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COMMUNICATION NEEDS OF AIRCRAFT MAINTENANCE PERSONNEL, PROBLEMS AND CHALLENGES

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ENGLISH FOR SPECIFIC PURPOSES TRAINING CENTRE,

PAFU DĘBLIN

- English for aeronautical communication
- English for AVSEC personnel
- Aviation English testing
- English for Aircraft Maintenance Technicians (AMTs)
FIRST COURSES 2006

- CLIL format
- Addressed at experienced and novice maintainers
- Heavily overloaded with lengthy academic texts
- Emphasizing reading skills
- Too few SMEs and language instructors lacking expertise
TARGET POPULATION ANALYSIS

- Wide range of professional areas with no common center of interest
- Reluctance to learning “from the book” and academic explanations
- Not used to remaining in class all day
- Tendency to have visual intelligence
- Tendency to underestimate own learning abilities (aircraft maintenance career often a second choice)
- Being used to necessity to reach professional, though not linguistic, proficiency standards
- Increased needs to incorporate reading/writing activity
- Working in a team
- Mixed language competencies and educational backgrounds
TARGET POPULATION AND JOB ANALYSIS CONSTRAINTS

- No procedures and technical instructions available for analysis
- The posting for which training was provided was not created at the time
- Equipment on which the trainee was intended to work was not installed
- Problems with acquiring technical documentation to develop hands-on practical exercises
- Scarcity of SMEs on site or SMEs located at other units
- Limited number of qualified course developers
- Variety of equipment for which technical manuals were needed
AMTs’ LEARNING NEEDS

- Reading comprehension (manuals, job guides, illustrated parts breakdowns)
- Writing (making technical entries in documentation)
- Listening comprehension
- Speaking
SPEAKING

- Sharing information
- Giving and receiving instructions
- Planning and performing procedures
- Analysing a problem and debating
- Discussing possibilities of solving a problem
- Reaching a consensus
LISTENING

- Following spoken instructions
- Note taking during follow-on training
- Reporting daily activities and duties
- Efficient interaction with foreign counterparts
- Discussing possibilities of solving a problem
- Reaching a consensus
CHARACTERISTICS AND EXAMPLES OF WRITING TASKS

Brief and to the point. Mostly elliptical sentences which convey observations that technicians may have to enter in their work cards. Basic types of written entries include:

- **Work performed**: Oil filter replaced.
- **Inspection results and actions taken**: – NLG tire tread depth below minimum. Tire removed and replaced
- **No action necessary/taken**: Turbine duct cracks: none. No action required.
- **Test reports**: Serviceable LRU (*line replaceable unit*) installed. Operation correct.
- **Servicing reports**: Oil level checked. Replenished with 1 liter.
- **Work deferred with reasons**: Unit cracked but serviceable. Replacement deferred until next check due to current lack of spares.
READING - DOCUMENT TYPES

manuals, job guides, illustrated parts breakdowns, block diagrams, flow charts, work cards etc.
### DOCUMENT TYPES

<table>
<thead>
<tr>
<th>CARD NO.</th>
<th>WORK AREA(S)</th>
<th>TYPE MECH RQR.</th>
<th>MECH NO.</th>
<th>CARD TIME</th>
<th>PUBLICATION NUMBER AND DATE</th>
<th>CHANGE NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>08</td>
<td>AIRCRAFT</td>
<td></td>
<td>00:48</td>
<td>TO 1F-</td>
<td>D-29</td>
</tr>
</tbody>
</table>

#### PHASED

1. LEFT MAIN LANDING GEAR SHOCK STRUT CYLINDER FOR CRACKS (REF JG32-11-04).
3. LEFT MAIN LANDING GEAR WHEEL POSITIONING COLLAR FOR PROPER GAP AND/OR SHIM MIGRATION (REF 32FI-00-1 (32-30-ZT)).
4. CHECK LEFT MAIN LANDING GEAR DRAG PIN SHIM (REF JG32-11-14).
5. LEFT MAIN LANDING GEAR DRAG BRACE SUPPORT FITTING IN REGION OF LUGS AND HOLES FOR CRACKS (REF TO 1F- [REDACTED] (53-15-09)).
6. LEFT MAIN LANDING GEAR WHEEL WELL FOR DAMAGE; HYDRAULIC LINES, JAMNUTS, AND FITTINGS FOR LEAKS, CRACKS, SECURITY, AND DAMAGE.
7. PERFORM INITIAL SERVICING OF LEFT MAIN LANDING GEAR SHOCK STRUT (REF JG32-11-05).
ENGLISH FOR AIRCRAFT MAINTENANCE COURSE -
INSTRUCTORS’ PREREQUISITES

