Interim Report AO-2017-001: collision with terrain, Eurocopter AS350-BA, ZK-HKW,
Port Hills, Christchurch, 14 February 2017

The Transport Accident Investigation Commission is an independent Crown entity established to determine the circumstances and causes of accidents and incidents with a view to avoiding similar occurrences in the future. Accordingly it is inappropriate that reports should be used to assign fault or blame or determine liability, since neither the investigation nor the reporting process has been undertaken for that purpose.

The Commission may make recommendations to improve transport safety. The cost of implementing any recommendation must always be balanced against its benefits. Such analysis is a matter for the regulator and the industry.

Interim Report

Aviation inquiry AO-2017-001
collision with terrain
Eurocopter AS350-BA, ZK-HKW
Port Hills, Christchurch
14 February 2017

Approved for publication: March 2017

Transport Accident Investigation Commission

About the Transport Accident Investigation Commission

The Transport Accident Investigation Commission (Commission) is a standing commission of inquiry and an independent Crown entity responsible for inquiring into maritime, aviation and rail accidents and incidents for New Zealand, and co-ordinating and co-operating with other accident investigation organisations overseas. The principal purpose of its inquiries is to determine the circumstances and causes of occurrences with a view to avoiding similar occurrences in the future. Its purpose is not to ascribe blame to any person or agency or to pursue (or to assist an agency to pursue) criminal, civil or regulatory action against a person or agency. The Commission carries out its purpose by informing members of the transport sector and the public, both domestically and internationally, of the lessons that can be learnt from transport accidents and incidents.

Commissioners

Chief Commissioner	Jane Meares
Deputy Commissioner	Peter McKenzie, QC
Commissioner	Stephen Davies Howard
Commissioner	Richard Marchant

Key Commission personnel

Chief Executive	Lois Hutchinson
Chief Investigator of Accidents	Captain Tim Burfoot
Investigator in Charge	Steve Walker
General Counsel	Cathryn Bridge

Email	inquiries@taic.org.nz
Web	www.taic.org.nz
Telephone	+ 64 4 473 3112 (24 hrs) or 0800 188 926
Fax	+ 64 4 499 1510
Address	Level 11, 114 The Terrace, PO Box 10 323, Wellington 6143, New Zealand

Important notes

Nature of this report

This is an interim report. It is not a draft report prepared for comment but a complete report that the Commission believes is necessary or appropriate in the interests of transport safety.

This interim report presents some of the facts and circumstances established up to this point in the Commission's inquiry, and contains no analysis or final conclusions. Any extrapolation of the information given in this report would be speculation.

Final report may include different information

The Commission will publish a final report on the accident after it completes its inquiry. That report will contain an analysis of the facts of the accident, findings and recommendations. The information contained in the Commission's final report may differ from the information contained in this interim report.

Citations and referencing

Information derived from interviews during the Commission's inquiry into the accident is not cited in this interim report. Documents that would normally be accessible to industry participants only and not discoverable under the Official Information Act 1982 have been referenced as footnotes only. Other documents referred to during the Commission's inquiry that are publicly available are cited.

Photographs, diagrams, pictures

Unless otherwise specified, photographs, diagrams and pictures included in this interim report are provided by, and owned by, the Commission.

Verbal probability expressions

The expressions listed in the following table are used in this report to describe the degree of probability (or likelihood) that an event happened or a condition existed in support of a hypothesis.

Terminology (adopted from the Intergovernmental Panel on Climate Change)	Likelihood of the occurrence/outcome	Equivalent terms
Virtually certain	> 99% probability of occurrence	Almost certain
Very likely	> 90% probability	Highly likely, very probable
Likely	> 66% probability	Probable
About as likely as not	33% to 66% probability	More or less likely
Unlikely	< 33% probability	Improbable
Very unlikely	< 10% probability	Highly unlikely
Exceptionally unlikely	< 1% probability	

AS350-BA, ZK-HKW

(Courtesy of Way to Go Heliservices)

Source: mapsof.net

Location of accident

Contents

Figures

Abbreviations

BEA	Bureau d'Enquêtes et d'Analyses pour la sécurité de l'aviation civile (France)
Commission	Transport Accident Investigation Commission

Glossary

dipping point	a location for filling a bucket, usually a pond or other water storage area
monsoon bucket	a large bucket slung beneath a helicopter for dropping water on a fire or other target

Data summary

Aircraft particulars

Aircraft registration:	ZK-HKW
Type and serial number:	Eurocopter[1] AS350-BA, 1360
Number and type of engines:	one Honeywell LTS 101-600A-3A turbo-shaft
Year of manufacture:	1980
Operator	Way To Go Heliservices
Type of flight:	firefighting
Persons on board:	one
Pilot's licence:	commercial pilot licence (helicopter)
Pilot's age:	38
Pilot's total flying experience:	2,350 hours (approximately)

Date and time	14 February 2017, 1420[2]
Location	Port Hills, Christchurch
	latitude: 43° 36.4´ south
	longitude: 172° 39.5´ east
Injuries	one fatal
Damage	helicopter destroyed

[1] Since 2014 known as Airbus Helicopters.
[2] Times in this report are New Zealand Daylight Time (co-ordinated universal time + 13 hours) and expressed in the 24-hour format.

1. Executive summary

1.1 On the afternoon of 13 February 2017, wildfires broke out on the Port Hills between Lyttelton Harbour and the south-eastern suburbs of Christchurch. A major effort began early the following day to control the fires, using large ground parties assisted by up to 12 helicopters and two aeroplanes. In the early afternoon one of the helicopters, a Eurocopter AS350 'Squirrel' registered ZK-HKW, crashed while the pilot was returning to the dipping pond to refill the firefighting monsoon bucket. The pilot was killed and the helicopter was destroyed.

