Why Martin and Simon died

Few accidents have been so keenly felt in the Helicopter Club as that which befell Martin Rutty and Simon Lichtenstein. They were energetic and inspiring members of the Club, we were their friends, we knew their families and we shared the pain the catastrophe visited on their loved ones at that awful time.

Little good can come of such tragedy and it's profoundly depressing to pick over the details of what happened that day. But we can learn something from what happened – something that might make us think twice before flying, and might perhaps save a life in future.

***Richard Mornington-Sanford**, who assisted the French accident investigation bureau, the BEA, in establishing the cause of the accident, has analysed the BEA's conclusions and written this article to highlight the lessons we should all take to heart:*

The accident

On December 9th 2010 the families and friends of Martin Rutty (the pilot) and Simon Lichtenstein (the passenger) were informed that they had been involved in a fatal helicopter accident in the South of France while ferrying a Robinson R22 from Italy to the UK. Both Martin and Simon were well-known and very active members of the Helicopter Club of Great Britain.

Due to my long standing connections with Robinson as their European Technical and Accident Investigator, I understandably soon began to receive numerous phone calls from fellow pilots and friends of the deceased requesting information about the incident and questioning how such an experienced and skilful pilot as Martin could possibly have been involved in a fatal accident. Unfortunately there are no quick answers to any of these questions, and the due process of a full accident investigation has to be completed, followed by a report, before we can gain any insight as to the possible cause.

Opposite: The pair resting at the British Helicopter Championships in 2006
Top: the R22 crashed into a wooded ravine where access was exceptionally difficult
Above: police and investigators needed mountaineering gear to reach the crash site

As with all accidents, there are those 'experts' within the aviation world who seem to know the causes or have theories as to the cause of these accidents well before the accident investigators. This is, to say the least, purely misleading and speculative, and at worst, is very distressing and extremely unhelpful to the families and friends of those involved, who are trying to come to terms with the tragic event.

The purpose of an investigation into any accident is not to apportion blame but to find the cause or causes and make recommendations where necessary to prevent further accidents. The report on Martin and

Simon's accident by the French Accident Investigators from the Bureau d'Enquetes et d'Analayses (BEA) was issued in September 2012.

My assistance with the accident investigation was requested by the French investigators to help them understand the forensic evidence available in the wreckage once it had been taken to their facility in Paris. If you have read the report (which was originally written in French, but there is an English translation available via Google),

Above: Martin with ever-present Akubra – a recognisable part of 'Brand Martin'

you will see that the accident was caused by the pilot's inappropriate control inputs when flying in very turbulent conditions.

The testimony from one of the witnesses on the ground stated: *"He noted that the helicopter appeared to be caught in storms and the tail swung from right to left"*. The result of overcontrolling can, and in the case of this accident did, result in the main rotor blades exceeding their flapping angles; thus causing one of the main blades to strike the left-hand side of the cabin and the toe of the left skid. This resulted in the lower skin of the blade being ruptured in such a way that led to a portion of it being opened to the airflow, thus acting like an air brake; these events resulted in a low RPM rotor stall.

I have been asked to review the BEA report and write an article on the lessons that we can and should learn from such a tragic event. This is not in any way to be construed as personal criticism, but constructive criticism with a view to helping understand what went on and how we may best avoid repeating the same mistakes, which is after all the purpose of any accident report. It is extremely difficult to give honest and sometimes frank opinions without the danger of upsetting family and friends, which is not my intention: my sole aim is the prevention of accidents, and those that know me will be aware that this has been my particular crusade for more years than I wish to remember. A 'poisoned chalice' accepted in the vain hope that, *just maybe*, it will help prevent a similar accident.

The pressures

An accident investigator might forensically establish the event that caused the accident from the wreckage. However, with this type of accident we are usually left with the question of how or why the pilot ended up in the particular situation, and how and what they did for the accident to have occurred.

So what do I think caused Martin and Simon to find themselves in a situation that lead to their fatal accident?

Although this was a private ferry flight it had all the pressures associated with a commercial flight, but without any of the checks and balances that go with AOC flights. Martin and Simon had flown together many times before as a team in various Club (and other) competitions. They would therefore have great faith in each others judgement, and this would of course reduce the likelihood of the passenger (Simon) questioning the decisions and actions of the pilot: as a team, they were used to pushing the boundaries.