- Fully qualified ESP Teacher (ELE) or Aircraft Maintenance Engineer (SME)

- Outstanding knowledge of English vocabulary related to aircraft maintenance and general science and technology

- Teaching experience in the relevant ESP field

- English (SME): Common European Framework for Languages (CEFR) Level B2 or NATO STANAG 6001 Level 3 or above
STUDENT-RELATED CHALLENGES FACING COURSE DEVELOPERS AND INSTRUCTORS

- Insufficient language competence of students
- Variety of professional specialties of students
- Variety of educational backgrounds of students
- Variety of needs and, consequently, lack of clear or common goals
- Inability to distinguish a language course from a professional development course
OTHER CHALLENGES FACING COURSE DEVELOPERS AND INSTRUCTORS

F-16
C-130 Hercules
Gulfstream G550
Boeing 737 800
SH-2 Seasprite
M346 Master
OTHER CHALLENGES FACING COURSE DEVELOPERS AND INSTRUCTORS

- Variety of equipment the students work on (F-16, C-130 Hercules, Gulfstream G550, Boeing 737 800, M346 Master, CASA C-295, etc.)

- Variety of maintenance documentation management systems used by various equipment manufacturers (USAF: Technical Orders, Boeing: Maintenance Performance Toolbox, etc)

- Variety of terminology used by various equipment manufacturers (e.g. main, service, reservoir fuel tank)

- Classified status of a large part of technical documentation making it impossible to be used in the classroom
Lack of common language certification standards for AMTs:

"Holders of a Part-66 aircraft maintenance license may not exercise certification privileges unless they have a general knowledge of the language used within the maintenance environment including knowledge of common aeronautical terms in the language."

*Source: European Aviation Safety Agency (EASA), Part-66, GM 66.A.20(b)3*

"Be able to read, write, speak, and understand the English language. (Note: If the applicant does not meet this requirement and is employed outside the United States by a U.S. carrier, the certificate will be endorsed “valid only outside the United States.”)"

*Source: Title 14 of the Code of Federal Regulations (14 CFR) part 65*
TYPES OF COMMUNICATION USED BY AMTs

**Synchronous Communication:**
- communicating with English speaking instructors
- sharing information, giving and receiving instructions, planning tasks in multinational teams where English is the only common language
- communicating with foreign flight crews
- non-verbal communication (pointing at things, etc.)

**Asynchronous Communication:**
- reading technical orders/manuals, job guides, and other documentation
- making written technical entries in documents

*Drury, C. G., Ma, J. (2003)*
In the light of the above, what modules should be included in the course for AMTs?

**Mechanical parts** (e.g. gears and power transmissions, bearings, springs and shock absorption)

or

**Casting and polymer processing** (e.g. sand casting, squeeze casting, die casting, shell-mold casting, common defects, polymer processes)?
EXAMPLES OF MAIN GRAMMAR AREAS INCLUDED IN THE COURSE

- Verb forms and tenses
- Noun clusters
- Cause, effect, and purpose clauses
- Word formation, prefixes and suffixes
- Expressing movement and locations, directional references
VERB FORMS AND TENSES

- Imperatives
- Present Simple, Past Simple, Future Simple
- Gerund (e.g. A diffuser **is used for reducing** the velocity of already heated air by **increasing** its pressure)
- Present and Past Participle including their use as parts of compound adjectives (e.g. **forward-looking, engine-driven**)
- Passive Voice
- Modal Verbs (e.g. **can’t vs may not, shall (=must), is/are to, should; mandatory vs. recommended, expressing warnings**)
NOUN CLUSTERS

