1.4.58 If the ac had been fitted with an FDR, technical attributes associated with the accident would have been more readily available. Had the Panel been unable to establish the course of events through crew interviews, an FDR might have been the only way in which it would have been possible to reconstruct the accident sequence. The Panel made the **observation** that the lack of some safety related information, due to the absence of an FDR, was an **organisational influence.** Exhibit 269 Exhibit 111 Exhibit 213

1.4.59 **Ac stability**. The QHI reported a marked reduction in ac stability at the beginning of the accident sequence. The Lynx had a duplex stabilisation system which meant that all inputs and functionality were duplicated to provide 100% redundancy, thus reducing the possibility of total stabilisation failure. While it was possible that the FPT blade burst may have resulted in the loss of power feed to Lane 2 of the AFCS as described in para 1.4.50, the Panel could find no evidence to suggest that Lane 1 was affected. On that basis, the Panel concluded that there was no technical explanation for a total loss of ac stability. Witness 1 Exhibit 186

1.4.60 In attempting to understand possible causes of the 'sloppy' controls and in the absence of evidence to support a technical explanation for a loss of stability, the Panel considered other circumstances in which the ac may have appeared unstable: Witness 1

a. **Inadvertent Stab Release**. The stab release button on the cyclic may have been inadvertently operated; however, the QHI stated that this would have required him to reposition his hand on the cyclic which he could not recall having done. Although he thought such a dis-engagement was unlikely he could not discount the possibility. Exhibit 238

b. **Handling Pilot Tensing on Controls**. The Panel also considered the possibility that the QHI tensed on the controls under the stress of dealing with the emergency situation resulting in the perception of degraded ac stability. Exhibit 227

1.4.61 The Panel concluded that it was unlikely that the AFCS had been disengaged or failed on the basis that the ac attitude appeared to have remained relatively constant throughout the emergency sequence, including the period when the QHI lost all visual references. This judgement was based on the facts that once the smoke cleared, none of the crew reported anything unusual about ac attitude; additionally, the German Air Traffic Control radar trace showed that the ac maintained constant track throughout the emergency. The Panel also considered that it was improbable that the QHI would have been able to swap hands on the cyclic in order to open his cockpit window with no visual references without significant divergence of ac attitude if the AFCS had failed or been de-selected. The most plausible explanation for the perceived loss of stability was therefore judged to have been an instant anxiety-induced strong grip on the controls by the QHI following the engine malfunction, possibly exacerbated by some degree of over controlling. The onset of this perception may, in part, have been the result of a momentary flight path deviation following a loss of AFCS Lane 2 as a result of wiring loom damage in the avionics bay. The Panel found that ac stability was **not a factor.** Exhibit 240 Exhibit 109

