

PART 1.3 – NARRATIVE OF EVENTS

All times local (Zulu plus 1 hour).

Synopsis

1.3.1 At 1405 on 1 Dec 11, Lynx AH Mk7 XZ210 of 1 Regiment Army Air Corps (1 Regt AAC) departed Gütersloh with a crew of 3 on a routine training flight. The sortie was being flown as part of a 6 monthly Qualified Helicopter Instructor (QHI) check for the left hand seat (LHS) Pilot with an intended profile of a standard tasking scenario including some low level navigation. Simulated aircraft (ac) emergencies were introduced by the ac commander (ac cdr) at various stages of the sortie.

Witness 1
Witness 2

1.3.2 After approximately 1hr 35 mins of flight while in the cruise, having completed various general handling manoeuvres without incident, a major mechanical event within the No2 (starboard) engine took place which initiated an airborne fire within and around the engine bay area. The crew heard a loud bang coupled with the illumination of several red and amber captions on the Central Warning Panel (CWP) and associated audio warning; additionally, the handling pilot reported loss of ac stability.

Witness 1
Exhibit 103

1.3.3 During the initial diagnosis by the handling pilot (QHI) in the right hand seat (RHS), the crewman (CM) observed smoke entering the cabin from the vicinity of the lower aft section of the starboard cabin door. With the ac already in a gentle descent at an estimated height of 700-800ft above ground level (agl), the QHI transmitted a partial mayday call. The smoke very quickly filled the whole cabin and cockpit area, such that the crew lost all visual references; as a result, the pilots were unable to see any instrumentation or external visual references. While the ac continued in its descent, at some stage the CM opened the starboard cabin door. Soon afterwards, the smoke cleared sufficiently for the QHI to see a tree ahead of him on the flight path; subsequent avoiding action limited contact to minor impact on the main rotor blades with the outer branches of the tree. 27 seconds (secs) after event initiation, the crew completed a controlled emergency landing in a recently ploughed field at position N52.038 E008.36 (7 NM/018° from Gütersloh Airfield); at that stage the fire had taken hold. As a result of the running landing in soft ground, the ac skids were buried to the belly of the fuselage.

Witness 1

Witness 2
Witness 3

Exhibit 103



Fig 1 - XZ210 on fire at the crash site

Both pilots egressed the burning ac having elected not to carry out the ac shutdown drills other than retarding both Engine Condition Levers (ECLs); the fire extinguisher system was not used. The CM, (S40)

Witness 1
Witness 2
Witness 3

, was unable to operate the emergency release of his MK60 (M) Armour Capable Life Preserver (ACLP) but was able to egress without assistance by releasing the karabiner attaching the strop to the cabin floor. All crewmembers crawled clear of the unusually low rotors which were still turning as the rotor brake had not been applied.

1.3.4 Having been alerted by civilian witnesses, local emergency services arrived at the accident site within a few minutes of the ac landing. Fire crews extinguished the fire and an ambulance crew provided immediate medical care for the CM (S40) and LHS Pilot (S40), later transporting them to the local hospital.

Witness 15
Witness 19

Pre-Accident Events

Aircraft History

1.3.5 XZ210 was a Lynx AH Mk7 Helicopter under the Aircraft Operating Authority (AOA) of the Joint Helicopter Command (JHC). At the time of the accident, it was based at Princess Royal Barracks, Gütersloh as part of 1 Regt AAC. At the start of the sortie the ac had flown 6806 hrs 45 mins and had been at Gütersloh since 16 Sep 10, having previously undergone depth servicing at Fleetlands.

Exhibit 202
Exhibit 204

1.3.6 The last significant scheduled maintenance was a B1¹, completed on 23 Sep 11 by 1 Regt AAC Workshop (Wksp) Royal Electrical Mechanical Engineers (REME), which included a No2 Engine Change Unit (ECU) change. At the start of the sortie the replacement ECU had been run for 58 hrs 25 mins, since installation.