➢ importance of word order (qualifiers normally **before** the key word):

  bleed air -> air from engine compressor

  air bleed -> a system that provides hot air

➢ structure of noun clusters in technical manuals:

  Location/system + function/assembly + key word

  (e.g. Left wing leading edge)

➢ structure of noun clusters in part catalogues:

  Key word + function/assembly + location/system + additional information (e.g.

  bolt, connecting rod, upper special)

➢ Very long noun clusters or combinations thereof in e.g. OBD codes and error messages,

  e.g.: motor lock roof lock motor,

  air outlet damper control servo motor circuit (low/high/range/performance)
CAUSE, EFFECT, AND PURPOSE CLAUSES

- **Cause markers:**
  
  due to, because, because of, since, as, the cause, result in, bring about, etc.

- **Effect markers:**
  
  be + result of, be caused by, result from, be + produced by, be + a consequence of,
  
  the effect, thus, as a result, the result, consequently, therefore, so, hence

- **Purpose markers:**
  
  the purpose of, the objective of, the function of, in order to, in order that, so that,
  
  for + gerund, etc.
Suffixes of various speech parts, e.g.:

propel, propeller, propellant, propulsion, propulsive

Latin prefixes, e.g.

subassembly, pyro-line, photoelectricity, equidistant, centrifugal

Latin and Greek plurals, e.g.

data, phenomena, indices, axes, bacteria, fungi
EXPRESSING LOCATION AND MOVEMENT,

DIRECTIONAL REFERENCES

- **Common expressions of movement and location, e.g.:**
  
in, into, onto, forward (-s), rearward(-s), along, alongside, between, among, etc.

- **Directional references, e.g.:**
  
nose, tail, aft, starboard, port, ventral, dorsal, at 3 o’clock
READING STRATEGIES, CONTEXT

List of **Effective** Pages

In what sense can a page be **effective**?

*effective = in use/current*
"For example, water in a pail exerts pressure on the sides and bottom of the pail as shown in figure 1."

”It is generally agreed that all matter is made up of molecules. In a solid, the molecules are bound together, and their movements are restricted. This gives a solid the rigidity which causes it to resist any force tending to change its shape.”

This = The fact that the molecules are bound together, and their movements are restricted.

Frequent use of synonyms and near-synonyms in technical texts is meant to make the texts easier to understand but sometimes the opposite is true.

- According to Pascal's law, an external force applied to an enclosed liquid will be transmitted **uniformly and evenly** throughout the liquid at right angles to the walls of its container.

- Directional references: **front or forward** = cold end of the engine; **rear or aft** = hot end of the engine

Source: Manuals Combined “ARMY AIRCRAFT GAS TURBINE ENGINES: Covering The T53, T55, T62, T63 And T73 Series Gas Turbine Engines”
False friends are words in two languages that look or sound similar, but differ significantly in meaning. The term originates from a book by French linguists describing the phenomenon, which was translated in 1928 and entitled, "false friend of a translator".


- A positive-displacement pump is a pump whose output volume is identical on each work cycle. It is a constant or fixed displacement pump.

- Aspiration toxicity—may be fatal if swallowed and if enters the airways.
TYPES OF READING TECHNIQUES

- **Scanning/Checking** – reading rapidly in order to find specific facts.
- **Skimming** – reading rapidly in order to get a general overview of the material.
- **Matching** – comparing information from various parts of the instruction/table/diagram.
- **Step by step procedure reading** – reading texts in checklist and step by step instruction formats.
- **Extensive „linear” reading for holistic comprehension** – reading whole texts.

These techniques are in the same hierarchy as they are used during the course. To simulate real-life situations, texts used tend to be relatively long and time to find general or specific information is limited.
CONCLUSIONS

- When developing a technical English course, more emphasis should be placed on typical structures and general technical words encountered in technical texts rather than on system-specific terminology.

- Standardization of technical words is possible, or conceivable, only with regards to general technical words (Simplified English) not to specific terminology used by equipment manufacturers.

- Some form of AMT language certification should be introduced, independent, however, of ICAO examinations for ATCOs and pilots.
THANK YOU FOR YOUR ATTENTION

QUESTIONS?

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