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BACK TO BASICS

Has anyone else ever asked themselves why balloonists don't have a ground school? Twenty years ago I decided to give hang gliding a try and so I went down to Wales and spent a weekend learning about hang gliding. I sat in a classroom for a day together with 10 other students and learnt about pitch, roll, stalls, wingtip vortices and everything else I needed to know so that I understood how to control the hang glider.

Fifteen years later I got in a basket and was told, "Okay, now get it hot and we'll lift off." That was the extent of my ballooning theory lesson. Luckily, during my training I was instructed by pilots who were able to offer better explanations of how things happened and why, so that I steadily gained experience and understanding. But at no point was I able to sit down in the calm and quiet of a classroom and ask questions like "What is a safe descent rate?" or "Why didn't I get into that field?" and "How do I change my direction of travel?"

The answers to most of these questions came from experience and mostly after I had my licence. Several years later I was discussing a pilot who checked out in

Martin Axon looks at the way we learn about ballooning and says a bit more cohesion in training might benefit us all

record time with a friend. This pilot's secret, or so he said, was that he had worked out some of the underlying principles and this had helped him to master his flying more quickly than most. He had figured out principles such as; to maintain a steady rate of descent you need to keep the balloon temperature constant and, if you are in a cold descent, the descent rate won't slow when you put in the first burn, nothing will happen until you get the envelope back up to its equilibrium temperature. That is when I realised that if you understand what you are doing with the burner and why, you are more likely to be able to quickly master the control of the balloon.

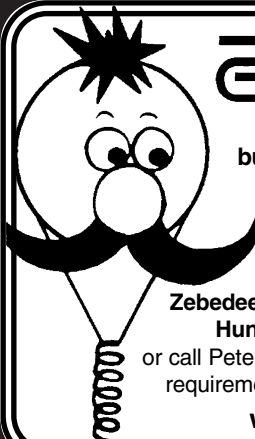
So balloonists don't have a ground school but, in addition, unlike many other aviation sports, most balloonists don't have the benefit of a club or an airstrip that they fly from so they also don't have a group of experienced balloonists that they can approach to discuss ballooning and learn from them. So how do balloonists get the information that they need and use this to learn how to fly? Most trainees rely on the three basic sources: the basket, the pub and books on ballooning. However these don't always provide what is needed; instruction in the basket depends on the knowledge of the pilot - you may be lucky in your choice of instructor but even then the basket is a far from ideal environment

for explanation and discussion. The same goes for the pub where discussion rarely goes beyond recounting tales of the last exciting flight. Books offer the best hope, but these are primarily aimed at getting you through the dreaded PPL examinations rather than giving you a thorough understanding of the equipment and how to control the balloon. To prove this point, try finding the answers to all of the questions in the quiz in any ballooning book you might have. The exception to some extent is the BBAC Pilot Training Manual, though even this doesn't cover all the areas that are needed. The same goes for the excellent Cameron Crammer Course. This will get you through the examinations but it won't tell you everything that you need to know about flying the balloon.

The problem was summed up by a recently qualified pilot who also happens to be a psychologist. "There is a wealth of information out there which trainee pilots need to know but there is no systematic way of imparting this information. There is also no one you can go to and ask stupid questions like - why do we use propane instead of butane and how does the burner work?" This issue is highlighted in question 6 of the quiz, by the pilot who didn't ask the question "Why should you leave the flight cylinder bleed valve open when refuelling?"

By now you probably have a some understanding of what I feel that problem is. There is a lot of wisdom and experience out there but it isn't getting to those that need it. So can we make things better? I believe we can and there are two ways to do this. The first is a central resource that





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can be accessed by all; the obvious solution to this is a website which covers some of the issues I have highlighted. A website is useful but it won't fulfil the need for discussion, explanation and the ability to ask stupid questions. So as an experiment I will be running a ground school for all those who think that they might benefit. Finally, I would like to assure everyone that I am not advocating changes to the current system that will affect the mandatory requirements. All I am advocating is a helping hand so that those that come after us don't have to work it all out for themselves. If you still aren't quite sure what all the fuss is about then have a go at the Ground School quiz and it will give you a feel for some of the topics that we will cover.

The Ground School Quiz

1) "Always lead with liquid" means always turn on the liquid valve on the flight cylinder first when carrying out a burner test or prior to hot inflation. Why should you lead with liquid? Note that this only applies where the burner has a vapour take-off.

- a) Leading with liquid reduces excess pressure in the flight cylinder. This ensures that there is no "blow back" when you light the pilot light.
- b) Getting into the "lead with liquid" habit means that there is no ignition source, so any escaping gas will be harmless.
- c) You should always operate the flight cylinders and burner in a consistent and systematic way so that it is easier for trainees to understand what to do.

