## ON SOME PROBLEMS OF TEACHING SCIENTIFIC-TECHNICAL TRANSLATION AT ARTSAKH STATE UNIVERSITY

#### **ABSTRACT**

The article highlights the problems of scientific-technical translation in general, as well as its teaching at ASU at the present stage. Relevance of the issue under study is due to the necessity of providing students with necessary translation skills. The authors take into consideration the main techniques of translating scientific-technical texts which have an effect on translation process and the choice of translation strategy.

Moreover, the translation of scientific-technical texts is an important element of professionally-oriented teaching. Scientific-technical translation is regarded as a separate kind of activity of a translator as well as an independent practical discipline.

**Key words:** scientific-technical translation, language, linguistics, text, foreign language teaching, lexical and grammatical peculiarities, translation skills, professional activity, translator, terminology.

# РЕЗЮМЕ О НЕКОТОРЫХ ПРОБЛЕМАХ ОБУЧЕНИЯ НАУЧНОТЕХНИЧЕСКОМУ ПЕРЕВОДУ В АрГУ

В данной статье рассматриваются особенности перевода научно-технической литературы на современном этапе в целом и преподавание дисциплины «перевод» в АрГУ. Актуальность статьи заключается в необходимости повысить качество перевода научных и технических текстов среди студентов. Авторы данного исследования рассматривают особенности перевода технических текстов, оказывающих влияние на процесс перевода и выбор переводческой стратегии.

Помимо этого, научно-технический перевод по специальности является важной составляющей профессионально-ориентированного обучения. Науч-

но-технический перевод выделяется в качестве отдельного вида деятельности переводчика и как самостоятельная практическая дисциплина.

**Ключевые слова:** научно-технический перевод, язык, лингвистика, текст, преподавание иностранного языка, лексические и грамматические особенности, навыки перевода, профессиональная деятельность, переводчик, терминология.

### ԱՄՓՈՓՈՒՄ ԳԻՏԱՏԵԽՆԻԿԱԿԱՆ ՏԵՔՍՏԵՐԻ ԹԱՐԳՄԱՆՈՒԹՅԱՆ ՈՒՍՈՒՑՄԱՆ ՈՐՈՇ ԽՆԴԻՐՆԵՐԸ ԱրՊՀ-ՈՒՄ

Սույն հոդվածում ամբողջական տեսքով ուսումնասիրվում են արդի փուլում գիտատեխնիկական գրականության թարգմանության առանձնահատկությունները և նրանց դասավանդումը ԱրՊ<-ում։ <ոդվածի արդիականություն պայմանավորված է ուսանողների մոտ գիտական և տեխնիկական տեքստերի թարգմանության որակը բարձրացնելու անհրաժեշտությամբ։ <եղինակների կողմից ուսումնասիրվում են տեխնիկական տեքստերի թարգմանության այն առանձնահատկությունները, որոնք թարգմանական գործընթացի և թարգմանական ռազմավարության ընտրության վրա ունեն մեծ ազդեցություն։

Գիտատեխնիկական թարգմանությունը կարևորվում է արհեստավարժ ուսուցման առումով։ Գիտատեխնիկական թարգմանությունն առանձնացվում է որպես թարգմանչի գործունեության առանձին տեսակ, ինչպես նաև որպես ինքնուրույն գործնական առարկա։

**Բանալի բառեր՝** գիտական-տեխնիկական թարգմանություն, լեզու, լեզվաբանություն, տեքստ, օտար լեզվի դասավանդում, բառային և քերականական առանձնահատկություններ, թարգմանչական հմտություններ, մասնագիտական գործունեություն, թարգմանիչ, տերմինաբանություն:

At the present stage of studies there is a great necessity to emphasize scientific-technical translation not only as a special kind of translation activity and special theory that investigates this kind of activity but to assign scientific-technical translation a status of independent applied science.

The development of scientific and technical progress along with the complexity of the flow of technical information has caused increase in

requirements for professional technical and scientific translation, thus denoting the need to find new approaches for its study. Currently, despite the fact, that there are plenty of studies in the field of translation teaching both to linguists and non-linguists, the question of development of methodology of teaching translation is not well developed and requires close attention and study (Tarasova, 2015: 11-17; Noora, 2008: 33-44; Setati, Molefe, Langa, 2008: 14-25). In conditions of technical specializations it is necessary to provide students with sufficiently low language level with a minimal baggage of translation skills that they could successfully apply in their professional activities (Baranova, Valeev, 2013: 436-437).

Technical translation is the medium through which language, discourse and communication can exist in a global world (Hermans, Lambert, 1998: 113–132).

