grass after landing. I acknowledgedthe request. On downwind I was asked to orbit to the south ofthe airfield whilst the emergency services arrived. The toweragain asked if I preferred to land on the grass or the tarmac. I felt that the airport preferred me to consider grass and Itherefore requested the tower to inform me of the condition ofthe grass. The tower clearly stated that the grass was mostlywaterlogged and relayed the airport managers confirmation thatthe choice was entirely mine. I again chose to land on tarmacbecause I feared the consequences of the propeller digging intomud. I continued to orbit and then requested the tower confirmhow long it would be before I could land as I was concerned aboutmy fuel status. I was granted permission to land immediatelyand proceeded to final. I chose to fly a flat approach at 80kt selecting full flap at 400 ft. At 50 ft I closed the throttle,closed the mixture, switched off the fuel pump and battery masterbut did not have time to switch off the magnetos. I touched downlightly on the main wheels remaining to the north of centrelineand held the nose up until the elevators were against the stops. The nose fell down and the propeller struck the ground. I didnot notice the RPM at the time and the aircraft tilted onto theground and once the cowling struck the ground I felt the aircraftbraking very quickly under the friction. I felt I was doing littleharm to the runway surface and therefore maintained directionon the tarmac until the aircraft came to a rest. I then pluckedout the ignition keys, opened the canopy and ran away from theaircraft.

The emergency services were absolutely professional in everyrespect, preventing a fire but careful not to damage the aircraftfurther in the process.

I wish to commend Fairoaks Information, Farnborough Radar,the emergency services and Fairoaks flight centre for the absolutelyprofessional manner in which they conducted this emergency andhelped me to escape unhurt and minimise the damage to my aircraft.

Upon examination, it was found that the nosewheel had turned throughalmost 90° and had been jamming against the side of the bayinto which it retracts. On the Falco, the nosewheel bay is verynarrow and contains a guide which centres the nosewheel steeringas the leg retracts, assuming it is within the normal steeringrange. If this does not happen, then the wheel can foul the sideof the bay or the rudder controls as it appears had occurred. The oleo leg cylinder forging itself has an integral lug whichoperates within the torque link attachment brackets to limit nosewheelsteering authority (see photograph). The lug had been brokenoff by an overload failure but, as the photograph shows, thisis not immediately obvious unless one is looking specificallyin that area.

With the nosewheel now free to castor without restriction,the centring guide had missed its location and failed to centrethe steering.

All three landing gears are powered by a single electric motorwhich drives screw-jacks to raise and lower the legs. Each retractioncycle is concluded by a microswitch on the nose gear which simultaneouslycuts power to the motor and illuminates the 'gear UP' red lightas it reaches the fully retracted position. Clearly, the nosegearwas fouling structure as it was retracted but the motor continuedto run and resulted in tripping of the circuit breaker. Eventuallythe screw-jack drive shaft failed and, with the shaft broken,it was not possible to hand-crank the landing gear down.

The maintainer states that he has seen similar failures of thesteering stop lug when aircraft had been manoeuvred on the groundusing mechanical tugs, as opposed to manhandling.