2) If you are in a steady slow decent at 100 feet per minute, the air inside the envelope is:

- a) Cooling to allow the balloon to descend.
- b) Getting warmer to slow the descent
- c) Staying at about the same temperature.

3) Can you connect a Cameron vapour hose to a Thunder and Colt master?

- a) Yes, they are interchangeable.
- b) No, they aren't interchangeable.
- c) Yes, but you can't connect a T&C vapour hose to a Cameron master.

4) What simple rule of thumb would you apply for a safe rate of descent at 500 ft

when above ground level?

- a) If you are 300 feet or more above the ground then a safe descent rate is double your height above the ground.
- b) 500 ft above ground level so 500 ft/minute is safe.
- c) If it takes longer than a minute to reach the ground your rate of descent is safe.

5) What would happen if you hit the ground at a descent rate of 300 ft/minute?

- a) This is equivalent to about 15 miles per hour and you are likely to sprain an ankle or it is possible that someone in the basket might injure themselves more severely.
- b) Landing at this rate of descent is normal.
- c) This is about three miles per hour. If all basket occupants are fit and prepared for the impact it should be survivable.

6) A newly qualified pilot is flying the next morning and refuels his tanks using a propane tank with a pump. When refuelling he doesn't use flight cylinder bleed valves, instead he fills the cylinders until the pump stops. Since it will be frosty the next day he brings the tanks inside his house as he has heard that this will improve the burner pressure. What is likely to happen?

- a) The propane will expand until the pressure relief valve lifts and liquid propane will be vented.
- b) It is unlikely that the safety relief valve will lift as this is set at 375 psi.
- c) Any heat expansion in the liquid will be compensated by compression of the propane.

7) You are carrying out a hot inflation with full tanks and you notice that the burner sounds "hollow" and the coil start to glow red. What do you think is wrong?

- a) The burner crossover valve has been operated by mistake.
- b) You have a bent dip tube which is pointing up instead of down.
- c) The wind is lifting the basket so that the dip tube is in the vapour space.

8) What is an inversion and what effect does it have as you have as you ascend through it?

- a) An inversion is a layer of cold air which makes the balloon ascend more quickly.
- b) An inversion is a layer of air where the temperature increases with altitude (the inverse of normal), this reduces your ascent rate as you climb.
- c) An inversion is a layer area of high pressure, this pushes air out of the envelope so that you will need to burn more often than to climb through the layer.

9) There are several quick deflation systems available, all of them allow you to

reset the parachute if you decide to abort the landing.

- a) True, you will be able to abort the landing
- b) False, once deployed you are pretty much committed to landing.
- c) Only one will allow you to reset the parachute.

10) You descend through wind sheer and feel a wind in your face. What is happening and what should you do?

- a) The envelope is travelling faster than the basket, the speeds normally equalise very quickly meanwhile you need to put a burn in.
- b) If you feel a wind in the face then you should burn - the reaction should be instinctive.
- c) Windshear is due to layers of air travelling at different speeds, the turbulence results in air being knocked out of the envelope, you need to re-pressurise the envelope by putting in a burn.

11) You are at 500 ft above ground level and the windspeed all the way to the ground is constant at 7 knots. Approximately what descent rate would you need in order to approach your chosen landing field at an angle of 45 degrees to the horizontal ?

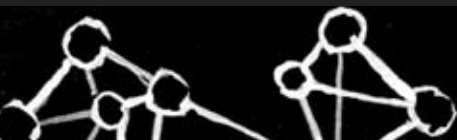
- a) 300 ft per minute
- b) 700 ft per minute
- c) Can't descend fast enough to achieve this angle of descent.

12) You are at 3,000 feet above ground level and in a cold descent of 700 feet per minute, you have already been descending at this rate for 4 minutes. You put in a long burn of about 7 seconds, what happens to the descent rate and why?

- a) The descent rate will start to decrease as the envelope temperature increases.
- b) The descent rate will slow markedly as you now have the balloon under control.
- c) The descent rate will not alter as the air in the envelope isn't hot enough yet to exert an upward force.

Martin Axon is a BBAC Instructor and has provided notes to those who wish to pass their CPL examinations for a number of years. He is now offering a one day Ballooning Ground School based in Essex. Details can be found on his website: <http://www.axon.to>

ANSWERS 1) b 2) c 3) b 4) b 5) c 6) a 7) b 8) b 9) b 10) c 11) b 12) c



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