Exhibit 205
Exhibit 197

1.3.7 Following the B1 servicing, normal procedures were carried out to return XZ210 to an airworthy condition. This included the post-fit engine ground run and flight testing of the No2 ECU which were uneventful. Magnetic Detector Plug (MDP) samples were taken at the post-fit engine ground run and first flight points. The post-ground run sample was deemed satisfactory by 1710 Naval Air Squadron (Materials Integrity Group) (1710 NAS (MIG)) but the post-first flight sample showed evidence of a small wire fragment on MDP No5; however, the debris was “not considered critical” by 1710 NAS (MIG), who recommended continuance of the normal sampling regime.

Exhibit 197
Exhibit 206
Exhibit 066

1.3.8 During the normal sampling regime that followed (12.5 hourly intervals), 5 samples were taken before the accident; of those, 3 samples resulted in abnormal debris being identified on MDP No4. As a result, on 2 Nov 11, 1710 NAS (MIG) advised that XZ210 should be placed on a 5 hourly sampling regime.

Exhibit 066

Crew Composition

1.3.9 QHI. The ac cdr, an A2 QHI, was sitting in the RHS, acting as pilot for the purpose of the sortie. He had a total of 4325 hrs Rotary Wing (RW) of which 1588 hrs were on Lynx. He had completed instructor training at Central Flying School (Helicopter) in Mar 09 followed by a tour as a Squirrel QHI at Middle Wallop (MW), re-categorising to A2 QHI on 1 Dec 10. Having completed a Lynx

Exhibit 097

¹ The B1 servicing is a routine front-line task that is conducted every 50hrs on the Lynx Mk7 and focuses on the inspection and servicing of the gearboxes.

Refresher-to-Type (RTT) course culminating in a Lynx Certified to Instruct (C to I) qualification in Sep 11, he arrived at 1 Regt AAC to take over the post of Regt QHI (RQHI) 6 weeks before the accident. At the time of the accident he was Limited Combat Ready (LCR).

1.3.10 **LHS Pilot.** The LHS Pilot was acting as ac cdr for the purpose of the sortie, which was intended to form part of his routine 6-monthly QHI check. A 1st tour pilot, he was LCR with a total of 498 hrs RW flying, of which 289 hrs were on Lynx. He had completed the Army Pilots' Course on the Squirrel at MW in Sep 09. This was followed by Lynx Conversion-to-Type and then Conversion-to-Role (CTR), finishing in Jun 10; while he ultimately completed CTR successfully, he required 2 attempts to pass. He was subsequently posted to 661 Sqn, 1 Regt AAC. His previous QHI check in Jun 11 had graded him as Average.

Exhibit 098

Exhibit 271

Exhibit 272

1.3.11 **CM.** The CM was LCR with a total of 307 hrs flying, all of which were on Lynx. He completed the CMs' course at MW in Mar 10, after which he was posted to 661 Sqn, 1 Regt AAC. At his biannual Standards check in Sep 11, he had been assessed as Average.

Exhibit 099

Exhibit 273

Previous 24 hours

1.3.12 On 30 Nov 11, all 3 crew members were engaged in ground duties at their respective places of work over typical working hours between 0830-1800. The LHS Pilot had arrived at work in time for the morning brief at 0830 expecting to fly his 6-monthly QHI check that day; however, the sortie had to be postponed for 24 hrs as the instructor was engaged in preparations for a forthcoming Military Aviation Authority (MAA) audit. None of the crew reported any reason why fatigue might have been an issue leading up to the accident.

Witness 1

Witness 2

Witness 3

Sortie Details and Preparation

1.3.13 The QHI arrived at work on the day of the accident at around 0800 and started the day with routine admin duties in his office. At approx 0930 he attended the outbrief of a 661 Sqn crew for the first sortie of the day in XZ210, a trooping exercise, which he subsequently authorised. He then attended a meeting in the Regimental Second in Command's office followed by a table top Post Crash Management (PCM) Exercise (1000-1045), covering actions in the event of an off site ac crash. He then returned to his office to continue MAA audit preparation work.

Witness 1

1.3.14 The LHS Pilot had been programmed to night fly on 1 Dec 11 and therefore arrived at work at approximately 1100, having done some light exercise and taken a late breakfast. Revised timings for the 6-monthly QHI check sortie, which had been postponed the previous day, had a planned take off time of 1400. Prior to the sortie outbrief, the LHS Pilot checked his route planning and made the appropriate flight planning bookings through Air Information Services (AIS). Having checked the weather forecast, he had some slight concern that the cloud base and visibility might become a factor for the planned route which involved crossing some high ground.