Crew Handling of the Emergency

Exhibit 103

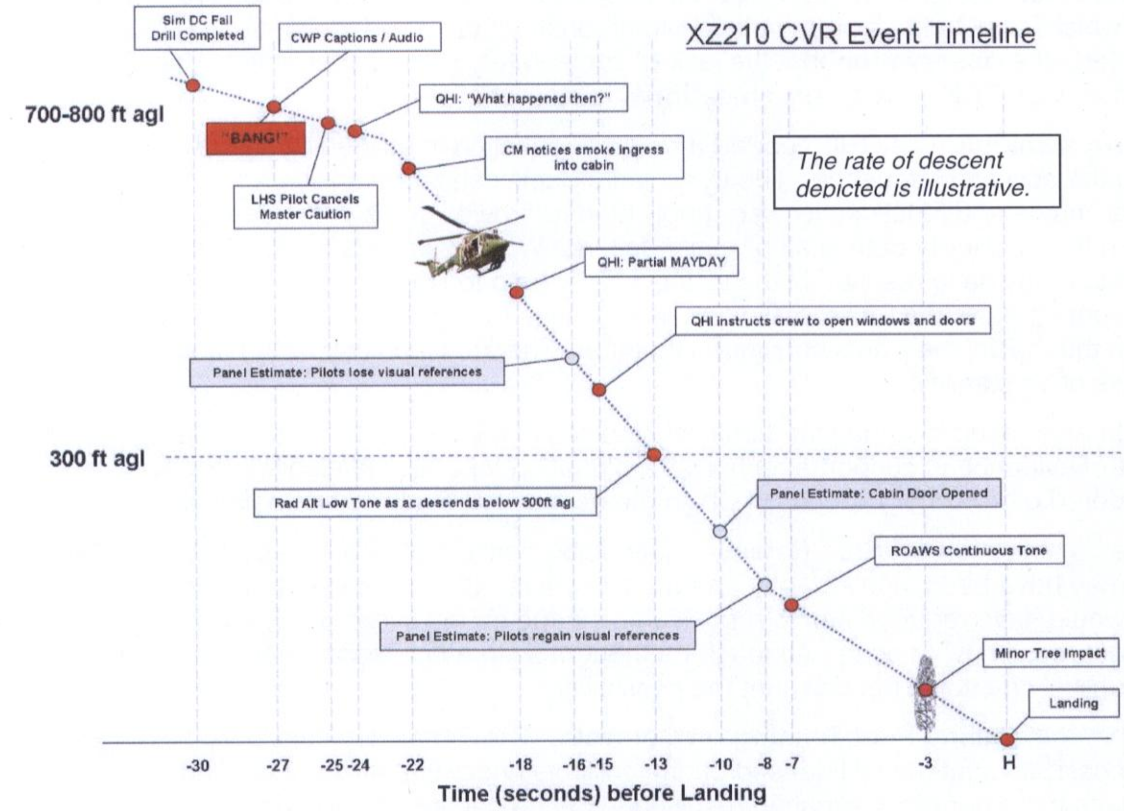


Fig 16 – XZ210 CVR Timeline

1.4.62 **Immediate Actions**. The QHI recalled that his immediate diagnosis, based on the combination of the bang, ac yaw and 'sloppiness' in the ac controls, was that something might have hit the tail rotor. Considering the potential loss of tail rotor control/drive to have been the worst case scenario, his first instinct was therefore to confirm that he still had tail rotor authority by moving the pedals. The ac response to the control input was normal and so the possibility of tail rotor malfunction was discounted. At this point the CM informed the pilots of significant smoke ingressing the cabin. The Panel noted that the Lynx Simulator only used the audio cue of a bang when initiating an engine drive shaft failure and was therefore able to discount preconditioning to audio stimulus as a result of synthetic training for the QHI's initial reaction.

Witness 1

Exhibit 103

1.4.63 During this time, the crew reported multiple CWP captions and associated audio warning. While the LHS Pilot and CM could recall vague patterns made by the lights, none of the crew recalled which individual warnings were activated. Although the LHS Pilot cancelled the Master Caution Audio Warning, he did not recall checking the CWP to ascertain why the attention getter had been activated. Neither pilot recalled checking the torquemeter or the triple tachometer (which indicated Nf for both engines and Nr) or noting any other dangerous indications. The Panel concluded that on the QHI's part this was as a result of his focus on flying the ac and initial diagnosis; the LHS Pilot reported an initial suspension of reality while he considered that this might have been another simulated malfunction that the QHI had somehow manufactured. By the time that this thought process had concluded, smoke had started to fill the cabin.

Witness 1-3

1.4.64 Prompted by the smoke ingress, the QHI started to transmit a Mayday call to Gütersloh Tower. However, the transmission was limited to 3 calls of Mayday and callsign once, before being curtailed. Having broken the transmission, on ac intercom

Witness 1

Exhibit 103

he called for the ac windows and doors to be opened. It was the Panel's view that his decision to interrupt the transmission was the result of suddenly losing visual references as he was making the call. It was likely that his focus then understandably shifted to ventilating the cockpit. Using the interruption of the QHI's mayday transmission to call for windows and doors to be opened as the best indicator of when he started to lose visual references, the Panel estimated that the time from the FPT failure (bang) to smoke filling the cockpit was approximately 11 secs.

1.4.65 The Panel considered whether the crew could have been expected to diagnose a No 2 engine failure and fire with the indications presented to them in the time available. While replicating the potential sequence of events in the simulator, with the Lynx Simulator Chief Instructor, the initial diagnosis of a single engine failure with fire indications took approx 15 secs. In the controlled synthetic environment where the Pilot was expecting a malfunction, the time taken before any engine controls were touched was significantly longer than the time that the crew of XZ210 had before losing all visual references. The Panel concluded that their inability to see the ac instrumentation and controls removed the opportunity to confirm fully the symptoms of the emergency. Furthermore, it was judged that had the crew attempted to operate duplicated engine controls in those conditions, the potential for exacerbating the emergency was significant. In the Panel's view, the conditions in the cockpit were not conducive to the safe enactment of the appropriate emergency drills and the crew was justified in concentrating on the overriding priorities of reducing the smoke in the cockpit and flying the ac. The Panel found that the immediate actions were not a factor in this accident, but made the **observation** that smoke in the cabin/cockpit simulated emergencies were rarely, if ever, practised, either in the air or in the simulator. It was noted that the Lynx simulator did not have a smoke simulation function[9]. Witness 1-3 Exhibit 281 Exhibit 282 Exhibit 283

