UDC 802.0:331.45/.46
DOI: 10.7562/SE2013.3.03.01
Review article
www.safety.ni.ac.rs

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ENGLISH LANGUAGE IN SAFETY ENGINEERING DISCOURSE

Abstract: *In a fast-changing world of safety, health and environment, professionals, students or anyone else in the field of occupational safety are often required to use English language in their professional and/or academic careers. Apart from technical excellence, engineers need good English language skills and knowledge of ESP (English for Specific Purposes) vocabulary terms in order to make professional improvement. Occupational health and safety (OHS) is an interdisciplinary field, which uses specialist terms and expressions from subject areas as diverse as engineering, medicine, law, psychology, etc. The aim of this paper is twofold. Firstly, to discuss briefly the relevant theory of English for Specific Purposes, and the significance of technical words and subject-specific terminology to OHS engineers. Secondly, to identify and provide a reference to some health and safety glossaries and terminology resources in English language that may assist health and safety experts who need to read and write professional literature in English.*

Key words: technical words, occupational health and safety, vocabulary terms, English for Specific Purposes.

INTRODUCTION

Development of science and technology demanded a language that would connect the international scientific community and enable the people of same vocations but different language background communicate and share their ideas. Engineering is often perceived as a hands-on, technical profession but there is an increasing demand for softer skills, especially the knowledge of English language.

In the introductory chapter to Technical Writing and Professional Communication for Nonnative Speakers of English, Huckin and Leslie state: ”Scientists and engineers may be technically brilliant and creative, but unless they can convince co-workers, clients, and supervisors of their worth, their technical skills will be unnoticed, unappreciated, and unused. In a word, if technical people cannot communicate to others what they are doing and why it is important, it is they and their excellent technical skills that will be superfluous”, [6].

Today all of the world's major scientific journals are published in English, which is the evidence that English is the “lingua franca” of science and technology. This fact sets the standards for a new approach in English language teaching and learning, a technique that would concentrate on English for the purposes specific to certain groups of people. If English language in different situations can be variously distributed, then tailoring English for Specific Purposes (ESP) also seems possible and justifiable. ESP is designed to meet specific needs of the learners and target groups may include doctors, judges, managers, engineers, etc. From this perspective, there is an emergence of various forms of specific English courses which concentrate on the employment related needs - technical English, medical English, business English, engineering English, English for tourism, English for aviation, etc.

The job of a Safety Engineer, or Occupational Health and Safety Engineer (OHS engineer), involves the variety of activities: assessing, mitigating and managing a wide range of hazards with the aim to minimize the risks of hazardous malfunctions; evaluating working conditions and inspecting working environment and equipment; identifying safety hazards and checking compliance to established occupational health and safety rules and requirements; responding to employee concerns of health and safety issues; developing educational, technical, and promotional materials and conducting risk management and safety training for employees [13]. Such interdisciplinary tasks require the knowledge of the state-of-the-art in the safety, which is conditioned by a good command of English. This implies both General English which is traditionally taught at schools, and Engineering English which falls within the category of ESP.

ENGLISH FOR SAFETY ENGINEERS - ENGLISH FOR SPECIFIC PURPOSES

Every branch of science and every profession have their own language for communication, and safety engineering is certainly not an exception. Safety engineering has extensive, unique and specific terminology. The primary goal of the ESP course is to teach professional communicative competence that is the ability to communicate in English according to the situation, purpose and specific roles of the the participans in dialogue. English for Specific Purposes has its place in linguistics, applied linguistics and various occupations, which makes it an interdisciplinary subject. Strevens [11] defines the absolute characteristics of ESP. According to him, ESP consists of English language teaching which is (i) designed to meet specified needs of the learner, (ii) related in content (i.e. in its themes and topics) to particular disciplines, occupations and activities, (ii) centred on the language appropriate to those activities in syntax, lexis, discourse, semantics, etc., and analysis of this discourse, and (iv) in contrast with General English.

ESP concentrates more on the context than on grammar and structures. ESP users are usually very motivated to learn what is closely related to their subject-matter fields. Vocabulary plays a key role in ESP, and it implies the vocabulary and technical words and phrases of a specialized discourse.

Non-native English speakers who are engaged in safety engineering do not have to attend ESP courses in order to perform their career activities globally. In order to improve their knowledge of subject specific vocabulary generally used by specialists in the field, they can take advantage of the available resources of EPS vocabulary word lists. The narrow focus of this paper is the terminology of occupational health and safety, and for this reason we should bear in mind that "environmental and occupational health is not a single topic, but rather a colourful, complex, and diversified range of interrelated subjects including all of the basic sciences, engineering, computer science, government, disease, injury identification, prevention, and control" [5].