As with most accidents, this particular accident could have been prevented on the ground prior to take-off, as it was a poor decision to depart: therefore, the cause of the accident must be centred upon "human factors". In particular it involves something we call 'get-home-itis' (referred to in the French accident report as 'target destination') which is one of the leading causes of helicopter

Above: tall, urbane and imperturbable, Simon was a foil to the effervescent Martin

accidents. Over the years I have personally lost friends to this fatal trap. The pilots feel an overwhelming pressure, for whatever reason, that they must either get the aircraft back, or get home. Instead of just arriving late, sadly they never arrive: as exemplified by Martin and Simon.

Some of you may be thinking, "Well, this type of accident will never happen to me." If you are one of these pilots, then let me just ask you this: in your opinion, did the pilot take off with the purpose of killing himself and his passenger? No, of course he did no such thing. Therefore his decision to take off must have

made sense to him at the time, as it might with you one day, just before *your* accident: *to err* is human.

So instead of thinking it will not happen to you, your question should be: Why did Martin make the decision to fly and press on, and would I make the same decisions in the same circumstances?

The answer to this question lies in the pilot's reasoning when it comes to making a decision, and their willingness to take a risk. There are two elements of risk:
1. Risk Perception: recognition of the risk inherent in a situation
2. Risk Tolerance: the amount of risk a person is willing to accept in the pursuit of some goal

So are there pilots who are more likely to take a risk and have an accident? Of course the answer is 'yes', and these pilots would exhibit the following personality traits: Anti-authority, Impulsiveness, Machoism and feeling of Invulnerability.

These traits often lead to a problem: perceived ability is higher than actual ability, which will lead to a risk being taken. Their attitude is: "I have survived it once so I know I can do it again," or "I have always done it! I'm still here." This then leads to positive feedback from a bad decision.

It was reasonably well known within the industry that Martin had all of these traits and it seemed that he was a chap who took chances, had high opinions of his flying skills, thought he was a match for anything and would fly when others would not: one might say a classic example of the above personality. This attitude has a dramatic effect on the pilot's decision-making and risk-taking processing. His past actions have set the bar very high, therefore the pilot and those around him will expect him to go where other pilots would fear to tread: a reputation based on doing things that a mere mortal pilot could not. "Wow, Martin, that was fantastic… only you could do such a thing!"

The result of this is that serious pressure is unwittingly placed on the pilot by those around him to always 'come through'. A reputation is like an investment: very difficult to give up, and needs feeding.

With the accident in question we can identify the first contributing causal factor is that of the pilot's currency, or lack of it. The accident report states that the pilot had only flown 11 hours in the previous three months, with only four of those hours on type. This is hardly sufficient currency on type for the intended ferry flight, especially given that there would be some challenging mountain and weather flying conditions, particularly at that time of year (December). Lack of currency equals an increase in the pilot's workload, eroding the spare capacity required for the early identification of deteriorating safety margins and the making of suitably early rational in-flight decisions. Having said that, the pilot did make the correct and timely decision to return to his point of departure – Cuneo, in Italy – the day before, due to poor weather. However, this led to a negative result arising from a good decision, in that losing a day only increased the pressure on Martin to fly the following day.

Right: Martin with his hero Frank Robinson at the Royal Aeronautical Society in London

The weather

Weather, as it so often does, played its part in this accident. However, we tend to think of weather-related accidents as those that involve inadvertent IMC; therefore, there is a danger that the pilot becomes narrow-minded and will tend to think 'bad weather' is associated with poor visibility, low cloud etc. When you wake up to good visibility and calm winds you automatically assume: "That's good weather: let's go flying. I don't need to check the weather as I can see what it is like!" Wrong: there could potentially be bad weather hidden in what we have come to consider good weather.

One of the named causes of this accident was turbulence, but when did you last hear of a fatal helicopter accident involving turbulence? Thankfully it is very rarely the cause of accidents in the UK, but unfortunately, as with most things, if it is not topical you do not hear about it.

The hidden danger in the case of this accident was embedded within the good visibility: *turbulence*. The report indicates that the pilot was not seen getting any weather information prior to the accident flight, but of course this does not mean that he did not. However, the weather at his departure point was good, with good visibility and calm winds. When a pilot who is pushed for time and has a reputation to uphold wakes up to this sort of weather it is a case of 'let's go', and Martin would not be alone in making this decision; a large majority of pilots would fall into the same fatal trap. Numerous studies of pilots' behaviour have found that they are by nature

optimistic and therefore tend to be *over*-optimistic when it comes to evaluating their flying skills, and in particular when it comes to the weather.