1.4.66 **Ac RoD**. Based on the joining call to Gütersloh Tower transmitted 4 mins prior to the start of the accident sequence, the ac was judged to have crossed the gap in the ridgeline near Halle at approx 1100ft (regional pressure based altitude). As the ac approached the ridgeline, the RHS rad alt bug was set to zero and the LHS bug to 500ft. The audio alert, indicating that the bug setting had been breached, was activated as the ac transited the rising ground, prompting the QHI to call for the LHS rad alt bug to be reset to 200ft. The LHS Pilot informed the QHI that he had actually set 300ft and sought confirmation that this would be sufficient; the QHI acknowledged the setting at which point the crew continued to deal with the simulated DC Gen failure. Having crossed the ridgeline, the QHI reported that he descended the ac slightly in order to increase separation from the cloudbase, estimating that the ac was approximately 700-800ft agl when the accident sequence commenced. Exhibit 103 Exhibit 049 Witness 1

1.4.67 During the descent that followed the engine failure, the rad alt audio was activated 14 secs after the bang, 13 secs before landing. Based on the assumption that the LHS rad alt bug had been set to 300ft agl, the average RoD throughout the emergency would have been in excess of 1500ft/min, including the flare prior to landing. On this calculation, the Panel judged that ac height was less than 150ft agl when the QHI regained external visual references and reduced this RoD. In the event that the high RoD had continued unchecked to the point of impact, the Panel concluded that there was a significant chance that the landing would not have been survivable. Exhibit 238 Annex G

1.4.68 **Rotor Overspeed**. Operation of the ROAWS continuous tone 7 secs before landing indicated that the ac rotor was subjected to an overspeed in excess of 115.8%. The CVR trace indicated that the Nr peaked at approx 135% (see Fig 17 below which shows Nr in red). Although the QHI did not recall making significant Exhibit 103 Exhibit 112

[9] The Sea King Simulator at RNAS Culdrose had the facility to simulate smoke in the cockpit.

attitude changes in the final stages of the approach, the LHS Pilot reported the ac having being flared to a nose up attitude of approximately 15-20° as the smoke started to clear.

1.4.69 The Panel considered what might have caused the rotor to overspeed. The possibility of a No1 engine run-away up was discounted on the basis of the Nr profile, which showed a transient peak before the rotor RPM recovered to normal as the ac landed. The Panel judged that the rapid increase in Nr was the result of the ac being flared in an attempt to arrest ac ground speed and the rapid RoD, exacerbated by manoeuvring to avoid the tree. The minor damage apparent on 2 of main rotor blades suggested that the impact with the tree branches did not have a significant effect on the ac flight path, or subsequent handling characteristics.

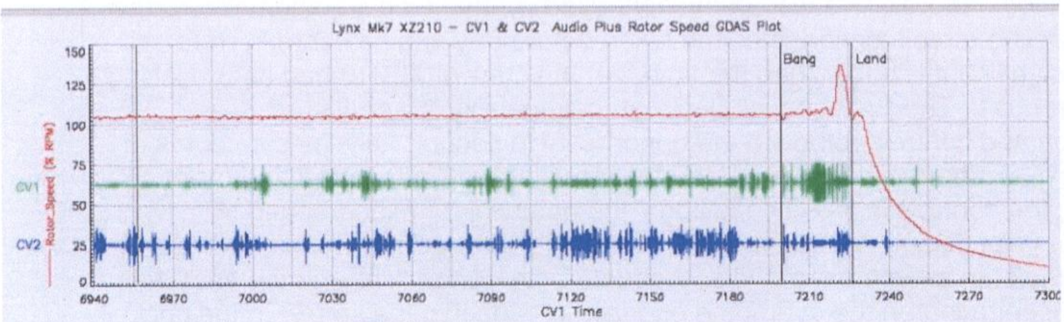


Fig 17 - CVR Visual Trace

1.4.70 **Landing**. The ac touched down 3 secs after making contact with the outer branches, approximately 40m beyond the tree. Impact marks on the soil suggested that the ac landed with skids level and there was no significant nose up attitude as witnessed by the lack of any marking on the "hockey stick" attached to the tail pylon. The soil on which the ac landed was light and sandy and had been recently ploughed, allowing the ac skids to bury themselves into the surface. The nature of the soil allowed the ac to run on to the point where the fuselage belly was in contact with the ground, bringing the ac to a rapid stop approximately 9m from the touch down point. Exhibit 103 Annex G