1.2 Evidence showed that the monsoon bucket suspension cables struck the tail rotor, damaging the tail rotor and causing the loss of the entire vertical stabiliser from the tail boom. After the loss of the vertical stabiliser, the helicopter rolled to the right and descended until it struck the ground.

1.3 Underslung loads flying back into the tail rotor is a known risk to helicopter sling operations. There is advice available to help pilots and operators to prevent this type of accident.

1.4 On 26 April 2017 a recommendation was made to the Director of Civil Aviation that he use this interim report, the attached service letter from Eurocopter (Service Letter No. 1727-25-05) and any other pertinent material to remind the aviation industry of the lessons learned from accidents involving sling loads, in particular with monsoon buckets during firefighting operations.

2. Conduct of the inquiry

2.1. At about 1525 on Tuesday 14 February 2017, the Transport Accident Investigation Commission (Commission) contacted the New Zealand Police in Christchurch, which confirmed media reports of a helicopter accident on the Port Hills. A Commission investigator arrived at the accident site at 1630 and made an initial assessment of the site. The Commission subsequently opened an inquiry under section 13(1) of the Transport Accident Investigation Commission Act 1990 and appointed an investigator in charge.

2.2. On 15 February 2015 two additional investigators arrived in Christchurch and a site examination was completed. The wreckage was removed from the site on 16 February and transported to a secure location and then to the Commission's technical facility in Wellington.

2.3. On 16 February 2017 the Bureau d'Enquêtes et d'Analyses pour la sécurité de l'aviation civile (BEA) appointed one of its investigators to be the Accredited Representative for France, the State of Manufacture of the helicopter, in accordance with Annex 13 to the Convention on International Civil Aviation. The BEA appointed Airbus Helicopters as its technical adviser.

2.4. The National Transportation Safety Board of the United States, the State of Manufacture of the engine, did not appoint an Accredited Representative, but did offer technical support.

2.5. On 17 February 2017 the investigation team commenced witness interviews and began to gather relevant information.

2.6. On 29 March 2017 the Commission approved this interim report for publication.

3. Factual information

The circumstances of the accident

3.1. On the afternoon of 13 February 2017, wildfires broke out on the Port Hills between Lyttelton Harbour and the south-eastern suburbs of Christchurch. That evening the fire authority used helicopters to survey the extent of the fires and for the evacuation of some people. One of the helicopters was a Eurocopter AS350-BA, registered ZK-HKW (the helicopter). The pilot of this helicopter flew back to his base at Rangiora Aerodrome at about dusk.

3.2. At about 0540 on 14 February 2017, the pilot departed from Rangiora to re-join the firefighting operation, which now involved more helicopters and, occasionally, two aeroplanes. The Air Attack Supervisor (supervisor) briefed the pilots on the situation and the planned operations for that day, the expected weather, the known hazards and general procedures. The supervisor was an experienced park ranger who was familiar with the area and had extensive experience in fighting wildfires and in controlling firefighting aircraft. The supervisor oversaw the aviation effort from another helicopter flown by a pilot who was experienced in helicopter firefighting and able to advise the supervisor on helicopter matters.

3.3. The supervisor allotted separate sectors of the fire to two groups of helicopters and appointed a lead pilot for each group, largely based on the pilot's firefighting experience. The pilot of the helicopter that crashed was a designated lead pilot for the Marleys Hill fire sector. The supervisor gave further instructions to the lead pilots, who then each briefed the other pilots in their group on the agreed circuit pattern and radio procedures for their sector.[3] The circuits flown between the allocated dipping points[4] and drop points provided separation between the groups, but each pilot was responsible for the safe operation of their aircraft and for their separation from other aircraft.

3.4. During the morning the pilot's group of three helicopters operated at several locations on the Port Hills. After the lunch break the group was directed to drop on fires near the Sign of the Kiwi, a café at the junction of Summit Road and Dyers Pass Road. The dipping point was a pond adjacent to Summit Road about two kilometres north-east of the fires. The pilots flew a left-hand pattern between the dipping point and the fire, around the Sugarloaf[5] (see Figure 1). The circuit visibility was clear of smoke, except above the fire. The time taken by the pilots to complete one circuit, dipping, dropping and returning to the dipping pond, was between three and four minutes.

[3] Each group was assigned its own radio frequency for position reporting and chatter. Pilots also monitored the supervisor's Fire Control frequency for instructions.
[4] A dipping point is a location for filling a bucket, usually a pond or other water storage area.
[5] A prominent hill with a television transmitter tower on the summit.

