

ENGLISH AND AIRCRAFT MAINTENANCE

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Maintenance may have often been a lower profile and less well defined area of language training within Aviation than flight crew, cabin crew, air traffic controllers or passenger service agents. However the size of the populations involved (sometimes over 15% of a major airline), recent technological developments (on board and ground computerization), increasing emphasis on Human Factors awareness and new FAR and JAR regulations invite a long, hard look at how the English language is used in a maintenance and engineering environment.

1. INTRODUCTION

Much has changed in the working environment of aircraft mechanics, even their name; A&Ps (Airframe and Powerplant mechanics) are now officially referred to as AMTs or Aircraft Maintenance Technicians. Glass cockpits, computerized documentation, FAR Parts 65/147 Optimization and JAR 66, worldwide shortages of qualified technicians, international cooperation between carriers, FAA form 1 and signing for release to service have passed their way. The present article is an attempt to take stock and have a look at the profession as a whole as regards the way the English language has become a indispensable tool in the aircraft Maintenance, Repair and Overhaul (MRO) business.

2. AREAS OF USE

Aircraft technicians use the English language, whether they are native English speakers or not, in a variety of ways.

Reading Skills

In terms of time spent, reading large amounts of technical documentation represents the predominant use of the language. It has been estimated that in the course of his job even an American native English-speaking aircraft technician may spend over 20% of his working time consulting written information. This information comes in the form of the Aircraft Maintenance Manual (AMM), Illustrated Parts Catalog (IPC), Troubleshooting Manual (TSM), Service Bulletins (SB), Airworthiness Directives (AD), Service Information Letters (SIL), Structural Repair Manual (SRM) or Component Maintenance Manual (CMM) and Engine Shop Manual (ESM) in the case of component and engine overhaul and job cards derived from the above documents by the operator's Engineering department. It represents literally tens of thousands of pages in paper, microfilm, CD ROM or on-line form.

The last decade and a half has brought an increased reading load in the form of on-board computer interfaces (Multipurpose Control and Display Units (MCDU), Centralized Maintenance System (CMS), Aircraft Communication Addressing and Reporting System (ACARS) used for system monitoring and troubleshooting. The airlines themselves have also generated computer systems designed to manage inventory, part flow and maintenance performed. As time goes by, 'mechanics' tend to have cleaner and cleaner hands.

Writing Skills

Similarly, the pen has almost become mightier than the wrench. Increased emphasis on traceability and responsibility in the release process mean that technicians need to document their work more and more and justify in writing the actions they perform. Log books, troubleshooting and test reports have to be filled out in a common language which is invariably English. Both the Authorities and manufacturers put their weight into the balance to encourage this trend.

In another maintenance activity, Engineering, most operators employ technicians to edit in-house documentation adapted to the requirements of their own fleet. These Engineering Orders or job cards are derived from the manufacturer's documentation and should also be written according to the rules of Simplified English incorporated in ATA 100 so as to be as easily understandable as possible on the hangar floor.

Communication Skills

There are two areas where AMTs are required to use the English language as an oral and aural tool in conjunction with the reading skills mentioned above. This is during basic A&P and type qualification training both in their exchanges with the instructors and in the use of CBT devices in the course of the learning process. They need to coordinate oral, graphic and written data and respond to this by asking and answering questions and discussing the subject matter at hand. FAR 147 and ATA 104 increasingly define the content and form in which this content should be expressed and close the gap between maintenance and training documents. A proficient mastery of the English language is one of the prerequisites of the efficient and cost-effective training that guarantee industry standards.

In the field, line mechanics need to liaise with the flight and cabin crew, not just for push-back, but in order to solve any snags during the limited turn-around time. Close ground crew/flight crew cooperation has been proven to be one of the key factors in operational efficiency, dispatch reliability and punctuality.

3. WORKING ENVIRONMENT

It was mentioned in the introduction that the AMT's working environment had changed significantly over the past fifteen years. But how? It is possible to single out a handful of items that characterize a general change in the way the maintenance profession operates and which have a direct bearing on the use of language.

- JAR 66 (Certifying Staff- Maintenance) specifies what had already become a generally accepted industry principle even if it was not always put into practice:
 1. "Certifying staff should have a general knowledge of the language used within the JAR6145 approved maintenance organisation including a knowledge of common aeronautical terms in the language. The level of knowledge should be such that the applicant is able to:
 - read and understand the instructions and technical manuals in use within the organisation;
 - make written technical entries and any maintenance documentation entries, which can be understood by those with whom they are normally required to communicate;
 - read and understand company procedures;

- verbally communicate at such a level as to prevent any misunderstanding when exercising the privileges of their authorisation.
2. In all cases, the level of understanding needs to be compatible with the level of certification authorisation granted.” (IEM 66.15(b))

Although it is not mentioned, it is a fact that the language in question is in most cases English.

