

IMPROVEMENTS THROUGH REORGANIZATION OF BRITISH AIRWAYS MAINTENANCE

Michael Skinner
Maintenance Training Manager
British Airways

British Airways has been undergoing a reorganization of its entire Engineering Department in order to improve safety and efficiency. [Figure 1](#) gives you an idea of the size of various different departments within British Airways. Total company has about 48,000 staff. Engineering and Property is a not a very large section of that. You can see that a large part of the cost of an airline tickets goes to Marketing and Operations. Still, without those people, we would not sell very many seats. Most airlines are probably similar to **Figure 1** in composition. I am not going to comments on salaries earned in the various departments. If you happen to notice, the flight crew is at the bottom. That is only for purposes of this slide. Their salaries are not at the bottom.

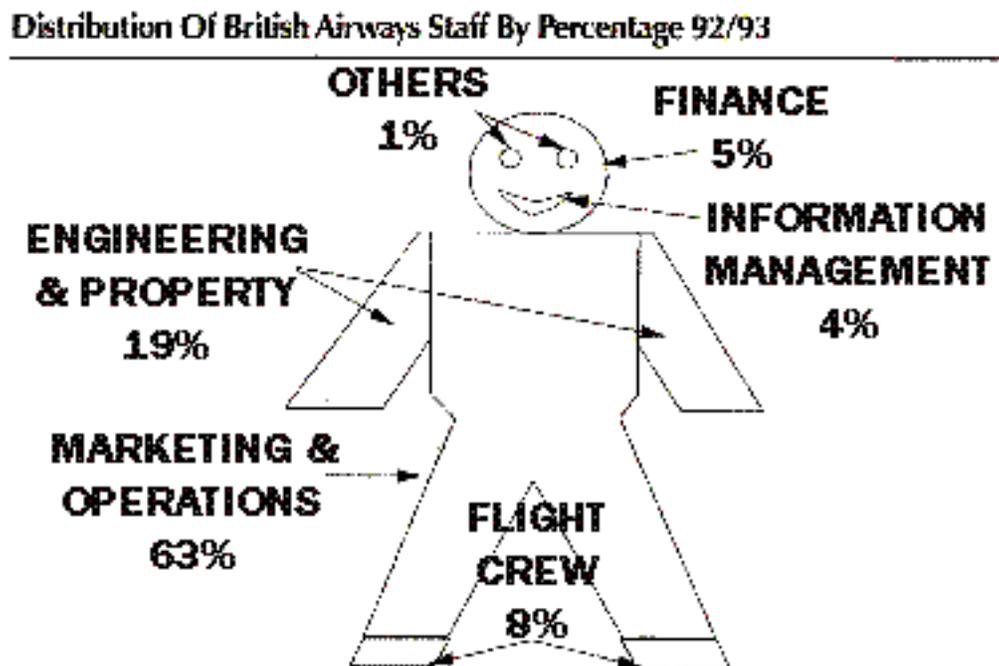


Figure 1

Although engineering is a small part of British Airways, it is the arms and has probably led the way with cost savings within the company. We have done a lot of work in reducing costs and have had a lot of new initiatives. One thing I would like to talk about today is a new initiative to restructure the entire Engineering Department.

Engineering has about 8,700 people. [Figure 2](#) shows the breakdown. Operational Aircraft is the largest segment, for obvious reasons. Heavy Maintenance includes all the main work done in the hangars. MMCO is our component overhaul side. It was considerably larger until we sold the engine overhaul division to finance an acquisition. As you probably know, we have money invested in all sorts of companies: US Air, QANTAS, and one or two other.