Martin either did not see the relevant available weather, chose to ignore it, or did not understand the risks associated with flying in the local area and the associated severe turbulence. However, it is clear that the available weather information was forecasting en-route weather conditions that would give rise to strong winds and severe turbulence on the south-eastern slopes of the mountains, resulting in extremely unsafe flying conditions. These extreme conditions were confirmed by a local helicopter flight instructor who arrived in the general area of the accident to find severe turbulence such that he turned around, returned to his flying school and cancelled flying for the day.

The weather was setting a trap that would require good pre-flight planning to enable the pilot to identify the danger. He would also need awareness of en-route terrain and its effects on certain prevailing weather conditions. I think most pilots have heard of the local weather phenomena in that area called the Mistral and its associated high winds and severe turbulence. He would need to be aware of the dangers resulting from flying an

The BEA's report

Martin Rutty and Simon Lichtenstein died near Tourrettes-sur-Loup in the South of France in the crash of an R22 they were bringing from Italy to England on behalf of their helicopter brokerage FlyQ. They didn't often fly together outside competition or practice, but Simon was a last-minute stand-in when Martin's original co-pilot dropped out.

The BEA accident report says the helicopter, G-CBVL, had taken off from a private site at Cuneo in Italy with the pilots intending to refuel at Avignon or Aix-en-Provence en route up the Rhone Valley towards England. They had left Cuneo the previous day but had returned after 20 minutes because of bad weather. Martin or Simon called Nice Info to say they were 2nm north of the village of L'Escarène, in the alpine foothills north of Nice. Nothing more was heard.

The wreckage was found in a ravine and was extremely difficult to get to. It showed evidence of a high-energy, almost vertical impact. The engine was working but the main rotor had been turning only slowly when the helicopter came down. Part of a main blade was located seven months later 580 meters from the crash site.

At the time of the crash, a local helicopter instructor departed from Cannes but returned after only 15 minutes after experiencing severe turbulence on the approach to the mountains, some 15km from the crash site. A witness on the ground said he saw the helicopter go over his house about 150 meters above him and added that there was a strong wind, the 'mistral Southwest'. He noted that the helicopter appeared to be caught in storms and the tail swung from right to left. Two other witnesses on the ground saw pieces of metal come off the helicopter and fall slowly to the ground.

The report comments that the helicopter had been sold and the pilot was under pressure to deliver it quickly to its new owner. It adds that the weather conditions in the area were characterised by strong turbulence, and not conducive to flight safely. The pilot did not know the local specifics of conditions in the area north of Nice. The helicopter was subjected to strong turbulence, and the pilot's actions on the flight controls were "likely to have led to a break of the bottom stop of the main blades."

It concludes that the accident was probably due to "inappropriate pilot action on the flight controls in turbulent conditions". This action caused a divergence of the plane of rotation of the main rotor, and resulted in a blade contacting the cockpit and the front left skid. The blade then separated in flight.

Contributory factors are said to

Right: flying the flag for Britain – Martin and Simon made friends wherever they went

R22 in these conditions and have read the advice given by Robinson Helicopter Company (RHC) on the subject: they are exceedingly good at passing on information to pilots relating to previous causes of accidents, both fatal and non-fatal. I do not know any other helicopter manufacturer that is so pro-active in accident prevention. Over the years RHC have published and updated information in the Pilots Operating Handbook about this subject and have clearly stated the risks and cautions when encountering turbulence: ignore this very good and useful information at your peril.

The trap was simple: directly to the north of Martin, the weather was considered un-flyable as he had already tried this route the day before. However, the weather on the day of the accident flight was giving good visibility to the west, so it would be an easy and almost instant decision to go west through the Southern Alps as north was still not an option.

Only good and detailed planning would have uncovered the fact that *both* directions were unflyable: the weather north being due to what we would consider classic fatal accident weather – low cloud, poor visibility, high ground. However, the weather to the west was a 'suckers gap': clear, with good visibility, but it would prove just as deadly due to the severe turbulence. ➔

Right: even at serious competitions, Simon and Martin always made a joke of it

have been "the phenomenon of 'target destination' pushing the pilot to continue the flight despite the deterioration in conditions", and ignorance of the local weather conditions in the region north of Nice.

Martin had 2,374 hours, including 11 in the past three months, four of them on type.

Witnesses

Martin, 50, and Simon, 49, were both family men – Martin had four children, Simon two. They lived 15 minutes from each other on the Hereford-Shropshire border and had both begun their flying careers in hang gliders and microlights, graduating to powered aeroplanes and then helicopters as circumstances allowed. At the Brits, they had won the Club Class four times in five years up to 2008, and they'd been part of Team GB in four World Championships.

