

Factual information

Occurrence :	2007083	Classification:	accident
Date occurrence:	29-08-2007	Flight crew:	1
Place occurrence :	De Kooy Airport (EHKD)	Passengers:	1
Aircraft registration:	F-GSHG	Injuries:	0
Aircraft model:	Fouga Magister CM-170	Lighting conditions:	daylight
Aircraft type:	training jet aircraft		
Type of flight:	training flight		
Phase of operation:	landing		
Damage to aircraft:	severely damaged		

Synopsis

During a touch and go the gear of the aircraft retracted unexpectedly where after the aircraft hit the runway and slid several hundred metres over the concrete. Finally the aircraft came to a stand still at the end of the runway.

Description of the occurrence



F-GSHG after the accident

The F-GSHG, a twin engine, two-seater training jet aircraft took off from Lelystad Airport (EHLE) at 14.15 (local time).¹ The aircraft was occupied by the captain and a passenger. The intention was a flight to De Kooy Airport (EHKD),² followed by some touch and go's and a full stop. After refuelling the F-GSHG was supposed to return to EHLE. During the flight to EHKD the aircraft was alternately flown by the captain and the passenger. The initial pattern for a touch and go was flown by the passenger; before the turn to base leg for runway 04 the captain took over control. The captain performed all checks and selections for the final approach. The gear was selected down and all three green landing gear indicators illuminated. When the main gear touched the runway, the captain kept the nose of the aircraft up, according to the flight procedures. He

pushed the throttle in the forward position to select take off thrust, but the aircraft did not accelerate as expected. Although the captain noticed the aircraft sagged abnormally, he considered continuing the touch and go but the fuselage belly had already hit the runway. The F-GSHG slid several hundred metres over

¹ All times in this report are local times.

² EHKD is a Naval Air Station with a civil section.

the concrete and came to a stand still at the end of runway 04. The occupants could leave the aircraft without injuries. The gear was found retracted. The F-GSHG was severely damaged.

Investigation and analysis

Investigations were performed by investigators of the Dutch Safety Board at the accident site.

The captain, the passenger and air traffic control (ATC) personnel were interviewed, traces on the runway were assessed as well as the damage and condition of the aircraft.

The aircraft

The Fouga Magister CM-170 (further called Fouga Magister) F-GSHG is a former military trainer, built in 1957. It has two cockpits which are situated behind each other. Controls, instruments and handles are dual fitted and coupled with each other. The pilot in the rear seat cannot see the system selections of the front seated pilot and vice versa.

The aircraft was French civil registered and operated by a Dutch association. The two occupants are member of this association. The aircraft held a valid certificate of airworthiness, issued by the French authorities. Maintenance was performed under supervision of a Dutch maintenance organization which held an European authorization. Maintenance requirements of the French association of Fouga Magister owners, Association Français Fouga Magister (AFFM) which were approved by the French aviation authority Direction Générale de l'Aviation Civile (DGAC), were followed. Agreements with the DGAC were made to allow taking passengers for a flight in the Fouga Magister on condition that the passenger holds a valid pilot licence.

The captain

The captain was seated in the front cockpit. He holds a valid JAA³ airline transport pilot licence airplanes (ATPL(A)) with the ratings IR-ME,⁴ RT,⁵ FI(A)⁶ and the type rating CM170 (VFR/IFR).⁷ He started his flying career in 1969 in the Royal Netherlands Air Force where he flew, amongst others, 141 hours in the Fouga Magister. After some years he continued his career as an airline transport pilot and he retired in 2005. In 1998 he started flying the Fouga Magister again. From then until the day of the accident he flew 47 hours on this type of aircraft.

The passenger

The passenger was seated in the rear cockpit. He held a valid JAA private pilot licence (PPL) with the ratings SEP⁸ and RT. His flight experience was 214 hours total on single engine piston aircraft. The passenger had also received 5 instruction hours in jet turbine aircraft, including 1,5 hours in a Fouga Magister. It was agreed that he should fly as passenger only in the Fouga Magister and would be enabled to make some manoeuvres under supervision of an experienced pilot.

