

by Bruce Goldsmith

ICARISTICS

FREEZE! A GUIDE ON HOW NOT TO

Bruce Goldsmith meets an expert on 'staying operational under extreme stress', and learns how we as a sport could develop our training and safety systems

"I'll bet you've heard this story time and time again. A pilot with several hundred hours flight time experiences a collapse. The collapse isn't big, but it causes the glider to turn, gently at first, but it soon picks up speed and the pilot does nothing. The collapse doesn't recover on its own. Pilots on the ground stand and watch in horror as the glider's turn rate steadily increases until it's a full-blown spiral dive. Finally, and often tragically, the pilot hits the ground.

Nobody can believe it. Why didn't the pilot do something? All he needed to do was to fly in a straight line by turning gently away from the spiral, but he does absolutely nothing. These exact circumstances caused a fatality at a major competition in Turkey a few years ago. The pilot was more than experienced and qualified, so why didn't he take the corrective action he was trained to take?

In another familiar scenario, a pilot applies a bit too much brake in a thermal and accidentally enters a spin. Rather than lifting his hands to stop the spin, as we've all had it thoroughly drummed into us, our pilot does nothing. And he continues to do nothing until he gets so low he goes for his rescue chute. On releasing the brakes to go for the rescue parachute handle, the glider recovers and resumes normal flight immediately. However, like in the situation in Turkey mentioned earlier, I have seen pilots that should have known better spin all the way to the ground in such situations. Why?

A third, equally tragic scenario centres on the spiral dive. Too often pilots have deliberately entered spiral dives then never recovered from them! Unfathomably strange when all that is normally necessary to recover from a spiral is to turn the wing away from the direction of the spiral. What could be simpler? Why don't they remember what to do to save their own lives?

These types of accidents have always mystified me. I'm aware that fear can cause people to literally freeze up, but I struggled to see how it could make a highly experienced and trained paraglider pilot do nothing to save their own life! As an explanation of the paragliding accidents mentioned above, freezing up has never been a good enough answer for me.

THE COLD LIGHT OF DAY

Recently I attended a course specialising in human factors in aviation accidents, conducted by Craig E. Geis, co-founder of the California Training Institute. Mr. Geis is a retired Army Lieutenant Colonel and former helicopter pilot. He also held the distinction of being the US Army's lead Safety Specialist in human factor accidents. He now instructs aircrews in both the private sector and in military operations worldwide, as well as fire-fighting crews and police organisations, in a specialised skill set developed to manage reactions under extreme stress situations. When I described the problems encountered by pilots, where they had serious accidents and

seemed incapable of even the simplest actions to save their lives, he looked me straight in the eye and simply said, "That is exactly what I would expect. We see it all the time in very stressful situations. Few people realise how severely debilitating fear can be."

The phenomenon occurs in both experienced and inexperienced pilots. In less experienced pilots, excessive stress often results when a pilot finds himself in a situation he has neither trained for nor encountered before. With experienced pilots, it's just the opposite. A very experienced pilot often fails to recognise a dangerous situation due to complacency and is then caught by surprise. Both situations cause the stress level to rise too quickly, which in turn causes excessive production of stress hormones and results in a significant decrease in mental performance.

CHEMICAL BROTHERS

The body's immediate reaction to stressful stimuli is an increased heart rate. In primitive man this was a good thing and a necessary prelude to the hyper-aroused state that primes us to either fight or flee a situation. In aviation however, too much of this good thing is definitely not a good thing. A pilot needs his wits about him in order for him to take the correct action.

In these high-stress situations your body pumps a complex mixture of extremely powerful chemicals into your bloodstream, with adrenaline acting as the cheerleader. At lower concentrations these natural drugs actually improve your reactions and cognitive powers, but as the stress levels rise the brain starts to overdose on its own drugs. Our mental capability to perform under stress starts to drop off. If the stress level continues to climb, the drop off in ability to perform can be very dramatic indeed.

Figure 1 shows just how badly we can be affected. When our heart rate is between 115-145 bpm we are in our optimal zone to perform exacting mental tasks. In an extreme high stress situation, when the heart rate climbs higher than 145, we can be completely frozen with fear and may even lose some of our most basic controls and actually void our own bowels - yes, the expression 'to shit oneself' has some very truthful grounding. It's not surprising that pilots find themselves unable to take even the simplest and most essential of actions, such as releasing the brakes or making a turn, at these times.

Figure 1's chart illustrates how our performance deteriorates as our heart rate climbs. During these 'exciting' times the body produces a hormone called Cortisol. Often referred to as the 'stress hormone', cortisol is produced in response to stress. It increases blood pressure and blood sugar and has a significant impact on our mental performance and our memory.

Cortisol impairs the transfer of information from short-term to long-term memory. It interferes with the encoding and consolidating process and

information is lost or fails to get to the long-term memory. Since short-term memory is limited in capacity anyway, in a stressful situation it simply overloads and fails us.