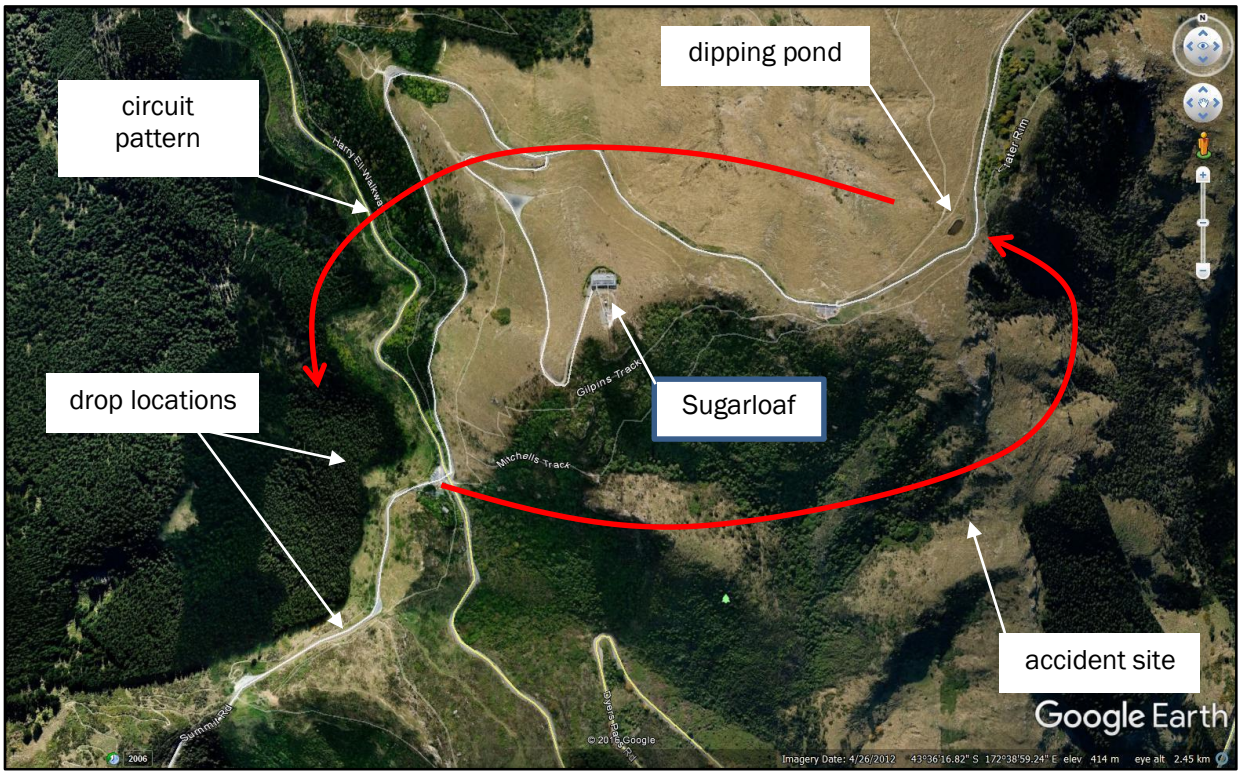


Figure 1
Location map

3.5. At about 1405 an abbreviated Mayday[6] call was heard by several pilots, but it was not clear on which radio frequency the call was made. The supervisor asked for a roll call of all the aircraft involved, to which the pilot did not respond. After a brief search, another pilot in the group found the helicopter wreckage on a steep slope near the head of a gully east of the Sugarloaf. The pilot had died in the crash.

3.6. The supervisor instructed all helicopters to return to the staging area and shut down. Firefighting flights did not resume until the pilots had been debriefed and had a mandatory rest, and each pilot had decided whether they would continue with the firefighting operation.

Wreckage examination

3.7. The helicopter had struck a steep, tussock-covered slope. Main rotor strikes on the slope indicated that the helicopter had very likely been in a steep bank[7] to the right when it struck the ground. The helicopter had tumbled further down the slope and come to rest inverted. The damage to the fuselage from the initial ground strike was predominantly to the front right section of the cabin.

3.8. The body of the pilot was found outside the fuselage.

3.9. The main rotor damage was consistent with the rotor having been driven by the engine at impact. The main rotor, the transmission and the engine had separated from the fuselage. The tail rotor assembly, including the gearbox, had separated from the tail boom after the helicopter struck the ground.

[6] A Mayday call is a distress message indicating a condition of being threatened by serious and/or imminent danger and of requiring immediate assistance.
[7] Bank angle is the angle between the vertical axis of an aircraft and the horizon during a turn.

3.10. The damage to the tail rotor blades was consistent with their having struck the wire suspension cables of the monsoon bucket[8] where the cables were joined to the lifting strop. There was corresponding damage on the cable cluster (see Figures 2 and 3). The bucket and the strop remained attached to the helicopter's fixed hook.