DISTRIBUTION OF ENGINEERING

STAFF TOTAL: 8,724 approx

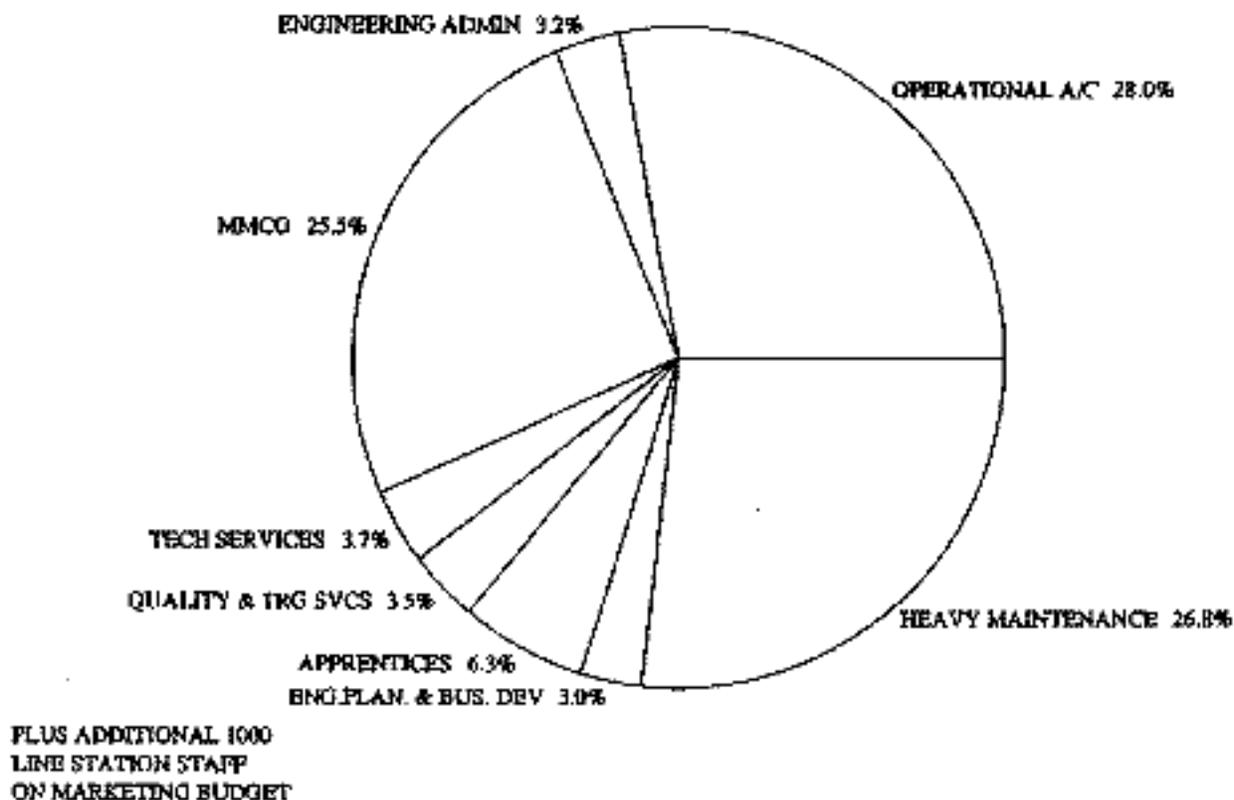


Figure 2

I work in Quality and Training Services, a very small part of Engineering. I run a training school with some 25 instructors, not very large when you consider that my target population is about 8,700.

Figure 3 breaks down where our 8,700 engineers and support people live. The two biggest areas, again, are Heavy Maintenance and Operational Aircraft. That is what I am mainly going to deal with. The figure dates back to November 1992, and the figures do not truly reflect the breakdown of people at that time, but was an estimate. Included in that estimate are LAEs, technicians, and aircraft mechanics.

DISTRIBUTION OF ENGINEERING STAFF TOTAL: 8,724 approx

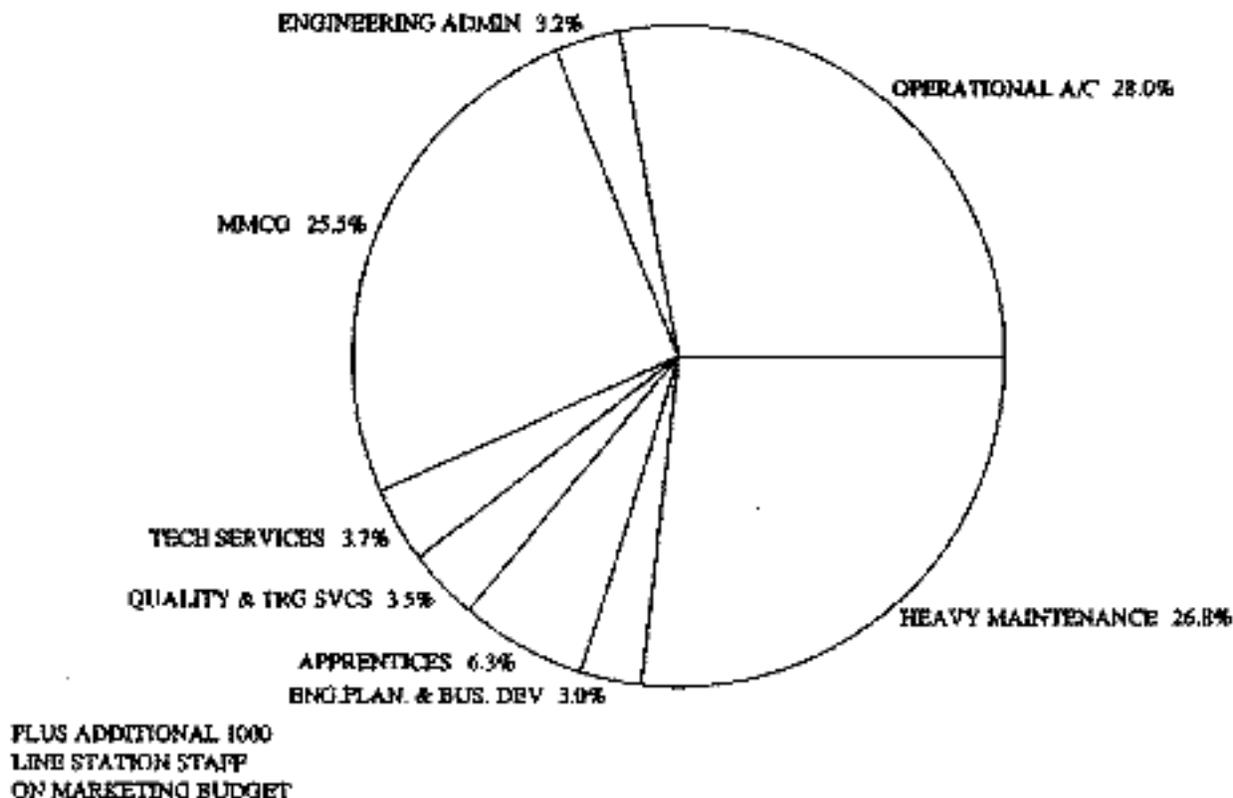


Figure 3

The number of people who work directly on aircraft is about 4,800 ([Table 1](#)). If we break this into two 50% chunks, 50% of those people are managers, foremen, supervisors, and CLTs (Certifying Lead Tradesmen). A CLT is a licensed engineer with exactly the same qualifications as a supervisor, but not holding a supervisory post. The 50% of tradesmen are skilled, but do not hold licenses and, therefore, do not receive services from my department. One of our concerns is that we have a massive work force and we only teach 50% of them real detail on the full CRS (Certificate of Release to Service) cover. These are the guys that sign out aircraft. The tradesmen work on aircraft, but they do not have a certificate of release, which means that they cannot sign an airplane out.