It also affects the long-term memory by impairing information retrieval. We don't lose information, but we have difficulty finding and retrieving it. This can have critical implications if we need to remember previously learned information under stress. This is exactly why even experienced pilots fail to recall previously learned emergency procedures. They're still in the long-term memory, but retrieving the information takes longer. In do or die situations, time is something we don't have. Our frontal lobes are our emotional control centre and home to our personalities. They are involved in motor function, problem solving, spontaneity, short-term memory, rational thought, language, initiation, judgment, impulse control, and social and sexual behavior. During a stressful event, Cortisol suppresses activity in areas at the front of the brain that control short-term memory, concentration, inhibition and rational thought. It allows us quick access to 'the lion' needed to either fight or flee from the danger. However, it hinders the ability to handle complex social or intellectual tasks and behaviors. The result is that when stress pushes our heart rate above 145 bpm we lose our ability to think rationally and, above 175 bpm, the frontal lobe stops working and rational thought reverts to fight or flight.

It is important to understand that heart rate is only an indication of the level of stress-released chemicals in our blood stream. Raising your heartbeat through exercising won't produce them. You need fear too.

So if fear can literally paralyse us, and more easily than many of us would think, what can we do to stop this from happening?

SUPPRESSING THE DRAGON

It is very hard to think clearly when your brain is flooded with these stimulus drugs. Here are a few of the things we can do as paraglider pilots to increase our chance of surviving a highly stressful and physically threatening situation.

Stress Inoculation

If you subject someone to a stressful situation for a long enough time, they will eventually stop finding it so stressful. During military combat training, troops are made to run around the training field with bullets whizzing around and grenades exploding. After a while the troops become desensitized to the noise and stress of the battlefield and become able to operate effectively again. Similar techniques are also used to train police officers for crisis situations using replica towns complete with bandits and bombs hidden about the place. Paragliding SIV courses attempt to do much the same thing. The pilot experiences scary situations and learns to overcome the resultant fear by getting used to it.

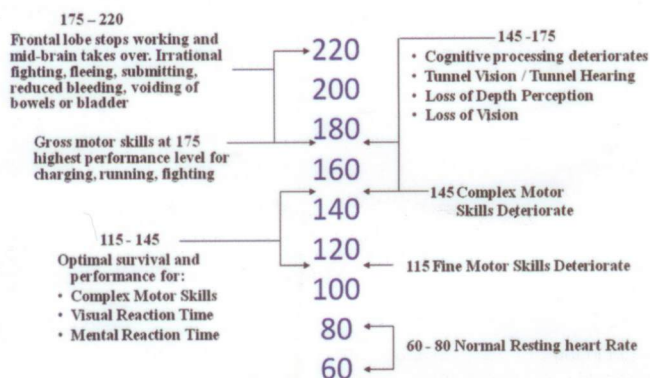


Figure 1. A heart rate between 115-145 is the optimal for mental task performance

Pre-Programmed Reactions

By repetitively going through a set of movements, you can pre-program your brain to react in the correct way to an event. In paragliding you can pre-program yourself to have automatic reactions such as going for your reserve parachute, or checking where the reserve handle is. SIV training can also help to pre-program some reactions to events. If you practise SIV frequently your reactions are likely to become automatic. In this case you must practice on your own to develop habit patterns.

Check Lists

Commercial airline pilots use checklists to keep on top of things and to remove the need to either creatively think or rely on memory in emergencies. Whilst digging around for checklists may sound a silly prospect when you are locked in a spiral, perhaps we could also follow this example in paragliding and sew a simple 'emergency checklist' onto our sleeves. It could be a great reference as well in SIV courses. A simple SIV check list could read something like this:

ASYMMETRIC COLLAPSE

1. COUNTER TURN
2. PUMP OUT
3. CHECK HEIGHT
4. DEPLOY RESERVE

SPIN / STALL

1. HANDS UP
2. WING OK?
3. WRAPS / LINES
4. WING OK?
5. DEPLOY RESERVE

STUCK IN THE MUD

In France they call fear paralysis 'Viscosity Mental'. It means that the brain becomes slow to react and your thoughts become bogged down. However, the exact details of the mechanism are not really explained. Perhaps the following four-step process should be incorporated into the training materials for all paragliding operations:

1. FORM HABITS - develop and practise patterns for actions needed in times of duress
2. CHECK LISTS - make and use them
3. PLAN AHEAD - before entering a potentially hazardous situation, think about what could happen and identify the correct action you need to take if it does

SPREAD THE WORD

Listening to Craig talking about Human Factors was like having him flick a light bulb on in my head. I immediately understood what had caused so many accidents I'd seen over the years. Moreover, it gave me some viable solutions to bring to my own sport. In sharing what Craig showed me, I hope I'm able to help improve paraglider training and instruction and thereby reduce the number of accidents within our sport. I really hope this Icaristics manages to make its way into the hands of the national federations around the world and gets incorporated into the training manuals for instructors everywhere. ☺

Additional information on stress and performance are available at Mr. Craig Geis's website, www.cti-home.com.