Witness 2

1.3.15 The CM had arrived in time for morning brief at 0830 and then prepared for his first flight that day, a trooping serial at Halton Training Area in support of Royal Logistic Corps personnel nearing the completion of their Junior Cadre Course. The crew took off in XZ210 from Gütersloh at 1030. At some point during the flight, the ac cdr recalled an attempt to use the cabin heating system in an effort to provide some warmth for the troops being flown; however, while the cockpit

Witness 3

Witness 4

heating operated normally, the cabin system did not, with only unheated air being blown through the cabin vents. The ac landed at 1320 and was shut down prior to being refuelled and prepared for the next sortie. Some cleaning of the cabin was required due to dirt brought in by passengers during the trooping serials. The offgoing ac cdr signed the ac back in as serviceable in the MF700 (ac log book).

Exhibit 203

1.3.16 At 1240 the QHI and LHS Pilot carried out the sortie brief using the standard JHC briefing format (SOP18). The CM was still airborne on the first sortie with the other crew and was therefore not in attendance. This briefing was disturbed on 2 occasions when the QHI took phone calls, believing them to be important calls that he had been expecting related to the MAA audit. Once the brief was complete, the 2 pilots walked to the Safety Equipment Section (SES) to sign out their Mk61(M) ACLPs. It was at this time that the QHI decided that he wished to fly in the RHS in order that he could assess the subject's potential in the ac cdr role; this would also allow him to carry out the ac start for his own practice. They returned to flight planning at approximately 1320, just as XZ210 was landing from the first sortie. The QHI resumed working in his office, adjacent to flight planning. Following his return from the trooping sortie, the CM ate lunch and was briefed by the LHS Pilot (QHI not present) on the sortie details.

Witness 1
Witness 2
Witness 3

1.3.17 At 1340, while the other 2 aircrew were walking to the ac, the QHI checked and signed the MF700. Having noted that the ac appeared to have only 15 mins available until the next maintenance event, he was informed by the duty engineering staff that this was a flexi service which allowed the ac to be flown for a further 2 hrs beyond that limit. He then self authorised and outbriefed the Duty ac cdr (DAC), who had just returned from flying the trooping sortie. The brief covered sortie content, route and a potential diversion; planned emergencies were also briefed out of earshot of the LHS Pilot who was being checked.

Witness 1

Witness 4

Sortie Execution

1.3.18 At 1340, the LHS Pilot and the CM walked to the ac which had been refuelled to 750kg. The LHS Pilot then carried out the external walk round of the ac; other than some grass on the snow guards protecting the engine intakes, there was nothing unusual noted during these checks. The ac cdr joined the rest of the crew in XZ210 at approximately 1350.

Witness 2
Witness 3

1.3.19 The QHI then proceeded to start the ac while the LHS Pilot monitored his checks using the Flight Reference Cards (FRCs). During the check of the Automatic Flight Control System (AFCS), the ac failed the heading hold functional test; however, the QHI elected to accept this minor fault and to continue the sortie. The rest of the start sequence was uneventful and the ac took off at 1405.

Witness 1
Witness 2

1.3.20 The sortie then followed the planned profile of navigation and some general handling exercises, including several simulated emergencies. During the early part of the sortie, the cloud base was confirmed as 1900-2000ft agl. As the sortie progressed, the Direction Indicator was seen to be fluctuating +/- 10° in heading. The CM recalled that during the previous sortie the pilots had been using the compass slave function and a subsequent check identified that the associated switch was in the slave position. Following reset of the switch, full AFCS functionality was restored.