1.4.71 The mechanical failure occurred while the ac was on an into wind heading of approximately 160°, this was maintained throughout the approach; however, the eventual orientation of the ac after landing was 174°. In the Panel's opinion, this change of heading in the latter stages of flight resulted from the QHI's efforts to avoid the tree using a combination of cyclic and yaw manoeuvring. It was judged that the loss of all references had severely limited the QHI's ability to effect any change to heading once smoke entered the cockpit. In this case, the into wind nature of the landing was significant to the eventual outcome. Not only did it benefit the limited power approach and landing, but it also prevented the rapid spread of the engine fire to the cabin area; importantly, the smoke was blown away from the crew improving their ability to egress the ac safely. Exhibit 103

1.4.72 **Ac Shutdown**. By the time the ac landed, the fire had been burning for some time and had taken hold, with fuel having been pumped straight into the engine bay from the severed LP fuel pipe. The CVR trace showed that Nr started to decay to zero approximately 5 secs after landing, indicating that the No1 ECL was retarded at that point (subsequent investigation of the wreckage confirmed that both ECLs had been retarded). The QHI, not knowing what damage might have been done to the underside of the ac, decided against using the rotor brake on the basis that he could not be sure how stable the ac was following the forced landing. Based on his experience, he believed that the significant torque effect resulting from the application of the rotor brake might have unsettled the ac in the event that the skid landing gear had been damaged. As the rotors continued to turn, the QHI felt that he needed to Exhibit 103 Annex G control the disc attitude and thus ac stability as the rotor slowed. Once the rotors had slowed sufficiently, he made the decision to egress the ac without completing any other shut down drills.

1.4.73 By not carrying out the full shutdown drills prior to egress, both LP cocks remained open with the fuel booster pumps and battery master on. As a result, fuel would have continued to be pumped through the severed LP pipe even after the ECLs had been retarded[10], thus feeding the fire. The Panel concluded that there was significant doubt that the fire extinguisher system would have been effective even if it had been used, as the integrity of the No2 engine bay had been breached and because the fire had by then spread to other parts of the airframe. This conclusion was supported by the experience of the XZ256 (HMS Richmond) accident inquiry findings which concluded that an engine fire, resulting from similar circumstances, continued to burn after the crew used both ac fire extinguishers on the affected engine. Annex G

1.4.74 The Panel noted that the MAA Regulatory Article 2350 - Aircraft Emergencies, stated that: Exhibit 228

> *" When a forced landing incident occurs, the Aircraft Commander, or if he is injured, the next senior uninjured member of the crew, **should** ensure that where it is safe to do so...[t]he engine, fuel and electrical supplies are shut off."*

1.4.75 The Panel felt that, once the ac had landed, the urgency to understand what had caused the emergency dissipated and there was no evidence to suggest that the crew made any further effort to diagnose the symptoms. In addition, none of the crew realised that the ac was on fire until they actually saw flames. For the CM this was while airborne just before landing after he had opened the cabin door; however, for the pilots, this did not happen until after they had egressed the ac. The Panel concluded that with no clear explanation for the emergency and having retarded the ECLs, they took the opportunity to egress the ac while they thought it was still safe to do so. Witness 1-3

1.4.76 The Panel made the **observation** that Army Lynx crews did not routinely practice forced landing shutdown checks as described in RA2350, either in the simulator or as part of their 6-monthly egress drill currency requirement. Whether in the simulator or practising emergency handling in the real ac, crews were briefed to follow the FRC drills to a "full and logical conclusion or until told to overshoot or exercise complete". This would inevitably mean that, in an effort to save time and maximise available training opportunity, the "logical conclusion" aspect of a training emergency drill would end prior to the close down and switch setting element of the emergency prior to crew egress. Exhibit 238

1.4.77 Although the decision not to shut down the ac might be viewed as a **breached defence**, it was judged that the omission of the drills did not aggravate the eventual outcome. Engineering analysis showed that the fire was so well established by the time the ac landed that the drills probably would have been ineffective. Accordingly, the Panel found that the decision not to carry out shutdown drills before egress in this instance was an **other factor**. Annex G