The occurrence

During the flight to EHKD some aerobatic manoeuvres and stalls were performed alternately by the captain and the passenger. When handling the aircraft the passenger operated the controls and selectors on command of the captain. Approaching EHKD initially runway 22 was the runway in use but due to the wind changing to direction 330°, finally runway 04 was chosen as runway for the first touch and go. The pattern for runway 04, including downwind was flown by the passenger. On downwind the passenger selected gear down and flaps 15° on command of the captain. After lowering the gear, all three green landing gear indicators illuminated indicating that the gear was down and locked. Before the turn to base leg for runway 04 the captain took over control. This was established by the captain saying the words "my controls" answered by "your controls" by the passenger. On base leg the speed brakes were selected and the beginning of final was flown with 130 knots and flaps were selected 40°. After the final checks the captain decreased the speed to the threshold speed of 100 knots.

³ Joint Aviation Authorities

⁴ Instrument rating multi engine aircraft

⁵ Radiotelephony

⁶ Flight instructeur (airplane)

⁷ Visual flight rules/instrument flight rules

⁸ Single engine piston

According to the touch and go procedure the flaps must be retracted to 15° after the landing. The corresponding check was called aloud by the captain during the flare by the words "flaps 15". He then selected the flaps from 40° to the 15° position. With a speed of 90 knots the main gear touched the runway surface, the nose wheel was kept up and take off thrust was selected. On that moment the captain experienced that the F-GSHG sagged more than expected. Finally the F-GSHG hit the runway with the underside of the fuselage and slid for several hundreds metres over the concrete. The aircraft stopped at the end of runway 04, near the threshold of runway 22. Subsequently the captain and the passenger left the aircraft after the fuel supply was closed and the battery was switched off. After it turned out that no fire started, the captain and the passenger returned to the aircraft. During the interviews it turned out that when they arrived at the aircraft, the gear lever in the front cockpit was in the "up" position and the gear lever in the rear cockpit was in a position between "up" and "down". Subsequently the passenger had tried to move the gear lever in the rear cockpit up and down. After a discussion between the captain and the passenger the lever was selected up again.

In a short conversation with personnel of De Kooy Airport, shortly after the accident, the passenger stated that "I was busy with my flaps when the gear retracted." During interviews with the investigators of the Safety Board nor the captain nor the passenger could give an explanation for the gear lever being in the up position. The passenger stated that, on the moment the captain made the call aloud "flaps 15", he was of the opinion that he was commanded to select the flaps although this was not briefed. However, when he saw on the instruments the flaps were already moving up he did not take any action, as he stated.

Some witnesses were interviewed after the accident. Three air traffic controllers, who were on duty in the tower, all stated they watched the F-GSHG on final with the gear down. After the main gear touched the runway, they saw the aircraft descending further where after it glided over the concrete. Another witness, who was near the runway, also saw the main gear touching the runway and subsequently retracting where after the aircraft slid over the concrete.

During the recovery of the F-GSHG the gear system was tested after the aircraft had been lifted. The extending, locking and retracting of the main and nose gear went well and without problems.

Information from the Belgium Air Force, where the Fouga Magister was still in service, learned that an early retraction of the gear immediately after take off will cause a small descent which could result in the aircraft touching the runway.

Technical investigation

After the accident a thorough technical investigation was carried out on the F-GSHG by technicians who were ~~very~~ experienced with this type of aircraft. The summary of their report is mentioned below:

System

- *the front cockpit landing gear lever is mechanical/electric and direct connected to the landing gear sequence box;*
- *the landing gear lever in the rear cockpit is mechanical only;*
- *both levers are equipped with an electrical override button which is safety wired;*
- *the main landing gear is mechanically locked in up or down position. Pressure is required to unlock these devices;*
- *the aircraft is equipped with an anti retract mechanism that is active on the ground only. This 'weight on wheels' sensor is integrated in the left hand main gear strut. When the strut telescope is compressed more than 1.2 cm the sensor becomes active and provides an electrical signal to the front cockpit landing gear box and mechanically locks the landing gear lever in the down position.*

Damage

- *the fuselage belly was damaged severely from the front cockpit up to the tailfin;*
- *in this belly several connectors, hydraulic hoses and fuel lines were damaged;*
- *damage was found on the right main gear and gear door;*
- *differences were found in the landing gear lever position between the front and rear cockpit.*