In 2010 Martin and Simon were competing in Minsk when they saw the Austrian pilot Günther Zimmer die while doing an aerobatic display in his Hughes 500. Both men were deeply affected by what they had seen. Afterwards Martin wrote an article for *Rotor Torque* in which he reflected on Günther's accident.

"The public started to melt away, quietly and without a fuss. Grown men, mostly pilots, were yet again in tears, but this time it was very different. We'd lost a friend, a competitor and a fellow aviator. This terrible event brought a premature close to the weekend's competition. The official closing ceremony was cancelled; the prizes were given out without gusto and were received without enthusiasm by shocked winners in a small side room.

"For me, Günter's death has completely changed my view regarding the validity of doing displays at the Helicopter Championships. As some of you know, I've done my R22 version of this type of display at several Championships, and I've thoroughly enjoyed doing so. But I won't be doing it again at a competition: having seen the effect on people when things go wrong, it just isn't worth it. It's not just those you know and (of course) your family: complete strangers were deeply scarred by seeing what happened so quickly to someone who was just seconds previously having such fun."

Left: the pair with a gorgeously-painted Robinson R44 in Russia

Having looked at the weather conditions, let us return to the most important lesson to be learned from this accident: Why do we find that the pilot feels the need to push on, to get home?

The investment

Human nature is such that when we invest in something, we will do everything possible to make that investment pay off (in this case we are not talking about monetary investment). These investments are not always obvious to us to us at the time we are making them and therefore we are not aware of the pressures we place on ourselves. Martin had made a very large investment in this particular flight when he departed from the UK to Italy to pick up the helicopter. Friends, colleagues, and most of all, the new owner would know the intention of his trip, therefore expectations would have been high. Added investment came when he decided to take a friend, Simon, with him. So even now, before he had reached the point of deciding to take off on the final flight, the investment that Martin had made would make it almost impossible for him to be seen to return to the UK without the helicopter: his decision to depart was already a foregone conclusion.

Martin and Simon in G-SPEE, the R22 in which they most often competed

Once the decision to take-off had been made and the flight had commenced he had made further investments, and the further the flight continued, so the investment increased and it became very difficult to turn around and return to the point of departure. We must also remember that Martin had already returned to Cuneo once, so to return twice would be unthinkable, as he had already lost a day. A witness stated that Martin needed to get the helicopter back to the UK quickly for the new owner, which is in itself a primary driver to push on. The weather was good, CAVOK: initially during the accident flight there may have been some unpleasant turbulence but his (over) confidence in his flying skills would have caused him to press on. *Perceived ability is higher than actual ability*. Fatal accidents associated with turbulence would most probably not have been in the forefront of his decision-making process and not perceived as a threat. As the turbulence increased his stress levels would have increased. As Martin's stress levels increased several things would have happened that would eventually have overwhelmed him: those tasks that he could easily have carried out at lower stress level became increasingly difficult, if not impossible, to carry out – and this would include rational and timely decision-making. The physiological effect of the increase in stress level would be such that Martin would tense up on the controls, making it impossible to make small, subtle control inputs, resulting in the tendency to over-control and leading to the eventual loss of control.

Research suggests that it is risk misperception and not high risk-tolerance that is associated with exposure to hazardous aviation events: that without knowing the real risks, a pilot is not able to

Left: Martin and Simon with Peter Barker and David Monks on a navigation course

properly evaluate different courses of action or outcomes. Prior to your flight it might be a good idea to ask yourself a question: "What is the risk, and how big a risk am I taking?"

So what are the real risks?

- One of the biggest risks is 'you' and your personality: which, as I have said can lead to *your perceived ability being higher than your actual ability*, leading to the notion: "I have survived it once so I know I can do it again" and "I have always done it! I'm still here". This then leads to *positive feedback from bad decisions* and favours greater risks being taken. Having survived a bad decision, it is imperative that you learn from it. If you are unsure how you managed to get yourself into the situation, then discuss it with an experienced pilot or send me an e-mail. Above all, do not think that because you got away with it last time, you will do so again next time! Be honest with yourself: are you a risk taker? Do you grow horns when you sit at the controls in your helicopter? *It is not the gun that kills, it is the person holding the gun*.
- Lack of awareness of those things that kill helicopter pilots: read accident reports and try and learn from the mistakes of others, attend safety seminars or manufacturers safety courses. I can only assume that Martin's lack of awareness of the dangers associated with severe turbulence was causative in the accident. You should understand that *it is not what happens to you, it is how you respond to what happens to you that determines the outcome*.
- Lack of flight planning or poor flight planning dramatically increases your risks: I think that it was also causative in this accident. Being in a rush is going to result in poor planning and is

Same the world over

The International Helicopter Safety Team, which has the ambitious goal of reducing the civil helicopter accident rate by 80 percent by 2016, believes a number of pilot behaviour patterns cause the vast majority of accidents, including the need by some aviators to prove they have "the right stuff" to fly in all situations.