Witness 1
Witness 2

Witness 3
Exhibit 103

1.3.21 In the period leading up to the accident, the QHI was flying the ac at 1100ft (Bar Alt) heading in a South Westerly direction approaching the ridge line near Halle, when he simulated a single DC Generator failure. The malfunction was initiated by the QHI describing the symptoms as they would have appeared in the

Witness 1
Exhibit 049

cockpit, with instructions to carry out touch drills only. The LHS Pilot carried out the immediate actions and was in the process of getting out the FRCs for the subsequent actions when the radar altimeter (rad alt) audio warning was triggered, indicating that the ac was within the bugged height from terrain. The LHS rad alt bug, set at 500ft, had activated as the ac approached the rising ground of the ridge, at a point near the Halle Gap. The QHI then instructed the LHS Pilot to reset the bug to 200ft who responded that he had set a height of 300ft, confirming this action with the QHI who acknowledged the response. The LHS Pilot then completed challenge and response touch drills with the CM to conclude the simulated DC Gen Fail. By this stage the ac was clear of the ridge on an approximate track of 160° and the QHI (handling pilot) was descending to a height of approximately 700-800ft agl in order to increase separation from the cloudbase.

Witness 2

Exhibit 103

Exhibit 207

Accident Events

1.3.22 At approximately 1540, the crew heard a loud bang originating above their heads on the starboard side of the ac. Immediately, the pilots heard the CWP audio warning (the CM intercom station box does not receive the CWP audio in the Lynx Mk7) and all crewmembers observed the illumination of several amber and red CWP captions. The LHS Pilot cancelled the CWP audio warning, his immediate thought being that this might be another simulated emergency initiated by the QHI. The QHI and CM recalled that the ac yawed by about 5-10° and the QHI also recalled a marked reduction in ac stability equivalent to the loss of the AFCS.

Exhibit 103

Witness 1
Witness 2
Witness 3

1.3.23 The QHI's instinctive diagnosis, based on the symptoms experienced, was that something had hit the tail. Believing that a tail rotor malfunction was the worst case scenario in those circumstances, he proceeded to check pedal inputs in order to test this theory and found the tail rotor response to be normal. At this point, 5 secs after the bang, the CM reported that significant amounts of smoke had ingresssed the cabin, emanating from the vicinity of the lower aft section of the starboard cabin door. The QHI then started to transmit a Mayday call to Gütersloh Tower. Shortly afterwards, the smoke completely filled the cabin and cockpit, resulting in complete loss of visibility. The QHI curtailed the radio call which had been restricted to 3 calls of Mayday and ac callsign once.

Witness 1
Witness 2

Exhibit 103

Exhibit 049

1.3.24 Immediately after the partial emergency transmission, the QHI opened the starboard cockpit window and instructed the other crewmembers to open their windows and doors. Throughout, the QHI was attempting to maintain ac attitude in what he believed to be a gentle rate of descent (RoD) (approx 200-300ft per min). Shortly afterwards, while still unable to see, the rad alt audio warning activated, indicating that the ac had descended below the height bugged on the LHS rad alt. The LHS Pilot did not succeed in opening the port cockpit window despite repeated attempts.

Exhibit 103

Witness 1
Witness 2

1.3.25 The ac cabin had been roled with the 6-man troop seats fitted fore-aft. In this configuration, the CM was accustomed to using the middle of the 3 bench seats on the starboard side of the ac cabin as his routine position to strap in when required. Faced with an emergency situation, his first instinct had been to strap into his seat; however, realising that the smoke in the cabin was his first priority, he elected not to strap in. He moved forward in the cabin to the seat immediately behind the RHS Pilot, in part to move away from where the smoke was ingressing, but also to enable him to reach the cabin door. Having opened the door, he stuck his head out into the airflow in an attempt to ease his breathing; as he did so, he saw that the ac was on fire in the vicinity of the No2 engine. He noted that the ac

Witness 3

was very low and that he needed to secure himself, but realised that he did not have time to strap into the seat in the time available.

1.3.26 A number of civilian eye witnesses recalled seeing flames emanating from the starboard side of the helicopter as it made an approach to land. Some also reported small amounts of debris falling from the ac. None of the crew recalled seeing any ac fire warning indications at any stage during flight.

