Spitfire AA810 presents:

Civilian Aircraft Maintenance

By Tony Hoskins, Director of Spitfire AA810 Restoration Ltd.

As much as technology continues to advance at incredible rates, so far no aircraft is actually capable of fixing itself – yet! Whilst onboard software systems become more advanced in self-diagnostic testing with electrical gremlins largely being rectified with a simple reset, the hardware of an aircraft, from the smallest circuit breaker to a complete High-Bypass Gas Turbine engine still requires a person to physically replace it when it fails. For this reason, and certainly for many decades to come, the industry will always need aircraft maintenance engineers.

There are tens of thousands of aircraft in the world. They all need maintaining…

An important point is to differentiate between aircraft maintenance trades and qualifications which essentially fall into two categories: Airframe and Engines (B1 qualification); and Avionics (B2 qualification). These qualifications are largely used in the heavy commercial aircraft industry, whilst the B1.3 qualification is used in general aviation and covers nearly all aspects of both trades with just some specialist tasks carried out by radio avionics engineers. Most people entering the industry now start by gaining a Mechanic rating (A qualification) which allows certification of small checks, minor fluid servicing requirements, and simple tasks that don't impact upon the airworthiness of the aircraft. Even those who have passed the B qualification exams, until the practical experience is obtained will only be able to exercise A qualification privileges.

Qualifications to work

The most common route into aircraft maintenance is by working in a small maintenance company after having shown interest in, and ability at, working in a workshop environment. Within general aviation, normally experience is built up on the job, shadowing an experienced engineer whilst studying for your A or B1.3 qualification, taking exams either through a college or directly at the CAA. For commercial aircraft, it is fairly rare for a new engineer to go to work for an airline without having carried out an apprenticeship with that particular company. The Airline apprenticeship will be thorough but geared only towards airline maintenance; however, your route through the system is clearly laid out. After five years, you will normally finish your apprenticeship having completed the relevant B qualification for your trade, but with the minimum experience to hold an A license. Over another couple of years, depending on the experience gained, you might be offered a type rating course which typically lasts 3-4 months depending on the aircraft. After that you might be issued company approvals on that aircraft type, and when a certifying engineer position becomes available, the move up the ladder is quite easy.

Airline apprenticeships do not come up often, and are normally advertised directly on the airline website. Just as with pilot training, aptitude testing, as well as team working and critical thinking are tested over a couple of days. Demand is high and competition is fierce for the small number of places available.

The self study route is also an option. The college I conducted mine at allowed me to complete the 15 modular exams and all the theoretical study in around 3,000 hours; my practical work took me another year to get to the point of sitting the 4 hour oral exam with a CAA board for license issue. It was a further two years before I had gained enough experience to sit my first type rating on the Airbus A340-500/600 series. Unlike professional pilot training which can be completed in around 18 months on a zero to hero integrated course, more realistic expectations for a certifying aircraft maintenance engineer wanting to do the same is 6 to 8 years.

Commercial Airline Line Maintenance

Increases in component maintenance time between overhaul cycles have significantly reduced the amount of work required to keep very modern aircraft in the air, but airliners rarely survive the ravages of the hundreds of passengers that board such craft daily. For this reason Line Maintenance offers exciting challenges in a high time pressure environment. Airliners on the ground cost money, from landing with a full load of passengers to leaving for its next destination can sometimes be as little as 30 minutes for short haul and often only 90 minutes for long haul. In this time minor servicing of the airframe is required, as well as rectifying or making safe any cabin, galley or In-Flight Entertainment issues. Line Maintenance engineers need to know a considerable amount about all the complex aircraft systems covering not just what makes the aircraft fly, but all the way down to mundane items as simple as coffee makers, boilers, galley refrigeration, toilets, interior trim, seat structures and carpets!

I spent five years in this highly pressured environment. As an aircraft would taxi to stand I knew what I had to achieve to prepare it for its next trip, but not what additional challenges I would have to manage whilst it was my allocated turnaround. Highly public facing, often lone working or just working with one other person, the role offered the opportunity to work for many third party carriers encompassing many different nationalities and cultures. Down route casualty work, out-station holiday cover, or fly-along trips onboard for new routes, line maintenance was never boring. It was, however, long hours, always outside no matter what the weather, and working airside at major international airports added hours to your working day just getting from the car park to the office. It was not uncommon to wake up at 3:15am to be airside at the airport for a 6am start, then returning home after a 12-hour shift at 8pm to shower, eat and hopefully get between five and six hours sleep before returning to work the following day. When I finished shift working, it took around seven months for my body clock to adjust back off the working schedule.