Table 1 Engineering Manpower 1992

Engineering Manpower 1992

- 4800 Direct Labor on A/C

Breakdown:

- 50% Managers/Foremen/Supervisors/CLTs
 - 50% Tradesmen
-

Now, we are missing quite an opportunity. One of the things we wanted to do is eliminate supervisors, so part of our restructuring has changed a lot of ways we work. [Table 2](#) outlines one way we have approached it.

Table 2 Engineering Manpower 1993

Engineering Manpower 1993

- 4200 Direct Labor on A/C

Breakdown:

- 700 Support - Managers / Dock Control / Planning
 - 3500 LAE/Technician/Mechanic
 - 20% LAE (Licensed A/C Engineer)
 - 40% Technician
 - 40% Mechanic
-

You will notice that the numbers have come down a little. That is not a result of our getting rid of people, but a result of natural waste. One thing we do not want to do in British Airways is to make people redundant. We create gaps in the lines to bring more work in because we do not want to get rid of people. We have a large investment in people; we spend lots of money training them. The last thing we want to do is to give them away. There are plenty of people out there who want to take them, like Virgin and one or two others.

We now have about 700 people in what we call support. Managers were always there for dock control and planning. Dock control was the function of a foreman before, and planning was the function locked away in an ivory tower somewhere. We never had planners on the hangar floor. What we have now is planners on the hangar floor that are part of the dock control system. They do part of the job that the supervisor used to do, so these 3,500 people, the hands-on people, do the job they are paid to do. They are not involved in progress chasing, running for the bit, looking at this/that bit, or running away to stores. We have a separate group of people under dock control to do that.

Our aim is to be at those levels in five years: 20% LAE's (Licensed Aircraft Engineers) instead of what we currently have; 50% of our stock licensed. It is a big training burden to train 50% of your staff for full CRS. Our goal is to have 20% licensed aircraft engineers. I do not use the word *supervisor* because it is a swear word at British Airways, but that is the type of role an LAE performs, a person who does the diagnostics and troubleshooting on the airplane. An LAE leads a team to repair an airplane.

Dealing with the 40% of technicians is a new beast for us. The technician is not new; the function is new. This person will have a limited CRS, without necessarily being a license holder, in other words without holding a full CAA license without type rating (LWTR). In five years' time, that is what our breakdown will look like.

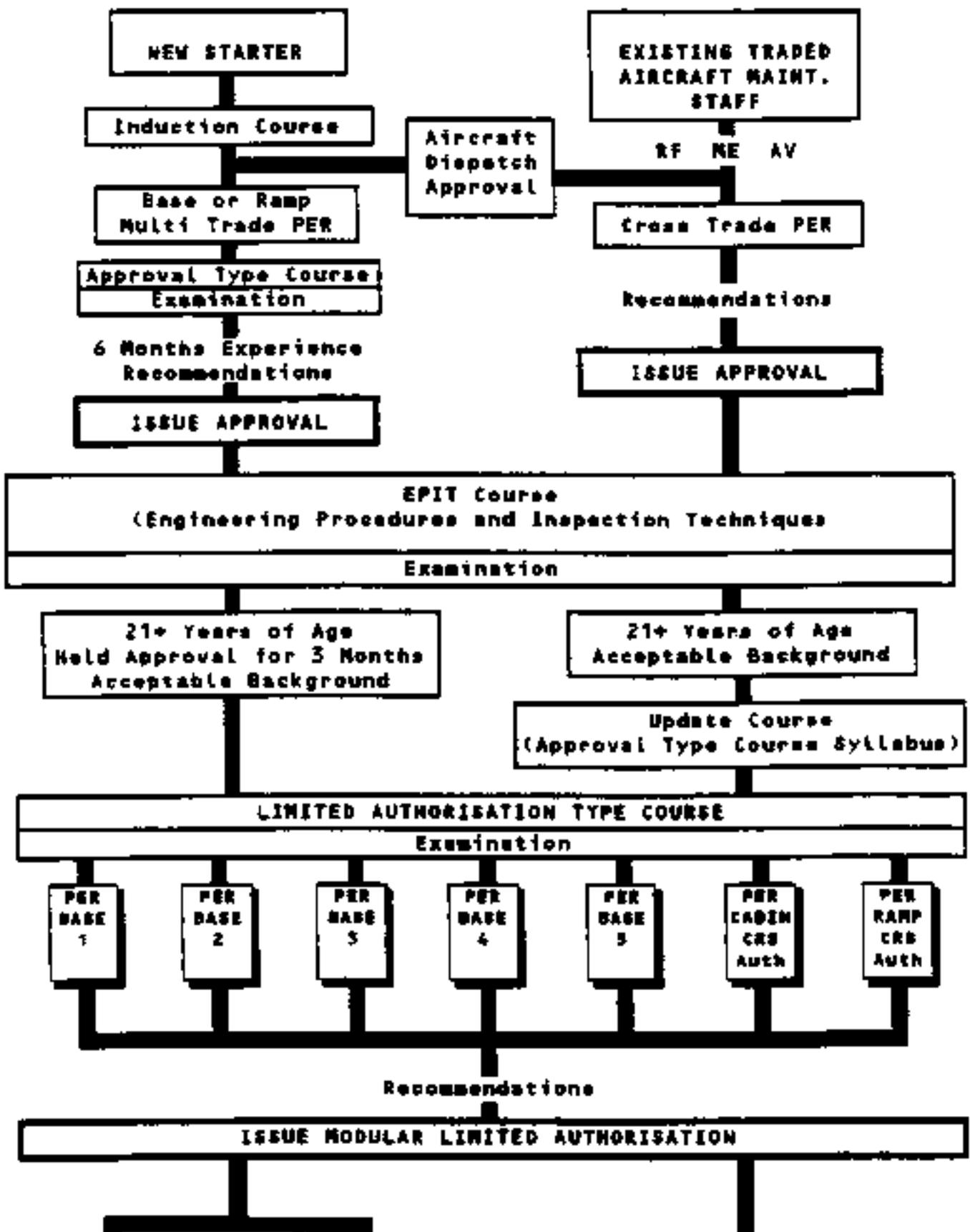
Our training school has a throughput of 240 students a day under this new system. When I was training 50% of the work force, I had about 140 students a day in training school. Since this has gone up to about 240, one of the natural questions, "How many more instructors will we have for the extra workload?" The answer is none. Now that does not mean that my instructors are underworked. In fact, any of them will tell you that they are very much overworked. So basically, I have about a 100% increase in throughput for the department with no increase in staff. There is no magic formula as to how I have done it. I did what most of you would probably have done; basically, I asked for more staff. I was told, "Sorry, you can't have more staff."