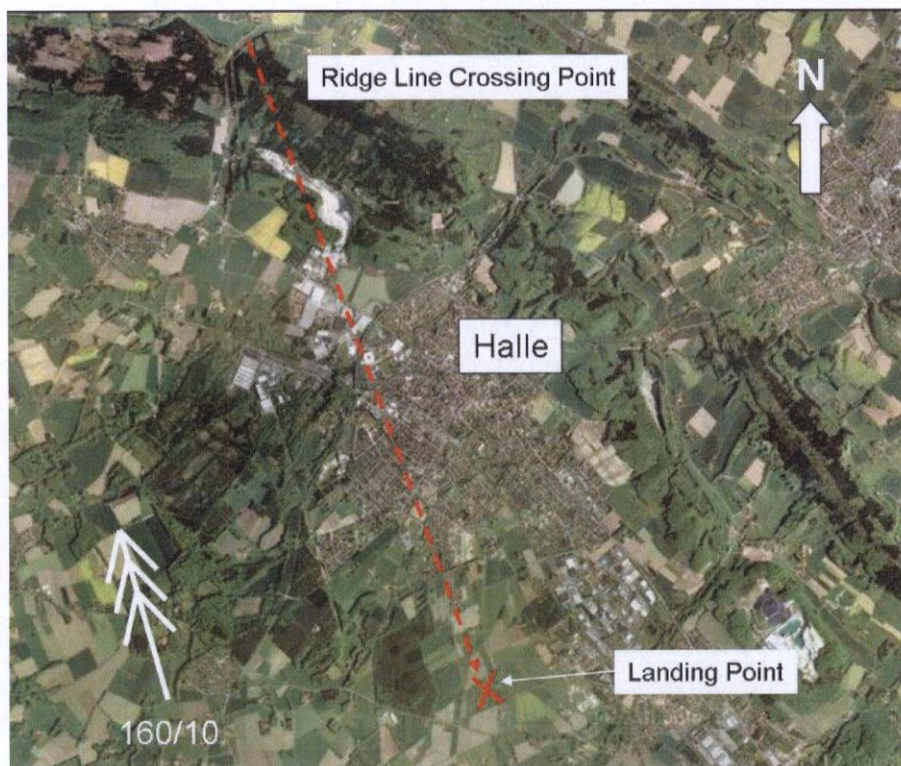


Fig 2 - Map of final stages of XZ210 flight

1.3.27 The CM reported that visibility inside the ac improved rapidly after the cabin door was opened. As the ac was nearing the surface, the external visual references improved sufficiently for the QHI to see a tree immediately ahead on the ac flight path. He flared the ac and manoeuvred left to avoid the tree; in so doing, the Rotor Overspeed Audio Warning System (ROAWS) audio was activated in continuous tone, indicating that rotor speed (N_r) exceeded 115.8%. The QHI managed to avoid the main part of tree, albeit minor contact was made with the outer branches by 2 of the main rotors and then he carried out a running landing onto the ploughed field. The ac came to a rapid stop approximately 1 ac length from impact; the QHI estimated the run on to have been at approx 20 knots (kts) ground speed. The ac came to rest level, upright and intact with the skids buried in the soft earth up to the belly of the ac; at this stage the fire had taken hold. The time from the first indication of the emergency to landing was 27 secs, with the ac having been flown on, or close to, an into wind heading throughout.

1.3.28 The ac landed before the CM was able to secure himself in his cabin seat. Realising he would not have time to use a seatbelt he had attempted to brace himself using the pilot's seat. However, he did not manage to establish a hand hold before landing and the sudden deceleration threw him forward resulting in his helmet impacting the RHS Pilot's seat frame. His clear visor was in the down position, as it had been throughout the sortie.

Witnesses 13-19

Exhibit 207

Witness 1
Witness 2

Exhibit 103

Exhibit 207

Witness 3

Post Accident Events

1.3.29 Having braced for landing with one hand on the doorframe and one on the instrument combing, the LHS Pilot egressed the ac as soon as it came to rest; it was only at this point, when visual with flames coming from the No2 engine, that he realised that the ac was on fire. He then leant back into the cockpit to operate the ECLs as the QHI called for them to be retarded. The LHS Pilot also reported pressing the red button at the end of the No1 ECL which was illuminated, believing that he was operating the fire extinguisher button. No other attempts to operate the fire extinguisher system were made by any crew member.

Witness 2

Exhibit 103

1.3.30 The QHI remained seated in the ac for approximately 30 secs following the landing. Having seen the LHS Pilot egress successfully, he instructed him to watch his head due to the unusually low rotor blades which were still turning; the QHI had made a conscious decision not to apply the rotor brake for fear that the ac might be unstable. Once the rotor blades had slowed, he got out of the ac having deciding to forego the remaining emergency shutdown drills in favour of clearing the ac. Making his way to the cabin door he could see the CM struggling with his harness.