Commercial Aircraft Base Maintenance

Base maintenance is normally always conducted in a hangar facility and includes all the heavier work and defects not covered on the line maintenance plus the major periodic checks. It is rare for engineers to work in both settings within the same company, but in some airlines it is common for the line to support the base maintenance on nightshifts, and less likely for base maintenance staff to support the line. Aircraft are normally in for anything from a few days to sometimes 6 months undergoing base maintenance checks and often you will work just one part of the aircraft for all of the check rather than the whole aircraft. You get a much deeper working knowledge of the aircraft than a line engineer would and will cover many jobs that it just isn't possible to do on the line; but hangar checks can also come with considerable down time if an aircraft is delayed into check. A lot of apprentice training at airlines occurs in the hangars on base maintenance inputs.

Contract working

It is not common for all engineers on any particular check to be permanent staff of the airline that owns the aircraft, in fact the majority of aircraft maintenance engineers, particularly those working base maintenance, will be contracted external staff. Rates of pay are generally better but your income security is only for as long as that one job lasts. Contracts are not always at your local airport, many contractors spend months away from home, both in the UK and abroad, living in short-term rented accommodation or hotels. Rates of pay across the contracting industry have slowly been coming down over the last 5 years as agencies feel the pressure exerted by airlines to reduce maintenance overheads. With airlines continually reducing the number of staff they take from outside their own apprenticeship schemes, those who are working their way through their exams outside of an airline will most likely end up becoming contractors when they enter the industry.

General Aviation Maintenance

There are some 20,000 UK registered aircraft that fall within the general aviation category – the vast majority of which require maintenance by a qualified, or at a minimum locally approved, engineer. Corporate Jets at the top end require qualifications similar to the airline industry, whilst at the bottom end, amateur homebuilt aircraft, gliders and microlights can be certified by those holding approvals issued by the governing bodies of the associations that manage these air sport activities. Most regional general aviation airports will have a maintenance company attached and as the average ages of engineers in this field increases, there is a considerable lack of younger people coming through the system to replace them. Supply of new staff in this instance cannot meet demand and it will not be many years before there will be a significant skills gap as the majority of engineers retire. Rates of pay at this level are relatively low as the profit margins in industry are tight, but the constant requirement of work generally means that within a well-managed company, job security is very high.

Vintage Restoration

Seen by many as the pinnacle of small aircraft work, the restoration of vintage and ex-military aircraft is growing in the UK as the values of the assets increase similar to the classic motorsport industry. Be it working on a 1930's Tiger Moth biplane, or a WW2 Spitfire, this line of work brings challenges in the use of older skills, sourcing, overhauling or repairing parts pushing 100 years old or, increasingly now, remanufacturing parts to allow these aircraft to fly for decades to come. With most projects taking years, the through-flow of work is generally slower but you'll get to understand the aircraft and its systems to its full depth. The pride that comes with a completed project handed over to the customer makes it all very worthwhile and, for me personally, one of the most rewarding. For myself, working in this field of engineering is never actually work – it is an absolute privilege and joy.

Tony Hoskins left school with just A-level qualifications shortly before the 9/11 terrorist attack in America brought the aviation industry to a standstill. Having spent some six years previously volunteering in gliding club and microlight workshops, a professional career in aircraft maintenance was a sensible plan. Undertaking a full-time CAA course over two years to qualify as a Licensed Aircraft Airframes and Engines Engineer he gained practical experience with FR Aviation, Aero Vintage and IWM Duxford. His first job was in general aviation aircraft maintenance at Shoreham and Thruxton airports before moving on to the commercial airline industry where he spent five years working as a Line Engineer for Virgin Atlantic Airlines predominantly on the Boeing 747, Airbus A340 and A320 series of aircraft. Leaving the airlines in 2009 following the financial crash he started the first of several light aircraft maintenance and restoration companies which have grown since then. Now 16 years on from a move into self employment and some 31 years from first starting in a workshop, Tony works primarily on long-term restoration projects of vintage and classic aircraft as well as ex-military warbirds. He is responsible for the restoration of Sandy Gunn's Spitfire on behalf of Project AA810.