

Note making

Note making is a skill that needs to be acquired by students as they have to refer several books for the completion of the course. They need to be independent learners. Adequate practice in note making exercises will make them independent learners.

Passage – 3 Make notes on the passage ‘The Planemakers’ given below with a title, points, sub-points and then write a summary based on the notes.

There are two main things that make aircraft engineering difficult: the need to make every component as reliable as possible and the need to build everything as light as possible. The fact that an aeroplane is up in the air and cannot stop if anything goes wrong, makes it perhaps a matter of life or death that its performance is absolutely dependable.

Given a certain power of engine, and consequently certain fuel consumption, there is a practical limit to the total weight of aircraft that can be made to fly. Out of that weight as much as possible is wanted for fuel, radio navigational instruments, passenger seats, or freight room, and, of course, the passengers or freights themselves. So the structure of the aircraft has to be as small and light as safety and efficiency will allow. The designer must calculate the normal load that each part will bear. This specialist is called the ‘stress man’. He takes account of any unusual stress that may be put on the part as a precaution against errors in manufacture, accidental damage, etc.

The stress man’s calculations go to the designer of the part, and he must make it as strong as the stress man says is necessary. One or two samples are always tested to prove that they are as strong as the designer intended. Each separate part is tested, then a whole assembly – for example, a complete wing, and finally the whole aeroplane. When a new type of aeroplane is being made, normally only one of the first three made will be flown. Two will be destroyed on the ground in structural tests. The third one will be tested in the air.

Two kinds of ground strength tests are carried out. The first is to find the resistance to loading of the wings, tail, etc. until they reach their maximum load and collapse. The other test is for fatigue strength. Relatively small loads are applied thousands of times. Each may be well under what the structure could stand as a single load, but many repetitions can result in collapse. One form of this test is done on the passenger cabin. It is filled with air at high pressure as for high-altitude flying and completely submerged in a large tank of water while the test is going on. The surrounding water prevents the cabin from bursting like a bomb if there is a failure.

When a plane has passed all the tests, it can get a government certificate of airworthiness, without which it is illegal to fly, except for test flying.

Making the working parts reliable is as difficult as making the structure strong enough. The flying controls, the electrical equipment, the fire precautions, etc must not only be light in weight, but must work both at high altitudes where the temperature may be below freezing point and in the hot air of an airfield in the tropics.

To solve all the problems the aircraft industry has a large number of research workers, with elaborate laboratories and test houses, and new materials to give the best strength in relation to weight are constantly being tested.

(Practical Faster Reading by Gerald Mosback and Vivienne Mosback)