Exhibit 103

Witness 1

1.3.31 The CM's egress was hindered by his inability to release his Mk60 ACLP / strop from the ac. Having suffered the impact injury to his head during the landing, he was dazed and the vision in his left eye was impaired. Initially he made numerous attempts to operate the emergency release mechanism on the right shoulder of the jacket, but he could not locate the tab to uncover the release mechanism with his left hand. He then unsuccessfully attempted to open the karabiner between the garment strop and the ac strop. Eventually, using both hands, he opened the 2nd karabiner attaching the ac strop to the cabin floor.

Witness 3

1.3.32 With the ac skids buried in the soil, the 3 crew crawled beneath the still turning rotor disc with its reduced clearance. Once clear, they stood up and moved to the ac's 3 o'clock, in the direction of a nearby road where civilian by-standers had started to gather. German Emergency Services, alerted by civilian witnesses, were on scene very quickly; the first police car arrived just over 4 mins after the ac had landed.

Witness 1

Witness 2

Witness 3

Exhibit 103



Fig 3 - Remains of XZ210 at the crash site

1.3.33 The ac had landed on fire but intact on its skids, with its nose pointing approximately into wind in a southerly direction. The fire consumed and collapsed the main cabin and cockpit, causing the engines, gearbox and rotor head to settle adjacent to the starboard side of the ac. The tail boom also burnt through aft of the avionics bay and fell to the ground, subsequently rolling over to port.

Annex F

Degree of Injury

1.3.34 (S40)

Witness 1
Witness 2
Witness 3

Damage to Aircraft, Public and Civilian Property

1.3.35 Aircraft: Lynx AH Mk 7 (XZ210) assessed as category 5 damage.

1.3.36 Public: Nil.

1.3.37 Civilian: Crash site contamination.

Exhibit 215

Post Incident Drug and Alcohol Testing (PIDAT)

1.3.38 The formal PIDAT process was not carried out following the accident. The requirement did not extend to areas outside UK and home waters.

Exhibit 200
Exhibit 263

Rescue

1.3.39 The 3 aircrew egressed the ac and cleared the burning wreckage to a safe distance unassisted. As the first to arrive, the local police established the security of the site. They were subsequently joined by fire service personnel who extinguished the ac fire. An ambulance crew provided immediate medical care for the CM and LHS Pilot, later transporting them to the local hospital.

Witness 1
Witness 2
Witness 3

PCM

1.3.40 As first to arrive at the accident site, PCM was initiated by the German Emergency Services who cordoned the area and controlled access until military police arrived. Outer and Inner cordons were both well defined and effectively controlled and formal PCM facilities were established at the site by 1 Regt AAC. There was also an armed German Army presence which patrolled the outer cordon but did not interfere with recovery activity.

Annex F

1.3.41 The crash site area was a flat recently ploughed field surrounded by other agricultural land and scattered housing. The main crash site covered a circular area of approximately 130m². The outer cordon extended some 300m to the rear of the main wreckage, 50m forward and from 300m in width tapering rearwards down to 100m. 2 further areas were cordoned to the North of the main cordon; both contained a small amount of debris and are identified on the map below. PCM Incident Officers (PCMIOs) controlled the outer cordon; they also controlled the inner cordon in combination with personnel from the Joint Aircraft Recovery and Transportation Squadron (JARTS).