I went and talked to the customer. I went and talked to the boss of Operational Maintenance and to the boss of Heavy Maintenance. I said, "We need to do something to train your people. In time, this new structure will drive down the demand for full CRS training, but in the meantime we have an operation to keep going and my customer out there still needs his licensed engineers." The only way I could solve the problem was to be loaned some staff; this is how I got a 100% increase in staff. It is great because I do not have to pay them. I just manage what they do. I am responsible for what they do, so what they do is produce work for me.

It has other benefits. Not only does it give me the ability to meet this increase through labor, but it breaks down some gaps that were there before; it builds bridges out of gaps. I have always had a problem with paying engineers more than instructors. Through a bit of restructuring, not only in the training department, but in the whole of technical services of British Airways we created something called *technical management*. My instructors now are classed as a technical management group. They do not necessarily manage employees, but this gives me the ability to pay them a bit more, to bridge the gap between them and the mechanics on the airplanes.

So, now I bring in this increased work force, give them basic instructional technique training, sit down with my instructors to develop courseware, and have a great big catchall area of potential instructors. I have already recruited two of them to my permanent work force, so it has done me a favor, as well.

Figure 4 is a flowchart of the restructuring process. It looks a bit like a map of the London underground; so, to make it easier to understand, I will divide it into three parts.