Findings

- *all landing gear systems were checked and no abnormalities were found;*
- *despite the difference in the landing gear levers position between the front and rear cockpit, full travel of the front lever is available from the rear cockpit;*
- *technically it is not possible that the landing gear lever movement is caused by electrical current;*
- *on ground it is only possible to move the gear lever manually if the left hand main gear strut is compressed less than 1.2 cm or the anti retract override button in one of the two cockpits is pushed. The safety wires of the override buttons were found intact.*

Conclusion

The aircraft had a valid certificate of airworthiness and was maintained in accordance with the French regulations. The weight and balance were within the limits as published in the aircraft operating manual. No technical anomalies were found. The flight was executed in keeping with the Dutch and French regulations. The captain was experienced, both in total flight hours and on type. The passenger had an flight experience of 1.5 hours on the Fouga Magister, during these flights he steered and operated the aircraft under the command of the captain.

According to the Board the most likely scenario is that during the flare the aloud spoken check "flaps 15" by the captain, was interpreted as a command by the passenger. In his confusion because this was not briefed, he accidentally took the gear lever for the flap lever and selected this up.

This scenario is based on the following considerations:

- during the flight and during a part of the pattern, the passenger was instructed by the captain to operate the controls and levers;
- the statement of the passenger shortly after the accident that "I was busy with my flaps when the gear retracted";
- the passenger was not quite familiar with the Fouga Magister;
- the similarity of the shape of the gear lever of the Fouga Magister with the flap lever in aircraft the passenger was used to fly in (Cessna and Beechcraft);
- the gear levers were found in the "up" position and in a position between "up" and "down".



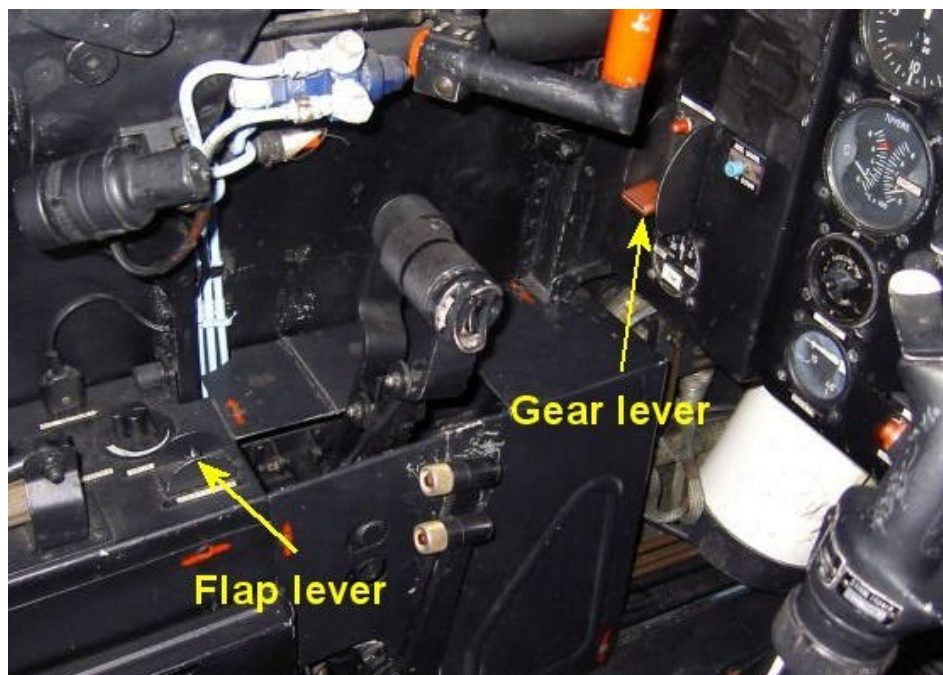
Gear lever Fouga Magister



Flap lever Cessna



Flap lever Beechcraft



Position of the gear lever and flap lever in the F-GSHG aft cockpit.

It is most likely that the aft gear lever was lifted at the same moment the left main gear strut was fully extended at the moment the aircraft pitched up which enabled the gear lever to be manually moved to the upward position. Since no technical defects were found and the override buttons were not used, this would be the only technical possibility for the gear to retract. The damage of the right main gear and right hand gear door demonstrates that the aircraft had a small bank angle to the right upon gear retraction.