- The whole process and organization of release to service implies a much larger degree of personal autonomy and responsibility on the part of the AMT, as well as a larger proportion of his/her time spent on documentary tasks, than in the past. One aspect of this autonomy is greater access to and communication of information.
- Previously, mechanics tended to work in their own language on translated job cards. Carriers have gradually abandoned the translation of their technical documentation into their local language for a number of reasons. It is very costly. It is a slow process that means that the translation of all revisions is always behind the actual revision causing the need to refer to the English original in any case. Each manipulation increases the probability of technical errors slipping into the documents. The carrier becomes legally liable for any such errors. Many carriers employ maintenance staff of a wide varieties of nationalities; a common working language is a necessity. Commercial considerations are more and more important for MRO operators or maintenance stations; they must be in a position to work on third party aircraft with their specific documentation which is invariably in English. Airlines belong to alliances and often shift maintenance loads between themselves for questions of cost efficiency or availability; in these conditions they need to be able to refer to a single common language.
- The airlines also tend to ‘customize’ their documents less, for reasons of cost and standardization, preferring to use the manufacturers’ documentation as it stands. Boeing, Airbus, ATR, Bombardier, Embraer, Saab aircraft ‘speak’ English.
- The same concern for cost effectiveness and creating a single-language loop for both training and production, and the manufacturers’ capacity to produce customized packages, also causes the carriers to standardize their training courseware and use existing CBT and Training Manual material instead of producing their own. To be effective, this choice obviously requires greater literacy on the part of the trainees.
- As we saw above, MRO is fast becoming much more of a commercial activity attempting not only to save money but to make profits with the need for efficiency, reactivity and cost-effectiveness than the inevitable drag on operating costs that it was still considered to be a few years ago.
- Glass cockpits, fly by wire, system monitoring, traceability, on-board testing and troubleshooting devices, lap-top engineering have all brought with them an English-language computer interface and increased the reading load on the AMT both on board and in the hangar or workshop.
- Aircraft technicians are less the specialized craftsmen they used to be and more multi-skilled operatives doing less in-depth work (very often it is enough to change a printed circuit board or a whole box or simply reset a system from the MCDU), but expected to cover a wider range of techniques and assimilate change as it occurs (modifications, revisions, on-job training, in-time training – in English).

- The documentation they use has changed in content and especially in presentation: cubic meters of paper documents and kilometers of microfilm have been replaced by CD ROM and on-line local or web-based documentation. Consulting several documents and finding cross references instantaneously is now possible, but has brought with it new and sometimes more demanding and selective reading habits.
- Given the worldwide shortage of qualified technicians and the desire for cost efficiency, resulting in some maintenance operations being relocated, the job of the aircraft technician is becoming a more itinerant one producing teams with mixed nationalities.

4. STUDENT CHARACTERISTICS

We have seen how the changing landscape of aircraft maintenance is also changing the demands on technicians in terms of English language skills. It gives an idea of some of the varied things they need to be able to do in English. When trying to define any training needs they might have, is it possible to say anything in general about aircraft technicians as a population with distinct characteristics? It may be fair to say that:

- They represent large populations, from several hundred in a medium size carrier to well over ten thousand in a major carrier;
- They tend to have very heterogeneous academic and linguistic profiles according especially to their professional backgrounds and age;
- Their cultural and national origins are increasingly diverse because of the conditions of the labor market;
- There is a generally very strong team spirit which is just one of the things that makes them efficient learners;
- Another is their sense of fun, imagination, curiosity and their uninhibitedness;
- They have a pragmatic, practical, 'hands-on', no-nonsense relationship with the real world;
- They are keen to progress professionally and socially and view English as one of the indispensable tools in this progression;
- They have visually-based working and learning habits;
- They are currently undergoing very rapid changes in their working and learning environments that are sometimes factors of stress.

5. CONSTRAINTS

So far we have seen why the English language is an increasingly important factor in an aircraft technician's working life and in what way they may be predisposed to take an active part in a training program. There are also a number of daunting 'red lights' to be taken into consideration, constraints, very often contradictory, that may condition the way in which the training can be performed.

- Availability is the first. AMTs usually work shifts; their working hours changing from one week to the next. The nature of their work means that their work load fluctuates according to operational events. Shorter working hours (in Europe), increased training induced by new regulations and working practice and a push for increased productivity compound this lack of availability for non-productive activities;
- Budgetary cost-cutting objectives often seem to run counter to training needs;
- The world-wide shortage of qualified A&P technicians either means that teams are understaffed or that less qualified staff requiring more basic training are hired;

- The safety constraint is to the forefront; the technician commits himself and the airline that authorized him when he signs;
- Aircraft mechanics have always been a low-profile social group compared with flight deck or cabin crew, for example. It is often more difficult to convince management to invest further in their training needs;
- This is often not helped by the inefficiency of previous attempts that were frequently ill-timed, ill-adapted or lacking the proper follow-up;
- Nevertheless greater awareness of resource management in maintenance highlights the impact of efficient communication;
- Any teaching needs to be very carefully targeted for the content and skills required for each professional group (an engine overhaul technician does not have the same requirements as a line mechanic);
- Teaching is not enough; there is a particular need for monitoring, testing and on-the-job validation to ensure quality in operational and regulatory terms;
- Any testing performed must attempt to measure proficiency in operational rather than in purely linguistic terms;
- Efficient in-house communication about objectives, rules and phasing in new learning strategies is extremely important for the success of any project;
- Middle and shop floor management must be fully informed of and committed to the program if the savings and economies of scale that can be made are to be achieved and the training goals met;
- Finally, the limited number of English for Special Purposes (ESP) teachers with expertise and experience in this field means that conventional teaching methods must be backed up by CBT, self-study, on-job training, a training continuum, resource centers and in-house cascade training in many cases.

6. CONCLUSIONS

These few pages will probably have shed light on the unusual diversity and complexity of the needs and constraints related to the use of English in the AMT profession. We only hope that they will also have shown the potential in both human and professional terms that any serious attempt to take up this challenge is able to develop.