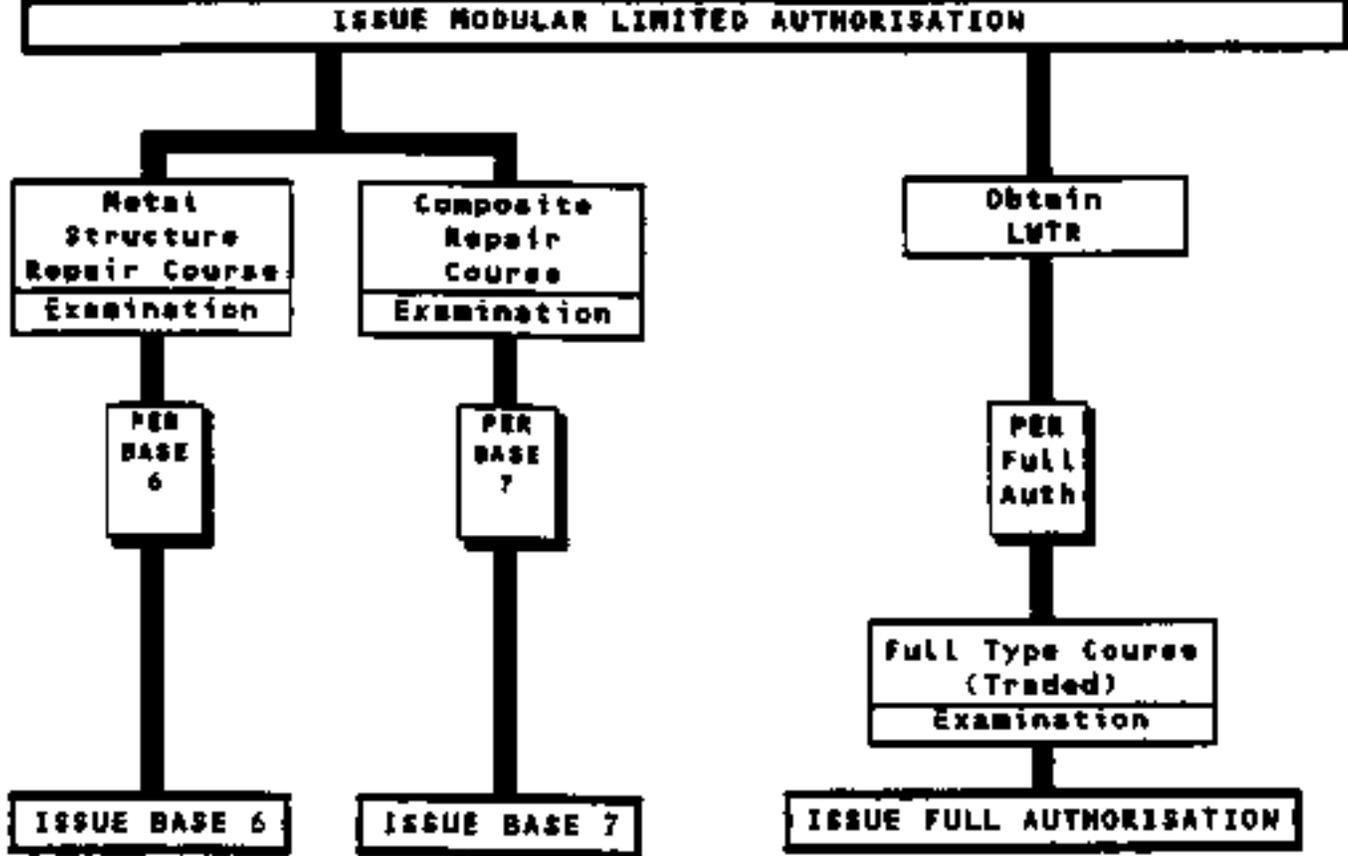


Figure 4 Restructuring Flowchart

As I already said, we will not benefit from this system for five years. People coming in from the top (the two lines shown in [Figure 5](#)) are skilled mechanics, tradesmen, engineers, call them what you will. These are not people coming into the company off the street. They all have the necessary experience and background to be an aircraft maintenance technician. There is another line for existing people in the company. We have negotiated this agreement with the trade unions and have got their total agreement. We have talked it through the CAA and have a year's trial period to see if it works OK and has no negative effects on aircraft safety. What we have agreed on is that every tradesman technician currently in the company has the opportunity to achieve technician.