Annex F

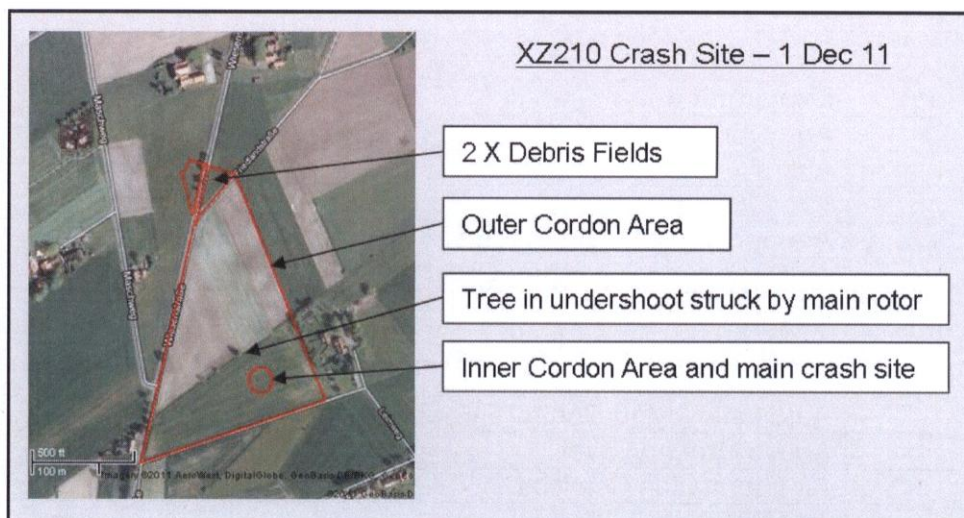


Fig 4 - XZ210 crash site search areas

1.3.42 **Search Process.** During the instigation of the Outer Cordon area, some small items of debris were discovered to the northern edge of the Outer Cordon. A brief line search was conducted by Military Air Accident Investigation Branch (MilAAIB) investigators who identified further fragments; as a result, a more detailed search was instigated using personnel from JARTS and the PCM team. The search was primarily looking for bits of cowling and Free Power Turbine (FPT) blades. The search covered the area of the Outer Cordon and parts of the two fields adjacent to the outer cordon as indicated at Fig 4. The search yielded small fragments of melted aluminium, which appeared to have been ac skin.

1.3.43 **Media Coverage.** A civilian photographer, who happened to be in the close vicinity of the accident site at the time, was on scene within a few minutes of the ac landing. He took several photographs which appeared on internet sites later that day through various German media organisations. Some details of the accident, including the German images, also appeared on a UK aviation specialist website (PPRune) within a matter of hrs.

Salvage Operations

1.3.44 MilAAIB Ops and Eng Investigators deployed to Gütersloh on the day of the accident and were on scene at the crash site at first light the following day. A JARTS team of 6 personnel deployed from Boscombe Down on 2 Dec 11, arriving at Gütersloh Military Barracks late the same night. They recovered the Cockpit Voice Recorder (CVR) and despatched it to UK the following day. The 2 engines and surrounding firewall structure were then carefully removed as one assembly and transferred along with the remains of the fuselage to a trailer for road transport back to UK. The remains of the ac wreckage were delivered to secure storage at MW and the engine assemblies to Rolls Royce (RR) Filton on 8 Dec 11.

Safety Health Environment (SHE) Aspects

1.3.45 Personnel from the Institute of Naval Medicine (INM) were also deployed on 2 Dec 11 to assess the occupational health and environmental protection aspects of the accident. Consultation between INM, JARTS and PCMIO ascertained that the site did not contain any significant hazards.

Annex G

Exhibit 254

Annex G
Annex F

Annex B

GLOSSARY

Acronym/ Abbreviation	Explanation
AAC	Army Air Corps
ac	Aircraft
ac cdr	Aircraft Commander
ACLP	Armour Capable Life Preserver
AESO	Ac Engineering Standing Order
AO	Area of Operations
AOA	Ac Operating Authority
AoB	Angle of Bank
AFCS	Automatic Flying Control System
agl	Above Ground Level
AIS	Air Information Services
AP	Air Publication
APC	Army Personnel Centre
AQMS	Aircraft Quarter Master Sergeant
ASIMS	Air Safety Information Management System
ASM	Artificer Sergeant Major
ATP	Allied Tactical Publication
Avn	Aviation
AW	Agusta Westland
BCF	Bromochlorodifluoromethane
CAP	Caution Advisory Panel
CAT	Category
CO	Commanding Officer
Comd	Commander
CM	Crewman
CR	Combat Ready
CRM	Crew Resource Management
C to I	Competency to Instruct (Aircraft Type Specific Check for QHIs)
CTR	Conversion to Role
CVFDR	Cockpit Voice and Flight Data Recorder
CVR	Cockpit Voice Recorder
CWP	Central Warning Panel
DAC	Duty Aircraft Commander
DC	Direct Current
DDH	Delivery Duty Holder
DE&S	Defence Equipment and Support
DEME(A)	Directorate of Electrical and Mechanical Engineering (Army)
D-FSOR	Defence-Flight Safety Occurrence Report
ECL	Engine Condition Lever
ECU	Engine Change Unit
EFD	Early Failure Detection
EFDC	Early Failure Detection Centre
ERS	Engine Repair Section (RNAS Yeovilton)
ETA	Estimated Time of Arrival
FCU	Fuel Control Unit
FCS	Fuel Control System
FDR	Flight Data Recorder
FOB	Flying Order Book
FPT	Free Power Turbine