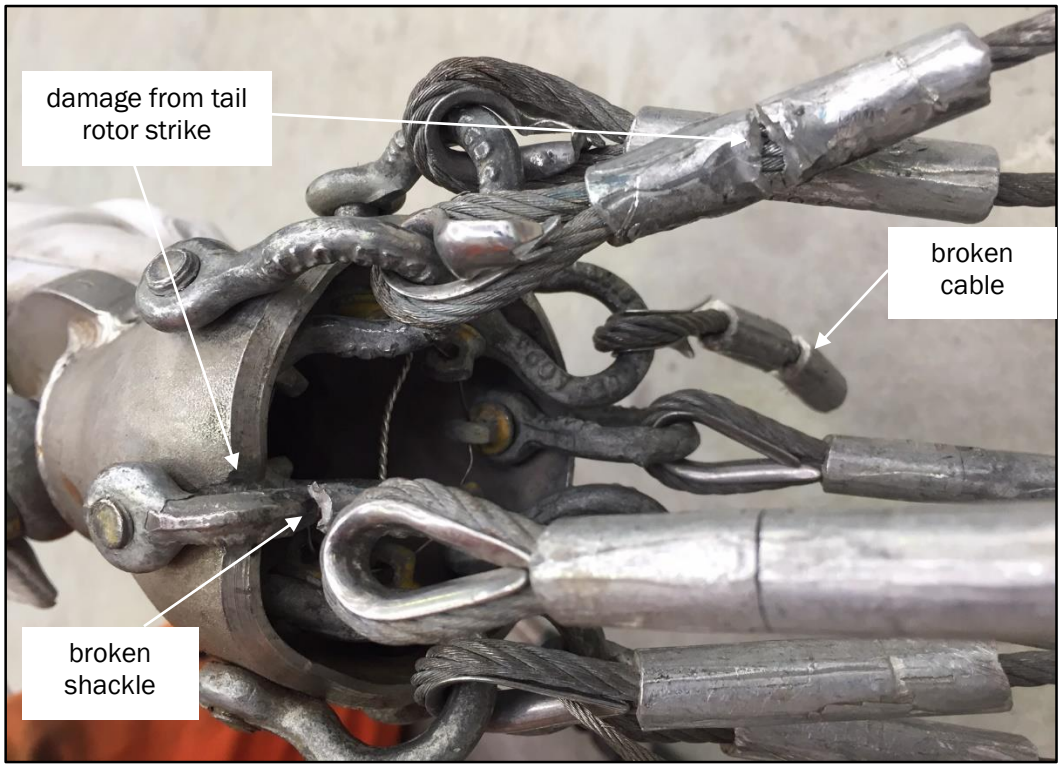


Figure 2
Damage to the monsoon bucket cables

[8] A monsoon bucket is a large bucket slung beneath a helicopter for dropping water on a fire or other target.

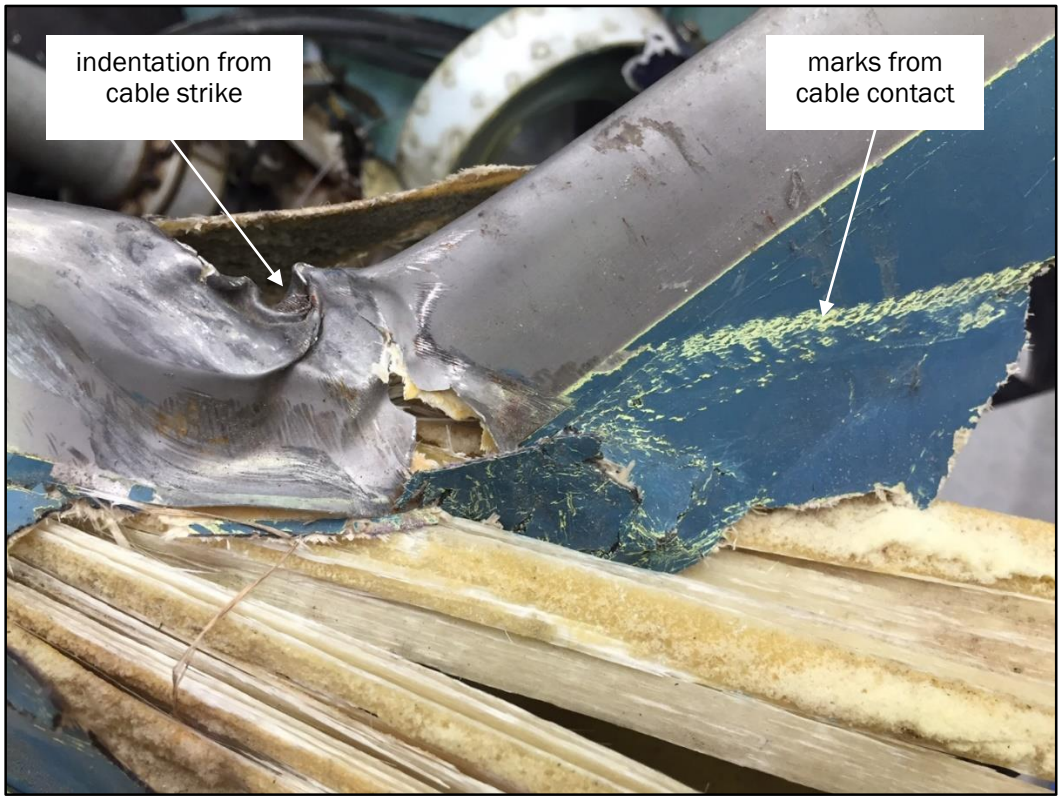


Figure 3
Damage to the tail rotor blade leading edge

3.11. The vertical stabiliser had separated from the tail boom and was found approximately 300 metres before the main wreckage.

3.12. The fuel tank remained intact and appeared to be approximately a quarter full. There was no leaking fuel at the site and no fire.