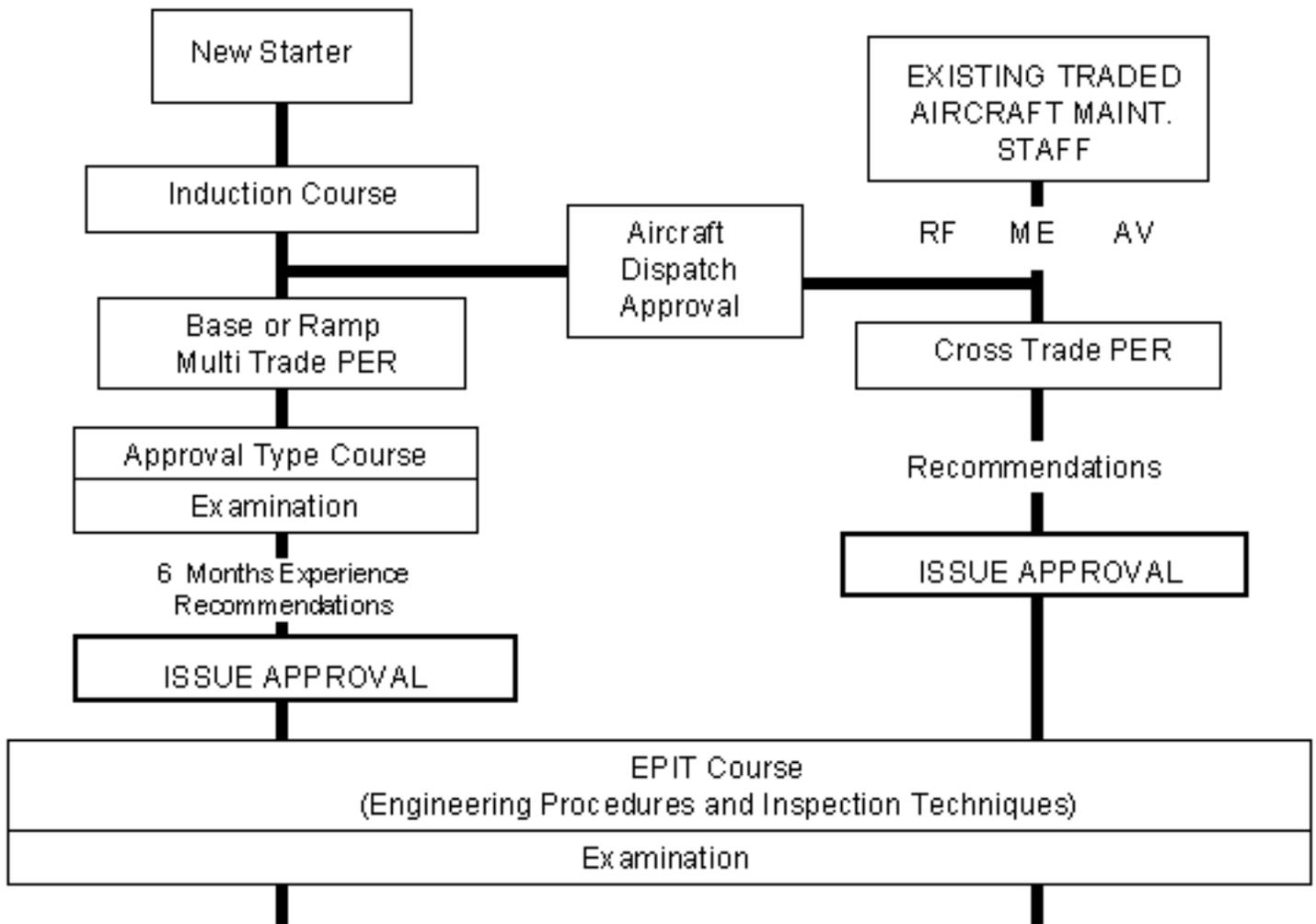


Figure 5 Restructuring Flowchart Part 1

What I have not mentioned is perhaps one of the most significant changes. Our license structure is a little different than what you have here in the US with the FAA. We have mechanical tradesmen, Airframe and Powerplant, and avionics instruments: electronics, radio, etc. Our CAA licenses dictate that technicians who sign out aircraft are either licensed in the mechanical or the avionics arena. What we have done is to produce a limited authorized person who can do limited tasks across all trade boundaries. A technician will come in here and will do some cross-trade training, organized by his or her manager, refurbishing mechanical and avionics. They already have skills in other trades because they have worked with those people for awhile. They will learn from that basic experience, work in a different trade, and build up what we call a PER, that is a Personal Experience Record. It is a record of tasks they have performed it is monitored by our senior people. This is a very closely monitored process. Once they have worked across those trades, completed their cross- training PER, and have their supervisor's recommendation, they will get an approval.

The approval does not enable the person to clear any aircraft paperwork. It means an individual can do tasks and identifies that he or she has done the job. The release to service comes later. Everybody who works on an aircraft has completed basic skill training and has learned the company's procedures. They know how to inspect an aircraft because it is laid down in a manual, but we felt we were missing something. So, we have run every single mechanic and engineer in the company through this engineering procedures and inspection techniques program, to refresh and update their skills.

When a new starter comes into the company whether from another airline, from an apprentice program, from the military, or from wherever, they get an induction course into what British Airlines is and how it works. They start to build a multi-trade PER. These people work either in heavy maintenance, which is base, or line maintenance, which is ramp. They start to build up their experience record. They then have an approval type course, which is not my responsibility. I am responsible for authorization training, not approval training.

The people I have in line who are doing this limited authorization training will, in time, pick up and run the approval course. Then, when the person has built up the PER, has done some approval training, has the necessary experience, and has the assessor's recommendation, he or she will be approved.

Figure 6 shows basic requirements of age, having held the approval and having been accepted. It goes on both sides. The update course is built into an authorization type course run in our training school. However, this is not the only training that the engineers have to get this limited authorization. What we try to do is to present a common core course that runs across base maintenance and operational aircraft. This is followed by hands-on training which is then recorded in the various PERs.

