INCIDENT

Aircraft Type and Registration:	Reims Cessna FR172K, G-PJTM
No & type of Engines:	1 Continental IO-360-KB piston engine
Year of Manufacture:	1977
Date & Time (UTC):	25 June 2006 at 1340 hrs
Location:	Final approach to Runway 09 at Filton, Bristol
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - 1
Injuries:	Crew - None Passengers - None
Nature of Damage:	Damage to propeller and engine cowling
Commander's Licence:	Commercial Pilot's Licence
Commander's Age:	42 years
Commander's Flying Experience:	904 hours (of which 500 were on type) Last 90 days - 49 hours Last 28 days - 21 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot and examination of the propeller by AAIB

Synopsis

Whilst on approach to Filton, a loud 'thud' was both heard and felt by the pilot. Damage was subsequently found to be present on the propeller blades, the cowling and on the cooling fins of the two front right cylinders on the engine. There was no direct evidence to indicate that the aircraft had struck an airborne object, or that any part of the aircraft had become detached to cause the observed damage. A witness mark on one propeller blade suggested that the object may have been a tool which migrated forward from the engine compartment to be struck by the propeller.

History of the flight

Following an uneventful flight from Haverfordwest, the aircraft was on final approach to Runway 09 at Filton when, at a distance of 3.8 nm from the threshold and at a height of 1,300 ft, there was what the pilot described as a "very loud and forceful thud" at the front of the aircraft. The engine continued to run normally but, fearing damage to the nosewheel, the pilot declared a PAN and shut down the engine immediately prior to touchdown to reduce the risk of damage. However, the landing was uneventful and, having stopped on the runway, the aircraft was met by airfield operations staff.

Aircraft examination

Subsequent inspection of the aircraft revealed that both propeller blades had sustained heavy impacts on their rear faces, Figure 1, one of which had resulted in a bulge appearing on the surface of the front face. There was also a significant impact on one of the leading edges that had resulted in the removal of material, Figure 2. In addition, the forward face of the engine cowling had received one or more impacts that had caused the paint to flake off over a considerable area, Figure 3. Inside the engine compartment, there was evidence of mechanical damage over a small area of the fins of the front two cylinders (Nos 3 and 5) on the right side, Figure 4. No part of the aircraft had become detached which could have been responsible for the observed damage.

Figure 1

Impact damage to aft face of propeller blade

Figure 2

Damage to propeller leading edge

Figure 3

View showing damage to front of engine cowling

Figure 4

View of marks on cylinders

Analysis

It was considered unlikely that the damage was caused as a result of a collision with an airborne object, as it is unlikely that such an object could have penetrated the propeller disc to make the marks on the cylinders fins. The nature of the damage to the blades suggested a direct impact from behind, as opposed to a glancing blow, with the object ricocheting between the propeller disc and engine/cowling, damaging the cowling and fins, before falling away. Whilst a list of possible objects capable of causing such damage could include a model aircraft, there was no residue on the propeller or elsewhere that pointed to such an occurrence.

The aircraft had undergone a '50 hour' maintenance check approximately four flying hours prior to the incident. The available evidence suggested the possibility that a loose article left in the engine compartment had migrated forwards and out of the cooling air intake. It could then briefly have ricocheted between the propeller disc and the engine/cowling before falling away. However, the object would have had to move forwards against the airflow through the engine compartment, although this would have been much reduced on the approach in comparison to the cruise.

As a suggestion of the type of article that could have been responsible for the damage, Figure 5 shows a photograph of a ratchet adaptor, the serrated edge of which appears to be similar to that seen on the propeller blade shown in Figure 1.

Figure 5

Type of article that may have caused the damage to the aircraft