3.13. All major components of the helicopter were accounted for (see Figure 4).

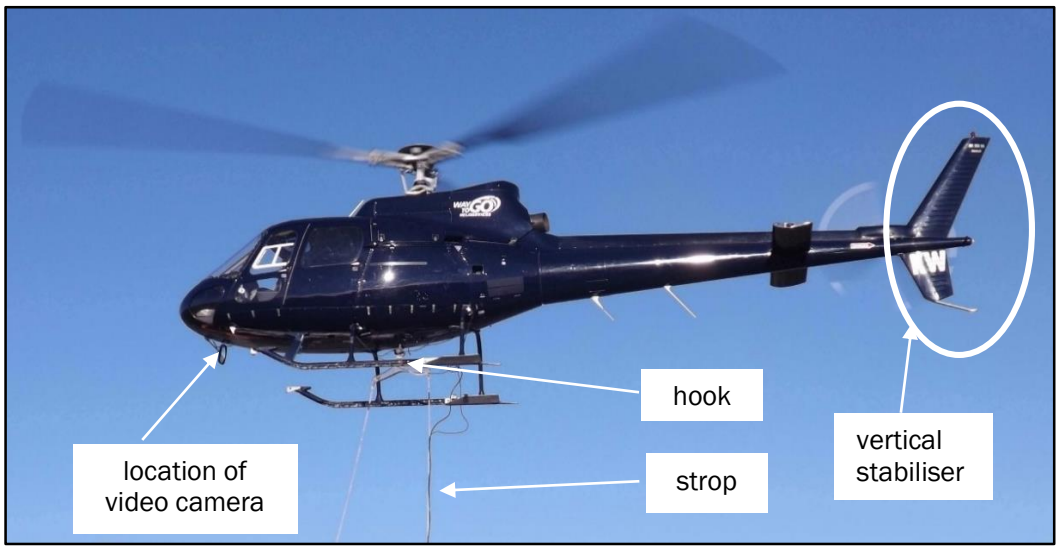


Figure 4
Locations of significant items mentioned

Recorded data

3.14. A digital video camera that had been mounted under the forward fuselage, pointing down and aft toward the monsoon bucket, recorded the entire flight. The video showed that the bucket had flown up towards the tail while the helicopter was returning to the dipping pond.

3.15. The video also showed that the bucket had not contacted the ground prior to the tail rotor strike. After the vertical stabiliser detached, the helicopter had entered a gradual descending right roll until it struck the ground.

The helicopter

3.16. ZK-HKW was a Eurocopter AS350-BA helicopter, serial number 1360, manufactured in France in 1980. It was powered by one Honeywell LTS101-600A-3A engine. The helicopter had flown a total of 9,127 hours.

3.17. An annual review of airworthiness had been completed on 1 February 2017. The most recent scheduled maintenance had been a combined 150-hour/annual airframe inspection carried out on 8 February 2017.

3.18. The pilot flew from the right seat. To assist pilots when they were carrying out underslung work, such as firefighting, the pilot's seat base had been modified so that it could be moved to the right. There was a window in the floor outboard of the seat that could be uncovered so that the pilot could look down at the underslung load. In addition, the collective lever was fitted with an extension. Both of the right doors had been removed, but the left doors remained fitted and closed.

3.19. The monsoon bucket was a collapsible type with a capacity of 1,000 litres. The water drop valve was pneumatically actuated, and electrically commanded by a button on the cyclic stick. It was attached to a strop of approximately six metres in length, making a total length for the underslung load of approximately 10 metres.

3.20. The helicopter had a bleed-air take-off from the engine, which provided the motive power for the monsoon bucket drop valve. A detachable flexible hose connected the helicopter to the monsoon bucket pneumatic selector valve assembly.

The pilot

3.21. The pilot had started training to fly helicopters in August 1998 and gained his commercial helicopter pilot licence in 2002. His total helicopter flying experience was about 2,350 hours, of which approximately 500 hours were on the AS350 helicopter type.

3.22. In January 2008 he had joined Way To Go Heliservices (the operator) as a contract pilot and ground crew member, but he had left in August 2009. He had returned in January 2013 as a full-time pilot.

3.23. In March 2013 the pilot had begun his training in firefighting with a monsoon bucket. He had accrued about 80 hours of firefighting experience.

3.24. He held a valid class 1 medical certificate with no restrictions, and was reported to be healthy and in good spirits on the day of the accident.

The operator

3.25. The operator was certificated under Civil Aviation Rules Part 119 to conduct commercial and charter operations, and had been performing this work in the Canterbury region since 2009. It operated three types of helicopter.

Firefighting operations

3.26. Firefighting air operations are covered by Civil Aviation Rules Part 91, General Operating and Flight Rules, and Part 133 External Load Operations. The integration of the air operation with the overall firefighting effort is covered by a New Zealand Standard; National Rural Fire Authority: Standard for Use of Aircraft at Wildfires, which was issued in August 2015.

Historical data and safety lessons

3.27. Eurocopter's accident database had numerous instances of underslung load lines contacting tail rotors, with a variety of causes. Some of these accidents had occurred while the helicopters were employed in firefighting roles. In 2006 the manufacturer had issued Service Letter No. 1727-25-05 (see Appendix 1) to inform pilots of the lessons learned from an analysis of these accidents.

3.28. The circumstances that have been established so far during the investigation of this accident indicate that the advice in the appended Eurocopter service letter might have relevance to this accident. The Commission is recommending that the Civil Aviation Authority use this interim report, the service letter from Eurocopter and any other pertinent material to remind the aviation industry of the lessons learned from accidents involving sling loads, in particular the use of monsoon buckets during firefighting operations.

4. Further lines of inquiry

4.1. The current and future lines of inquiry include, but are not limited to, the following topics:

- further examination of the wreckage, including the engine and the bucket assembly
- the procedures for the conduct and control of aerial firefighting operations, including the management of pilot fatigue
- the regulatory oversight of the operator and firefighting operations
- the operating procedures and limitations for monsoon buckets
- the pilot's training and employment history, particularly in firefighting operations
- the pilot's medical fitness to fly
- the meteorological conditions around the time of the accident
- witness interviews
- the collection and analysis of recorded data to determine the flight path
- a review of similar occurrences
- the nature of the flight path.

4.2. The Commission's inquiry will involve the manufacturers of the helicopter and its engine, and any other relevant experts as required.