1.4.78 **Emergency Egress**. The Panel judged that the QHI's decision to stay on the controls delayed his egress from the ac, which was estimated to have taken up to 30 secs from landing. It was feasible, due to his high level of in-flight stress, that the QHI had reached a point of 'closure' on landing (not on escape, which was more common). The sudden increase in stress and very high workload, where the QHI was responsible for dealing with a life-threatening situation, could have led to sudden relief when these conditions were overcome. It was likely that this relief (rightly or wrongly) came early on landing due to his experience and his reported confidence that a straight Annex A

[10] Retarding the ECLs closed the High Pressure (HP) cocks which were downstream of the break in the LP fuel pipe.

and level landing would reduce the threat to life. This was contrary to the LHS Pilot, who more typically did not feel this relief until after egress. As it was common for shock and realisation to set in once the hazard was perceived to be over, this may explain why the QHI took some time to exit the ac.

1.4.79 The LHS Pilot egressed the ac almost immediately after landing. Because the skids were buried, ground level was unusually high in relation to the cabin door as he stepped outside. Prompted by the QHI, he recalled that he leant back into the ac cockpit to retard both ECLs. He then pressed the No1 engine start button which was illuminated, indicating a fire warning on that engine; he did so in the mistaken belief that he was discharging the associated fire bottle. Witness 2 Annex A

1.4.80 The operation of the start button was judged to have been a **slip** by the LHS Pilot which probably occurred as a result of stress (**EPC**). The Panel made the **observation** that the dual nature of the ECL start button, combining an every-start function with one associated with an emergency was an **organisational influence** which, in this case, probably misled the LHS Pilot into believing that he had operated the No1 Fire Extinguisher.

1.4.81 The LHS Pilot stated that he saw no other indications of fire warning in the cockpit. The Panel considered that the unusual viewing angle from outside the ac may have affected the Pilot's ability to see associated fire warnings and switches. In particular, the raised viewing position would have made it difficult for the him to see the shrouded fire extinguisher buttons located in the roof panel to the rear of the ECLs. Witness 2

1.4.82 **Crew Handling of the Emergency - Summary**. The Panel considered that there were a number of factors that turned this accident from potentially fatal into one where the 3 crew walked away safe after landing. Some of these were down to luck, but some resulted from the actions of the crew. Critically, these included the opening of the cabin door to clear the smoke, the QHI's control of the ac once he lost all visual references, avoiding the tree and completing a controlled run on. Overall, the Panel found that aircrew emergency handling was **not a factor**.

Post Accident

Survival Aspects

1.4.83 **Crew Injuries.** Two of the crew suffered minor injuries and one was uninjured:

a. QHI – Nil.

b. LHS Pilot – **(S40)** .

c. CM – **(S40)** .

1.4.84 **(S40)** Annex C

Military Aviation Authority MAA

1.4.85 The CM's protective helmet showed general signs of wear and was in overall very good condition with no evidence of any impact marks, scratches or dents. The helmet visors could be raised and lowered as designed and the clear and tinted visor locking mechanisms functioned correctly. A post accident helmet check with the CM found the fit of the helmet to be good with no excess movement on the head. Annex C

1.4.86 The CM was unfortunate that he impacted the seat back at the very edge of the protection afforded by the helmet shell and visors. Although the helmet did not provide absolute protection, in terms of preventing **(S40)** , the helmet mitigated against the causation of more serious injuries. Furthermore, the fact the CM had his clear visor in the locked down position also ensured that only minor lacerations were sustained and a more serious **(S40)** was prevented. The CM not being strapped into his seat prior to landing was deemed to have been an **aggravating factor.** Annex C

1.4.87 **(S40)** Annex D

1.4.88 **Crashworthy Seats.** The Panel found that the absence of energy attenuating seats in the Lynx may have exacerbated injuries to the front crew and was therefore an **organisational influence** (ac design) and **aggravating factor** in the case of the LHS Pilot's injuries. The Panel also noted the absence of such seating in the Lynx cabin; although this did not influence the outcome of this accident, it was deemed to have been an **other factor** as there was potential for injury to occur to the CM in a situation where a Lynx ac was subjected to significant vertical deceleration[11]. Exhibit 266