LANGUAGE FORMS IN THE SAFETY ENGINEERING DISCOURSE

Safety engineers or occupational health and safety engineers and specialists who work in international companies worldwide are often required to read the specialized texts with up-to-date information which generally cover the wide range of technical topics, which means they need to rely on their knowledge of both general and specific English. Their assistance in translating the official documents (e.g. ISO standards) to their native languages is mandatory, since they best know the specialized vocabulary and terminology in a particular area.

In order to fully understand the demands of his or her job, OHS Engineer or specialist in an international environment needs to recognize and understand various language forms in the engineering discourse. One solution to overcome the difficulty of using English is to focus on language forms commonly found in scientific texts - compound nouns, passives, conditionals, anomalous finites (i.e. modal verbs), nominalization of verbs and adjectives, technical terms, and functional structures such as causal and reasoning verbs and impersonal language.

In many instances, it can be demanding and frustrating to those who seek the information in English, but lack decent language proficiency. There are certain language forms and structures that are considered to be imperative in safety engineering discourse and they involve:

- Language to describe warnings and health and safety requirements (e.g. modal verbs, imperative statements)
- The ability to read and comprehend manuals, guides and reports
- Verbs that would explain what safety engineers do (e.g. check, measure, monitor, assess, evaluate, etc.)
- Verbs that refer to what machines and devices do (e.g. break down, design, run, etc.)
- Abbreviations and acronyms (e.g. EPA - Environmental Protection Agency, OSHA - Occupational Safety and Health Administration, SOP - Standard Operating Procedure, LEL - Lower Explosive Limit, etc.)
- Expressing consequences/ cause and effect
- Giving presentations (e.g. presentation of a design or to explain an accident or failure)
- Words which have different general and technical meanings such as sub-technical vocabulary (e.g. run, power, work), etc.

Apart from the above mentioned, it is necessary to highlight the knowledge of specialist vocabulary and terminology which will be discussed in the remaining part of this paper.

VOCABULARY - TECHNICAL AND SUB-TEHNICAL VOCABULARY

Vocabulary knowledge is the single most important area of second language competence regarding academic achievement [8] and also professional achievement. A safety engineer needs to have a fundamental knowledge of other sciences and the vocabulary in the following areas - physics, chemistry, biology, physiology, statistic, statistics, mathematics, computer science, engineering mechanics, industrial processes, business, communication and psychology [14].

As it has already been stated by the main ESP theorists [3,7,10] the vocabulary in the ESP can be divided into three compartments:

- technical,
- sub-technical (semi-technical), and
- general vocabulary.

Each field of study has a corpus of terms needed to discuss the issues it deals with. General vocabulary of frequent use in a specific area comprises the most numerous group; it is formed by words from the general lexicon which do not lose their own meaning, but appear in technical context [12]. General English vocabulary is in most cases traditionally acquired at schools and universities and it consists of the most frequent words of everyday English.

Semi-technical or sub-technical vocabulary comprises the words that have one or more "general" English meanings, or have an extended meaning in specific fields [12]. This vocabulary is polysemic, which means it has two or more meanings, its original meaning and another one belonging to the specific context. Sub-technical vocabulary appears in many disciplines and it may include the words like design, function, isolation, relation, basis, report, presuppose, simulate, assess, etc. As we can see, these are common words with a specialized sense. Sometimes, semi-technical words give notable problems to second language learners, and it is usually difficult to recognize them [9]. By improving the knowledge of general English, one could fill the gap in sub-technical English because scientific English uses the same structures as any other kind of English but with a different distribution.

Technical words or technical vocabulary are closely associated to a specific subject knowledge, field or area of study which occur in specialist domains only with specialized terms [2,9]. The authors that discuss the issue of vocabulary in ESP agree that technical vocabulary is not problematic to non-native speakers or engineers in certain area, since they are already familiar with the terminology of the specific field. On the other hand, using technical vocabulary may be a daunting task since not even a native speaker can know all the words in his or her own language, and technical words are used only by the specialists in this field [9]. Technical vocabulary possesses a unanimous definition and words are monosemic, or used only in one specific domain for which they have been created. In the field of environmental and occupational safety engineering, we can ascribe specialized words related to equipment, environmental controls, new laws, loss prevention, safety management, insurance, environmental control, environmental engineering, occupational health, medicine, nursing, law, planning, etc. Safety terms are "tools" (concepts and ideas) used by safety engineers worldwide in applying their skills to make our technological world safer.

The list of technical terms can be developed by compiling dictionaries or glossaries. Glossary, also known as vocabulary, is a dictionary of the special terms in a particular field or job, with the definitions for these terms. The rapidly expanding field of environmental science has generated many new terms and multi-term words in this field. The question is: how much English vocabulary does an OHS engineer need to use English as a second language?