5. Safety recommendation

5.1. On 26 April 2017 a recommendation was made to the Director of Civil Aviation that, as a matter of urgency, he use this interim report, the service letter from Eurocopter (Service Letter No. 1727-25-05) and any other pertinent material to remind the aviation industry of the lessons learned from accidents involving sling loads, in particular the use of monsoon buckets during firefighting operations. (015/17)

On 2 May 2017, Civil Aviation Authority replied:

> Thank you for the opportunity to comment on the recommendation. The Director accepts the recommendation and will implement it as soon as practicable. In doing so, the CAA have a number of options available for alerting the aviation industry concerned. These options will be considered as to the preferred action response in due course.

Appendix: Eurocopter Service Letter No. 1727-25-05

eurocopter
an EADS Company

DIFFUSION/ISSUE
AUSGABE/PUBLICATION

Q | G

Service à la Clientèle
Direction Technique Support

13725 Marignane Cedex - France
Tél. + 33 (0) 4 .42.85.85.85 - Fax. + 33 (0) 4.42.85.99.66
Télex HELIC 420506
Télégramme : EUROCOPTER Marignane

Lettre-Service
No. 1727-25-05

Marignane, 30.03.2006

SUBJECT:

EQUIPMENT AND FURNISHINGS: Sling Work

Important: The information contained in this Service-Letter is intended mainly for pilots.

332	B	B1	M	M1	F1	C	C1	L	L1	L2
532	UL	AL	SC	AC	UC	A2	U2	UE		
EC225	LP									
EC725	AP									

350	D	B	B1	B2	B3	BA	BB	L1
550	U2	C2	C3	A2				
355	E	F	F1	F2	N			
555	MN	UN	SN	UF	AF	AN		
EC130	B4							

360	C											
365	C	C1	C2	C3	N	N1	N2	N3	K	F	Fs	Fi
366	G1	Ga										
565	SA	SB	UB	MA	MB	AA						
EC155	B	B1										

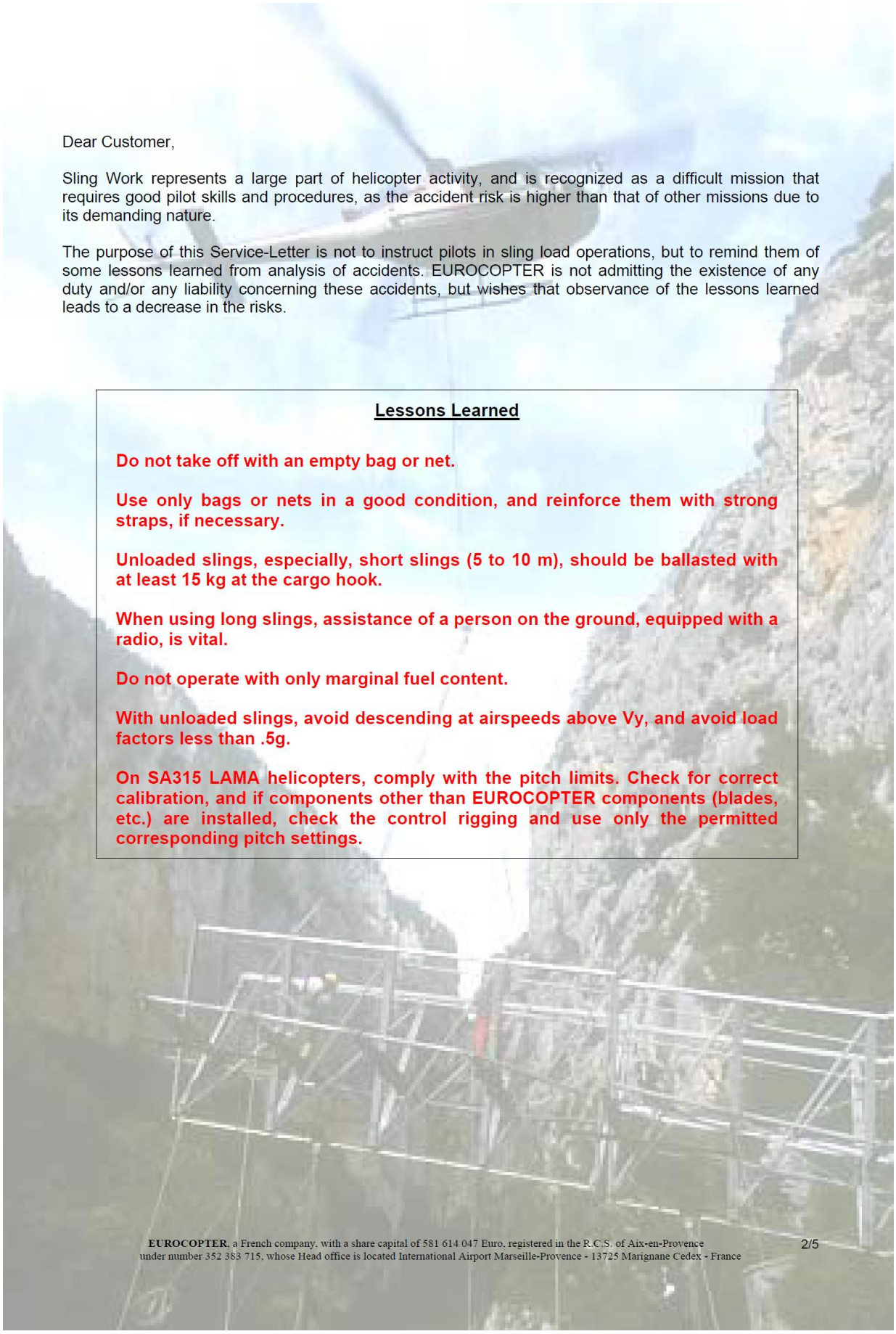
EC120	B

321	Ja	Ga	Gb	Gc

330	Sm	Ba	Ea	C	Ca	H	L	F	G	J	S1	JM	B

341	B	C	D	E	F	G	H
342	J	K	L	L1	M	M1	

AL II	313A	313B		
AL II ASTAZOU	318A	318B	318C	
AL III	316A	316B	316C	319B
LAMA	315B			



Dear Customer,

Sling Work represents a large part of helicopter activity, and is recognized as a difficult mission that requires good pilot skills and procedures, as the accident risk is higher than that of other missions due to its demanding nature.