The aim of technical translation teaching is to acquire comprehensive abilities in a foreign language and the mother tongue/first language (including listening, speaking, reading and writing) and even a comprehensive understanding based on the authentic technical texts. It equips students not only with practical bilingual ability, but also encourages the attitudes that will allow them to do the best possible translation work after graduation.

Our research has the following objectives:

- to clarify the basic principles, the purpose and to describe the content of technical text translation teaching to both linguists and non-linguists;
- to develop a set of exercises designed to develop translation skills as a part of the language competence of students.

Practical experience shows that one of the factors ensuring successful and efficient professional activity of the modern student is the ability to be confident in working with information - i.e., receive, process and transmit professionally valuable information, which is the main source of authentic texts in a foreign language. There are many reasons which justify the necessity of authentic texts translation, but in our opinion the most crucial ones are the following:

- rapidly developing telecommunication technologies;
- the importance of scientific knowledge exchange;
- the importance of mutual understanding and collaboration;
- the search of the ways and means to solve global problems of professional communication.

Special attention should be drawn to teaching translation under the circumstances of limited contact hours at ASU, as the translation is one of the

most important elements of performance monitoring at different stages of mastering a foreign language. In the course of training a future expert it is necessary to provide with all the professional and personal qualities, the leading of which is cognitive independence. Linguists note that the importance of the ability to organize independent activities is most clearly defined in the process of spoken and written foreign language communication that requires constant analysis of linguistic facts. (Tarasova, 2015; Lashkevich, Grozdova, 2016).

In foreign language learning process, in particular in the course of technical translation, the student is immersed in the active responding process. The student is constantly challenged with differentiation actions: find appropriate equivalents, find synonyms and antonyms, translate from one language to another. In this case, the value of a foreign language as a subject increases considerably as alongside with the formation of the translation skills students learn scientific or technical style of presenting in Armenian as well. They master the style, terminology, certain clichés not only in the foreign, but also in the native language. All these factors help to train a specialist who can correctly and logically express his or her thoughts both in Armenian and English.

Lexical-morphological translation skills are especially important for students. Lexical-morphological translation skill can be defined as readiness of a student to convert the content of certain lexical units of a Source Language into the Target Language by means of the corresponding language means. This aspect of translation is associated primarily with the development of skills to use the dictionary as the main source of reference in translation, language development guesswork and intuition, the ability to determine the context, and then transfer the content of unfamiliar lexical units in the Target language.

Technical translation is primarily a tool used for the exchange of scientific and technical information between individuals who speak different languages. There are different ways of technical text processing, each of them having its own characteristics and its own rules. When teaching technical translation it should be noted that the purpose of mastering the art of translation is not the transformation of the student into the professional translator but the formation of certain skills necessary for immediate understanding of a foreign text, the ability to interpret the text without translation into their native language with minimal reference to the dictionary.

Translation of scientific and technical documentation is an essential part of the scientific information activities that contributes to overcoming the language barrier. In the translation process the person has the maximum possible understanding of the meaning of the text.

In contrast to the fiction translation, technical translation does not allow any inaccuracies or deviation from the original source. In technical translation, each word and definition is translated precisely, eliminating ambiguity of understanding. Technical translation is saturated with various highly-specialized terms. Grammar of technical translations is characterized by the use of specific and firmly established grammar rules, *e.g., indefinite-personal and impersonal constructions, passive voice, and non-finite forms of the verb* (Gorbunova, Sbotova, 2015). Logical highlights are presented by means of inversion. Whatever the complexity of the information in a document to be translated is: description of technological processes, calculations of any parameters, principles of operation of equipment and its operating procedures, etc., the translator is required to understand the meaning of the text, and then skillfully and accurately convey it to the target language. Thus, technical translation is a special kind of translation, the quality of which depends primarily on the personality of a translator.

The peculiarity of technical translation of scientific text is an excessive amount of specialized terms, service and introductory words, frequent use of abbreviations, lexical neologisms, and realias. A significant role in the scientific and technical papers is played by prepositions and complex conjunctions (e.g., in order that, provided that, as though, on, upon, before, beside, instead of, in preference of, from, except for, in addition, together with, owing to, due to, thanks to, by means of, in connection with, for the purpose of, in order to, and others), which create logical connections between the individual elements of sentences. In addition, the scientific and technical papers frequently use adverbs, which are integral parts of the development of logical thinking. Under the realias of scientific and technical papers we understand the titles, the brands of equipment and materials.