OCCUPATIONAL HEALTH & SAFETY TERMINOLOGY

The constant evolution of the legislation on health and safety at work at both the national and European level has generated a variety of subject-specific vocabulary. The majority of terms originate from Health and Safety Regulations, Acts, Guides, Statutes, European legislation such as EU Directives, important legal references at the national and European level, and most notably ISO standards. Normally, they are written in native languages, linguistically or conceptually correlated in two or more languages, but they need to be recognized in English since it is a main language of EU Directives.

Keeping in mind specific group of English language users, many illustrated glossaries and glossaries of terms have been designed. One of these is *OSHA Glossary* coined by Occupational Safety & Health Administration, The United States Department of Labor [15]. It contains definitions, photos, and graphic illustrations of equipment and tools. Similarly, Koren Herman's *Illustrated Dictionary of Environmental Health & Occupational Safety* [5] first published in 1996 cover 16,000 terms and it is a very comprehensive language tool with drawn illustrations that can be used to make the term more meaningful and understandable. Another example may be *The Dictionary of Terms used in the Safety Profession* [1] published by the American Society of Safety Engineers which is a concise, informative and valuable safety asset.

Glossary of Occupational Health & Safety Terms [4] developed by the Industrial Accident Prevention Association is designed for joint health and safety committee members, health and safety representatives, and others with workplace health and safety responsibilities, and it provides easy understandable definitions of common workplace health and safety terms. Internet may be a valuable resource and tool for lexical investigation. One of the thought-provoking presentations of safety terminology may be *The Environmental and Occupational Health & Safety terminology website* (EOHS) [16]. EOHS terminology website is an experimental service of the terminological project conducted by Advanced School of Modern Languages for Interpreters and Translators (SSLMIT), University of Bologna in Forlì. The corpus of terms is a systematic collection of law texts which serve as knowledge base. Besides showing all the termbase records, the multilingual glossary enhances identification of equivalences between the four legal systems (English, Italian, German and French).

The terms presented in the Table 1 are randomly chosen from the terminology website and show the variety of grammatical structures (nouns, adjectives, noun compounds, noun phrases). Sometimes, a term can be expressed by a single word, but more often it is a group of nouns or phrases since nominal compounds tend to behave as key elements in specialized or technical discourse.

Table 1. *Environmental and Occupational Health & Safety terminology grouped by domains*

Preventive measures	Active noise reduction hearing protector, Assigned protection factor, Biological monitoring, Breathing apparatus, Breathing hood, Ear muffs, Ear plugs, Emergency escape or first-aid sign, Environmental monitoring, Exposure action value, Eye protector, Fire precautions, Fire safety sign, Full body harness, Goggles, Health surveillance, Helmet, Illuminated sign, Industrial safety helmet, Lower exposure value, Mandatory sign, Medical examinations, Medical surveillance, Occupational exposure limit, Occupational footwear, Personal fall protection system, Personal hearing protector, Personal protective equipment, Prohibition sign, Protective footwear, Radiation protection, Respiratory protective equipment, Risk assessment, Risk phrase, Safety colour, Safety footwear, Safety sign, Self-contained breathing apparatus, Self-retracting lifeline, Signboard, Suspension belt, Warning sign, Workplace protection factor
Diseases/ accidents	Asbestos-related disease, Carpal tunnel syndrome, Employer's liability insurance, Hand-arm vibration syndrome, Health detriment, Incapacity for work, Industrial Injuries Disablement Benefit Scheme, Noise-induced hearing loss, Occupational disease, Personal injury, Work-related accident
Documents/certfification certification	Accident book, Asbestos Management Plan, CE marking, EC declaration of conformity, Health and safety file, Health and safety plan, Health and safety policy statement, Health record, Monitoring record, Pre-tender health and safety plan, Safety data sheet
Protective measures	Emergency exit, Emergency lighting, Emergency route, Encapsulation, Enclosure, Evacuation of employees, Fire-fighting, Fire-fighting equipment, First aid equipment, First aid room, Glove-bag technique, Incapacity benefit, Industrial injuries disablement benefit, Statutory sick pay
Work places and equipment	Accelerator, Confined space, Construction site, Controlled area, Designated area, Display screen, General lighting, Hearing protection zone, Machinery, Power tool, Rest facilities, Safety component, Supervised area, Work environment, Work equipment, Workplace, Workstation
Risk factors	Agent, Asbestos-containing material, Biological limit value, Carcinogenic, Cell culture, Chemical agent, Chemicals, Corrosive, Daily personal noise exposure, Danger zone, Dangerous for the environment, Dangerous preparations, Dangerous substances, Dust, Electric field, Electromagnetic field, Electromagnetic power density, Explosive atmosphere, Extremely flammable, Hand-arm vibration, Harmful, Hazard, Hazardous situation, Impulsive Noise, Inhalable dust, Intermediate frequency field, Ionizing radiation, Irritant, Major accident, Manual handling of loads, Mechanical vibration, Mist, Mutagen, Noise, Occupational exposure, Oxidizing, Passive smoking, Peak sound pressure, Physical agent, Pollutant, Public exposure, Radioactive contamination, Radiofrequency field, Radionuclide, Respirable dust, Risk, Sealed source, Sensitizing, Threshold limit value, Transmission line, Weekly personal noise exposure, Whole-body vibration, Work at height, Workplace bullying