The purpose of this Service-Letter is not to instruct pilots in sling load operations, but to remind them of some lessons learned from analysis of accidents. EUROCOPTER is not admitting the existence of any duty and/or any liability concerning these accidents, but wishes that observance of the lessons learned leads to a decrease in the risks.

Lessons Learned

Do not take off with an empty bag or net.

Use only bags or nets in a good condition, and reinforce them with strong straps, if necessary.

Unloaded slings, especially, short slings (5 to 10 m), should be ballasted with at least 15 kg at the cargo hook.

When using long slings, assistance of a person on the ground, equipped with a radio, is vital.

Do not operate with only marginal fuel content.

With unloaded slings, avoid descending at airspeeds above Vy, and avoid load factors less than .5g.

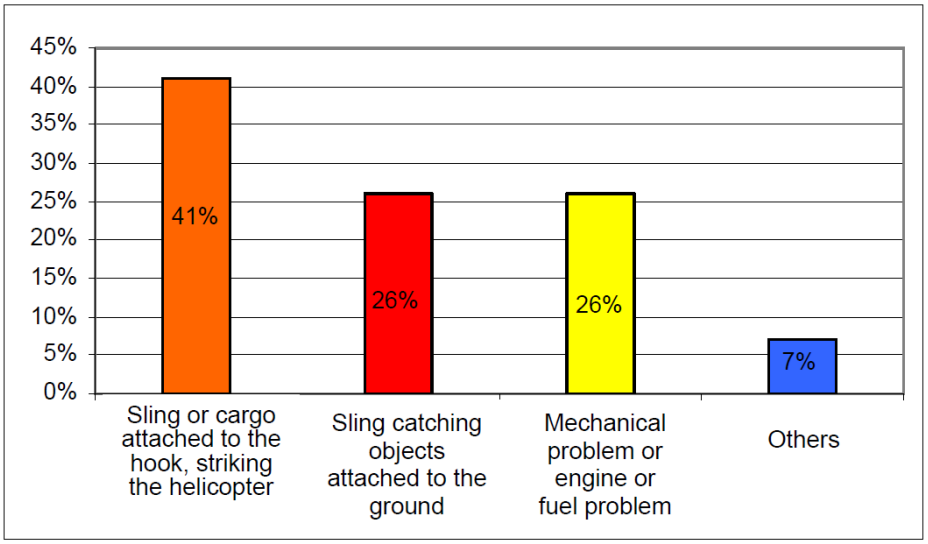
On SA315 LAMA helicopters, comply with the pitch limits. Check for correct calibration, and if components other than EUROCOPTER components (blades, etc.) are installed, check the control rigging and use only the permitted corresponding pitch settings.

1) <u>Accidents reported over the last 6 years</u>:

Type of aircraft:

41%	SA315	LAMA
4%	SA316	ALOUETTE III
55%	AS350	ECUREUIL
0%		DAUPHIN - PUMA - SUPERPUMA

Types of accidents:



2) <u>The causes broken down into 4 categories</u>:

In most of the cases (41%), the sling contacts the tail rotor, which may cause the TGB and parts of the fin to be damaged. The two main reasons are either an abrupt dive maneuver or bursting of the bag which behaves like a parachute when empty. In both cases, the cable and its cargo are subject to airstream loads which prevail over the weight of the cable and cargo. Consequently, the sling or load follows the airstream into the tail rotor area.

The second category includes cases in which the sling becomes entangled with objects on the ground (26%). Most of these cases could have been avoided if there had been a person on the ground to warn the pilot, who cannot see the hook clearly due to the length of the cable. This category also includes cases of slings becoming entangled in aerial lines.

The third category mainly includes LAMA helicopters with several cases of excessive use of collective pitch which, in hot weather or at altitude, causes the engine to surge and can then lead to its destruction (single-shaft engine). In cold weather and at low altitude, repeated torque exceedance can cause damage to the drive train. One LAMA helicopter was involved in an accident due to lack of fuel.

The fourth category includes a dynamite explosion which occurred during a sling operation, and a case of suspected transient control jamming. This event is still under investigation.

3) Solutions

Ballast slings, especially those that are less than 10 m long. The effect is obvious in stabilized flight. During descents at airspeeds above Vy, it is possible for the sling to move upward, even with ballast, at load factors less than .5g. This phenomenon can be avoided by conducting descents at airspeeds below Vy.

Failure of a bag can prove to be dangerous given the significant aerodynamic drag to which the empty bag is exposed. Even with no load factor, the sling and bag can move upward toward the tail rotor. You must use very solid bags which are in a good condition, reinforced with solid straps, if necessary. Consideration may be given to utilizing nets rather than bags when the load will allow this alternative.