The IHST has developed a list of 12 'operational pitfalls' it believes all pilots should review, and it runs as follows:

Responding to Peer Pressure – This is poor decision-making based on emotional responses to peers rather than evaluating a situation objectively.

Mental Expectancy – The inability to recognise and cope with changes in a situation different from those anticipated or planned. Visual illusions and similar aural sounds occurring at the 'wrong' time often lead to such miscues.

Get-There-Itis – This 'disease', common among pilots, clouds the vision and impairs judgment by causing a fixation on the original goal or destination combined with a total disregard for any alternative courses of action.

Duck-Under Syndrome – The tendency to 'sneak a peek' by descending below minimums during an approach, based on a belief that there is always a built in 'fudge' factor that can be used or on an unwillingness to admit defeat and shoot a missed approach.

Scud Running – Pushing the capabilities of the pilot and the aircraft to the limits by trying to maintain visual contact with the terrain while trying to avoid physical contact with it.

Continuing VFR into IMC – The all-too-often result of scud running when this becomes the only alternative to flying into the ground. It is even more dangerous if the pilot is not instrument qualified or is unwilling to believe what the gauges are indicating.

Getting Behind the Aircraft – Allowing events or the situation to control your actions rather than the other way around. This is characterised by a constant state of surprise at what happens next.

Loss of Positional/Situational Awareness – Another case of 'getting behind the aircraft' which results in not knowing where you are, and an inability to recognise deteriorating circumstances and/or the misjudgment of the rate of deterioration.

Operating Without Adequate Fuel Reserves – Ignoring minimum fuel reserve requirements, generally as a result of overconfidence, lack of flight planning, or deliberately ignoring the regulations.

Descent Below the Minimum En Route Altitude – The duck-under syndrome manifesting itself during the en route portion of an IFR operation.

Flying Outside the Envelope – Unjustified reliance on the (usually mistaken) belief that the aircraft's high performance capabilities meet the demands imposed by the pilot's (usually overestimated) high performance flying skills.

Neglect of Flight Planning, Preflight Inspections, Checklists, Etc. – Unjustified reliance on the pilot's (usually overestimated) short- and long-term memory of regular flying skills, of repetitive and familiar routes, etc.

Left: Martin and Simon in relaxed mode with a Tiger Helicopters R22 at Heythrop Park

likely to result in you rushing to your funeral. Good planning reduces the chances of unexpected situations in-flight, thus keeping your stress levels low and giving you the spare capacity to deal with the odd problem. The more spare capacity you have the less likely it will be for you to be overwhelmed during an emergency.

- Lack of judgmental skills: we tend to equate the pilot's experience and skills with flying hours, but judgmental skills are as important, if not more important, when accessing your experience. Unfortunately we tend to think that 'skill and daring' are to be applauded when 'skill and judgment' should be. You should be learning from every flight you make and improving your flying and judgmental skills, thus your experience, as your licence is no more than a licence to learn.
- Distraction: and this can come in a number of guises – passengers, internal events and external events. *Being at the controls does not necessarily equate to being in control*.

In summary there is a very old saying: "A superior pilot is one who uses their superior judgment so as not to have to use their superior skills."

I have to deal with the wreckage of an accident; thankfully I do not have to deal with the wreckage of the family and friends left behind. I often wonder if we should simply fit a picture frame in the cockpit, in sight of the pilot, that contains a picture of his or her family, as this just might be the incentive required to make the correct decision.

I have conducted Flight Safety courses worldwide, given presentations and have written articles for more years than I care to remember and the aviation industry must be somewhat bored with my 'harping on' in regards to flight safety. However, if I have managed to instill a sense of self-preservation, and as a result have saved even one life, then I would consider it to be a success – but it is frustratingly unquantifiable.

Remember, you are recreational pilots and it is supposed to be fun. If you are having to think seriously about it, then don't go; that way there will always be another day!

I wish you many long and enjoyable flying hours as a helicopter pilot as it is without doubt one of the most rewarding and challenging things you could have chosen to partake in.

Fly safely, keep your RPM in the green and I will keep 'harping on'… ❑

Right: cheers – Martin on the FlyQ stand at Friedrichshafen, Germany, in 2010