1.4.89 **CM Seating Position.** During initial training, CM were instructed to be loosely strapped in at all times when not undertaking tasks which required them to manoeuvre in the cabin. With the 6-man fore-aft seat arrangement (as fitted to XZ210), CM were advised to use the middle seat so as to reduce the possible impact damage of being thrown forward in an emergency landing; however, seat choice was discretionary once they were qualified. The ac cdr had the final say as to which side he wanted the CM to occupy as some tasks required the CM to be on a specific side. At the time of the accident, the XZ210 CM was not secured in his seat; with the ac in the cruise there was no compelling reason for him not to have been loosely strapped in. The Panel made the **observation** that if the CM had been secured in a cabin seat, there was a high probability that he would still have been able to operate the cabin door and then to tighten the straps before landing, thus avoiding **(S40)** . Exhibit 253 Exhibit 257

[11] A review of the Lx PAAFU and previous Lynx BOI reports by JHC (SO1 Safety) did not discover any recommendations pertaining to crash worthy seats (XZ210-266 refers)

Personal Aircrew Equipment Assemblies

1.4.90 The survival equipment and aircrew assemblies for all 3 crew members were found to be in good condition and working order, showing general signs of wear consistent with normal use. Annex C

1.4.91 **MK60 (Modular) ACLP.** Following the forced landing, the CM's inability to operate the emergency release mechanism on his ACLP hindered his egress. Although he eventually freed himself from the ac unassisted, it took him several attempts to operate one of the various attachments securing him. The Panel considered the circumstances which led to these difficulties. Witness 3

Fig 18 – Mk60 ACLP with Yoke Mounted Strop Assembly

1.4.92 The Mk 60 (CM) and 61 (pilot) Series ACLP were introduced into service to provide RW aircrew with personal body armour, survival and life preserving capabilities in one jacket, previously delivered by 3 different non-fire retardant items. The main difference for the MK60 was the new form of restraint, with the strop attached using a neck mounted "yoke" harness arrangement[12]. Exhibit 181

1.4.93 In Nov 10, CM from 1 Regt AAC started wearing the MK 60 ACLP whilst on exercise. From Jun 11, use of the jacket was extended to all flying at 1 Regt AAC and the traditional waist-belted dispatchers harness and Load Carrying Jackets were withdrawn. When the Mk 60 ACLP was introduced to service, the SES provided training to the Sqn SEREO, based on their interpretation of the information provided in the respective Technical Instruction. The SEREOs then delivered the training to the individual aircrew on their Sqns with an equipment brief and demonstration during which the CM were given the opportunity to operate the quick release handle. There was no evidence of a formal training package having been devised and no records were made of the training delivered/received. Additionally, there was no continuation training to consolidate the initial briefing and no further requirement to operate the emergency release mechanism to improve users' familiarity. For the XZ210 CM, the training had been provided by SES personnel as he had missed the SEREO briefings; during this instruction he operated the emergency release mechanism once. Exhibit 256 Witness 3

1.4.94 **MK60 ACLP – Emergency Release.** The MK60(M) ACLP included a emergency quick release handle on the right shoulder which, when pulled, allowed the harness to fall away at the collar attachment point. Exhibit 178

[12] Previously CM used a waist mounted 'dispatcher's harness'.