Specialized terms are to be translated using special dictionaries and glossaries. The realias, as a rule, are not translated but transliterated or given in the text in their original writing (e.g., the Russian ruble, franc, matryoshka, toreador, vodka, etc.). Optimal translation solution for the phraseology is a search for identical phraseological items in the target language. In the absence of direct correspondence, the original idiom can be translated by searching for similar phraseology items, having a similar meaning with the original one, but

built on a different verbal and image basis. It should be remembered that idioms, often having similar meaning but different form in various languages, are emotionally and associatively colored, and not always interchangeable. The translation process always takes place strictly within the logical thinking, i.e., those who are capable of thinking logically are likely to make the proper translation. Experts in logic say that to understand an unfamiliar term, we need to analyze the context. In the course of this analysis, we set different semantic connections and relationships between the unknown term and other words, the meaning of which is well known. Such cases are very common in the translation from the foreign language into the native language (Kartashova, 2011).

Stylistic peculiarities of the translation of scientific and technical papers are language clarity, lack of expressive, emotional and imaginative patterns. The texts of technical manuals and specifications often contain sentences without a predicate or a subject, as well as sentences, consisting of recitations only. The accuracy of the scientific and technical translation is determined by how well the translator commands the source language and the subject of discussion. The clarity of the text can be defined as its semantic unambiguity. Matukhin and Gorkaltseva identify three main categories of stylistic defects that deny the uniqueness of the text (Matukhin, Gorkaltseva, 2015):

- sentence amorphousness;
- logical stress shift in the sentence;
- "parasitic" relationships between words.

The authors suggest that semantic unambiguity of the text can be achieved by overcoming such defects of style as the excessive use of possessive case, the repetition of the same single-root words in a sentence, agglomeration of long words, pseudo-scientific patterns, bureaucratic style, etc. It is necessary to avoid literal translation which always leads to the distortion of an original meaning, or violation of the rules of the native language. The literal translation is based either on formal resemblance of the English word with the Armenian one, or the use of the main or most common meaning of the English word without considering the context as a whole, *e.g.*,

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plant – a herb not a station,
machinist – an engine driver not an operator,
package – wrapping not software, etc.
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Knowledge of the typical translation errors and their causes contribute to their prevention. Translation errors are divided into two main types: speech, and functional and informative. Speech errors, in turn, are subdivided into system-speech and normative speech errors. They feature a violation of the norms of language and speech standards (usage). Functional and informative errors are functionally unreasonable deviation from the original text, adversely affecting the transfer of its meaning. In terms of its negative impact on the quality of the original source translated, they are divided into the "distortions" and "inaccuracies". The distortions are errors in the translation, misleading the translation recipient about the content of a source text. Inaccuracy features lesser degree of equivalence violations, and less misleading impact, *e.g.*,

provide a means – give a chance not ensure a measure, to process – for the procedure not to produce, silicon – graphite not carbonium, etc.

From the linguistic viewpoint peculiarities of scientific-technical extend to its stylistics, grammar and lexis. The main task of scientific-technical translation is a possibly clear and precise bringing of the information to the reader. This can be achieved by logical interpretation of actual material without explicit emotionality. The style of scientific-technical materials can be identified as formally logical.

Scientific-technical texts reveal a great number of grammar peculiarities. The most typical lexical feature of scientific-technical materials is terms and terminology saturation as well as presence of lexical structures and acronyms. A special place in such materials are the texts oriented not only for this group language speakers but for representatives of a certain professional group with certain extra linguistic knowledge.

Grammatical peculiarities of the translation of scientific and technical papers are characterized by frequent use of participial and verbal adverb phrases, simple, expended and complex sentences, passive voice, infinitive, participial and gerund phrases. In the course of translation, it is required to use grammatical transformations. Functional correspondence is achieved by a complete change of structures, word order and by replacing parts of speech and sentence, adding and omitting words. The ability to adequately translate foreign text is one of the goals of training, even though it is not aimed at training a highly-qualified translator. The essence of adequate translation is not the transfer of letters but the spirit of the text. Each language has its own unique means, characteristics and properties, so to faithfully convey an image or phrase, sometimes a translator shall completely change them (Obskov, Pozdeeva, Matukhin, Nizkodubov, 2015).

The translation process features a number of special methods aimed at creating adequate translation. Experts distinguish two translation methods: direct and indirect translation. The methods of direct translation are borrowing, calquing and literal translation. The methods of indirect translation are transposition, modulation, equivalence and adaptation. Indeed, the message in the original language may properly be translated in the target language, since it is based on the parallel categories, either the parallel concepts. Although, sometimes due to structural or metalinguistic distinctions, some stylistic effects can't be transferred to the target language, without changing in varying degrees, the order of the elements or even lexical items. (Kobenko, Tarasova, 2015; Kobenko, Ptashkin, 2014; Kobenko, Zyablova, Gorbachevskaya, 2015).