RESTRICTED – SERVICE INQUIRY

FRC	Flight Reference Cards
FS	Flight Safety
ft	Feet
GHUMS	Generic Health and Usage Monitoring System
HF	Human Factors
HP	High Pressure
HQ	Headquarters
HUMS	Health and Usage Monitoring System
IAS	Indicated Air Speed
iaw	In Accordance With
IBES	In-Barracks Equipment Support
ICS	Inertia Crash Switch
INM	Institute of Naval Medicine
IPT	Integrated Project Team
JAEAT	Joint Helicopter Command Air Engineering Assurance Team
JARTS	Joint Aircraft Recovery and Transport Squadron
JHC	Joint Helicopter Command
JHCHQ	Joint Helicopter Command Headquarters
JSP	Joint Service Publication
kts	Knots
LAR	Local Acting Rank
LCR	Limited Combat Ready
LHS	Left Hand Seat
LP	Low Pressure
Lx GM	Lynx General Message
MAA	Military Aviation Authority
MC	Modification Committee
MDP	Magnetic Detector Plug
MIG	Materials Integrity Group
MilAAIB	Military Air Accident Investigation Branch
Mk	Mark
MOB	Main Operating Base
MOD	Ministry of Defence
MP&GA	Manpower Planning and Gapping Advice
MW	Middle Wallop
NAS	Naval Air Squadron
Nf	Free Power Turbine Rotations Per Minute
NHP	Non-Handling Pilot
Nh	High Pressure Turbine Rotations Per Minute
NM	Nautical Miles
Nr	Representative Figure (expressed as %) of Rotor Revolutions Per Minute
OC	Officer Commanding
OJT	On-the-Job Training
Op	Operation
PAAFU	Post Aircraft Accident Follow Up
PCM	Post-Crash Management
PIDAT	Post-Incident Drug and Alcohol Testing
PPE	Personal Protective Equipment
PT	Project Team
QHI	Qualified Helicopter Instructor
QUAvR	Quarterly Unit Aviation Report

RESTRICTED – SERVICE INQUIRY

Rad alt	Radar Altimeter
RAFCAM	Royal Air Force Centre of Aviation Medicine
RAR	Royal Electrical and Mechanical Engineers Aviation Review
REME	Royal Electrical and Mechanical Engineers
RHS	Right Hand Seat
RNAS	Royal Naval Air Station
RNFAIC	Royal Navy Flight Safety and Accident Investigation Centre
RNFSC	Royal Navy Flight Safety Centre
RoD	Rate of Descent
ROAWS	Rotor Overspeed Audio Warning System
rpm	Revolutions Per Minute
RQHI	Regimental Qualified Helicopter Instructor
RR	Rolls Royce
RTT	Refresher-to-Type
RTS	Release To Service
RW	Rotary Wing
Secs	Seconds
SEI	Service Engineering Instruction
SEREO	Search Evade Resist and Extract Officer
SES	Safety Equipment Section
SHE	Safety, Health & Environment
SI	Service Inquiry
SNCO	Senior Non-Commissioned Officer
SNOW	Serial Number of Work
SOP	Standard Operating Procedure
Sqn	Squadron
STARS	Squadron Training Achievement Recording System
TI	Test Installation
TORs	Terms of Reference
UASRR	Unified Air Safety Risk Register
UIRR	Unified Issues Register
UORR	Unified Objective Risk Register
UT	Under Training
UTI	Urgent Technical Instruction
WDM	Wear Debris Monitoring
WDMS	Wear Debris Management System
WFT	Wildcat Fielding Team
WHL	Westland Helicopters Limited
Wksp	Workshop