Hot Air Balloons | Sean

Hot air balloons look simple and cool, but there is more than just a balloon and some string attached to a basket. This is where the science comes in. Its designs vary, depending on its use for it. But the most frequently flown type of balloon is used for commercial. This is when the ground crew and the pilot come in. They both have very important jobs, but that will be told later on. Obviously they have to first set up the balloon and consider lift off. Then the pilot guide and navigate the balloon including him/her through the air. After a while, the balloon lands, the crew packs the stuff back and the process is over. This may be done all over again later. These are the first few steps of hot air balloons.

Even before launching anything, they must consider the balloon’s purpose, and then design it due to the plan. Some types of balloons may be used for research, including atmospheric pressure, and other sorts. Commonly, commercial flight is done in special occasions. For example, in the United States, the 4th of July is well known as the Independence Day. Usually there are some balloons out there to celebrate the special day. Common and modern tourist-use balloons most certainly require a burner, a parachute valve, a gondola/basket, and obviously the balloon made up of thin, light, strong materials like nylon and Dacron. Once the design is built to perfection and manufactured, it must be used in order for it to do its job and use the science.

Hot air balloons have a reason it is called “hot air balloons”. It is because it uses hot air in order to fly, although it isn’t always mandatory to use it. There are three other options for gases that you can use other than hot air. For example, there is hydrogen which ignites extremely easily. The other 2 are coal gas, and helium. 3m3 of hydrogen is 3.4 kg, 3m3 of helium is 3.1 kg, and 3m3 of coal gas is about 1~2.5 kg. Hydrogen is known to produce the most buoyant force, and helium produces 93% of the force that hydrogen creates. Coal gas is cheap and less efficient, whereas helium is expensive, efficient and quiet. Someone named Roger Bacon and someone else came up with a theory that if hot air floats, they can use the same principle to create lift and make flight possible. It became true, and we use it nowadays sometimes. Hot air is called hot because it is warmer than the surrounding gas. When any molecules become relatively hot, the molecules become active and take up more space, which causes it to rise, since the cooler surrounding air is denser. It’s the same thing as if you were putting an air packed beach ball into the water. Since the air inside of the ball is less dense, the pressure of the water would win against the pressure of the air inside. So when the air inside the balloon is hotter than the surrounding air, the air tends to be less dense, which results in lower pressure. The pressure outside of the balloon would be higher, which concludes to flight using hot air. But first you got to set up the balloon before even applying those principles.

Launching is the next part of the cycle, and this is one of the smaller ones. Possibly, the ground crew takes the most credit in this part of the process. First they lay down the whole balloon on the ground in a wide open area. Second the ground crew sets up the gondola (also known as the basket), and then it is hooked up to the balloon. After so, the propane burners are secured to the mouth above the gondola, then they use a fan to suck cold air from outside to partially fill up the balloon. Once it is partially filled, the burners are turned on to heat the air inside. Then the pilot makes final inspections before taking off for the big flight. Once they are in the air, the pilot has a few choices where they can go.

Once the balloon is high in the sky, the pilot has some choices he can make about where he goes. All the pilot can do is going up and down, but the weather can change a whole lot more. At different altitudes, there are different wind currents. When the balloon goes at a certain height, the wind may be blowing towards the North, and when the balloon goes a little further up, the wind might be blowing towards the East. What can be controlled in piloting are only going up and down, but the pilot can take advantage of the wind currents. The pilot must then search for a landing spot.

Landing is quite simple, and part of it starts right when the balloon is in the air. Right when the balloon is up, the pilot needs to search for a good landing spot just in case. The ground crew also looks for a nice clear spot. Once the location is found, the ground crew sets up a sheet of ground tarp so that no parts of the balloon would be damaged. First, the parachute valve is opened all the way to let out most of the air out. When the balloon is lowering to land, they must always land on the edge of the ground tarp and be tipped over on the tarp using one of the cords attached to the balloon. Once the balloon is down on the ground, the whole crew starts seeping out some of the leftover air. Last but not least, they fold the balloon neatly into a sac. It may take some time, but it’s worth it.

If hot air balloons didn’t require these steps, and of course, the science, then it *would* be quite simple and cool, and maybe a little interesting. All I’ve explained may not be enough. There is more than what there seems to be to how it flies, how they are set up and other extra things. Things have been covered so much that the basics should be included. In conclusion, I believe that Hot air balloons are neat things that seem simple, but can tell a lot about itself.

References

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