Borrowing is the simplest method of translation. Borrowed approximately from 50 languages, lexical items account for almost 75% of the vocabulary of the English language and include layers of vocabulary borrowed from various historical periods and under the influence of different conditions of existence and development. Many borrowings under the influence of the system, into which they have entered, undergo significant phonetic, grammatical, and even semantic changes, adapting to the phonetic, grammatical and semantic laws of the system. The process of assimilation can be so deep that the foreign origin of such words is not obvious for native English speakers and is exposed only with the help of etymological analysis. This is most true for the Scandinavian and Latin borrowings, e.g., engineer, figure, get, skill, etc. It should be noted that the borrowings are often introduced to language through translation, among them are semantic borrowings, or "false friends", which should be avoided. For example:

fixed – repaired not mounted, current – electricity not present/existing, realize – work out not understand, accurate – tidy not precise, conductor – a cable not a fare taker, mark – a stamp not a label, or a sign, etc.

Calquing is a special kind of borrowing: we borrow from a foreign language a syntagm and literally translate the elements that compose it. For example: the word 'superpower' is translated, using the method of calquing as a 'power house', other examples are as follows point of view, high voltage, air conditioned, etc.

Literal translation is to transfer the structure of the sentence without changing the construction and without substantial changing the word order. If the Armenian sentence has a structure similar to the English one and it can be used without violating the grammar rules and reasoning, the literal translation is acceptable. For example:

bolt of lightning – lightning strike not lightning flash, main – primary not manifold, line – a string not pipe, etc.

Modulation is a variation of the message, using a phrase with the different meaning in the original language and the target language for the transfer of the same idea. This method can be resorted when it is clear that literal translation or even transposition results in a grammatically correct statement, which is not contrary to the spirit of the target language. Inadequate translation can be avoided through modulation. For instance:

"....which provide the extensive foundation for assuring reactor safety." – «....որոնք ռեակտորի անվտանգության պահպանման համար լայնածավալ հիմք են ապահովում»:

In addition to modulation, concretization method is widely used in translation, i.e., the translator uses a narrow meaning, belonging to a word, but does not provide a new, as in modulation. For example:

"...according to the operable codes." – «...pum appon optiuapptph»: The word 'codes' stand for «կողեր», but it has got another meaning such as «Ժողովածու», for example, «օրենքների կող».

Equivalence often occurs that two texts describe the same situation trough very different stylistic and structural means. Most of equivalences are stable and are part of the idiomatic phraseology, including clichés, sayings, adjectival or substantive fixed patterns and so on, e.g.,

dog bolt – կափարիչի պտուտակ, cast iron – չուգուն, pin – միացում, համակցում, liquid rockets – հեզուկ հրթիոներ, etc.

Quite often is used a translation method called grammatical replacement, which can be seen at the level of word forms or the whole sentences, *e.g.*,

"...that would clearly set the preferable attributes for safety control of a scientific reactor."—«...npp humul umhuminul t humiphunphih punqu-

#### դրիչներ գիտական ռեակտորի անվտանգության հսկողության համար». A verb 'would set' is translated as a participial phrase «սահմանում է»:

Compensation is used when some semantic elements and stylistic peculiarities can't be transferred reliably. The translator shall remember that the translation is not just the transfer of words from one language to another, it's also transfer of cultures. For example:

#### clunker – հալից ընկած, etc.

Adaptation. When the situation in the original language does not exist in the target language, it shall be transferred through a different situation, which we consider an equivalent, e.g.,

"Nature asked both candidates" – «Nature ամսագիրը հարցեր տվեց երկու թեկնածուներին»,

# "Department of Energy people" – «ԱՄՆ-ի էներգետիկայի դեպարտամենտի ներկայացուցիչները»:

It's worth mentioning that students often confuse conversational and scientific styles. More precisely, they do not even think that they need to follow the rules of any style, in this case the scientific one. Thus, there are stylistic errors. In addition, differences of the scientific styles of Armenian and English create even greater challenges even for professional translators.

In the process of technical translation teaching, we are guided by the following criteria for the selection of the material:

- rational selection of texts that best reflect the style of scientific and technical documentation;
- texts should not be overloaded with unfamiliar terminology;
- texts should not be large in size (no more than two printed pages);
- texts should not be adapted.

Translation skills are being formed gradually while students do the exercises, consisting of both exercises training translation skills (pre-translation exercises), and tasks where students translate texts of a certain volume and within a required period of time. The set of exercises is also characterized by a gradual growth of the complexity level.