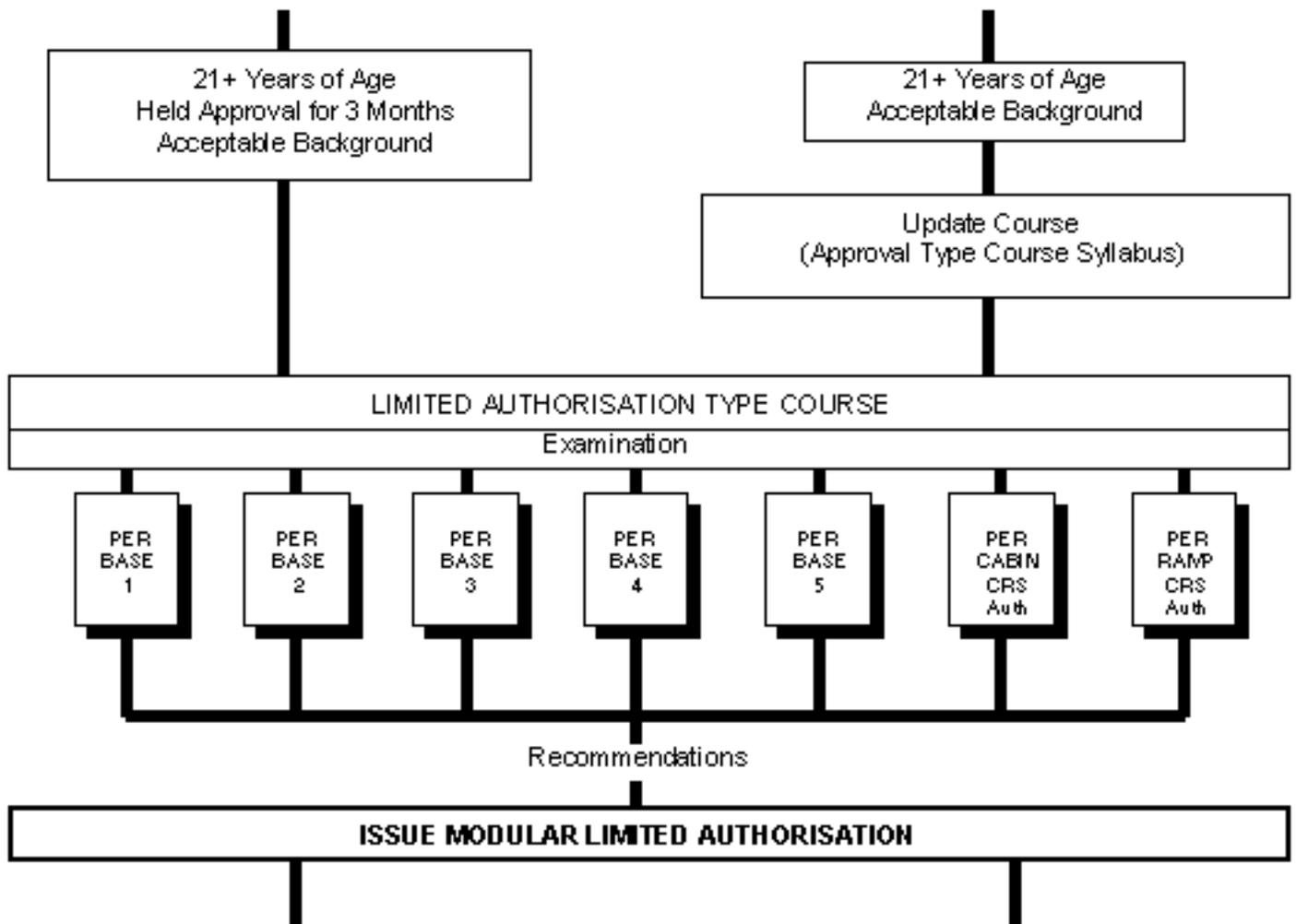


Figure 6 Restructuring Flowchart Part 2

Generally speaking, this course is aircraft type oriented and is basically a three-week full-trade familiarization. It covers the systems, how the airplane works from all trade areas. After they have completed that course, they go away and build their PER. I will go into what the one, two, three, four and five are in a moment. Basically, one, two, three, and four are purely base maintenance. Five is an oddball, what we call a service check and cabin and ramp CRSs. It would take far too long to cover the whole lot, but I will touch on what we do in the base area. When the engineer, mechanic, tradesman, or technician has completed the three-week course and the PER, had it all suitably stamped by a quality approved assessor, they are then issued the modular limited authorization.

There are two more modules in [Figure 7](#). I will go into a little more detail in a moment. From this point on, there are a whole bunch of people who are multi-trade covered. For somebody to have a full certificate of release to service an airplane, he or she must comply with CAA regulations; they must be licensed and trained in accordance with CAA regulations.