REMARK:
In the event of tail rotor contact and loss of control consider the following procedure.
Depending on weight, damage, altitude and airspeed, the suggested procedure will be more or less effective, but may provide the best alternative for this circumstance.
The helicopter will start a quick leftward rotation (rotor rotating clockwise), and even if the pilot did not respond early enough, and the helicopter has already rotated several turns, proceed as follows:
- Select full low pitch.
- Shut down the engine completely
- If possible, establish a speed of 40 kt as soon as the helicopter stops rotating. In case of a loss of the tail fin, the decent will be vertical.
- Down to a height of approx. 200 m above the ground, the situation seems to have become normal, then the sensation of vertical speed will become more and more obvious.
- Start increasing the pitch at a height that is twice the usual height for an autorotation. The touchdown will be hard, but survivable. (High-energy absorbing seats increase the survivability considerably).

Attempts to take off with the sling caught on the ground can be avoided if a person, in radio-contact with the pilot, monitors the operation from the ground. This is vital when the cargo hook is not clearly visible either directly or in the mirror. In addition, it is recommended to avoid aggressive take-offs, and to start with a vertical climb before transition to level flight. Thus, the pilot should become aware of a snag because of the restricted climbing capability.

Sling Work is often carried out in a relatively low fuel state (with a remaining fuel quantity of less than 10%). LAMA helicopters are fitted with a very-low-fuel-level option. This option is not available on AS350 helicopters. For helicopter versions up to version B2 inclusive, when the fuel probe indicator has reached “0”, there are only 2 minutes of flying left, and when the fuel pressure drops to zero, there are only 10 seconds left, until engine flame-out occurs. On helicopter version B3 and EC130 B4 helicopters, these 10 seconds are reduced to zero. Due to the shape of the tanks and the technology of the fuel probes installed on AS350 helicopters, the equipment proves to be accurate since capacitance probes were introduced to service in 1992. However, be more careful with resistance probes. Get used to checking that the indications are consistent with the partial top-ups, and do not wait until there are only a few liters of fuel left.

The single-shaft engine of the LAMA helicopter is an old design and has particular characteristics. Exceeding of thermal power limits may result in surging which subsequently might result in heavy damage of the engine. On engines of more recent design, e.g. ARRIEL engines, any thermal power exceedance just results in NG or T4 exceedance and is harmless if it does not last for more than 5 to 10 seconds and if the limits specified in the Flight Manual are not exceeded.

LAMA helicopters are not equipped with a torquemeter. Consequently, compliance with the power limits is ensured by accurate adjustment and correct determination of the pitch limit. On AS350 B3 helicopters, a pitch error of 0.5° equals 13% of torque. The sum of these errors (e.g. resulting from a pitch error of 0.5° plus an error of 0.5° made by the pilot) in addition to the installation of rotor blades from outside sources not recommended by EUROCOPTER, without taking the corresponding maximum pitch reduction into account may cause the torque limit to be exceeded in the magnitude of 30%,.
In cold weather, with the same pitch, the torque increases. The exceptional performances of the LAMA helicopter hide torque exceedances that may cause damage to the dynamic components.

4) Flight Manual Familiarity

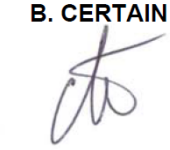
Most of the recommendations noted in this Service-Letter are specified in the various Flight Manuals. For example, refer to:

315 LAMA	SUPP 1
350 B2	SUPP 9.1
350 B3	SUPP 13
EC120 B	SUPP 10.1

We hope that this document assists you in operating your helicopter or fleet safely.

Yours sincerely,

B. CERTAIN



Consultant Expert

M. SOULHIARD

Technical Support
Operations Director

Recent Aviation Occurrence Reports published by the Transport Accident Investigation Commission (most recent at top of list)

AO-2013-011	Runway excursion, British Aerospace Jetstream 32, ZK-VAH, Auckland Airport, 2 November 2013
AO-2014-006	Robinson R44 II, ZK-HBQ, mast-bump and in-flight break-up, Kahurangi National Park, 7 October 2014
Interim Report AO-2016-007	Collision with terrain, Robinson R44, ZK-HTH, Glenbervie Forest, Northland, 31 October 2016
AO-2014-004	Piper PA32-300, ZK-DOJ, Collision with terrain, Near Poolburn Reservoir, Central Otago, 5 August 2014
AO-2015-002	Mast bump and in-flight break-up, Robinson R44, ZK-IPY, Lochy River, near Queenstown, 19 February 2015
AO-2013-008	Boeing 737-300, ZK-NGI, Loss of cabin pressure, near Raglan, Waikato, 30 August 2013
AO-2013-003	Robinson R66, ZK-IHU, Mast bump and in-flight break-up, Kaweka Range, 9 March 2013
AO-2014-002	Kawasaki BK117 B-2, ZK-HJC, Double engine power loss, Near Springston, Canterbury, 5 May 2014
AO-2013-006	Misaligned take-off at night, Airbus A340, CC-CQF, Auckland Airport, 18 May 2013
AO-2010-009	Addendum to Final Report: Walter Fletcher FU24, ZK-EUF, loss of control on take-off and impact with terrain, Fox Glacier aerodrome, South Westland, 4 September 2010
AO-2012-002	Airbus A320 ZK-OJQ, Bird strike and subsequent engine failure, Wellington and Auckland International Airports, 20 June 2012
AO-2013-005	In-flight loss of control, Robinson R22, ZK-HIE, near New Plymouth, 30 March 2013
AO-2013-007	Boeing 737-838, ZK-ZQG, stabiliser trim mechanism damage, 7 June 2013
AO-2013-009	RNZAF Boeing 757, NZ7571, landing below published minima, Pegasus Field, Antarctica, 7 October 2013
AO-2013-002	Robinson R44, ZK-HAD, engine power loss and ditching, Lake Rotorua, 24 February 2013

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