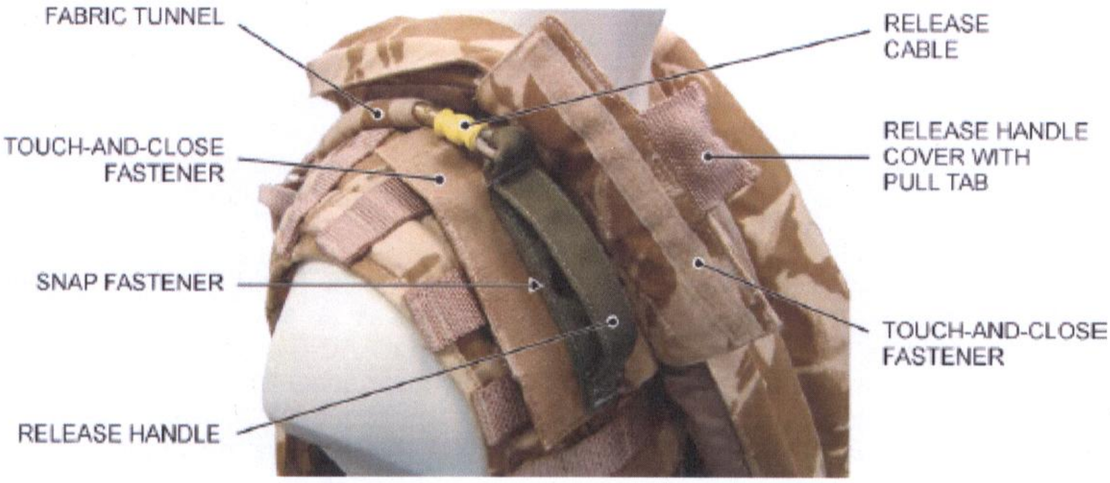


Fig 19 – Mk60 ACLP

1.4.95 The handle was protected in day-to-day operation by a flap of material, hinged on the inboard edge and secured on the outboard edge by a touch-and-close fastener (Velcro) (see Fig 19 above). The outboard edge was augmented by a locating pull tab of webbing containing 2 plastic beads. The mechanism was designed to be operated by feel, as it could potentially be required at night or even underwater.

1.4.96 In the case of the XZ210 accident, the CM made numerous unsuccessful attempts to take hold of the locating pull tab with his left hand during egress; however, he was unable to expose the quick release handle and operate the emergency mechanism. He recalled pulling the jacket in the area where he believed the pull tab was located but was unable to actually open the covering flap. Witness 3

1.4.97 Examination of the CM's Mk60 ACLP showed it to be undamaged with only minor wear consistent with normal use. The strop quick release system had not been operated and the touch and close protective tab was in place. The evidence suggested that the quick release system would have worked as designed if it had been operated by the CM. Witness 3

Fig 20 – Emergency Release Flap

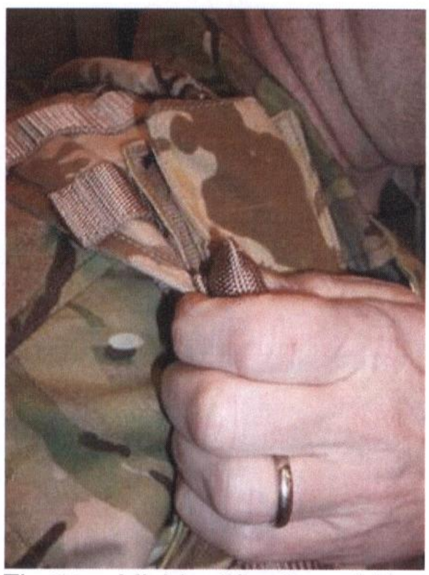


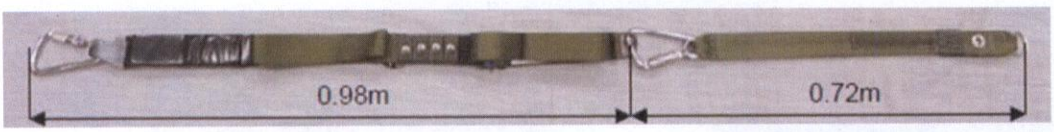
Fig 21 – Misidentification of Flap

1.4.98 During subsequent trials by RAFCAM, the standard emergency release patch on the Mk60 ACLP was found to be fit for purpose in the benign circumstances[13] under which the testing was completed. One of the trial subjects, who had no experience with the equipment, was able to locate the patch and release in less than 6 secs in all assessments. However, the trial findings did conclude that it was possible to feel the beads, contained within the pull tab, through the fabric of the waistcoat; it was therefore possible for the wearer to inadvertently believe that they were pulling the release patch cover, whilst actually pulling the main waistcoat. Exhibit 249

1.4.99 The Panel concluded that due to insufficient training on the Mk60 ACLP the CM did not have an appropriate motor skill memory for operating his emergency release mechanism. Prior to the introduction of the Mk60, 1 Regt AAC CM wore the waist mounted dispatcher harness where the emergency release mechanism was the same as the normal release mechanism. The benefit of this was that CM effectively practised the emergency release every time they removed their harness via the normal release mechanism. Consequently, practice rate was high and so CM would have had sufficient motor skills to use the emergency mechanism in an emergency scenario. Only limited training on first use was provided to CM to mitigate the change in mechanism and the reduced frequency of use. Annex A; Witness 3

1.4.100 The Panel judged that the limited training undertaken by the CM influenced his ability to operate the emergency release mechanism. On this occasion, he managed to release himself from the ac attachment by other means and was therefore able to egress unassisted; however, the Panel decided that this lack of formal training (**organisational influence**) had the potential to influence another accident and so found it to be an **other factor**.