According to EOHS database, English language terms are very readable, grouped into fields, or domains which represents the main are of interest within health and safety at work. The domains include:

- Diseases/accidents
- Documents/certification
- Preventive measures
- Professional figures and company committees
- Protective measures
- Risk factors
- Work organization

The vocabulary list comprises of up-to-date English terms which are accepted and recognized internationally and taken from standards and regulations.

As it can be noted from the list, some of occupational health and safety terms are general English words and sub-technical terms, and they occur in everyday speech, but in health and safety discourse they have different meaning.

In EOHS term website, terms are not only identified and compiled into term records; they are defined by providing the legal source of definition and cross-referenced so that the user can simply read the text to fully understand the meaning. The advantage of glossaries of this kind is that the users learn a new word in context as they learn complete phrases. From language learning theory, this is a good step towards developing fluency in English. Acquiring single new words and huge vocabulary without being able to put words together in a coherent sentence is commonly discouraged or disregarded [9].

The corpus of terms may be further expanded and revised, and newly defined terms could be added. It is just one of the examples of how to make profession-related terminology appealing to HS specialists who are not attending courses of English for Specific Purpose.

CONCLUSION

English language is used in the vast majority of international organizations and scientific publications in engineering field; therefore, most engineers whose native language is not English would experience difficulties in applying professional terminology if they lack a sound knowledge of specific terminology.

If they want to pursue their long-term competitive careers, they need to familiarize themselves with engineering contents in English language as well. Learning a specific genre of English with specific goals, such as English for Specific Purposes (ESP) where English is meant for vocational and occupational purposes, can be just one of the formal language acquisition techniques. The alternative, not so formal, but very practical tool for autonomous learning is reading technical literature in a foreign language. To safety experts who are non-native users of English, glossaries should be indispensable resource for acquiring vocabulary terms related to their professions. Luckily, there is plenty of literature available on the internet to suit their needs.

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BIOGRAPHY

Aleksandra Petković was born in Niš, Serbia, in 1981. She graduated from the Faculty of Philosophy, English Language Department in 2005, and received MA in English Language from the Faculty of Philology, University of Belgrade. Her research interests include English for Specific Purpose, applied linguistics, English in environmental sciences, etc. She is currently working as a research and development associate at the Faculty of Occupational Safety in Nis, University of Nis.

ENGLESKI JEZIK U OBLASTI BEZBEDNOSTI I ZDRAVLJA NA RADU

Aleksandra Petković

Apstrakt: *Svet bezbednosti, zdravlja i životne sredine se veoma brzo menja, te su stručnjaci, studenti i svi ostali iz oblasti zaštite na radu veoma često u obavezi da koriste engleski jezik u toku rada i/ili učenja. Osim tehničke izvrsnosti, inženjerima je potrebno dobro poznavanje engleskog jezika ali posebno poznavanje stručne terminologije i engleskog za posebne namene (engleski kao jezik struke) za stručno usavršavanje. Bezbednost i zdravlje na radu (BZNR) je interdisciplinarna oblast u kojoj se upotrebljavaju specijalistički termini i izrazi iz različitih oblasti, kao što su inženjerstvo, medicina, pravo, fizika, psihologija, itd.*

Cilj ovog rada je dvostruk. Prvi cilj je da u kratkim crtama predstavi relevantnu teoriju engleskog kao jezika struke i značaj stručnog vokabulara i terminologije specifične za inženjere iz oblasti BZNR. Drugi cilj rada je da pruži preporuku i posluži kao izvor referenci pojedinih rečnika i terminoloških glosara iz oblasti bezbednosti i zdravlja na engleskom jeziku koji mogu biti korisni stručnjacima od kojih se zahteva da čitaju i pišu na engleskom jeziku.

Ključne reči: stručna terminologija, bezbednost i zdravlje na radu, vokabular, engleski za posebne namene.