Pre-translation exercises are designed to create the conditions for successful implementation of the translation process, check the students' language and background knowledge, to show them the solution of typical translation problems.

Pre-translation exercises can be divided into exercises forming general learning skills and those responsible for language skills. A typical example of a pre-translation exercise, forming the language skills, is a paraphrase exercise followed by translation.

Describing the types of exercises included in the course of technical translation teaching, we used the following pre-translation exercises:

- lexical exercises comprising field-specific terms, names, etc.; search for equivalents of the active vocabulary according to the studied topics;
- grammatical exercises designed to detect specified grammatical phenomena;
- lexical and grammatical exercises may include exercises to identify discrepancies in the source and target languages, search for equivalents both in English and in Armenian.

Also, a student is required to find the specified grammatical phenomenon in the text and analyze the method of translation.

Depending on the type and stage of the training, exercises can be performed either in class without preparation or done as homework and then checked in class

Pre-translation exercises include the tasks aimed at searching for the equivalents, explanation of clichés that may be unknown to the students. The result of the exercise will be that the difficulties of translation (lexical and grammatical, as the purely grammatical phenomena can not be shown without vocabulary) will be removed as students will be using translation transformations. Speaking about translation transformations, we consider the following: reordering, expansion, omission and loan translation. Thus, the exercises include assignments designed to help students to understand the typical phrases and certain syntagmatic units that are "building" material of English scientific writing. It should be mentioned that the lexical and grammatical exercises determine the basis for the subsequent text material. These exercises are aimed at mastering features of scientific and technical text on the grammatical and lexical levels. Students will learn how to make up meaningful phrase which is correct from the lexical and grammatical aspects when translating words, expressions and sentences into the target language. Key terms are given in the form of exercises, which excludes the overlearning.

To the second group of pre-translation cycle we include exercises on translation text analysis in English:

- read the text about new area of scientific and technical knowledge;
- define a genre of this text, together with the lecturer specify its main features;
- try to determine its semantic contents by the heading of the text;
- analyze the structure of the text (highlight introduction, main part, conclusion);
- make a plan of the text, paying attention to the basic information;
- choose your options for the title of the article;
- find in the text words connected to the culture of the country, proper names. Find their interpretation;
- discuss who the text might be addressed to (specification of characteristics of the addressee);
- define a way of statement (description, reasoning, narration and polemics);
- define the main and secondary information.

Operational (translation) cycle. Exercises of this cycle are divided into 2 groups.

Group 1: exercises on teaching translation of non-equivalent vocabulary: terminology, proper names and realia.

Group 2: exercises on removal of grammatical difficulties in translation.

Group 1 includes the following tasks: a) translation of non-equivalent vocabulary in various ways (transliteration, loan translation (calque), selection of adequate replacement, descriptive translation, notes-comments of a translator). Group 2 of the operational cycle includes such tasks as: a) translation of constructions from the translated text with the most frequent grammatical difficulties of scientific and technical functional style (passive voice, impersonal sentences, past participle, etc.); b) translation of the specified paragraphs, containing various grammatical difficulties.

As experience at non-linguistic faculty shows, matching parallel texts is an effective tool for development of learners' corrective translation skills at the third stage of teaching (editing). We offer the following types of tasks.

- Compare two or three variants of translation, which one, do you think, is more suitable, why?
- In the wrong translation find standard mistakes in the use of the Armenian language, correct them.

- Compare your translation with the translation by a professional translator, analyze the differences.
- Compare your translation with the translations by your groupmates, choose the best one, and give your reasons.
- Find mistakes in the translation by your neighbor, classify them.

Doing the exercises of all the cycles mentioned above is vital for activating the future professional translators' brain working to make their speech exact and concrete, all this being very important for acquisition of translation skills by students of technical specialties (Makayev, Yakhin, Makayeva, 2017: 4795-4799).

Students of technical specialties with weak language preparation should be provided with minimal baggage of translation skills during a short period of time, which they could successfully apply in their professional activity.

Thus, translation of technical texts is the field of professional translation activity. The professional translation shall be performed by highly qualified personnel, commanding a foreign language, professional knowledge, being able to adequately and competently express their thoughts in the target language.

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Ներկայացվել է խմբագրություն՝ 04.12.18, տրվել է գրախոսության՝ 09.12.18-16.12.19, երաշխավորվել է ԵՊՀ եվրոպական լեզուների և հաղորդակցության ֆակուլտետի անգլերենի թիվ 1 ամբիոնի կողմից, ընդունվել է տպագրության՝ 03.05.19