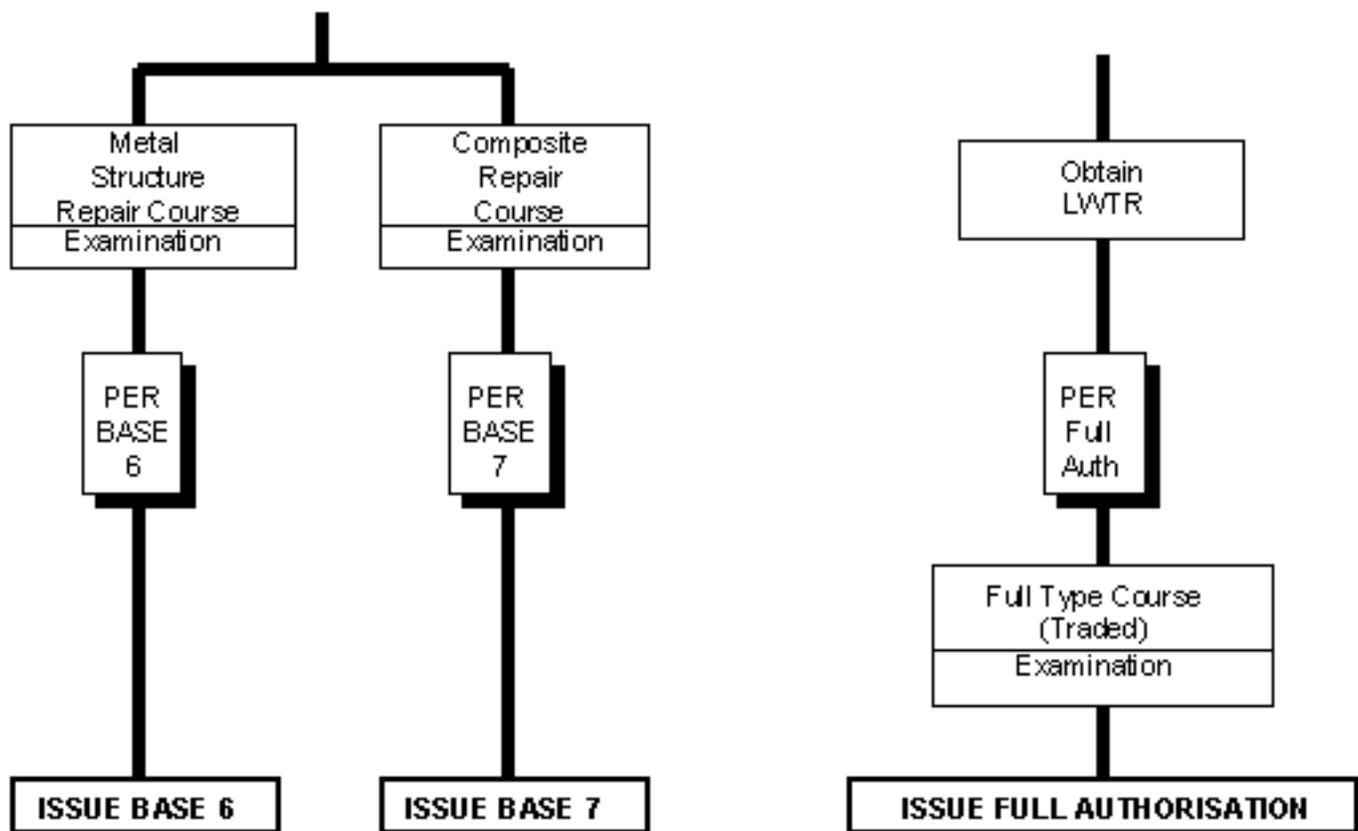


Figure 7 Restructuring Flowchart Part 3

We now have people who have limited authorization, and I will go into what we can do with that in a moment. Those people can go on and get full license without type rating, receive a full aircraft type course, and end up restricted by trade as to what they can do. Even so, the person probably is better all-round qualified, having broadened his or her skill base across all trade categories.

What are the modules ([Table 3](#))? This really is all for heavy maintenance: it is how those different areas are broken down. I do not want to spend too much time on this; I want to spend more time on the one for Base. Basically, they break the airplane down into areas, and a technician can have limited approval on various areas. Numbers six and seven are extensions given to somebody who holds numbers one, two, three, and four. Number 6 is for structural repair--metal; number 7, structural repair--composite. They are both specialist training courses. Numbers one and two stay in our skill center, which trains apprentices and gives basic training to all the engineers in British Airways.

Table 3 Modules

	<u>Modules</u>
1.	Engine / Pylon / APU
2.	Wings / Empennage / Ldg Gear
3.	Ext Fuse / Equip Bays / Cargo
4.	Cabin / Flt Deck
5.	Service Check
6.	Str Repair (Metal)
7.	Str Repair (Composite)

A person with ramp maintenance authorization is one of our front-line people. These people are working on our airplanes that come in sick and, hopefully, go out fixed. Sending out a licensed engineer to an airplane that basically just needs gas pumped in, the tires kicked, and a quick look around is an expensive way to operate. We want to give the people with limited authorization the ability to go out to a clean airplane, that is, an airplane coming in with no significant defects. When a plane is inbound and the pilot calls in to say that it has no significant defects and is good for a turnaround, we do not need to send a licensed engineer. We can instead send someone with limited authorization to go out and do a PDI (Pre Departure Inspection) on ramp 1. That is basically a turnaround check, involving a lot of extra work like looking at bits and pieces of the airplane, kicking tires, checking wires, looking at the wheels, and looking at the brakes. If an airplane has significant defects, we have to send out a licensed engineer.

We have picked or identified 21 items that really are not that important because they are liable to change, and you will notice that we have included the engine starter. When we used to operate airplanes like Tridents, we used to change starters like they were going out of business. We do not change many starters now. Anyway, we identified 21 items these people could have limited authorization on ([Table 4](#)). They can identify a brake unit that needs changing and change it, certify it, and send the airplane on its way. I must stress that this is a trial. We are about nine months into the trial, and everything was negotiated and agreed with CAA. They are looking at us and what we're doing; they want to make sure that it has no significant safety effects on the British Airways' operation.

Table 4 Ramp Maintenance Authorized Tasks

Ramp Maintenance Auth Tasks

- PDI / Ramp 1
- Defect Rectification and Component Changes:
 1. WHEEL CHANGES
 2. BRAKE CHANGES
 3. EMG EQUIP (LTD)
 4. OVENS / BEV MKR
 5. LIGHT FILAMENTS
 6. W/WIPER BLADES
 7. SEAT REPAIRS
 8. COWLS & QA PANELS
 9. TOILET PUMP / FILTER
 10. STARTER (LESS FNC)
 11. HE IGN PLUG (LESS FNC)
 12. INT DOORS & PLACARDS
 13. CABIN FURNISHING REPAIRS
 14. ENG OIL FILT CHK (LESS L/CHK)
 15. STATIC WICKS
 16. CREW H/SETS
 17. BATTERIES MAIN & APU
 18. ENG ST VLV (LESS FNC)
 19. ENG IGN BOX (LESS FNC)
 20. IDG RESET (LESS FNC)
 21. IFE SYSTEM

That is basically what a person with ramp maintenance authorization does. When you consider that this person is not necessarily a fully licensed engineer, that gives you some idea of where we are saving in the cost of the person, not in the individual's skill and qualification. We feel we have trained the individual to meet the task's requirements.

Table 5 gives you an idea of the size of the task. We started less than a year ago, although we had talked about it for a long time before we started. By the end of October 1993, we had trained 1,146 technicians. It takes a little longer for those technicians to get their PER work done, to get it all stamped up, and then to obtain approval by getting it authorized. As of the end of October, we only have 131. We need many more to make the system work properly.

Table 5 Total Trained & Authorized to Date

- Trained - 1146 to end Oct 1993
 - Authorized - 131 to end Oct 1993
 - Target to train by end Mar 1994 - 2614
-

Our target is to train 2,600 people by March 1994 and we should achieve that. Basically, that is a brief overview of the approach British Airways has taken to deskill the task. It is very important to realize that we are giving people a limited authorization and an opportunity for training and hands-on experience in that task.