1.4.101 **Mk60 ACLP Strop Design**. The purpose of the strop assembly attached to the Mk60 ACLP was to allow the CM freedom of movement in the ac cabin while affording a degree of safety. Should a CM fall from the cabin he should be restrained such that he could recover to the cabin and not be exposed to undue risk. Exhibit 126; Exhibit 179; Exhibit 184



Ac Strop Garment Strop

Fig 22 – Lynx CM Strop Assembly

1.4.102 When reduced to their minimum lengths, the 3 ring garment strop (attached to Mk60 jacket) measured 0.72m and the ac strop 0.98m (attached to floor point), giving an overall length of 1.70m. However, the ac strop also had an extra 1m of webbing which was designed to deploy on shock-loading. Even with the full 1.7m length of strop, full movement around the cabin by the wearer was restricted because of the yoke mounted harness being attached to a floor mounted ring. The basic geometry involved with neck attachment to floor fixing meant that more strop length was needed to allow manoeuvre in the cabin compared to a waist attachment. Exhibit 179; Exhibit 286

1.4.103 The Panel found that a CM wearing the Mk60 ACLP with strop (at minimum length) attached to the starboard cabin floor could not reach and operate the opposite (port) cabin door with the 6 man fore-aft seat fitted. The combination of yoke mounting and floor hard points, even with the minimum length of strop, also meant that any wearer ejected from an ac could depart some distance outside the cabin before being restrained.

[13] All the assessments were undertaken in ideal conditions, in that there were no extremes of light, heat or noise. In even the most benign of ac accidents or emergencies there will be some degree of this type of external factor that could adversely affect the egress time of a subject.

Fig 23 – Mk60 ACLP with Strop – distance away from ac achievable

Fig 24 – Mk60 ACLP with Strop – distance aft of ac cabin achievable

Fig 23 and Fig 24 above illustrate the strop assembly as worn and attached by the XZ210 CM. The images show the distance that the CM might have been ejected based on minimum strop length; however, they do not show the additional 1m of strop webbing that would have deployed in the event of shock loading as shown at Fig 25 below:

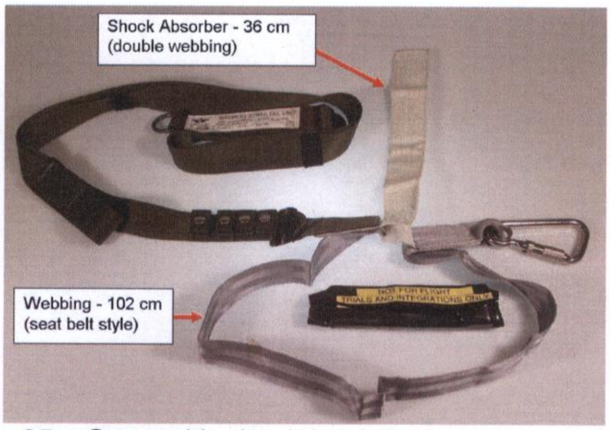


Exhibit 286

Fig 25 – Strop with shock load deployable webbing

1.4.104 The Panel was concerned that this strop arrangement did not afford the appropriate level of restraint, as set out in the Mk60 ACLP Safety Case, whereby a CM would be prevented from inadvertently falling out of an open door. It was concluded that this strop length would have allowed the CM to be thrown to a position where there was potential to be trapped beneath the ac in the event of rollover following an uncontrolled landing. The strop design (minimum strop length) was an **organisational influence** that in other circumstances might affect the outcome of another accident and was thus deemed to have been an **other factor**.

1.4.105 **Cabin Floor Attachment Points**. The Panel made the **observation** that although all Lynx Mk7 CM used the cabin floor attachment points, these points were not specifically mentioned for use as a dispatch harness anchor point in the ac documentation set. The Panel also made the **observation** that yoke mounted harnesses were in common use by CM in other JHC helicopters (Merlin Mk3/3A, Chinook and Puma), but all used roof mounted attachment points. On the Lynx Mk7, the only point with specific clearance in the Ac Maintenance Manual (AP101C-1307-1B5) was the winchman's attachment bracket located on the ac frame in the roof at the port cabin door; also known as the medical attendant's attachment. However, CM instructors were unable to find any evidence to support its suitability and therefore it was not taught as part of the CM's course. Exhibit 195 Exhibit 253

1.4.106 **RTS and Safety Case.** In the Lynx Mk7 RTS, the MK60(M) ACLP

